IEP-SAC JOURNAL

2008 - 09

BUILD BETTER WORLD

IE

PAKISTAN

1948

Institution of Engineers Pakistan

Saudi Arabian Centre

AL-QAHTANI
PIPE COATING TERMINAL
Tariq A.H. Al-Qahtani & Bros.

مصنع القحطاني
لتغليف الأنابيب
طارق عبد الهادي القحطاني وإخوانه

Services offered :

- External Fusion Bonded Epoxy Coating.
- External 3 Layer Extruded Polyethylene Coating.
- External Sintered Polyethylene Coating
- External Coating & Wrapping.
- External Concrete Weight Coating *(Impingement & Compression Coat)*
- Internal Fusion Bonded Epoxy Coating.
- Internal Baked-on Phenolics Epoxy Coating.
- Internal & External Conventional Liquid Coating.
- Custom Coating of piping spools with Fusion Bonded Epoxy or Liquid Epoxy Coating Systems.
- Shop Girth Weld Coating.
- Internal & External Field Fusion Bonded Epoxy Girth Weld Coating.
- Double Jointing *(Welding two 40 LF pipe sections into one 80 LF section.)*
- Fabrication *(cutting, rebevelling and welding)*
- Repair of pipes
- Positive Seal Coupling System *(procurement, coating & shop/field installation)*
- Pipeline Rehabilitation

النشـــاط:

- التغليف الخارجي بالأيبوكسي بطريقة الصهرالمباشر.
- التغليف الخارجي بالأيبوكسي والبولي إيثلين بنظام الثلاث طبقات .
- التغليف بالبولي إيثلين بطريقة الصهر المباشر.
- التغليف الخارجي بقطران الفحم الحجري واللف.
- التغليف الخارجي الثقيل بالخرسانة.
- التغليف الداخلي بالأيبوكسي بطريقة الصهر الصناعي.
- التغليف الداخلي بالفينوليك المعالج حرارياً.
- التغليف خارجياً وداخلياً بطريق السوائل.
- تغليف الوصلات بطريقة الصهر المباشر للأيبوكسي أو بالسوائل.
- التغليف لأماكن اللحام في الورش.
- التغليف خارجياً وداخلياً لأماكن اللحام في مواقع الأنابيب.
- التلحيم الثنائي للأنابيب (تلحيم مقطعين انبوبيين ٤٠ قدم في مقطع أنبوبي واحد ٨٠ قدم).
- جميع أعمال تفصيل الأنابيب (قطع وتسوية الحواف والتلحيم)
- جميع إصلاحات الأنابيب.
- وصل الأنابيب عن طريق الانزلاق المحكم (تجهيز وتغليف بالورشة/ الموقع).
- إصلاح وإعادة تأهيل وتغليف الأنابيب في الورشة وفي الموقع.

Kingdom of Saudi Arabia :
P.O. Box 20 Dammam 31411
Tel: 8574150 / 8575152 / 8575400 Fax: 8269894
Tlx: 801017 QATANI SJ
E-mail:info@al-qahtanipipecoating.com

United States of America :
Saudi Arabian Overseas Services, Inc.
5718 Westheimer, Suite No. 1710, Houston, Texas 77057
TWX 6868163 SAOSI HOU, Tel: 713 7810366
E-mail:saosi@mail.swbell.net

المملكة العربية السعودية:
ص.ب ٢٠ الدمام ٣١٤١١
هاتف: ٨٥٧٤١٥٠/٨٥٧٥١٥٢/٨٥٧٥٤٠٠
فاكس: ٨٢٦٩٨٩٤ تلكس: ٨٠١٠١٧ قطاني إس جي
بريد الكتروني : info@al-qahtanipipecoating.com

مكتب الولايات المتحدة الأمريكية- هيوستن- تكساس

TÜV CERT EN ISO 9002

TÜV CERT
ISO 9001 & 2000

RIYADH CABLES GROUP

BASEC Certificate No: CS1.154

UKAS QUALITY MANAGEMENT 004

RIYADH CABLES GROUP OF COMPANIES

P.O. BOX : 26862 RIYADH 11496 K.S.A. TEL :+966 -1- 2651415 FAX : + 966-1-2651423
E-mail:rcgc@riyadh-cables.com

www.riyadh-cables.com

aquarius

AQUARIUS (SAUDI ARABIA) LTD. CAPITAL 1,400,000
REVERSE OSMOSIS-SWIMMING POOLS-SEWAGE TREATMENT

P.O.BOX 9150 - RIYADH 11413 - SAUDI ARABIA
TEL: 4784020 (8 LINES) - RIYADH - FAX : 4785237
E-mail: aquarius@zajil.net - C.R. 19821 RIYADH

P.O.BOX 8093 - JEDDAH 21482 - SAUDI ARABIA
TEL: 6602650/1 - FAX : 6611929 - JEDDAH
E-mail: aquariusjeda@zajil.net -C.R.40405 JEDDAH

Arabian Waterproofing Industries Co.

(A Saudi Joint Stock Co.)

34 Years

The Original AWAZEL Company
Established at 1974 .

P.O.Box2955 , Riyadh 11461
Tel: 4782876 Fax : 4781078
WWW . awazel . Com

CENTRAL AIRCONDITIONERS

الوكيل المعتمد الوحيد للمكيفات في المملكة

شركة ح.ع. إبراهيم شاكر المحدودة

جـــــدة ، تليفون ٦٤٤٥٢٠٨ (٠٢) فاكس ، ٦٤٣١٨٩٦ (٠٢) مكة المكرمة ، جوال ، ٤٦٠٦١٧٣ (٠٥٠) فاكس ، ٥٣١٨٢٢٣ (٠٢)

الـريـــاض ، تليفون ، ٤١٩٧٣٥٠ (٠١) فاكس ، ٤١٩٧٣٥١ (٠١) المدينة المنورة ، جوال ، ٤٦٦٥٢٧٦ (٠٥٠) فاكس ، ٨٤٥٩٢٢٤ (٠٤)

الخـبـــر ، تليفون ، ٨١٤٠٠٧٢ (٠٣) فاكس ، ٨١٤٠٠٧٣ (٠٣) الإحـســاء ، جوال ، ٥٨٧٩٥٠٤ (٠٥٠) فاكس ، ٥٣١٠٠٤٩ (٠٣)

بـريـــدة ، تليفون ، ٣٨٣١٧٠١ (٠٦) فاكس ، ٣٨١٠٩٧٠ (٠٦) خميس مشيط ، جوال ، ٤٦٠٩٠٧٢ (٠٥٠) فاكس ، ٢٣٥٤٦٢٣ (٠٧)

جـيـــزان ، تليفون ، ٣١٧٥٧٤٤ (٠٧) فاكس ، ٣١٧٥٥٤٧ (٠٧) تـبـــوك ، جوال ، ٦٦٧٣٣٨٩ (٠٥٠) فاكس ، ٤٢١٩٢٠٨ (٠٤)

موقع الانترنت : www.shaker.com.sa

http://www.iep-sa.org

IEP-SAC JOURNAL 2008-2009

Editors

Engr. Khalil Ahmed
Engr. Dr. Nazar Hussain Malik
Engr. Obaidullah Siddiqi

Publishing Committee

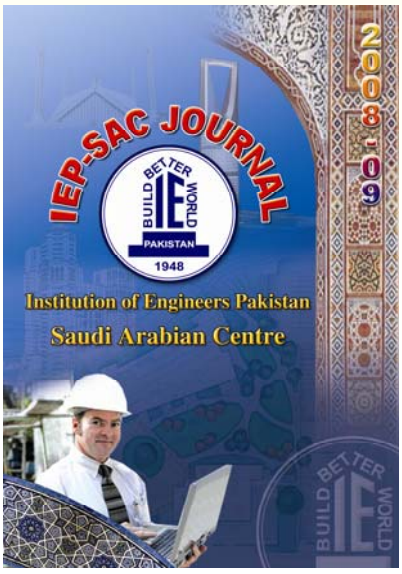
Engr. Khalil Ahmed
Engr. Naveed Ahmed
Engr. Obaidullah Siddiqi
Engr. Shaikh Asrar Ahmed
Engr. Syed Faiz Ahmed
Engr. Syed Salman Shafiq

Design

Mr. Zia-ul-Hassan (Cover)
Engr. Khalil Ahmed (Layout)

Published By

IEP-SAC, P. O. Box 50344
Riyadh 11523, Saudi Arabia
Website: http://www.iepsac.org
Email: info@iepsac.org



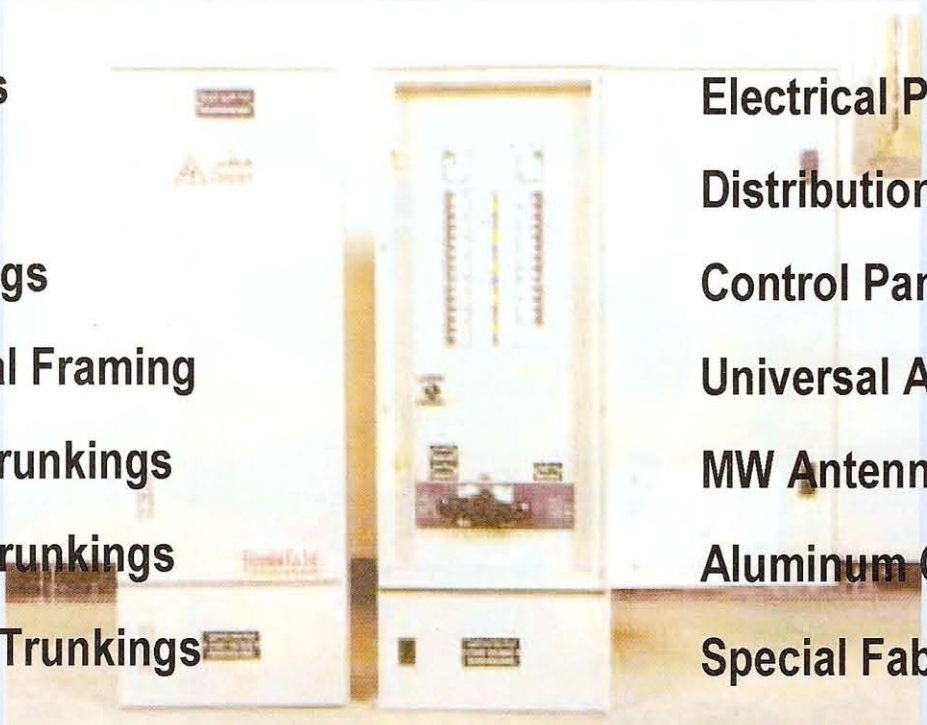
CONTENTS

Electrolink Co. Ltd.

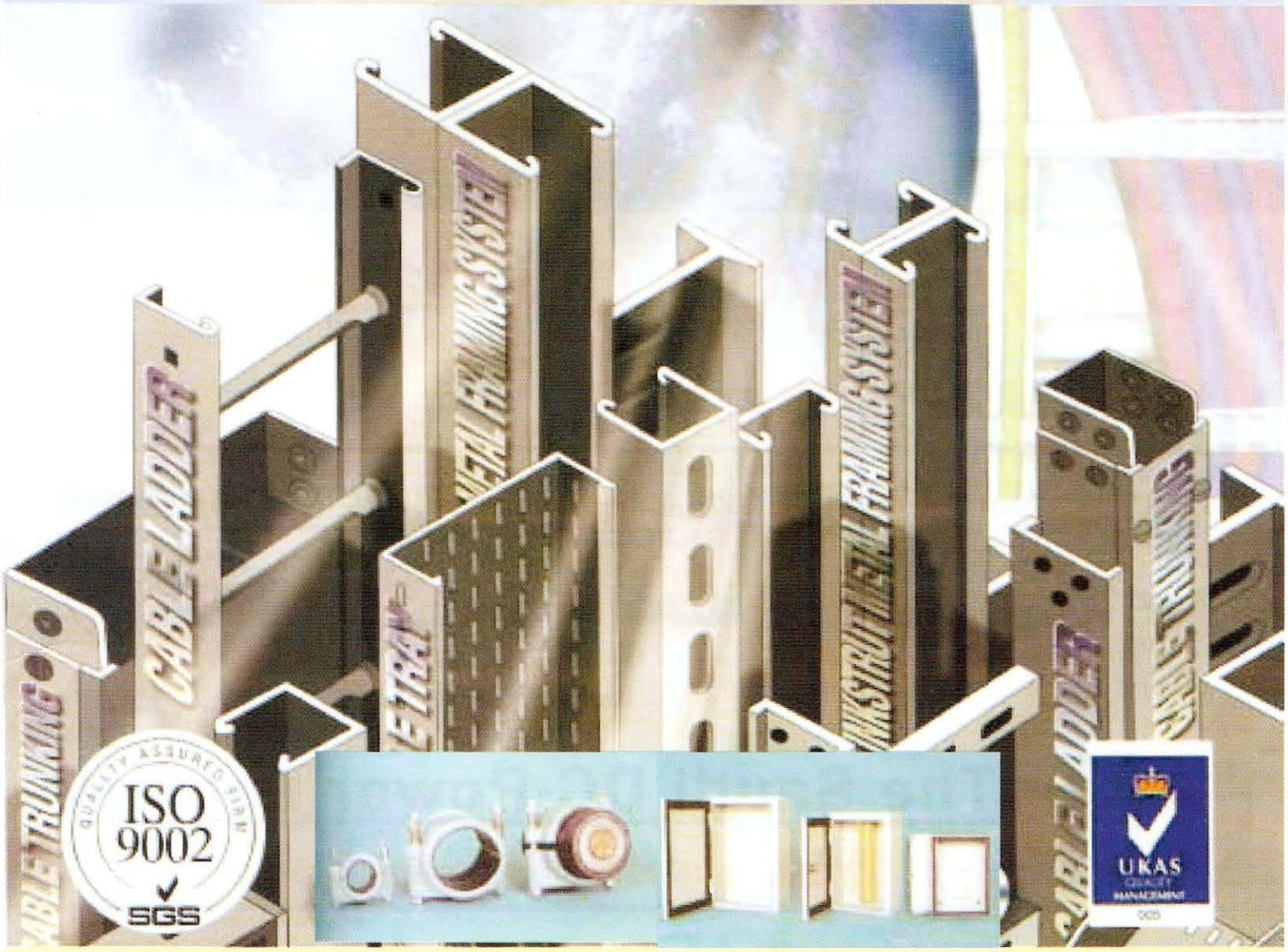
Cable Management & Support Systems

Electrical Panel Boards

- Cable Trays
- Cable Ladders
- Cable Racks
- Cable Trunkings
- Linkstrut Metal Framing
- Under Floor Trunkings
- Flush Floor Trunkings
- Raised Floor Trunkings



- Electrical Panel Boards
- Distribution Boards
- Control Panels
- Universal Antenna Mounts
- MW Antenna Mounts
- Aluminum Cable Clamps
- Special Fabrication



Tel: 01 28202433, 282 0464, 282 0467. Fax: 01 282 0465. email: sales@electrolinkltd.com

Irrigation and Agronomic Total Solutions

Committed to your success .... all the way!

MEAC Turf Irrigation

MEAC Environmental Cooling Systems

MEAC Drip Irrigation & Filtration Systems

" Customer Satisfaction"

Through MEAC Added Value Services ...

- Agronomic and Water Management Case Studies.
- Engineering, Shop drawings and Project Documentation.
- Qualified and Experienced Sales Engineers.
- In House After-Sales Service and Supervision.
- "MEAC College" for Professional Training Programs and Workshops

WWW.MEAC.NET

MEAC Electro-Mechanical

MEAC Super Intensive Olive Solutions

MEAC Central Control Systems

Hunter® MOTOROLA MICRO COOL KSB TECNIDRO AGROMILLORA

Regional Coverage- Gulf States, Iran, Iraq, Sudan and Yemen.

MEAC Saudi
Tel.: +966-1-493 8627
Fax:+966-1-493 8038
P.O. Box 49921
Riyadh, KSA

MEAC UAE
Tel.: +971-4-8861151
Fax +971-4-886 1152
P.O. Box 261237
Jebel Ali, UAE

MEAC Qatar
Tel.: +974-432 6598
Fax +974-431 1968
P.O. Box 3082
Doha, Qatar

MEAC Iran
Tel.: +98-21-828 0702
Fax : +98-21-828 0703
Islamic Republic of Iran

مؤسسة أدمة شمران للتجارة

ص.ب ٥٤٧٤ الرياض ١١٤٢٢ هاتف: ٢٤١٠٥٤٣- ٢٤١٤٩٨١- فاكس: ٢٤١١٩٠٧

NPCC

An enterprise of Government of Islamic Republic of Pakistan and one of the top constructors known in world for power projects, is proud of its contribution in the development and building of economy of the two brotherly Muslim countries-Pakistan and Kingdom of Saudi Arabia.

NPCC

PAKISTAN

NATIONAL POWER CONSTRUCTION CORPORATION LIMITED (PAKISTAN)

HEAD OFFICE - PAKISTAN

9 - Shadman II, Lahore 54000, Pakistan

Tel.: 0092 42 756 6016 / 6017 - Fax: 756 6022

BRANCH OFFICES - KSA

Jeddah: Tel.: (02) 697-2620, 697-6958, Fax: (02) 639-1128

E-mail: npccjed@zajil.net

Makkah- P.O. Box# 12619, Makkah Al-Mukarramah

Tel.: (02) 526-1131, Fax: (02) 526-1132

E-mail: npccmak@zajil.net

- BATTERY CHARGERS
- CONVERTORS
- INVERTORS

- SEALED LEAD ACID BATTERIES
- NiCd BATTERIES
- FLOODED AND TRACTION BATTERIES

ITSO

TOTAL TELECOM SOLUTION

- RECTIFIERS
- GENERATORS
- UPS SYSTEMS

- SITE ACQUISITION
- TOWER ERECTION
- COMPLETE CIVIL WORKS

- SHELTERS
- PRECISION AC
- RAISED FLOORING

HEAD OFFICE LOCATION
DIRECTLY OPPOSITE KING FAHAD MEDICAL CITY ENTRANCE ON DABBAB ROAD, RIYADH

Eltek Energy · Deka · Saudi Hoppecke Batteries · Can Power · Emerson Network Power · Uniflair · Marvair · Remco · ABSOPULSE Electronics Ltd.

DISTRIBUTING VOLTS BY THE KILO

ISO
The DC Power Factory
TOTAL TELECOM SOLUTION
www.itso.com.sa

الشركة الدولية لتشغيل أنظمة الإتصالات
International Telecommunication Systems Operation

UKAS QUALITY MANAGEMENT 005

Head Office:
Telephone No. :+966 1 217 9011
Fax No. :+966 1 217 9022
Website : http://www.itso.com.sa

Factory Office:
Telephone No. :+966 1 265 1997
Fax No. :+966 1 265 1998
E-mail address : gm@itso.com.sa

THE INSTITUTION OF ENGINEERS PAKISTAN
SAUDI ARABIAN CENTRE

نقابة المهندسين الباكستانين - مركز المملكة العربية السعودية

http://www.iep-sa.org
P.O.Box 50344, Riyadh 11523
Kingdom of Saudi Arabia

Phone: (01) 464-1498
Fax: (01) 462-6769
E-Mail: info@iep-sa.org

FOREWORD

I am very pleased in presenting the 2008-2009 issue of IEP-SAC Journal. This Journal is compiled and printed through the collective and tireless efforts of the IEP Council members. The Journal contains Technical papers of Engineer's interest and an updated Directory of Pakistani Engineers in the Kingdom of Saudi Arabia.

IEP-SAC is a live and vibrant albeit a non-profit organization. The main objectives of IEP-SAC are to provide a forum for Pakistani Engineers living in the Kingdom to update their professional knowledge, facilitate communication and comradeship and help the new generation of the Pakistani Engineers through an ambitious scholarship program All these events, seminars and activities are organized through absolute voluntarism of IEP Council members whose dedication and commitment to the cause of Pakistani Engineers living in the Kingdom is outstanding.

I call upon the Pakistani Engineers living in the Kingdom to come forward and participate in the IEP-SAC activities. This is the voice of your community and this forum is for you. Attending IEP seminars and other activities not only would support professional advancement, it also provides opportunities for get-together and wider networking not so easily available otherwise.

We wish to express our deep appreciation for the very valuable voluntary services of our IEP Council members in Central and Eastern province. We are appreciative of the efforts of the Pakistani Engineers in Jeddah who are establishing Western Chapter of IEP in addition to the existing Central and Eastern Chapters.We are also thankful to IEP HQ Pakistan for their continuous support. We are grateful to the sponsors and advertisers who make the publication of this Journal possible. We are grateful to H.E. the Ambassador of Pakistan and his Embassy staff for their cooperation and support.

On behalf of IEP-SAC, we wish to express our gratitude to the Kingdom of Saudi Arabia for its hospitality and cooperation to the Pakistani community in the Kingdom in general and Pakistani Engineers in particular. I very much hope that this journal will meet your expectations. Suggestions and comments are welcomed.

ENGR. MASOOD A. KHAN
Chairman
Institution of Engineers Pakistan
Saudi Arabian Centre

5th June 2008
1st Jamadi-ul-Thani 1429H

DISCLAIMER

This Directory has been complied mainly on the basis of the information provided by the individuals whose data appears in the Directory. IEP-SAC accepts no responsibility for the accuracy of the data or any misrepresentation / misprint of the information, although all possible care has been exercised in the collection and presentation of the data. The articles represent the views of the authors not necessarily of the IEP-SAC.

النبأ العالمية
Naba International

Civil Construction & Heavy Equipment Rental	مقاولات إنشائية وتأجير معدات ثقيلة
Industrial & Electro-Mechanical Contracting	المقاولات الصناعية والالكتروميكانيكية
Metal Fabrication & Engineering Works	تشكيل المعادن والصناعات الهندسية
Electrical & Industrial Materials Trading	تجارة المواد الكهربائية والصناعية
Manufacturing & Supply of Concrete Products	تصنيع وتوريد المنتجات الخرسانية
Realestate Developments / Investment	إستثمار وتطوير عقاري
Public Relations & Advertising	علاقات عامة و دعاية واعلان

النبأ للمقاولات
Naba Contracting

جوماك
JOMAC

المقاطع السعودية
Saudi Pro-Trade

النبأ للبيوت الجاهزة
Naba Prefab

النبأ للمنتجات الخرسانة
Naba Conmix

الجودي العربية للاستثمار العقاري
Al Judi Al Arabia For Realestate

emarapolis

www.alnaba.com

ص.ب. ١٠٠٠٥ مدينة الجبيل الصناعية ٣١٩٦١ المملكة العربية السعودية هاتف: ٣٤١٢٣٤٠ ٣ ٩٦٦+ (٦ خطوط) فاكس: ٣٤١٢٣٦٠ ٣ ٩٦٦+
P.O. Box 10005 Jubail Indl. City 31961 Saudi Arabia Tel: +966 3 3412340 (6 lines) Fax: +966 3 3412360

...greater flexibility & agility in meeting customer demands.

Manufacturing
- Pressure Vessels
- Heat Exchangers
- Storage Tanks
- Flare Stacks
- Bins, Ducts, Hoppers
- Pre-fabricated Piping
- Steel Structure

Plant Services
- Annual Turnarounds/Shutdowns
- Re-Tubing of Heat Exchangers
- Refurbishment of Vessels/Tanks
- Overhaul/Repair of Mech. Valves
- Machining Services
- Electrical & Instrumentation
- Calibration of Control/Pressure Safety Valves & Measuring Eqpt.

E & I Services
- Calibration/Repair of Control / Pressure Safety Valves and Measuring Equipment
- Instruments/Equipment Maintenance

Plant Construction
- Civil, Mechanical, Electrical & Instrumentation Services

DESCON

OLAYAN

Olayan Descon

P.O.Box 10108, Jubail Ind. City 31961, KSA
Tel. +966-3-341-0671, Fax. +966-3-341-0950
E-mail odico@olayandescon.com

TAILOR-MADE PRODUCTS

Fuchs. A perfect fit for any and every requirement in lubricants.

Being the world's largest independent supplier of Industrial oils and lubricants and a leading player in auto lubricants, Fuchs combines the finest German technology to create world-class lubrication systems.

Fuchs worldwide lives up to this reputation & capability to tailor-make & produce any kind of lube required for any kind of application.

So, the next time you want tailor-made solutions for your lubricant needs, take the right measure.

www.fuchs.com.sa

FUCHS

The Total Solution Provider

Alhamrani-Fuchs Petroleum Saudi Arabia Limited. (Member of Alhamrani group)
Head Office: Jeddah, Saudi Arabia, Phone: 02-6635666 Fax: 02-6633702

بسم الله الرحمن الرحيم

AMBASSADOR

سفارة باكستان - الرياض
EMBASSY OF PAKISTAN
RIYADH

Message for Institution of Engineers Pakistan Saudi Arabian Center (IEPSAC)

I wish to congratulate the Institution of Engineers Pakistan- Saudi Arabian Center (IEP-SAC) for organizing a Seminar on the topics:

i) Smart Industrial Cities
ii) Quality Management Systems

Industries are playing very vital role in the economic conditions and welfare of any society. In this regards, the concept of smart industrial cities is novel and leads to better use of resources and facilities. Moreover, in the competitive environment of today, quality management becomes very crucial for any organization. Therefore knowledge of quality management systems is very useful. Due to the importance of these concepts it is gratifying to know that IEP-SAC is organizing seminar on these issues. I am sure this seminar will serve a useful purpose for the engineers working in Saudi Arabia.

As the Ambassador to the Kingdom of Saudi Arabia, I am pleased to notice that IEPSAC has distinguished itself as a vibrant forum for Pakistani Engineers, Architects & Town Planners, who have earned good name for their motherland by their sheer hard work, dedication, professional skills and contributions in the development of brotherly Kingdom of Saudi Arabia. By holding seminars from time to time, IEP-SAC provides its members opportunities to share experience and knowledge with each other on a variety of subjects.

I call upon all the distinguished engineering professionals in the Kingdom to keep up their good work with full devotion and commitment. I wish to assure them of the Embassy of Pakistan's continued support in the pursuit of their professional activities and noble endeavors such as awards of scholarships to deserving and needy students studying in Pakistani Engineering Colleges and Universities.

Finally, may I take this opportunity to congratulate the Institution of Engineers Pakistan - Saudi Arabian Center for publishing an update of the Directory of Pakistani Engineers Working in Saudi Arabia along with several articles in IEPSAC Journal, 2008-2009. I am sure that these articles will be of interest to most engineers and IEPSAC members. I hope that the Directory will not only be a useful source of information for members of IEP-SAC but will also prove equally beneficial to other interested organization. Finally I am hopeful that the seminar and Directory will help strengthen the brotherly ties between Pakistani and Saudi engineers.

Admiral Shahid Karimullah (Retd)
Ambassador

Engr. Kamal Nasir Khan
C.E.O.
SKB Pakistan

WE OFFER GRATITUDE TO OUR PRESTIGIOUS CLIENTS IN SAUDI ARABIA

MINISTRY OF EDUCATION & SAMAMA GROUP

Engr. Ahsan Rashid
Genaral Manager
SKB Saudi Arabia

OUR VISION IS TO BUILD BETTER

SKB ENGINEERING & CONSTRUCTION

P.O.Box 52930, Riyadh 11573 **Kingdom of Saudi Arabia**
Tel.: 00966-1-4603271, Fax: 00966-1-4603274
C.C. No. 135375
Head Office, Lahore, Pakistan
Tel.: 0092-42-5750181/5751317
Fax.: 0092-42-5712073
E-mail: skb@brain.net.pk

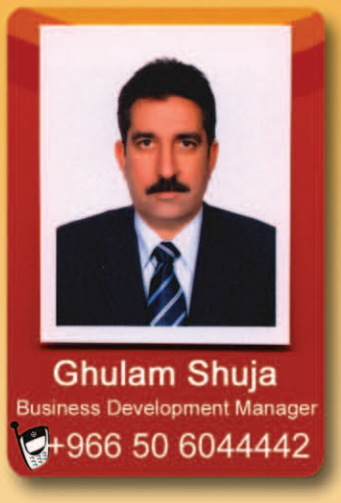
Certified ISO 9001 by BVQI

UKAS UNITED KINGDOM ACCREDITATION SERVICE

MGA

TRADING EST.

MGA Trading is a quality-led supplier and is a full-line distributor of Electrical, Industrial, Mechanical, Instrumentation and Construction Materials & Equipments in the Kingdom of Saudi Arabia.
MGA is an approved supplier to leading organizations such as Saudi Aramco, Saudi Electricity Co., SABIC and Royal Commission for Jubail and Yanbu.
MGA is committed to become a leading Distributor of Electrical, Mechanical, Industrial and Construction Material in the Kingdom of Saudi Arabia by providing Quality Products and Services at the most competitive Prices.



Our Products:

- Power Cables, & Wires
- Instrumentation & Control Cables
- Conduits & Fittings
- Conduits Outlet Bodies
- Junction Boxes
- Cable Tray Systems
- Channels, Wire Ways, Pull Boxes
- Enclosures
- Termination Kits & Joints
- Cable Ties - Nylon & Stainless Steel
- Lighting Fixtures & Lamps
- Transformers
- Control Apparatus
- Fire Alarm/Protection
- Test Instruments
- Cable Accessories & Tools
- Control Systems
- Cable Glands & Cleat
- Earthing & Lightning Protection Materials

Our Suppliers:

CADWELD ERICO Panasonic COOPER Crouse-Hinds

RIYADH CABLES GROUP

JASCO

Schneider Electric We do more with electricity
Merlin Gerin Modicon Square D Telemecanique

شركة الكابلات السعودية Saudi Cable Company

S3C

GE

MESC

PRYSMIAN CABLES & SYSTEMS

AXIS

INTERNATIONAL METAL HOSE COMPANY

WIRSSORIES

Ducab دوكاب Advanced Cable Solutions

UNITECH

COPE

BICON

SSP الأنابيب ALANABEEB

3M

P.O.Box 9377 Dammam31413 Kingdom of Saudi Arabia Tel +966 (0)3 858 4783 Fax +966 (0)3 858 4782
E-Mail: ghulamshuja@mgat.com, Website: www.mgat.com

gec

شركة هندسة الأرض للمقاولات

GROUND ENGINEERING CONTRACTORS

Fundex Piling

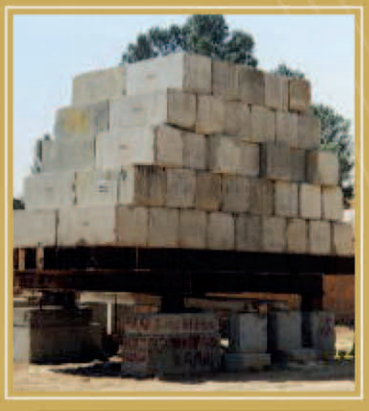
Bored Piling

Stone Columns

Sheet Piling

Deep Dewatering

Multistage Dewatering



Pile Load Test

Stone Column Testing

DMS Testing

RIYADH
P.O. Box 15297
Riyadh 11444
Tel. : +996 1 4773601
Fax : +966 1 4784558

الرياض
ص.ب ١٥٢٩٧
الرياض ١١٤٤٤
تليفون ٤٧٧٣٦٠١ ١ ٩٦٦+
فاكس ٤٧٨٤٥٥٨ ١ ٩٦٦+

AL-KHOBAR
P.O. Box 2870
Al-Khobar 31952
Tel. : + 996 3 8982240
Fax : + 966 3 8944378
E-mail :gec@zajil.net

الخبر
ص.ب ٢٨٧٠
الخبر ٣١٩٥٢
تليفون ٨٩٨٢٢٤٠ ٣ ٩٦٦+
فاكس ٨٩٤٤٣٧٨ ٣ ٩٦٦+

The Institution of Engineers, Pakistan
HEADQUARTERS OFFICE

I.E.P HQ. BUILDING
ENGINEERING CENTRE,
I.E.P ROUND ABOUT,
GULBERG-III, LAHORE

Ph: 042-5756974
5754043
Fax: 042-5759449

Dated: April, 29, 2008

Engr. Aftab Islam Agha
President

MESSAGE FROM
ENGR. AFTAB ISLAM AGHA
PRESIDENT OF
THE INSTITUTION OF ENGINEERS PAKISTAN

It gives me immense pleasure to learn that SAC is holding a Seminar on "Smart Industrial Cities" and "Quality Management System" at the end of May 2008 at Riyadh. On this occasion also publishing of IEP-SAC Journal by the engineers of Saudi Local Centre is appreciable. In fact publication of engineering knowledge through Journals is a commendable activity and is a certain help for transfer of engineering knowledge among public in general and engineers in particular. I feel this publication will provide a regular Forum for this purpose and will be aimed at bringing latest developments in the field of engineering & Technology to the door steps of members. The efforts made by the SAC Engineers in this regard is remarkable and adds help to Pakistani Engineers as well and Islamic Ummah also.

I would request the Fellow Engineers to encourage the publication of this journal at all level. I am confident that the aforesaid "Seminar" and this Journal will be a great success. I also hope that publication of this Journal be a great source of inspiration to other centres to follow.

I sincerely wish the IEP-SAC Journal and Seminar a great success.

Engr Aftab Islam Agha

President, IEP

PAKISTAN TELECOM INDICATORS

Fixed, Local Loop and Cellular Phones

Fixed Line Subscribers									
Year	PTCL	NTC	Brain Limited	World Call	Union Comm.	Naya Tel		Total	Tele-density
Jun 2005	5,190,899	81,027	1,520	4,100	-			**5,277,546**	**3.43**
Jun 2006	5,128,442	92,163	5,880	13,327	200			**5,240,012**	**3.39**
Jun 2007	4,676,204	99,665	6,089	10,748	2,500	11,000		**4,806,206**	**3.04**
Dec 2007	4,695,971	106,336	7,376	10,008	3,500	13,500		**4,836,691**	**2.99**
Mar 2008									**3.06**

Wireless Local Loop Subscribers									
Year	PTCL	TeleCard	World Call	Great Bear	Burraq	Wateen	Mytel	Total	Tele-density
Jun 2005	163,681	98,469	2,678	200				**265,028**	**0.17**
Jun 2006	661,532	229,292	115,637	21,407				**1,027,868**	**0.66**
Jun 2007	1,128,272	396,873	273,616	51,311				**1,850,234**	**1.08**
Dec 2007	1,237,424	455,391	375,455	54,909		4,100		**2,127,279**	**1.34**
Mar 2008	1,384,009	477,778	423,738	55,737	242	14,437	140	**2,356,081**	**1.48**

Cellular Subscribers									
Year	Mobilink	Ufone	Paktel	Insts-phone	Telenor	Warid		Total	Tele-density
Jun 2005	7,469,085	2,579,103	924,486	454,147	835,727	508,655		**12,771,203**	**8.30**
Jun 2006	17,205,555	7,487,005	1,040,503	336,696	3,573,660	4,863,138		**34,506,557**	**22.21**
Jun 2007	26,466,451	14,014,044	1,024,563	333,081	10,701,332	10,620,386		**63,159,857**	**39.94**
Dec 2007	30,612,630	16,161,936	1,980,587	325,858	14,596,382	13,205,677		**76,883,070**	**48.61**
Mar 2008	31,756,283	17,198,373	2,142,465	320,768	16,701,720	14,394,927		**82,514,536**	**52.16**

Note: *Data include Azad Jammu Kashmir & Northern Areas*

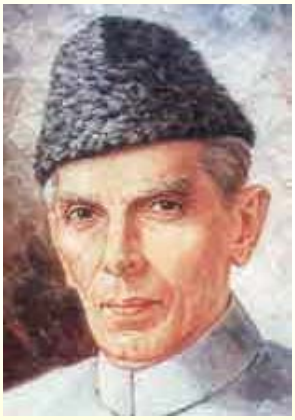
Value Added Services

YEAR	PAYPHONES		INTERNET	
	Total	Growth Rate (%)	Dial-Up Users (M)	DSL Subscribers
Jun 2005	279,320	54.40	2.10	14,600
Jun 2006	353,194	38.73	2.40	26,611
Jun 2007	387,490	9.71	3.5	45,153
Dec 2007			3.5	57,960
Mar 2008			3.5	128,689

PAKISTANI UNIVERSITIES STATISTICS

REGION	UNIVERSITES	PUBLIC	PRIVATE
AJK	3	1	2
Balochistan	6	5	1
Islamabad	17	14	3
Northern Areas	1	1	
NWFP	21	12	9
Punjab	36	19	17
Sindh	38	13	25
Total	**122**	**65**	**57**

1ST INAUGURAL MEETING
OF THE INSTITUTE OF ENGINEERS PAKISTAN



Quaid-e-Azam
Mohammad Ali Jinnah
20th June, 1948

"If Pakistan is to take its proper place among the progressive nations of the world, it will have to take up a good deal of leeway in the realm of scientific and technical education which is so necessary for the proper development of the country and the utilization of its resources. The establishment of institution like the Institute of Engineers will greatly stimulate technical research and help in disseminating available information. The Institute of Engineers will not only benefit the engineers themselves by improving their technical knowledge but also bring lasting benefits to public services which they are called upon to perform.

I wish the Institute every success."

CALL FOR PAPERS

In order to enhance and intensify the quality of this Journal, the IEP-SAC invites the Technical Papers on different themes in all Engineering and Architecture disciplines. Please avail this opportunity and contribute to your professional elegance.

Instructions

- **The abstract should be 200 to 300 words and may be submitted by e-mail as Word (.doc) or Acrobat (.pdf) file**
- **The abstract must include name, affiliation, telephone/mobile number, e-mail address and full postal address of an author**

Deadlines

- **Submission of abstract : Sep. 30, 2008**
- **Notification of acceptance of abstracts : Oct. 31, 2008**
- **Submission of papers : Dec. 31, 2008**
- **Review of papers : Jan. 01, 2009 to Feb. 28, 2009**

Email to

- **smhkirmani@hotmail.com; kirmani@rashidengineering.com Or**
- **nmalik@ksu.edu.sa; nhmalik@hotmail.com**

PRECISION ELECT TRADING INTERNATIONAL

Your Partners In The Middle East

PRECISION ELECTRICAL EQUIPMENT TRADING INTERNATIONAL UAE

ATHER T&C EST.

ATHER TRADING & CONTRACTING EST.

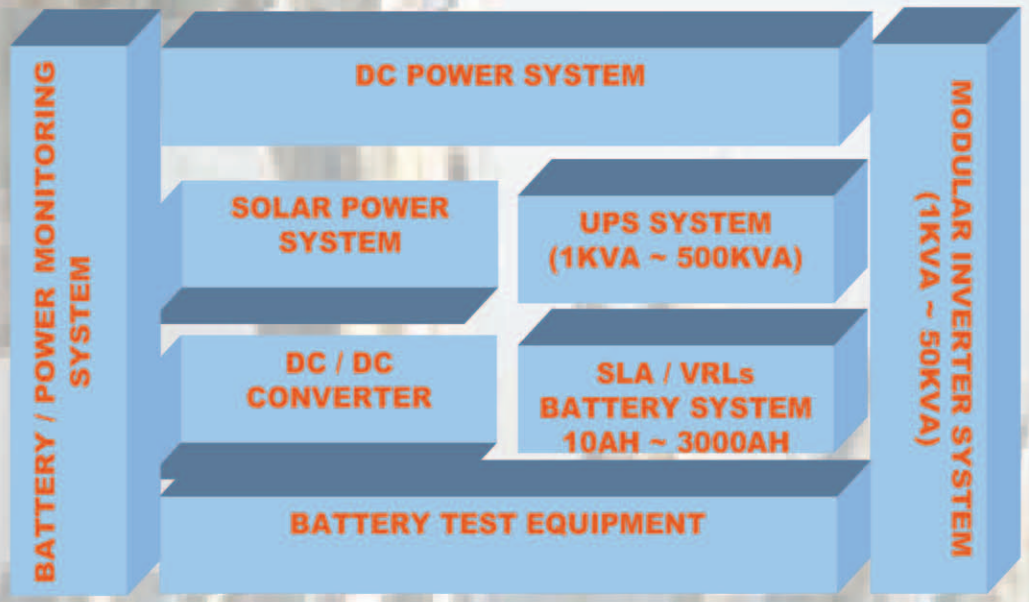
POWER & TELECOMMUNICATION DIVISION

TOTAL POWER SOLUTION COMPANY

EATON Electrical

POWERWARE

Ather Trading & Contracting Est. is total power Solution Company providing turnkey solutions to STC, MOBILY,SCECO, SABIC ,ARAMCO & MajorTelecom.vender, We are fully equipped with high end air-conditioned battery storage and testing facility which meets the international standards . AT&CE a Saudi Based company, is a sister concern of PRECISION ELECTRICAL EQUIPMENT TRADING INTERNATIONAL UAE with offices in Sharjah, USA & Pakistan. AT&CE and PRECISION focuses on providing highest quality of power solutions to its customers in the region.



ATHER TRADING EST.
Industrial Area- New Owaidah, Ali Bin Abi Talib Road
P.O.Box 87021, Riyadh 11642
Tel: +966 1 243 5580, +966 1 4381591:
Fax:+966 1 270 8143
Website: www.precision-pnt.com

مؤسسة اطهر للتجارة
المنتقة الصناعية حي العويضة الجديد شارع علي بن أبي طالب
١١٦٤٢ الرياض ص ب٨٧٠٢١
تلفون : 2435580 1 ٩٦٦+ ٤٣٨١٥٩١ 1 ٩٦٦ +
فاكس: ٢٧٠٨١٤٣ ١ ٩٦٦ +
www.precision-pnt.com

MEMBERS OF IEP-SAC LOCAL COUNCIL

Engr. Masood A. Khan
Project Manager PP-9
Saudi American General Electric
Ph (Off) 246-1047 / 246-3770
Ph (Res) 248-3471 Ext. 226
Fax 408-0594
Mobile 050-527-6091
masoodkhan_2002@yahoo.com
Chairman

Engr. Dr. Nazar H. Malik
Professor, Electrical Eng. Dept.
King Saud University
Ph (Off) 467-6783
Ph (Res) 468-2048
Fax 467-6757
Mobile 056-845-2834
Email: nmalik@ksu.edu.sa
General Secretary

Engr. Jaleel Hasan
Chief Executive Officer
I.T.S.O
Ph (Off) 225-0428
Ph (Res) 269-4235
Fax 217-9022
Mobile 050-448-7027
Email: jaleel@canada.com
Ex. Chairman

Engr. Abdul Waheed Mir
Engineering Specialist
Saudi Electric Company (CRB)
Ph (Off) 403-2222 Ext. 14546
Ph (Res) 460-5633
Mobile 050-286-2318
Email: waheedmir@sceco.com

Engr. Abdur Rashid Shad
Construction Manager
Al-Khodari Sons Co
Ph (Off) 04-622-4874
Fax 622-4875
Mobile 055-504-3898
Email: arsba49@hotmail.com

Engr. Kauser Mahmood Butt
Consultant Engineer
Saudi Electric Co. (CRB)
Ph (Off) 403-2222 Ext. 23196
Ph. (Res) 461-5604
Fax 406-7351
Mobile 050-916-8981
Email: kmbutt43@hotmail.com

Engr. Khalil Ahmed
System Software Engineer
Royal Saudi Naval Forces
Ph (Off) 499-6666 Ext. 2907
Ph (Res) 235-5873
Fax 235-5873
Mobile 050-712-0047
Email: khalil999@gmail.com

Engr. Masood Hamid
Chief Project Manager
National Power Const. Corp.
Ph (Off) 697-2620 / 697-6958
Fax (02) 639-1128
Mobile 050-568-0706
Email:masoodhamid@yahoo.com
Location: Jeddah

Engr. Mubashir H. Kirmani
Chief Engineer
Rashid Engineering
Ph (Off) 465-3127
Ph (Res) 473-8034
Fax 465-6245
Mobile 050-725-4876
Email: smhkirmani@hotmail.com

MEMBERS OF IEP-SAC LOCAL COUNCIL

Engr. Naveed Ahmad, PMP
Head of Project Management
ABB Automation Co. Ltd.
Ph (Off) 265-3030 Ext. 1534
Fax 265-1211
Mobile 050-549-1307
Email: engr.naveedahmad@yahoo.com

Engr. Obaidullah Siddiqi
Sr. Engg.Consultant
Zuhair Fayez Partnership Consultant
Ph (Off) 476-3030 Ext. 289
Ph (Res) 405-0167
Fax 405-0167
Mobile 050-744-9291
Email: obaid41@hotmail.com

Engr. Saifullah Saleem
Marketing and Sales Manager
MAQ Trading and Contracting
Ph (Off) 204-6279
Ph (Res) 402-6838
Fax 276-5801
Mobile 050-344-4853
Email: faastintl@yahoo.com

Engr. Shaikh Asrar Ahmed
General Manager
Tatweer International Co.
Ph (Off) 473-8995 / 473-8996
Ph (Res) 450-3773
Fax 473-8330
Mobile 050-442-3772
Email: saahmad_27@yahoo.com

Engr. Sheikh Akhtar Hussain
Project Manager
Saudi Consulting Services
Ph (Off) 465-9975 Ext. 240
Ph (Res) 442-1161
Fax 464-7540 / 465-0530
Mobile 050-911-4871
Email: shaikh@saudconsult.com

Engr. Syed Faiz Ahmad
Chief Structural Engineer
Saudi Oger Ltd.
Ph (Off) 477-3115 x 3845
Ph (Res) 412-1966
Fax 477-3115 x 5331
Mobile 050-816-9304
Email: syedfaiz23@hotmail.com

Engr. Syed Salman Shafiq
Internet Product Manager
Saudi Telecom. Company
Ph (Off) 452-6275
Ph (Res) 454-1282
Email: sshafiq2000@hotmail.com

Engr. Syed Zafar Ahmed
Specialist Advisor, RSAF
BAE Systems
Ph (Off) 476-9777 Ext. 42310
Ph (Res) 462-1686
Fax 419-2738
Mobile 050-714-9698
Email: syedzafar@awalnet.net.sa

Engr. Wasim Noor Malik
Project Manager
El-Seif Engineering Contracting
Ph (Off) 454-9191 Ext. 309
Ph (Res) 493-0438
Fax 454-9191 Ext. 356
Mobile 050-429-6470
Email: wasimnoormalik@hotmail.com

IEP-SAC LOCAL COUNCIL – EASTERN PROVINCE

Engr. Rizwan Ahmed
Business Development Manager
NABA Intenational Enterprises
Ph (Off) 03-834-1730
Ph (Res) 03-857-2275
Fax 03-834-9371
Mobile 050-490-5682
Email: rizwan_asr@yahoo.com
Chairman

Engr. Akhtar Jawaid Niazi
General Manager
Al-Najam Cont. & Trad Est.
Ph (Off) 03-865-9765
Ph (Res) 03-867-1802
Fax 03-867-8459
Mobile 050-389-3042
Email: ajniazi_sa@yahoo.com
Vice Chairman

Engr. Syed Zahir ul Husnain
Business Development Manager
Al-Osais
Ph (Off) 03-811-2225, Ext: 406
Ph (Res) 03-811-5968
Fax 03-889-7838
Mobile 050-586-9227
Email: shahzahir007@hotmail.com
General Secretary

Engr. Ismet Amin Khawaja
General Manager
Foundation Building
Ph (Off) 03-864-6593
Ph (Res) 03-864-5809
Fax 03-894-5869
Mobile 055-880-792
Email: 786ttc@cyberia.net.sa
Ex Chairman

Engr. Abdul Qadir Aqbani
Liaison Engineer
Al-Qahtani Pipe Coating
Ph (Off) 03-857-4150
Fax 03-826-9894
Mobile 050-385-2602
Email: info@aqpct.com

Engr. Amanullah Turk
Director of Engineering
BJB - Arabia
Ph (Off) 881 3775 Ext: 342
Mobile 054-141-7051
Email: aturk@bjbinc.com

Engr. Dr. Anwar Khalil Sheikh
Professor of Mechanical Eng.
KFUPM
Ph (Off) 860-8575
Ph (Res) 860-6906
Fax 860-6906
Email: anwarks@kfupm.edu.sa

Engr. Asad Zuberi
Manager
B.A.C Allied Maintenance
Ph (Off) 882-9977 Ext. 306
Ph (Res) 859-0895 Ext. 222
Fax 882-4483
Mobile 050-582-9186

Engr. Asif Kamal
Staff Engineer
Petrokemya
Ph (Off) 03 357 7387
Ph (Res) 03 362 2870
Fax 03 358 4480
Mobile 050-590-2847
Email:
kamalas@petrokemya.sabic.com

Engr. Dr. Asrar-ul Haq Sheikh
Chair Professor
KFUPM
Ph (Off) 860-1182
Ph (Res) 860-5171
Fax 860-1183
Mobile 050-222-5141
Email: asrarhaq@kfupm.edu.sa

Engr. Aziz Arshad
Research Engineer
KFUPM
Ph (Off) 860-2761
Ph (Res) 860-5356
Fax 860-3685
Mobile 050-787-9745
Email: aarshad@kfupm.edu.sa

Engr. Itlaq Ahmed Khan
Project Engineer
M. A. Al-Azzaz
Ph (off) 03-340-9667
Mobile 056-933-8154
P. O. Box: 31172
Khobar 31952
Email: itlaque@hotmail.com

IEP-SAC LOCAL COUNCIL – EASTERN PROVINCE

Engr. Khalid Hussain
Operations Manager
M. Daffer Al-Qahtani Est.
Ph (Off) 03-867-1708
Ph (Res) 03-897-5491
Fax 03-867-8459
Mobile 050-384-7053
Email: khalidmdqest@yahoo.com

Engr. Misbah ul Islam Ahmed
Design Manager
Architect & Engineer
Ph (Off) 897-1717
Ph (Res) 865-5675
Fax 864-4758
Mobile 050-437-3694
Email: misbah_sabri@hotmail.com

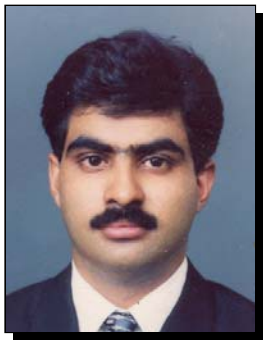
Engr. Mohammad Javed Iqbal
Senior Technical Officer
AETCON
Ph (Off) 889-1609 Ext. 19
Ph (Res) 867-1952
Fax 889-1640
Mobile 050-183-7143
Email: javed_132@hotmail.com

Engr. Mustafa Noeed Ahmed
Manager Projects
SAUDEK
Ph (Off) 842-2442
Fax 841-7734
Mobile 050-586-8017
Email: mustafanoeed1@yahoo.com

Engr. Pervez A. Naushahi
General Manager
Ground Engineering Contractors
Ph (Off) 03-898-2240
Ph (Res) 03-895-1615
Fax 03-894-8378
Mobile 050-580-9867
Email: gec@zajil.net

Engr. Sami Uddin Chughtai
Project Manager
Gulf Consolidated Contractors
Ph (Off) 817-3000
Ph (Res) 865-6896
Fax 817-3300
Mobile 050-587-4716
Email: samipk003@yahoo.com

Engr. Tanweer Ejaz
Manager Planning
SCECO (East))
Ph (Off) 858-6725
Ph (Res) 814-0112
Fax 858-5683
Mobile 050-791-3942
Email: nawaz_te@hotmail.com



Engr. Tariq Aziz Bhutta
Sales Manager
Sika Gulf BSC
Ph (Off) 847-3556
Ph (Res) 867-4793
Fax 847-1763
Mobile 050-593-4655
Email: engr.tariq@hotmail.com

Engr. Tariq Bin Zafar
General Manager
M. A. Al-Azzaz Est.
Ph (Off) 03-891-1075
Ph (Res) 03-859-0250
Fax 03-891-2908
Mobile 050-582-4538
Email: maaz@arabtec.com

AL-TUWAIRQI GROUP

CHAIRMAN'S Massage

The tremendous growth and success of Al-Tuwairqi Group is a result of gradual process of reinventing by utilizing the human resource, financial strength and capability. During the last decade, we had registered some remarkable achievements in the steel sector of Kingdom of Saudi Arabia with the dedicated efforts off all team members of Al-Tuwairqi Group.

The strategic future market challenges demands to focus on the well defined objectives of Al-Tuwairqi Group to emerge as a strong player in the international market. Therefore constant brain storming to broaden the vision to crystallize the innovative ideas is a prerequisite for successful business development.

Commitment, quality and customer satisfaction is our prime responsibility. These are the tools of mammoth future success we are striving for. With highly skilled human resource and latest technology we can build the future of our

Dr. Hilal H. Al Tuwairqi
Chairman Al Tuwairqi Group

COMPANY Profile

Al -Tuwairqi Group of companies is one of the leading business concerns in the Kingdom of Saudi Arabia. From a humble beginning in 1977, the growth in the last two decades and in the year 1999, made its entry into the top hundred companies in KSA on turnover basis and among the top fifty Saudi companies in terms of the profitability index. With its portfolio of diversified business activities, the Group has gone beyond the boundaries of Saudi Arabia into other areas of Middle East as well. Beside trading and contracting activities, the Group is also engaged in distribution of building and materials, white cement, and trading of industrial materials throughout the kingdom of Saudi Arabia. Al -Tuwairqi Group is extensively engaged in manufacturing various types of products including Steel Billets, Hot Rolled Steel products, reinforced wire mesh, Galvanized Steel , fusion bonded epoxy coated Steel and electrical equipment.

Our Vision

Al- Tuwairqi Group is an ISO 9001:2000 and CARES certified company for its production facilities. The Group is a responsible corporate citizen with ethical practices and environment friendly waste disposal methodologies.

It provides a stimulating working environment to attract and retain professionals who are committed to their work and achievements. Dedicated to extend services and reach technical excellence, the Group envisages a vision that continues its core strength and provides the basis for a growing number of satisfied customers.

Our Mission

The management of Al-Tuwairqi Group is enthusiastic for continual improvement of its management quality systems in accordance with the requirement of ISO 9001-2001, CARES and also committed for

Creating, stimulating and rewarding the work environment.
Identifying, setting and achieving the quality objectives at relevant functions by providing adequate resources, training and development human resources.
Providing quality products and services.
Meeting mutual contractual obligations.
Ensuring customers satisfaction and enhancing productivity and efficiency.
Achieving business leadership by devotion.
Reviewing quality policy periodically.
Producing quality products according to the international standard.
Maximum production of iron, steel and electrical products for our clients.

- To provide on timely delivery.
- To maintain efficient customer's services at all times.
- To sustain effective and consideration support to client.

THE INTERNATIONAL ELECTRICAL PRODUCTS COMPANY

First company in the region among switchgear manufacturers to obtain ISO 9001 – 2000 certification

Electrical Division of Al Tuwairqi Group is one of the pioneers in the Switchgear Industry in the kingdom of Saudi Arabia.

It started its manufacturing activities in 1987 for the Medium and Low Voltage Switchgear. In 1998 the premises was upgraded to build a new factory with the name "The International Electrical Products Co. (TIEPCO)" in order to stand at par with the quality products of competitors, mainly multinationals.

Within short span of time since inception of its new plant TIEPCO is now enjoying status of approved manufacturer for Saudi Electricity Company for numerous products like Metered CB Ring Main Units, Ring Main Units, Package Substations and Relay Control Panels.

TIEPCO has its Technology Centre in Dammam with back offices outside KSA to serve the local market requirements for offering complete electrical solutions.

Tel: 03 - 857 1043 - Fax: 03- 857 9014

Our Partners

SMD represents the following reputed companies and their brands in the Kingdom and other Gulf countries:

Leica **MICROSYSTEMS - GERMANY**

* Compound Microscopes
* Stereo Microscopes
* Imaging Software
* Camera Systems
* Sectioning and Specimen Preparation
* EM Specimen Preparation
* Confocal Microscopes

REICHERT - ANALYTICAL INSTRUMENTS - USA

* Handheld Refract-o-meters
* Benchtop Refractometers
* Clinical & Diagnostic Instruments

TECHCOMP - HONG KONG

* High Speed Centrifuge
* Large Capacity Centrifuge
* Hitachi Compact Centrifuge
* Hitachi Benchtop Centrifuge

Contact:
Office # 1127 -1190 Hail Center-Al-Rakha
Tel: + 966-3-8577766-Ext: 225- Fax: +966-3-8588357

Head Office:
Tel: +966-3-857 9922-857 9966 - Fax: +966-3-857 9014

Al-Ittefaq Steel Products Company (ISPC-1) a subsidiary of Al Tuwairqi Group of Companies is considered as a premiere & one of the biggest of its kind in the Kingdom and in the Middle East in the private sector producing hot rolled, high tensile, weld-able reinforcement steel bars of sizes from 12mm to 50mm, manufactured by using the Thermex Bar Quenching process, 8mm and 10mm rebar and 5.5mm to 14mm plain round coils through wire-rod mill. ISPC products are confirmed to national and International Standards.

ISPC-1 is achieving a production of 1, 250,000 metric tons per annum. ISPC-1 has secured its leadership position through innovative management strategy. ISPC-1 quality management system from raw material to finished products with a world class in-house material testing laboratory, authenticate its brands in the local and GCC market.

Al-Ittefaq Steel Products Company-Makkah (ISPC-II) is another addition to the Al-Tuwairqi Group of Companies. With a total available area of 262,000 m2, ISPC- Makkah can accommodate sizeable expansion.

Al-Tuwairqi group responded the demands for steel by creating and upgrading steel mills. On each investment projects everything has been carefully studied and planned to achieve the target in the most profitable manner. This is by utilizing the existing machineries in hand, adding new machineries and utilizing its owned sources of manpower.

Tel: 03 - 8121314 - Fax: 03 - 8121059

National Steel Company Limited (NASCO) is Al-Tuwairqi Group's (ATG) steel melt shop started its production in 2004. Visualizing the domestic and international demands of steel rebar, a regular supply of billet was inevitable. NASCO has played a pivotal role in meeting the billet demands for ATG rolling mills. ATG is proud of its melting capability as it has set a proven production record during the last years.

NASCO is a Recycling Industry. Steel is among the most known recycled material in the world. The tonnage of steel recycled per annum is far ahead of all other recyclable commodities like aluminum, glass and paper. Steel is the only material that can be simply recovered from any waste stream through the use of magnet. About one-third of the world's steel is produced by Electric Arc Furnace (EAF) melting method, which uses high-current electric arcs to melt steel scrap and convert it into liquid steel of a specified chemical composition and temperature.

NASCO, melt shop project was completely managed by Al Tuwairqi Group. NASCO started its production on 16th June'04. With capacity enhancement and engineering developments NASCO produced 575k prime billets in 2005 and 668k tons in 2006. NASCO has given quite consistent production with record highest production of 63k+ in January'07.

Tel: 03 - 812 2966 - Fax:812 1059

Al-Faisal steel products factory (FSPC) became the first domestic down stream steel producer to be certified to ISO 9001-2000. Al-Faisal Steel is proud of this achievement and recognizes that ISO 9001-2000 are bases of its quality management system.

Excellence in customer services brings effluance to the cummunity, and this is the mission of our steel business enterprise.

Presently FSPC has the straightening & cutting capacity of rebar about 120,000 tons/year. Cut & bend processing capacity about 50,000 tons/year Cold rolling capacity about 60,000 tons/year, Weld mesh production capacity about – 40,000 tons/year and epoxy coating about – 50,000 tons/year with two machines.

The rated production capacity of the plant will be about 300,000 tons/year which can be increase upto 350,000 tons. Presently total area of the factory 45,000 sq. meter, and Covered area 12,500 sq meter.

Al Fasail steel Products Company today commands an enviable position in catering to the specialized steel needs of the Kingdom. For consistently producing world class products FSPC employs highly qualified and trained personel and have acquired high quality Online/Offline testing equipments.

Testing equipment consists of special Online Offline Holiday Detector, Temperature, Recorder, Digital Thickness Gauge, Universal Testing machines besides conventional equipment like Micrometer, vernier Calipers, Weighing Scales etc. Testing is carried out to satisfy the requirement of ASTM A 496, ASMT A 497, BS4483, ASTM A775M etc.

Tel: 03 - 8122212 - Fax: 03 - 8122128

Direct Reduction Iron Company (DRIC) The domestic need of raw material that is required for the continuous process and decided to go for the integration of infrastructure for an ntegrated steel plant. The route to achieve this is thru DRI (Direct Reduced Iron), with a backward integration of Pelletization Plant in near future. Since February 2005, the blueprint for achieving this has come in to place as the two (2) DRI modules of Corus at Mobile (USA) were purchased; dismantled; transported to Saudi Arabia and now both of them are commissioned. This new company is named as Direct Reduction Iron Company (DRIC).

The two (2) DRI modules operates on natural gas based MIDREX technology, a proven DRI technology which has more than 64% world market share. These modules are upgraded to produce more than 1.5 million tons of DRI annually.

From metallurgical stand point steel melt shop performance is greatly influenced by the quality of the metallic input. With competitive world wide performances of electric arc furnaces, the improvement in this area demands major changes in the chemical and physical characteristics of metallic inputs. Moreover there is a shortage of good and consistent quality scrap for electric arc furnaces. Therefore, more and more use of DRI /Sponge iron is being

Tel: 03 - 812 2966 - Fax: 03 812 1059

GLIMPSES OF IEP-SAC ACTIVITIES

Right: H.E..Admiral (Retd) Sahid Karim Ullah, Ambassador of Pakistan to Saudi Arabia, is addressing to the audience of the seminar on 31st May 2007.

Center: Engr. Dr. Nazar Malik, General Secretary IEP-SAC, is speaking on *"Emerging Trends in Electrical Power Systems Related Technologies"* at the occasion of a seminar.

Left: Engr Rizwan Ahmed, Chairman IEP-SAC Sub-center is presenting his annual report on Eastern province activities.

Down: An impressive view of the audience of the seminar.

A group photo of the IEP-SAC Local Council members with the Ambassador at the occasion of a seminar on *"Emerging Trends in Electrical Power Systems Related Technologies"* held on 31st May 2007. Standing from left to right are: Engr, Rizwan Ahmed, Engr. Obadullah Siddiqi, Engr. Saifullah Saleem, Engr. Abdul Waheed Mir, Engr Jaleel Hasan, Engr. Dr. Nazar Malik, H.E..Admiral (Retd) Sahid Karim Ullah, Engr. Masood Khan, Engr. Mubashir Kirmani, Engr. Sheikh Akhtar Hussan, Engr. Naveed Ahmed, Engr. Khalil Ahmed, Engr. Shaikh Asrar Ahmed and Engr. Kauser Butt.

GLIMPSES OF IEP-SAC ACTIVITIES

H.E..Admiral (Retd) Sahid Karim Ullah, Ambassador of Pakistan to Saudi Arabia, is addressing to the audience of the seminar.

H.E..Admiral (Retd) Sahid Karim Ullah is meeting the guests.

H.E. is receiving a copy of the IEP-SAC Journal.

Left: H.E..Admiral (Retd) Sahid Karim Ullah is visiting the sponsor's stand. Prominent in picture are Engr. Khalil Ahmed, Engr. Naveed Ahmed, Engr. Mubashir Kirmani, Engr, Engr Jaleel Hasan, H.E..Admiral (Retd) Sahid Karim Ullah, Engr. Masood Khan and Engr. Shaikh Asrar Ahmed.

Right: A group photo of the engineers with the Ambassador H.E..Admiral (Retd) Sahid Karim.

GLIMPSES OF IEP-SAC ACTIVITIES

H.E..Admiral (Retd) Sahid Karim Ullah is presenting mementos to the Speaker, Engr. Dr. Nazar Malik, Engr. Rizwan Ahmed and Engr. Mubashir Kirmani on the occasion of a seminar on *"Emerging Trends in Electrical Power Systems Related Technologies"* held on 31st May 2007..

H.E..Admiral (Retd) Sahid Karim Ullah is presenting certificates to Engr. Abdul Waheed Mir, Engr. Sheikh Akhtar Hussan and Engr. Naveed Ahmed for the meritorious services rendered for advancing the cause of engineering profession.

Engineer Aftab Islam Agha, President of IEP Pakistan, is presenting mementos to Engr. Obadullah Siddiqi, Engr. Shaikh Asrar Ahmed and Engr. Saifullah Saleem on the occasion of a seminar on *"Contributions of Engineering Profession in the Development of Pakistan"* held on 30th Nov 2007.

Left: H.E..Admiral (Retd) Sahid Karim Ullah is presenting a memento to the Speaker Engineer Aftab Islam Agha.
Center & Right: Engineer Aftab Islam Agha, President of IEP Pakistan, is presenting Diplomas to Pakistani engineers.

GLIMPSES OF IEP-SAC ACTIVITIES

Right: H.E..Admiral (Retd) Sahid Karim Ullah, Ambassador of Pakistan to Saudi Arabia, is addressing to the audience of the seminar on 30th Nov 2007.

Center: Engr. Aftab Islam Agha, President Institution of Engineers Pakistan, is presenting his Paper on *"Contributions of Engineering Profession in the Development of Pakistan: Past, Present and Future Prospects"* at the occasion of a seminar.

Left: Engr Masood Khan, Chairman IEP-SAC is speaking to the audience of the seminar.

Down: An view of the audience of the seminar.

A group photo of the IEP-SAC Local Council members with the Ambassador at the occasion of a seminar on *"Contributions of Engineering Profession in the Development of Pakistan: Past, Present and Future Prospects"* held on 30th November 2007. Sitting in the front row are: Engr. Mubashir Kirmani, Engr. Masood Khan, H.E..Admiral (Retd) Sahid Karim Ullah, Engr. Aftab Islam Agha and Engr. Dr. Nazar Malik. Standing in the back row are: Engr. Saifullah Saleem, Engr. Naveed Ahmed, Engr. Syed Faiz Ahmed, Engr. Shaikh Asrar Ahmed, Engr. Khalil Ahmed, Engr. Obadullah Siddiqi, Engr Jaleel Hasan and Engr. Syed Zafar Ahmed.

GLIMPSES OF IEP-SAC ACTIVITIES

Right: Engr. Siraj-ul-Huda Siddiqui is receiting verses from the Holy Quran at the occasion of a seminar on *"Contributions of Engineering Profession in the Development of Pakistan: Past, Present and Future Prospects"* held on 30th November 2007.

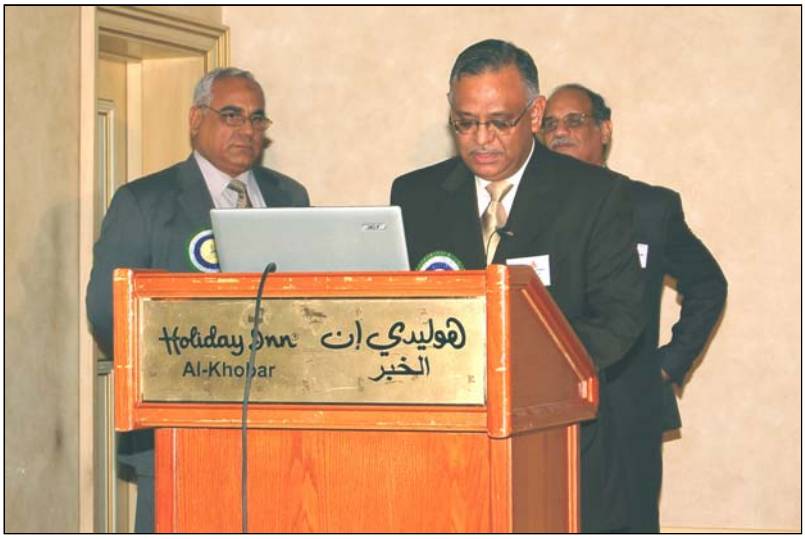
Center: Engr. Dr. Nazar Malik, General Secretary IEPSAC, is presenting his report on the IEPSAC activities at the occasion of a seminar.

Left: The moderator, Engr. Mubashir Kirmani, is conducting a seminar.

Down: A view of the stage. Sitting from left to right are: Engr. Mubashir Kirmani, Engr. Masood Khan, H.E..Admiral (Retd) Sahid Karim Ullah, Engr. Aftab Islam Agha and Engr. Dr. Nazar Malik...

A group photo of the engineers with the Speaker Engr. Aftab Islam Agha, President Institution of Engineering Pakistan at the occasion of the seminar on *"Contributions of Engineering Profession in the Development of Pakistan: Past, Present and Future Prospects"* held on 30th November 2007.

GLIMPSES OF IEP-SAC ACTIVITIES



Engr. Rizwan Ahmad, Chairman IEP-SAC-EP is taking charge from Ex-Chairman, Engr. Ismet Amin Khawaja. At the occasion of a seminar on *"Innovative Industrial Flooring System"* held on 26th November 2007.

Mr. Adnan Al-Nueim, Secretary General Chamber of Commerce & Industry Eastern Provience, is presenting a shield to Engr. Aymen Mamoon, keynote Speaker of the seminar on *"Innovative Industrial Flooring System"* held on 26th November 2007 at Holiday Inn, Al-Khobar.

A group photo of the IEP-SAC-EP Local Council members with Mr. Adnan Al-Nueim, Secretary Chamber of Commerce & Industry Eastern Provience, and the Speaker Engr. Aymen Mamoon, Customer Group Manager SIKA, at the occasion of a seminar on *"Innovative Industrial Flooring System"* held on 26th November 2007.

GLIMPSES OF IEP-SAC ACTIVITIES

The kids are participating in *"50 meter Race"* and *"Spoon Collection"* events
at the occasion of *"Annual Picnic and Family Get-together"* held on 29th February 2008.

Left: The organizers are announcing the results of the *"Bait Bazi"* competition.
Center & Right: The engineers are participating in *"Table Tennis"* and *"Carrom Board"* competitions.

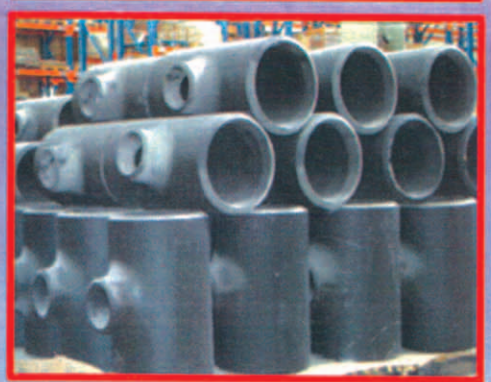
Left & Center: A group of participants is relaxing and chating at the occasion of *"Annual Picnic and Family Get-together"*.
Right: The organizers are getting ready to distribute prizes to the winners, and the raffle draw.

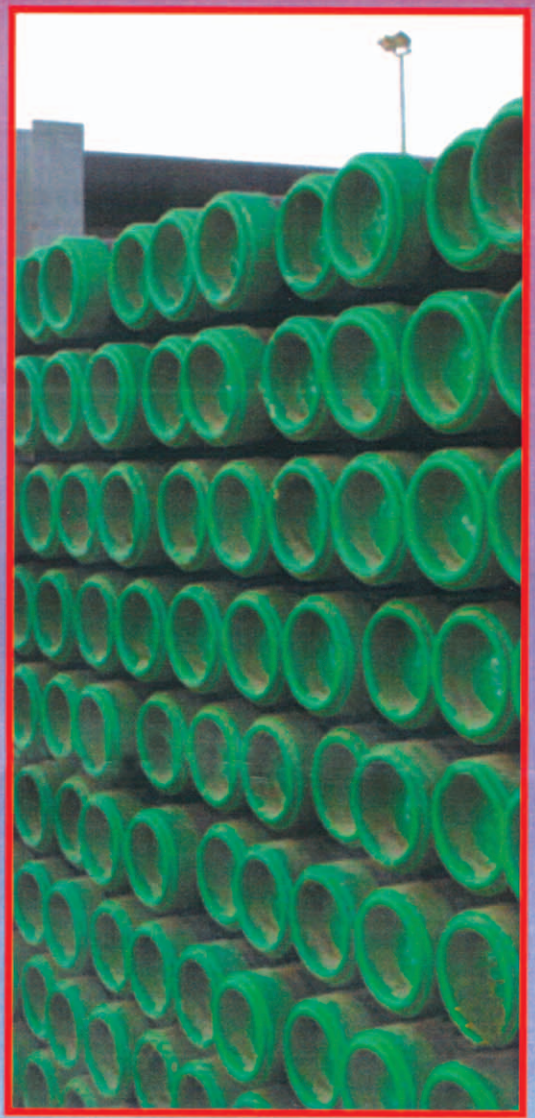
Left & Right: The engineers are participating in *"Spoon Race"* and *"Musical Chair"* competition.
Center: The organizers of the Picnic are distributing prizes to the competition winners.

GERAB NATIONAL ENTERPRISES Est.

Committed to the Oil, Gas, Petrochemical & Power Industries

STOCKIST OF PIPES, FLANGES, FITTINGS VALVES, GASKETS & STUD BOLTS





EXSTOCK AVAILABLE FROM OUR STOCKING & WAREHOUSING FACILITIES IN KSA (DAMMAM)

ISO 9001 Certified

P.O. BOX: 2867, PETROMIN ROAD DAMMAM PORT - 31461, SAUDI ARABIA

Tel: +966-3-8574577

Fax:+966-3-8571220

DUBAI • U.S.A • OMAN • KUWAIT • ABU DHABI • QATAR • INDIA

e-mail:gerab@sahara.com.sa

www.gerab.ae

We Offer our Expertise in Fulfilling your Dreams to Reality

Industrial Specialized Projects:

- **Production Plants / Factories**
- **Warehouses / Cold Storage houses**
- **Specialized Civil Works of Energy Plants and Industrial Project**

Our major projects

Group Five Pipe Saudi-Dammam

The Leading Contractor in Eastern Provence

MULTIBUILD

MULTIPLE BUILDERS, LTD. شركة الإنشاءات المتعددة المحدودة

Tel. (03) 867-1558 Fax: (03) 867-2272 (٠٣) ٨٦٧ - ٢٢٧٢ فاكس: ت: ١٥٥٨-٨٦٧ (٠٣)

HTE مؤسسة الخط الرئيسي التجارية
Headline Trading Est.
Importers, Exporters & Suppliers to the Oilfield.
Fabrication, Mechanical & Electrical, Consumable & General Trading.

HMC شركة الخط الرئيسي الصيانة
Headline Maintenance Co.
Importers, Exporters & Suppliers to the Oilfield.
Fabrication, Mechanical & Electrical, Consumable & General Trading.

Al-Khobar
P.O. Box 70182 **Al-Khobar** 31952
Tel: 00966 (03) 8570931,8593253
Fax: 00966 (03) 8591865
Kingdom of Saudi Arabia
E-mail: headline.ksa@gmail.com

DUBAI:
Al-Quoz Industrial Area
Tel: (00971-4) 3475675
Fax: (00971-4) 347 5485
E-mail: commercial@hbm.ae

Bahrain:
Office No. 42, Bldg 20,
Road 385, Block 305,
Manama, Kingdom of Bahrain
E-mail: hbm.bahrain@yahoo.co.uk

WE (HEADLINE TRADING EST) HAVE EVERY FACILITY TO ENABLE IT TO SERVE THE MARKET REQUIREMENTS.
WE HAVE EXPERIENCED SALES STAFF TO HANDLE YOUR REQUIREMENTS;
WELLTRAINED OFFICE STAFF IS AVAILABLE TO HANDLE DOCUMENTATION AND LOGOSTICS.

IN THIS CONTEXT WE WOULD LIKE TO MENTION ABOUT OUR BIG WARE HOUSE & VARIETY OF PRODUCTS IN THE FIELD OF HARDWARE, HERE THOUGH IT IS NOT POSSIBLE TO GIVE DETAIL OF ALL OUR PRODUCTS WE ARE ABLE TO PROVIDE BUT SOME OF OUR MAIN PRODUCTS WE WOULD LIKE TO GIVE IN DETAIL HEREUNDER

HARDWARE PRODUCTS DETAILS: -

- *ALL TYPE OF BOLTS/NUTS/WASHERS (COMPLETE IN VARIETY).*
- *ROUND BARS AS PER LATEST SPECIFICATIONS OF ASTM, ASME, DIN STANDARDS. (WITH CERTIFICATE).*
- *ALLOY STUD BOLTS.*
- *EXPANSION BOLTS (RAWALPLUG)*
- *CHEMICAL ANCHORS*
- *LADDER RUNG WITH (Red PVC Coated)*
- *WIRE MESH (GALV & PVC COATED)*
- *RUBBER SHEETS (AWAZEL)*
- *POLYTHIN ROLLS*
- *WELDING ACCESSORIES (Cable Connectors)*
- *FIRE BLANKET*
- *THREADED RODS.*
- *SELF-DRILLING SCREWS/ NAILS.*
- *WIRE & WELDING ELECTRODE.*
- *MASONARY/ CARPENTARY TOOLS.*
- *ALL KIND OF CUTTING & GRINDING DISCS.*
- *COMPLETE VARIETY OF SAFETY EQUIPMENTS.*
- *FILLER BOARD (Fiber flex) HUNTON*
- *SPART PARTS FOR TURBINES/ PUMPS ETC.*
- *TRANSMISSION & DISTRIBUTION MATERIAL.*
- *POLELINE HARDWARE ITEMS.*

FABRICATION SERVICES: -

IN THIS WE WOULD LIKE TO MENTION MAIN TYPE OF PRODUCTS WE ARE FABRICATING i.e.: "I"/"J"/"T"/"U" TYPE OF BOLTS, MORE IN THIS FIELD WE ARE ABLE TO PROVIDE ALL KIND OF JOBS ON OUR VALUEABLE CUSTOMER DEMAND WE CAN FABRICATE EVERYTHING AS PER INSTRUCTIONS GIVEN.

COATING & GALVANIZING SERVICES AS ARAMCO & SCECO APPROVED:

- *FLUOROPOLYMER COATING.*
- *PVC COATING*
- *ELECTOR GALVANIZING.*
- *BLUE/ YELLOW PASSIVATIVE*
- *CADIMUM PLATING.*
- *NICKLE PLATING.*
- *HOT DIP GALVANIZING.*

LIFTING ACCESSORIES:-

- *STEELWIRE ROPE.*
- *CHAINS (GALV & BLACK)*
- *STEEL WIRE ROPE SLINGS*
- *POLYESTER WEB SLINGS*
- *LASHING BELTS*
- *HOOKS*
- *SHACKLES (CROSSBY)/ LOAD BINDERS SERVICES DETAILS:·*

STANLEY PROTO
STANLEY

uvex

Zamil Ladders الزامل للسلالم

HTE مؤسسة الخط الرئيسي التجارية
Headline Trading Est.
Importers, Exporters & Suppliers to the Oilfield.
Fabrication, Mechanical & Electrical, Consumable & General Trading.

THE INSTITUTION OF ENGINEERS PAKISTAN
SAUDI ARABIAN CENTRE

نقابة المهندسين الباكستانين - مركز المملكة العربية السعودية

http://www.iep-sa.org
P.O.Box 50344, Riyadh 11523
Kingdom of Saudi Arabia

Phone: (01) 464-1498
Fax: (01) 462-6769
E-Mail: info@iep-sa.org

GENERAL SECRETARY'S ANNUAL REPORT

I have the pleasure to present the annual report of IEP-SAC on the activities and events that took place during the year 2007-2008. IEP-SAC has been actively pursing its objective of creating a community spirit and fellowship among Pakistani Engineers working in the Kingdom of Saudi Arabia. In addition, IEP-SAC strives for disseminating and sharing of latest technical knowledge among engineers. IEP-SAC also runs an ambitious scholarship program. IEP-SAC has continued to pursue its above stated objectives in this reporting period with full enthusiasm as reported next.

IEP-SAC organized its annual seminar and dinner on May 31, 2007. Seminar topic was *"Emerging trends in electrical power systems related technologies"*. Speaker was Professor Nazar Hussain Malik from Electrical Engineering Department, King Saud University, Riyadh. Venue was Marriott Hotel, Maather Street Riyadh. On this occasion IEP-SAC also published its annual Journal including the directory of Pakistani engineers residing in the Kingdom of Saudi Arabia. A second technical Seminar was organized on 30 November, 2007. The topic of this seminar was *"Contributions of Engineering Profession in the Development of Pakistan: Past, Present and Future Prospects"*. The presentation was given by Engineer Aftab Agha, President of IEP Pakistan. Venue was Auditorium of Saudi German Hospital. The seminar proved to be very interesting and was well received by engineering community in Riyadh.

The great annual social event of IEP-SAC is the family picnic. One family picnics was organized during the reporting period on 29 February, 2008. The picnic was attended by more than 400 people and was a full day event. Such picnics provide opportunities for cementing ties among engineering community in a relaxing and entertaining environment.

IEP-SAC has continued its scholarships awards program to provide financial assistance to the needy and deserving students in Pakistan. The recipients are selected from 11 public sector Engineering Universities / Colleges spread in Pakistan and Azad Kashmir. Each award is for four year undergraduate study in any field of engineering.

We are thankful to the government of Custodian of Two Holy Mosques, King Abdullah Bin Abdul Aziz Al-Saud for facilitating our stay in the Kingdom. I am thankful to our Council members in making all of the above events a great success. I also appreciate the support and guidance of IEP head quarter and the full support we enjoy from the Pakistan Embassy in Riyadh. I am grateful for the support of all Pakistani engineers living in the Kingdom and my personal appreciation of our Chairman IEP-SAC Engr. Masood Khan and his predecessor, Engr. Jaleel Hasan for their support and guidance in running the affairs of IEP-SAC. Finally I wish to convey my deep appreciation to all brother engineers, sponsors, advertiser, guests, press and media personnel and well wishers for their cooperation and support of IEP-SAC activities.

ENGR. DR. NAZAR H. MALIK
General Secretary
Institution pf Engineers Pakistan
Saudi Arabian Centre

Al-Osais Int'l. Holding Co.

P.O. Box 1083, Dammam 31431, Kingdom of Saudi Arabia
Head Office: Tel: +966 3 811 3333 Fax: +966 3 811 3334
Email: osais@osais.com Website: www.alosais.com

A leading global multifunction group known by its commitments

A leading Saudi construction company in a class of its own. We provide Civil, Mechanical, power & telecom Engineering & construction services to private & Public Sectors.

Al-Osais Contracting Co.
P.O. Box 1083, Dammam 31431
Kingdom of Saudi Arabia
Tel: +966 3 811 3333
Fax: +966 3 811 3334
Email: osais@osais.com
Website: www.alosais.com

A leading & most experienced Industrial Services Co. in the GCC, covering widest range of Industrial Maintenance, thrust-boring & Support services. We also have international presence with offices in Malaysia, China, Thailand, Singapore & India.

ANABEEB Pipeline & Services Co.
P.O. Box 234, Al Jubail 31951
Kingdom of Saudi Arabia
Tel: +966 3 362 0556
Fax: +966 3 361 4990
Email: info@anabeeb.net
Website: www.anabeeb.com

A leading support company of al Osais offering total solutions for road constructions & maintenance. From earth work, raw material preparation to transportation and asphalt laying, we offer every solution driven with latest technology.

Al Osais Transportation & Road Construction Co.
P.O. Box14044, Dammam 31424
Kingdom of Saudi Arabia
Tel: +966 3 820 3390 / 811 5982
Fax: +966 3 820 5750 / 811 5983
Email: transport @alosais.com
Website: www.alosais.com

A manufacturer of precision engineered structural steel for the construction industry. The factory is equipped with the latest & high quality machines & equipments with automatic computer controlled engineering facilities.

Al Arabi Factory For Steel Works
P.O. Box 14044, Dammam 31424
Kingdom of Saudi Arabia
Tel: +966 3 812 3070
Fax: +966 3 812 3339
Email: info@asfsteel.com
Website: www.ASFsteel.com

A premier service led supplier of a vast range of industrial & construction consumables and materials in the Kingdom of Saudi Arabia.

Al-Osais Ind'l. & Structural Supply Co.
P.O. Box 13376, Dammam 31493
Kingdom of Saudi Arabia
Tel: +966 3 811 2225
Fax: +966 3 811 5969
Email: osaissupp@yahoo.com
Website: www.alosais.com

A high quality supplier of Electrical, Electronic, Construction and Industrial materials & equipments in the kingdom of Saudi Arabia.

MGA Trading Est.
P.O. Box 9377, Dammam 31413
Kingdom of Saudi Arabia
Tel: +966 3 858 4783
Fax: +966 3 858 4782
Email: mga@mgat.com
Website: www.mgat.com.sa

OTHER SUBSIDIARY / AFFILIATED COMPANIES ARE:

Al-Osais Hiring Co., Al-Osais Tele-Communication, Middle East Resources Company (MERCO), Al-Osais Petroleum & Services Co., Al-Osais Real Estate Investment Co., Al-Osais MCM Co.Ltd. Inabensa Saudi, Middle East Weighing Systems, Baseelah Mechanical Works, Al-Berri United Food Co. Rehal Alsharq Logistic Services Co., MGA Consultant Engineering Office.

شركة بناء الأساسات للمقاولات المحدودة
Foundations Building Contracting Co. Ltd.

أعمال
خوازيق وركائز
Piling
Bored Cast-in-Place
Driven, Steel

أعمال
حقن وتقوية التربة
Grouting
Stabilization
Anchors
Structures

هندسة صخور
Rock Engineering
Drilling
Botling
Splitting
Anchors
Blast Holes

أعمال
أساسات خاصة
Special
Foundations
Transmission Lines
Sub Structures

شفط مياه
Dewatering

تلفون : ٨٦٤٦٥٩٣ (٩٦٦٣)– فاكس : ٨٩٤٥٨٦٩ (٩٦٦٣) – ص . ب ٣١٢٦٩ الخبر ٣١٩٥٢ – المملكة العربية السعودية

Tel.: (966 3) 8646593 - Fax: (966 3) 8945869 - P. O. Box 31269, Al-Khobar 31952 - Saudi Arabia

e-mail : fbcc_sa@hotmail.com بريد الكتروني:

Arabian Electrical Transmission Line Construction Co. Ltd.

The recognized leader in Transmission and Distribution projects.

Arabian Electrical Transmission Line Construction Company (AETCON) is a joint Venture of a TAMIMI CO and ICC(PVT) Limited Pakistan. ICC Further expanded its business in the Kingdom of Saudi Arabia For the Construction of Substations And Transmission Lines On Turnkey basis and registered AETCON in 1998.

AETCON Projects

380 kV OHTL (Turnkey) On-Going	104 KM
132 kV OHTL (Turnkey) On-Going	184 KM
132 kV OHL (Turnkey)	110 KM
69 kV OHL (Main Contractor)	19 KM
380 kV T/Line Erection & Stringing	365 KM
132 kV T/Line Erection & Stringing	250 KM
Replacement of OGW with OPGW	120 KM
Construction of HV/LV Distribution Lines	25 KM

AETCON QUALITY POLICY

At AETCON, it's a continuing process geared at achieving still better results in the future. Every member of AETCON is committing to achieve the highest possible Quality of project products and processes to meet the stated and implied needs of both the external and internal clients

SAUDI ARABIA OFFICE :
ARABIAN ELECTRICAL TRANSMISSION-LINE CONSTRUCTION CO. LTD. (AETCON)
A TAMIMI COMPANY & ICC (PVT) LTD. JOINT VENTURE - LIMITED LIABILITY COMPANY
P.O BOX 172 DAMMAM 31411 TEL : 00 966 3 - 889 - 1609, 889 - 1596, 889 - 1576 - FAX : 889 - 1640 - SAUDI ARABIA
E-mail : aetcon@aetcon.com

PROJECT OFFICE-RIYADH :
P.O BOX 250974, Riyadh-11391
PHONES : (01) 4028019 , (01) 4037519 (PABX) FAX : (01) 4027135 E-mail : aetcon-po@aetcon.com

PAKISTAN OFFICE :
242 - A ANAND ROAD, UPPER MALL, P.O BOX 1280, LAHORE - 54000, PAKISTAN E-mail : icc@iccpvt.com
PHONES: (042) - 5757123 - 28 FAX: 92 - 42 - 571 2594, 575 3664 URL : www.iccpvt.com

THE INSTITUTION OF ENGINEERS PAKISTAN
SAUDI ARABIAN CENTRE

نقابة المهندسين الباكستانين - مركز المملكة العربية السعودية

http://www.iep-sa.org
P.O.Box 50344, Riyadh 11523
Kingdom of Saudi Arabia

Phone: (01) 464-1498
Fax: (01) 462-6769
E-Mail: info@iep-sa.org

AWARDS AND SCHOLARSHIP COMMITTEE
CONVENER'S REPORT

AL-QURAN

To spend your substance, out of love for him, for your kin, for orphans, for the ***needy****, for the wayfarer, for those who ask and for the ransom of slaves; (2:177)*

If ye disclose (acts of) charity, even so it is well, but if ye conceal them, and make them reach, those (really) in ***needs****, that is best for you. It will remove from you some of your (stains of) evil. And Allah is well acquainted with what ye do. (2:271)*

By the grace Allah the Almighty, the scholarship program for needy and academically sound students in Pakistani Engineering Universities and Colleges was launched in the year 1996. Eleven Universities and Colleges – as listed below - are taking benefit from this program.

1. University of Engineering and Technology, Lahore
2. University of Engineering and Technology, Taxila
3. University College of Engineering and Technology (Bahauddin Zakariya University), Multan
4. Institute of Chemical Engineering and Technology (University of the Punjab), Lahore
5. Dawood College of Engineering and Technology, Karachi – Affiliated with Mehran UET Jamshoro
6. NED University of Engineering and Technology, Karachi
7. Mehran University of Engineering and Technology, Jamshoro
8. Quaid-e-Awam University of Engineering Sciences and Technology, Nawabshah
9. NWFP University of Engineering and Technology, Peshawar
10. Balochistan University of Engineering and Technology, Khuzdar
11. University College of Engineering and Technology, Mirpur (AJ&K)

This program serves all the four provinces of the Islamic Republic of Pakistan and the State of Azad Jammu and Kashmir. The Rules and Regulations, Selection Criteria and Application Forms can be read and printed out from IEP-SAC website (http://www.iepsac.org). Eleven (12) batches for 196 needy students had been launched so far. By the help and blessing of Allah the Almighty, 107 students are serving our homeland after graduation by benefiting from this program.

We had started the scholarship program 12 years ago and we had maintained its continuity. I take this opportunity and appeal to engineers in particular and Pakistani community in general to please join hands in this noble and just cause. It is a great service to Pakistan. Let us make more efforts to continue and expand the program. Your suggestions to improve the program further will be most welcomed. For more information please contact any of the members of Awards and Scholarship Committee or any Local Council Member.

ENGR. ABDUR RASHID SHAD
Convener Awards and Scholarship Committee
Institution of Engineers Pakistan
Saudi Arabian Centre

Al-SinSinah Contracting Est.

General Contracting, & Electro. Mechanical Contractor

Prop.: Waled Al-Homaydan

C.R.: 1010206158

مؤسسة السنسنة للمقاولات

مقاولات عامة وأعمال الكهرباء والميكانيكا

لصاحبها : وليد أحمد الحميدان

س.ت ١٠١٠٢٠٦١٥٨

Al-SinSinah Contracting Est. is well known company in the field of Construction by applying the highest quality of workmanship.

Our Specialties Include:

1. Fabrication of Piping & Steel
2. All type of Electro-Mechanical Works

For Information & Contact:

Tel. # 00966 1-2434449
Fax. # 00966 1-2417639

Postal Address:

P.O. Box 230093
Riyadh 11541

الرياض - الخالدية - شارع الثلاثين - هاتف : ٢٤٣٤٤٤٩ ٠١ - فاكس : ٢٤١٧٦٣٩ ٠١ - ص.ب ٢٣٠٠٩٣ الرمز البريدي ١١٥٤١

Riyadh - Al-Khaldyah - 30th Street - Tel.: 01 2434449 - Fax : 01 2417639 - P.O. Box 230093 Code 11541

TROOUG WA TEHLA CONTRACTING ESTABLISHMENT

A fast growing contracting enterprise, providing valuable services to cater the growing needs of Industrial & Power plant sectors in the Kingdom of SAUDI ARABIA for the last many years, emphasizing on quality and standards to achieve the goal of clients satisfaction in high tech competitive environment.

We have the honor to be amongst the registered Sub-contractors of GE, RAYTHEON, SAIPM, MARAFIQ and many other companies of outstanding repute.

OUR EXPERTIES INCLUDES:

- Electrical & Mechanical Construction work
- Industrial Maintenance
- Fabrication & Welding
- Structural Steel Work
- Piping Installations
- Construction & Power Plants

FOR INFORMATION & CONTACT:

HEAD OFFICE:
P.O. Box 1050,Al-Jubail 31951,K.S.A
Tel: 00966 3 361 1748
Fax: 00966 3 361 3104

RIYADH OFFICE:
P.O. Box 321224, Riyadh 11343,K.S.A
Tel: 00966 1 260 6681
Fax: 00966 1 260 6658

E-Mail: info@troougwatehla.com
Website: www.troougwatehla.com

ROLE OF ENGINEERS IN THE ECONOMIC DEVELOPMENT OF PAKISTAN

BY ENGR. AFTAB ISLAM AGHA
President Institution of Engineers Pakistan
Lahore, Pakistan

INTRODUCTION

The significance of the contributions made by engineers in the development and progress of a nation hardly needs any emphasis. Engineers, since time immemorial have been around and with the power of their knowledge and its immense application for making this world a better place to live in have helped to solve innumerable problems faced by mankind. This endeavor continues to manifest itself to this day and it will be so for all times to come. Practically every man made system, product and facility around us, in one way or the other, is the result of creative work of engineers. In fact throughout all stages of evolution of human civilization the entire spectrum of human progress and achievements owe its genesis to the devotion and dedication of engineers. There are countless examples of spectacular engineering feats dating back to ancient times.

Engineering makes a better world and the engineers build the better world. Almost 85% of the development budget of a country is incurred through the hands of engineers by way of planning, execution, evaluation or monitoring, etc.

Engineering is a practical and physical expression of theoretical research in various disciplines of science. An ideal engineer is a composite… he is not a scientist, he is not a sociologist or a writer, but he may use the knowledge and techniques of any or all of these disciplines in solving engineering problems. The engineers translate the theoretical into the practical; the development of science and technology in general and of engineering in particular, has become crucial for the survival and progress of countries. "Scientist" investigates that which already is; engineers create that which has never been. Defined as the one who is professionally engaged in a discipline of engineering, an engineer applies the principles of science and mathematics to develop efficient and economical solutions to technological problems of varied nature and diversified spectrum.

The engineers play a vital role not only in the economic development of countries, but also towards enrichment of human civilization and cultural heritage. The great miracles of the world i.e. pyramids of ancient Egypt, hanging gardens of Babylon, great wall of China, etc, are all engineering works. There are crucially-important contributions of the engineers in all sectors since the creation of the Islamic Republic of Pakistan- - - raising practically from zero level, be it railways or road works, waterways or power generation, agriculture or construction, mining or industry, employment or environment, transport or telecommunication, population or healthcare, defense or other strategic areas. Indeed the economic growth, industrialization and infrastructure development witnessed during the last sixty years or so would have not been possible without the effective involvement of the engineers.

The design and construction of all infrastructure projects e.g. bridges, roads, tunnels, harbors, airfields are primarily the manifestations of the creativity and skills of engineers.

The Pakistani nation has achieved many landmarks as a sovereign developing Islamic State. The major achievements of Pakistan during last decade particularly in the field of engineering and technology are generally commendable for more than one reasons. The growth in economy is fastest in Asia, surpassed only by China and India. Their achievements have had positive and far reaching impact on economy and society.

The status of growth and development in various fields is discussed below:

Table 1: Pakistan GDP

Year	GDP (in billion Rs.)
2000-01	4,162.654
2001-02	4,401.699
2002-03	4,822.842
003-04	5,640.580
2004-05	6,581.103
2005-06	7,713.064
2006-07	8,706.917

TRANSPORT

Road Transport

Road transport is the backbone of Pakistan's transport system, accounting for 90 percent of national passenger traffic and 96 percent of freight movement. Over the past ten years, road traffic – both passenger and freight – has grown much faster than the country's economic growth. A total of 10,849 km long National Highway and Motorway network contributes 4.2 percent of the total road network. They carry 90 percent of Pakistan's total traffic.

Pakistan, with about 160 million people, has a reasonably developed transport system. However, when compared with other developed and developing countries, the road density of Pakistan is still low.

Road Network

Pakistan has a road network covering 259,197 KM including 172,827 KM of high type roads and 86,370 KM of low type roads. 600 km long – 6 lane high class motorway is a piece of classic achievement of Pakistan's Engineers. Total roads, which were 229,595 KM in 1996-97, increased to 259,197 KM by 2006-07 an increase of 13 percent. Extent of high type roads have increased by 37 percent since 1996-97. A sizable and continuous improvement of the high type road network can be observed from 2001 to 2007, where the network grew at an average rate of 3.3 percent. As a result of an emphasis on high type roads, many low typed roads were converted to high typed roads during this period.

National Highway Authority (NHA)

The NHA is currently the custodian of nearly all of Pakistan's major inter-provincial road links called the national highways, including the motorways and strategic roads. These roads comprise only around 4 percent of Pakistan's total road network but carry 80 percent of the country's commercial traffic. Consequently, the network is under pressure and its importance from a development perspective cannot be over emphasized.

The future Vision for the transport sector is the establishment of an efficient and well integrated system which will facilitate the development of a competitive economy and poverty reduction, while ensuring safety in mobility. The strategic thrust is on optimal utilisation of the existing capacity, improved management, and co-ordinated use of various modes of transport. Private sector in the sector needs to be enhanced and institutional capacity building activities undertaken to enhance sector efficiencies.

Pakistan Railways

A well functioning railway system is crucial for sustainable economic growth. Railways have a definite edge over roads for long haul and mass scale traffic movement, both for passenger and freight, as a safe, economical and environment friendly mode of transport. It not only contributes to economic growth but also promotes national integration. Pakistan Railways was the primary mode of transportation in the country till seventies. However, due to diversion of resources to expansion of road network, the performance of Pakistan Railway declined and it's share of inland traffic reduced from 41 percent to 10 percent for passengers and 73 percent to 4 percent for freight traffic.

During the last seven years (2000-2007), Pakistan Railways has shown improving trend in both passenger and freight traffic, registering an average increase of 5.6 percent and 8.0 percent per annum, respectively. The positive growth trend for seven consecutive years (2000-2007) can be attributed to the wide range of improvements made by the Pakistan Railways through completion of a number of development projects and better policies aimed at modernization of railway system. Pakistan Railways has introduced 9 new train services in order to facilitate passengers as well as freight customers.

Civil Aviation Authority (CAA)

After the completion of a new terminal complex (NTCL) at the Lahore Airport, the construction of a new Islamabad International Airport (NIIA) is expected to play a major role in the national aviation sector. The airport shall be developed by the Civil Aviation Authority (CAA) on self-finance basis with an estimated total cost of Rs. 25 billion on 3200 acres of land. The CAA is also going to undertake the development work on the New Gwadar International Airport through Public Sector Development Programme (PSDP), at a total estimated cost of Rs. 3.6 billion. The airport is planned for latest generation wide bodied aircraft in order to accommodate all the future requirements of Gwadar city. A new green field international airport, initiated by the local business community, has been completed in Sialkot on a Build, Own and Operate (BOO) basis and is mainly for commercial purposes. It is likely to boost exports of leather and surgical goods. The plans for upgrading Multan and Peshawar International Airports have also been prepared with estimated cost of Rs. 2.6 billion and Rs. 0.6 billion respectively.

Karachi Port Trust (KPT)

The steady and continuous progress made by KPT has helped boost the national economy. The KPT established an annual cargo handling record of over 32.3 million tons during 2005-06.

The existing port facilities, however, appear to be inadequate to handle the growing cargo at the port. To address these constraints, the KPT has launched a number of projects, which are at different stages of execution.

Port Qasim

Port Qasim is another fast becoming a major contributor to national economy with an impressive growth in port operations.

Gwadar Port

The Gawadar port was inaugurated on 20th March 2007. This port is being developed as one of the most modern ports of the world and would be an integral component of the trade corridor for Central Asian states, China and the Gulf countries as 60 percent trade of oil and gas is done through this route.

To ensure future development is carried out in an orderly, coordinated and planned manner, the Authority has appointed Arthur D. Little (ADL) Malaysia, Lyon Associates, USA and Indus Associated Pakistan to prepare a Master Plan for the port, the related infrastructure and business plan for the port.

TELECOM SECTOR GROWTH

Teledensity of the country has improved many folds in the last couple of years. Currently the total teledensity in Pakistan is over 40.2 percent, which was just 2.8 percent at the end of 2000. Total number of mobile subscribers in Pakistan crossed 55.6 million by the end of March 2007 whereby mobile density has hit 35.8 percent, far surpassing the fixed line teledensity which is 3.32 percent with total working connections of 5.2 million. The Wireless Local Loop (WLL) subscribers are also on the rise and have reached 1.6 million. Similarly, value added services, such as payphones and Internet usage are also on the rise. There are 353,194 PCOs working across Pakistan and more than 2.4 million registered Internet subscribers with an estimated 12 million Internet users.

With perhaps every global IT company in the world having a presence in Pakistan, and with revenues growing by 30-40 percent year on year, the IT industry is probably the most exciting and dynamic sector in Pakistan today.

Telecom sector is a major contributor to government revenue. During the year 2005-06 total revenue collected by the government in the form of taxes and PTA deposits was more than Rs. 77 billion.

Keeping in view the rising demand of AJK and Northern Areas for advanced telecom facilities, the PTA has initiated the liberalization of telecom sector in the area after the mutual decision of the Governments of Pakistan and AJ&K to open the telecom sector for private operators for enhancing telecom facilities in the region. Mobilink, Warid, Ufone and Telenor were awarded licenses to operate services in AJ&K and NAs. Similarly, licensing for fixed line and wireless local loop is also underway. Currently there are over 260,000 cellular mobile connections in the region provided by the cellular companies:

MANUFACTURING

In the manufacturing sector, Pakistan started almost from the scratch. At the time of independence, there were only one or two textile mills, three cement plants and host of small manufacturing units in the country. During the last 60 years, not only hundreds of textile mills have come up throughout the length and breadth of the country, but food industries, vegetable ghee and sugar mills, cigarette manufacturing units, cement plants and fertilizers factories have also been established.

The lack of diversification in Pakistan's manufacturing sector has been due to heavy protection granted to resource based industries, high rates of import duties on raw materials used in the machinery, equipment, and chemical industries, and zero or low rates of import duties on finished and semi-finished goods relating to these sectors. This is further compounded by widespread smuggling of all consumer durables. Many of these issues have been resolved to some extent through tariff rationalization in the last few years, but further fine tuning is needed to encourage investments in manufacturing.

Traditional industries such as food and textiles industries still account for an overwhelming share of the manufacturing output; food industries accounted for 13.8 percent and textiles industries for 24.0 percent of the total manufacturing value added. On the other hand machine goods producing industries, electrical and non-electrical, and automobile industries accounted for just 4.4 and 4.7 percent of value added respectively. Even though chemical industries accounted for around 15.2 percent of manufacturing output, most of the chemical industrial output is concentrated low-tech and low value added industries.

Global demand for goods does not match what Pakistan produces and sells. The five sectors having the largest share in world trade are machinery, electronics, pharmaceuticals, automobiles, and agricultural products.

Production of selected Industrial items of large scale during last four years is depicted in Table 2.

Textile Industry in Pakistan

Pakistan's textile industry ranks amongst the top in the world. Pakistan is world's fourth largest producer of cotton and the third largest consumer of the same. Cotton based textiles contribute over 60 percent to the total exports, accounts for 46 percent of the total manufacturing and provide employment to 38 percent manufacturing labor force. The availability of cheap labor and basic raw cotton as raw material for textile industry has played the principal role in the growth of the Cotton Textile Industry in Pakistan. With the advent of the quota free global imperative for a rapidly developing country like Pakistan to

Table 2: Production of Selected Industrial Items of Large-Scale

Item	Units	July – April				
		2004-05	2005-06	2005-06	2006-07	% Change
Cotton Yarn	000 tonnes	2280.6	2546.5	2115.8	2369.3	11.9
Cotton Cloth	Mln.Sq. Mtr	924.7	930.3	745.7	797.8	7.0
Sugar	000 tons	3116	2960.0	2941.1	3517.5	19.6
Nitrogenous Fertilizer	000 N. tons	2315.4	2411.8	1991.3	1989.8	(0.08)
Phosphatic Fertilizer	000 N. tons	393.3	415.1	341.8	331.2	(3.10)
Soap & Detergent	000 tonnes	209.2	242.6	199.4	207.8	4.2
Vegetable Ghee	000 tonnes	1048.3	1146.4	969.4	984.1	1.52
Cooking Oil	000 tonnes	226.2	256.5	209.8	224.2	6.8
Cement	000 tonnes	16353	18483	15214	18426	21.11
Cigarettes	Billion Nos.	61.1	64.1	52.2	54.3	4.14
Jeep& Cars	Nos.	128381	163114	129754	133629	3.0
Tractors	Nos.	43746	49439	39745	44274	11.40
L.C.V	Nos.	23613	29581	23494	27498	17.04
Motorcycles/Scooters	Nos.	571145	744875	607084	681752	12.30
Bicycles	000 Nos.	587.9	587.1	498.9	416.6	(16.50)
Paper & Paper Board	000 tonnes.	420.6	476.2	394.9	388.8	(1.54)
T.V Sets	000 Nos.	908.8	966.4	799.6	487.0	(39.09)
Motor Tyres	000 Nos.	5366	5966	4787	5610	17.19
Billets	000 tonnes	2714.7	3508.1	2794.0	3106.3	11.18
Refrigerators	000 Nos.	784.6	861.6	658.2	722.7	9.80
Caustic Soda	000 tonnes	206.7	219.3	180.4	201.3	11.61

Source: Federal Bureau of Statistics

further explore potential new markets both in its neighboring territories as well as distant ones.

The current scenario poses challenges firstly to sustain its global positioning and secondly to increase its market share by both increase in volume as well as increase in unit values. This requires upgradation in resource development both in manufacturing and marketing. The focus needs to be on R & D, technical innovation, product development on one hand and brand and market development on other with the goal of moving up in the global textile value chain.

Engineering Sector

Engineering sector accounts for 63 percent share in world trade. Achieving any significant share of the world trade in engineering goods and services will require concerted efforts by Pakistan in gearing up our universities, poly-techniques and factories for the kind of manufacturing prowess and design capabilities required by the world market.

Automobile Sector

Despite increase in the production of cars in the country, the demand of cars in market is increasing day by day. The production of cars during 2006-2007 registered an increase of 130841 units as compared to last year's figure of 127738 (2.4 percent). Production of buses also increased to 758 from 625 (21.3 percent) in 2005-06 whereas those of LCV's grew by 17.04 percent during the same period. Production of motor cycles increased by 12.30 percent during July-April 2005-06. At the moment there are 47 units producing motor cycles all over the country with an installed capacity of 1648000 per year. Out of these 47 only 6 are members of Pakistan Automotive Manufacturers Association (PAMA) and are hence reporting their production figures to them. Five new units will start production of motor cycles in the coming year.

Fertilizer Industry

There are about six urea manufacturers in the country of which four are listed at the local stock exchanges.

Cement Industry

The last few years have been a golden period for local cement manufacturers, where improving economic fundamentals, government of Pakistan's increased spending on infrastructure development, high commercial activity and rising demand for housing on account of higher income, has kept cement off take growth in double digits.

The cement industry comprises of about 29 firms of which over 21 firms are listed cement manufacturers. The industry is divided into two broad categories; the Northern Region and the Southern Region. The Northern Region has over 87 percent share in total cement dispatches while the manufacturers based in the Southern Region only contribute 13% on average to the annual cement sales. According to the All Pakistan Cement Manufacturers' Association (APCMA), the current industry's capacity for cement is 24 million tons, which is likely to rise to 37 million tons by the end of FY07 given the expansion being undertaken in the sector. On the other hand, consensus expects demand growth to settle at around 17%, which translates into 22 million tons. If the planned expansions come online according to APCMA's estimates, the industry is likely to have a production surplus of about 15mn tons.

Mining and Quarrying

Pakistan has a widely varied geological framework, ranging from pre-Cambrian to the present that includes a number of zones hosting several metallic minerals, industrial minerals, precious and semi-precious stones. Although many efforts have been made in developing geological products, institutional, academic and R&D infrastructure, much remains to be done to enable this sector to take full advantage of its endowment. As a result of various efforts devoted for the development of mineral sector, resources of several minerals have been discovered over the last many decades, including world class resources of lignite coal deposits at Thar, Sindh; porphyry copper-gold deposits in Chagai, Balochistan; Iron ore deposits at Dilband, Balochistan; lead-zinc deposits at Duddar, Balochistan; gypsum, rock salt, limestone, dolomite and china clays etc. in the Indus Basin; ornamental and construction stones in the various parts of the country; and about 30 different gems and precious stone deposits in northern Pakistan. These and many other mineral projects are in various stages of implementation from grass root through exploration and evaluation to development stages.

However, mineral industry in Pakistan shows that over the last few decades this sector has been allocated very small amount - 0.45 percent to 2.46 percent of the total public sector expenditure. Considering that substantial scope exists for the development uncertainties, it requires Government support and recognition of mineral sector.

Coal

Pakistan's coal resources are estimated at 185 billion tonnes (82,700 MTOE, or 2 per cent of the world coal resources), 95 per cent in the Thar coal field in Sindh. This coal is of lignite rank having high moisture content and low heating value. So far only 3.3 billion tonnes of coal resources are in the 'measured' category, and considering a recovery factor of 60 per cent these correspond to some 2.0 billion tonnes of recoverable coal reserves. However, this coal is equivalent to the combined oil reserves of Saudi Arabia and Iran.

As part of the strategy of increasing local energy content, a major emphasis is being placed on exploiting coal resources for large-scale use in power generation, and possibly for the production of coal bed methane. In one of the four blocks at Thar being investigated for large scale mechanised mining (6 million tonnes per year, capable of fuelling a 1000 MW net capacity power plant), coal price at the mine mouth has been estimated as US$ 3.40–4.22 per GJ (US$ 20-24 per barrel of crude oil). Though 3-4 times higher than the cost of good quality coal in major coal producing countries, electricity generation cost is economically viable, considering that the present domestic natural gas price is US$ 3.8/GJ for power sector and cost of imported furnace oil (without taxes) is more than US$ 6.0/GJ (assuming furnace oil price at Gulf being US$ 250 / tonne).

Pakistan Steel

The overall share of Pakistan Steel in the market is 30 percent. The Steel Mill is producing Coke, Pig Iron, Billets, Hot Rolled Coils/Sheets, Cold Rolled Coils/Sheets, formed sections like Channels, Angles and Galvanized sheets.

FROM DEPENDENCY TO SELF-RELIANCE

During the colonial rule, sixteen ordnance factories were established in the sub-continent. After the creation of Pakistan in 1947, all those sixteen factories fell to Indian share since none of them were located in Muslim majority areas forming Pakistan.

After independence, out of 1700,000 tons of ammunition, Pakistan got only 6,000 tons, when it was proportionately entitled to more.

The Heavy Industries at Taxila was established in 1971, followed by the F-6 overhaul and Rebuild Factory in 1972 at Kamra. Later, Pakistan Aeronautical Complex at Kamra, north of Islamabad, also came into being.

DEFENCE EXPORTS

Pakistan's defence industry is not only meeting the requirements of its Armed Forces of Pakistan, but also exporting defence products to other friendly countries. In 2000, the Defence Export Promotion Organization (DEPO) was established to promote the export of surplus defence products.

Pakistan has exported a number of products to other countries including Saudi Arabia, Iran, UAE, Sri Lanka and Bangladesh. In 2001, Pakistan also exported several weapons systems to Malaysia.

Over the year almost more than 200 items including missiles and tanks and the accessories related to them and other arms were exported to more than 21 countries including Indonesia, Turkey, Iran, Saudi Arabia, Bangladesh, Thailand, Morocco, Libya, Mauritius and other countries of Africa.

Pakistan is also exploring the possibilities of joint ventures with Saudi Arabia in arms production including missiles and tanks.

Table 3: Annual Energy Consumption

Fiscal Year	Petroleum Products		Gas		Electricity		Coal	
	(000 tones)	% Change	(mmcft)	% Change	(Gwh)	% Change	(000 M.T)	% Change
1996-97	15,606	0.0	597,799	2.6	42,914	3.4	3,553	-2.3
1997-98	16,624	6.5	607,890	1.7	44,572	3.9	3,159	-11.1
1998-99	16,647	0.1	635,891	4.6	43,296	-2.9	3,461	9.6
1999-00	17,768	6.7	712,101	12.0	45,586	5.3	3,168	-8.5
2000-01	17,648	-0.7	768,068	7.9	48,584	6.6	3,095	-2.3
2001-02	16,960	-3.9	824,604	7.4	50,622	4.2	3,492	12.8
2002-03	16,452	-3.0	872,264	5.8	52,656	4.0	3,768	7.9
2003-04	13,421	-18.4	1,051,418	20.5	57,491	9.2	5,284	40.2
2004-05	14,671	9.3	1,161,043	10.4	61,327	6.7	6,622	25.3
2005-06	14,627	-0.3	1,223,385	5.4	67,603	10.2	7,714	16.5
Avg. 10 years		**-0.4**		**7.8**		**5.1**		**8.8**
Jul-Mar								
2005-06	10,164		922,112		49,416		4,345	
2006-07	12,114	19.2	929,516	0.8	52,246	5.7	5,414	24.6

Source: Hydrocarbon Development Institute of Pakistan

ENERGY GROWTH

With a primary commercial energy consumption of 55.5 MTOE in 2004 -05, Pakistan ranks 30th in the world in terms of amount of energy use. However, the per capita energy consumption (0.36 TOE) is one fifth of the world average of 1.77 TOE. The mix of primary energy supply in 2004-05 was: gas 50.3 percent; oil 29.8 percent; hydro 11.0 per cent; coal 7.6 percent and nuclear 1.2 percent. The current installed electricity generation capacity is 19,400 MW and the generation mix is: gas 50.8 per cent; hydro 30.0 per cent; oil 15.8 per cent; nuclear 3.3 per cent and coal 0.2 per cent (HDIP 2005).

Pakistan's development, too, demand enormous amounts of energy. The links between sustainable development and energy require even greater efforts for long-term energy security. The matter has acquired urgency because Pakistan depends heavily (50 per cent) upon its reserves of natural gas for industry power generation, and commercial and household use; these reserves will start declining within the next decade if no new major discoveries are made. Ensuring availability of usable affordable energy is therefore the bedrock of our current and future development.

Energy Consumption: An Update

Energy sector in Pakistan comprises electricity, gas, petroleum and coal. During the last ten years (1997-2006), the consumption of petroleum products has decreased by an average rate of 0.4 percent per annum. The consumption of gas, electricity and coal on the other hand, has increased at an average rate of 7.8 percent, 5.1 percent and 8.8 percent per annum, respectively. The annual trend of energy consumption for the period 1996-97 to 2005-06 is given in Table 3.

Oil and Gas Development Company Limited (OGDCL)

OGDCL is the first Pakistani exploration and production company to list its shares on the London Stock Exchange through the issuance of GDR.

During July-March 2006-07, company's average oil and gas production remained at 34,893 barrels per day and 834 mmcfd respectively. This reflects an increase of 11 percent in oil and 7.1 percent in natural gas as against the same period last year. The LPG and sulphur production reached 310 metric ton per day and 65 metric ton per day showing an increase of 7.6 percent in LPG production and 16.0 percent in sulphur as against the same period last year.

OGDCL has discovered four new gas and oil producing fields during July -March 2006-07. For example, the Mela oil and gas mix field located in NWFP is producing 4,100 barrel per day of crude and 12 mmcfd of natural gas. The other three fields are situated in Sindh. Unar-1 is a mix field, producing 150 barrel per day of oil and 13.7 mmcfd of gas. While Pasaki and Nim West-1 produced 1,800 barrels of oil and 6.26 mmcfd of natural gas respectively. These discoveries when fully developed will help the country save millions of dollar in foreign exchange. OGDCL has drilled 19 wells (14 exploratory/appraisal and 5 development) during July- March 2006-07, as against 18 wells (14 exploratory/appraisal and 4 development) in the same period last year. The physical performance of the OGDCL is given in Table 4.

Table 4: Physical Performance of OGDCL

S. No.	Name of Activity		July-March 2005-06	July-March 2006-07	% Change
1.	i Exploratory Wells		14	14	-
	ii Development Wells		4	5	25
2.	**Production**	**Unit**			
	i Oil	US Barrels	8,602,700	9,560,816	11
			(31,397)	(34,893)	
	ii Gas	MMcft	213,570	228,531	7
			(779)	(834)	
	iii LPG	Tonnes	78,907	85,040	8
			(288)	(310)	
	iv Sulphur	Tonnes	15,414	17,882	16
			(56)	(65)	
					(Figures in bracket show daily average production)

Source: OGDCL

Table 5: Power Generation Plan

	Nuclear	Hydel	Coal	Renewable	Oil	Gas	Total	Cumulative
Existing (2005)	400	6460	160	180	6400	5940	19540	
Addition	-	-	-	-				
2010	-	1260	900	700	160	4860	7880	27420
2015	900	7570	3000	800	300	7550	20120	47540
2020	1500	4700	4200	1470	300	12560	24730	72270
2025	2000	5600	5400	2700	300	22490	38490	110760
2030	4000	7070	6250	3850	300	30360	51830	162590
Total	8800	32660	19910	9700	7760	83760	162590	

Source: Planning Commission of Pakistan

Sui Northern Gas Pipelines Limited (SNGPL)

Sui Northern is supplying gas to 897 towns/villages of Punjab and NWFP. During the period July- March 2006-07, the Company connected 469 industrial, 2,503 commercial and 163,704 domestic consumers bringing the total number of consumers to 2,839,237. These include 4,242 industrial, 46,422 commercial and 2,788,573 domestic consumers. During July-March 2006-07, the Company carried out development work for extension of gas network to the tune of Rs. 1,077 million on transmission projects, Rs. 3,906 million on distribution projects and Rs. 252 million on other projects under Khushal Pakistan programme. During fiscal year 2007-08, SNGPL has plans to invest Rs. 11,376 million on transmission and distribution projects.

Sui Southern Gas Company Limited: (SSGCL)

By the end March 2007, Sui Southern Gas Company Limited had expanded its network to 1,351 towns/villages of Sindh and Balochistan. During the period July-March 2006-07, SSGCL provided new connections to 221 Industrial, 1,232 Commercial and 67,373 Domestic consumers bringing the total number of consumers to 1,929,237. These include 3,199 industrial, 21,170 commercial and 1,904,868 domestic consumers. During July-March 2006-07, Sui Southern Gas Company Limited carried out development work for extension of gas network to the tune of Rs. 4,433 million on transmission project, Rs. 3,137 million on distribution projects and Rs. 680 million on other projects under Khushal Pakistan programme with the collaboration of district governments. During 2007 – 2008, SSGCL plans to invest Rs. 10,384 million on transmission and distribution projects.

Power Sector

Historically Pakistan faced electricity deficit from 1990 to 1997. The demand and supply of electricity was balanced in 1997. From 1997, the generation capacity increased and it was expected that the demand and supply position of electricity will remain in equilibrium up to 2009. However, as existing peak demand approached 6.6 percent growth per annum during 2001 to 2007 and the supply shortage occurred much earlier than 2009. Brisk pace of economic activity, rising levels of income of the people, the double-digit growth of large scale manufacturing, higher agricultural production and village electrification programme all resulted in higher demand of power in Pakistan. The Government has prepared plans to respond to this challenge. As a first step the government has encouraged the private sector power projects to meet this additional demand. The following tables shows the future power generation plan in Pakistan (Table 5).

Table 6: Total Installed Generation Capacity (MW)

Name of Power Company	Installed Capacity 2005-06	% Share	Installed Capacity 2006-07	% Share	% Change
WAPDA	11363	58.2	11363	58.5	0.0
Hydel	6463	57.7*	6463	56.9*	0.0
Thermal	4900	42.3*	4900	43.1*	0.0
IPPs	5858	30.3	5859	30.1	0.0
Nuclear	462	2.4	462	2.4	0.0
KESC	1756	9.1	1756	9.0	0.0
Total	**19439**	**100**	**19440**	**100**	0.0

*** Share in WAPDA system**

Source: Hydrocarbon Development Institute of Pakistan

Table 7: Consumers by Economic Groups (Thousands)

Year	Domestic	Commercial	Industrial	Agriculture	Others	Total
1996-97	8155	1365	184	167	7	9878
1997-98	8455	1397	187	171	8	10218
1998-99	8912	1517	190	173	8	10800
1999-00	9554	1654	195	175	8	11586
2000-01	10045	1737	196	180	8	12166
2001-02	10483	1803	200	184	8	12678
2002-03	11044	1867	206	192	9	13318
2003-04	11737	1935	210	199	10	14092
2004-05	12490	1983	212	201	10	14896
2005-06	13390	2068	222	220	10	15911
July-March						
2005-06	13144	2044	219	214	10	15632
2006-07	14069	2132	230	233	11	16675

Source: Water and Power development Authority

Village Electrification

In order to increase the productive capacity and socio-economic standard of the population living in the far-flung areas of the country, the government plans to electrify all the villages in the country. Nearly 7,000 villages from Balochistan and 900 villages of Sindh will be provided with electricity through renewable energy sources. The number of electrified villages had increased to 113,605 by the end of March 2007. The trend of village electrification during past 10 years is provided in Table 8 & Figure 1. It is important to note that village electrification has increased at an average rate of 12.3 percent per annum, over the last four years as against 2.5 percent in the last seven years, prior to 2003-04. Furthermore, it took seven years (1996/97- 2002/03) to provide electricity to 11,680 villages but in just four years (2003/04-2006/07); 39,798 villages have been provided electricity.

Nuclear Power Energy

Pakistan Atomic Energy Commission (PAEC) is responsible for implementation of nuclear power programme. At present, two nuclear power plants; Karachi Nuclear Power Plant (KANUPP) and Chashma Nuclear Power Plant (CHASNUPP) Unit-1 are in operation, while a third plant, CHASNUPP Unit-2, is under construction. KANUPP has completed its designed life of 30-years is now operating on extended life. It generated 93 million kWh of electricity during the period July-March 2006-07, rising the lifetime generation to 11.39 billion kWh. CHASNUPP -1 having a gross capacity of 325 MW generated 1,682 million kWh of electricity during July-March 2006-07, rising the lifetime generation to 13.18 billion kWh. The construction work of CHASNUPP-2 is ahead of planned schedule. It is expected that plant will be commissioned in 2011. Government has set a target of 8,800 MW nuclear power capacity by the year 2030 with increasing share of indigenisation. To meet this target, PAEC has restructured its power sector to gradually assume greater technical responsibility in the construction of future nuclear power plants.

Alternative Energy

Presently power shortage is a worldwide phenomenon due to the accelerating levels of economic activity. According to the International Energy Agency, which acts as energy policy advisor to 26 developed countries, the world can only meet its energy needs till 2030-35 through traditional sources. Realizing the gravity of the situation many countries are taking steps to develop alternate source of energy to meet their future requirements. Similarly, Pakistan is also seeking to develop generation capacity through alternate energy including the wind and solar technologies. The goal is to ensure that at least 7 percent of

Table 8: Village Electrification (Number)

Year	Target	Realization *	Progressive Total	% Growth
1996-97	4,000	2,441	64,568	3.9
1997-98	4,000	1,383	65,951	2.1
1998-99	4,000	1,232	67,183	1.9
1999-2000	1,852	1,109	68,292	1.6
2000-01	-	1,595	69,887	2.3
2001-02	-	1,674	71,561	2.4
2002-03	-	2,246	73,807	3.1
2003-04	-	7,193	81,000	9.7
2004-05	-	9,467	90,467	11.7
2005-06	-	12,764	103,231	13.5
(July-March)	-			
2005-06		9,128	99,595	13.5
2006-07		10,374	113,605	14.1
				***Including FATA**

Source: Water and Power Development Authority

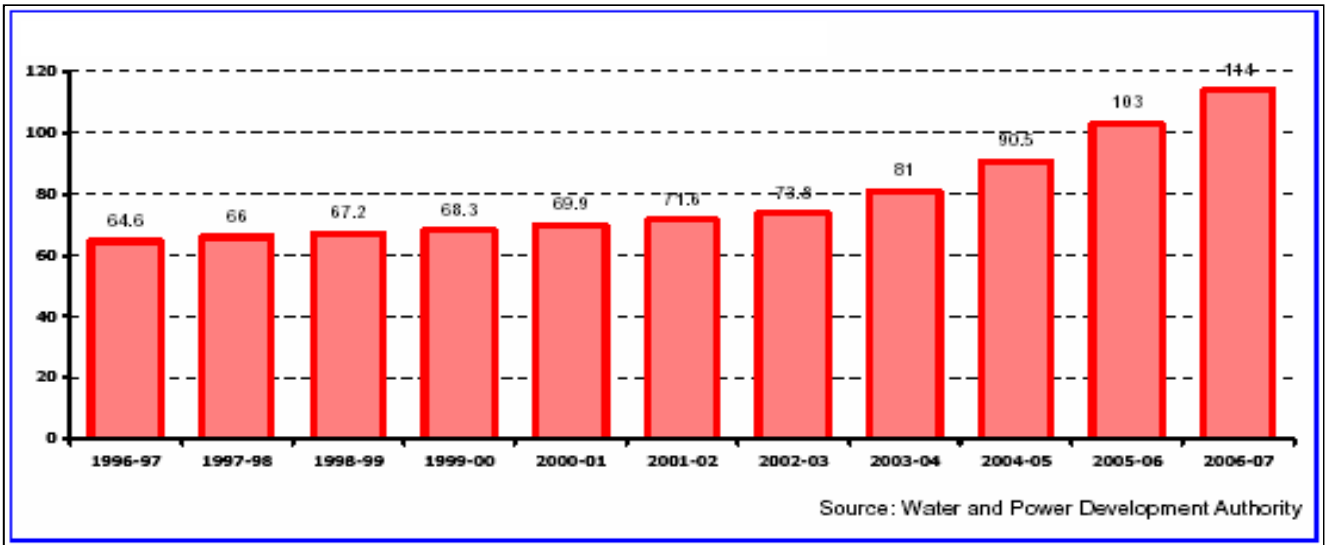


Figure I: Village Electrification (000 Nos)

total power generation capacity is met through wind and solar energy by year 2030. Installation of 700 MW wind power by year 2010 and 9,700 MW wind power by year 2030 is being planned. It will electrify 7,874 remote off-grid villages in Sindh and Balochistan provinces utilizing alternative energy technologies.

FUTURE MEGA PROJECTS

Water Storage Dams

Pakistan's economy largely depends upon agriculture. Its 35 million acres land is irrigated by canals and tubewels. Water availability from canal withdrawals has progressively increased from 67 to 106 MAF between the years 1947 and 1976 to meet ever growing demand. This increase was achieved with the construction of water reservoirs at Mangla, Tarbela and Chashma. After completion of Tarbela reservoir, in 1976 there has not been any further increase in canal withdrawals although the population has continued to grow at an average compound rate of 3.0 percent. On the other hand gross capacity of Mangla, Tarbela and Chashma reservoirs has depleted by 4.89 MAF by the year 2004. The process of sedimentation will continue and it is estimated that the gross storage loss would reach 6.37 MAF by the year 2013.

With increasing population and depleting water resources, Pakistan is fast heading towards a situation of water shortage and threat of famine. Per capita surface water availability for irrigation was 5650 cubic meters per year in 1951. It has reduced to 1350 cubic meters per capita in 2002. The minimum water requirement to avoid being a "water short country" is 1,000 cubic meters per capita per year. As such in the year 2012, Pakistan will have reached the stage of “acute water shortage” where people fight for every drop of water. Fresh storages, therefore, have to be created by building dams to replenish the lost capacity and save Pakistan's agricultural economy from total disaster, and produce food grains for rapidly increasing population.

According to Water Sector Investment Planning Study, Pakistan will face a deficit of 12 million tons in total grain production in the year 2012-13 which is 31 percent of projected target.

Such a large scale deficit cannot be bridged simply by improving farming practices and technology. The irrigation supplies scenario, by the year 2012-13, would be critical, and it will become increasingly disastrous year-by-year thereafter. Hence there is urgent need of more storage dams.

To meet these challenges Water and Power Developmet Authority (WAPDA) has prepared a grand development programme known as Vision 2025 Programme for Water Resources and Hydropower Development. Kalabagh Dam Project is a component of this programme to be undertaken by WAPDA for the benefit of the country. Engineering studies of Kalabagh Dam Project have already been completed. The project could be taken up for implementation. The project would provide irrigation water to meet the demand of food production and of cheap electrical energy for our growing population. However, the construction of much wanted dam is marred by the political differences.

Mangla Raising Project

To regain the reservoir capacity lost due to sedimentation and make provision for loss of capacity for future sedimentation, raising of Mangla Dam presently is ongoing at a cost of Rs. 62,552 million. The brief scope of the project is to raise the height of dam up to 30 ft. The project was initially targeted to be completed by September 2007, which is now expected by April, 2008.

Upcoming Projects

Other upcoming major storage projects include:

1. **Sabakzai Dam** with power generating capacity of 100 MW; cost US $19 million, construction period 3 years, feasibility already completed.
2. **Diamer Basha Dam** on Indus River about 300 Km upstream of Tarbela Dam. The salient details are: live storage 6.4 MAF, power generation capacity 5,400 MW. Initial feasibility report of the project was prepared by the Canadian Consultants Montreal Engineering Company during 1981 – 84, which was updated by local consultants in 1989. The work of the project was stopped in 1990 due to interference of local people. The review of the feasibility study currently is underway and is likely to be completed by March 2008. Construction of dam will affect 27,000 population, 31 villages and about 2,833 households. In addition, 17,000 acres agricultural land shall be submerged. About 110 KM Kara Karakuram Highway shall also be submerged.
3. **Skardu Dam** – With height of 755 ft. shall have the storage capacity of 15.52 MAF. Draft pre-feasibility report has been completed and is under review.
4. **Sanjwal Dam** in Province of the Punjab with a storage capacity of 3.6 MAF at a cost of US $ 600 million to be constructed in 6 years. The dam is at planning stage.
5. To nullify the adverse effects of Kalabagh Dam, **Munda Dam** at a cost of US $ 1.1149 billion (Rs. 70 billion) is being planned.

Iran – Pakistan – India Natural Gas Pipeline

The Iran – Pakistan – India Pipeline (IPI) would run totally 2,670 km (1,660 mile), about 1,115 km (690 mile) in Iran, 705 km (440 mile) in Pakistan and 850 km (530 miles) in India, and the total investment is estimated at US $ 7 billion and may take four to five years to complete. Apart from the fact that the IPI pipeline makes good economic sense, particularly in promoting regional cooperation, it is immensely important to the on-going peace process between India and Pakistan. A number of observers of the India-Pakistan conflict have termed this project as the mother of all confidence-building measures between India and Pakistan and named it as the Peace Pipeline.

Future Vision & Challenges

To meet the future challenge, the Vision 2030 statement approved by NEC envisages a “developed, industrialized, just and prosperous Pakistan through rapid and sustainable development in a resource constrained economy by deploying knowledge inputs”.

The Vision 2030 document concludes that Pakistan will break out of the cycle of high expectations and poor performance of the past. Moreover, this will be possible with a considerable degree of certainty within one generation. This development and prosperity will be judged basically by only one parameter, i.e. improvement in the quality of life of each and every Pakistani, and their ability to unleash their true potential, within assured security and opportunity.

Pakistan has the potential and the will to be a developed, industrialized, just and prosperous nation within one generation. Within the constraints imposed by the physical resource base, we should reach the required development levels by deploying knowledge inputs and human capital.

Vision 2030 presents a clear picture to meet with us of important emerging and expected challenges that the nation will have to confront. These pertain to water, energy, infrastructure, climate change, world trade and markets.

We have the capability to turn all these challenges into opportunities with commitment, resourcefulness and sense of responsibility.

The stress on knowledge and innovation are key drivers of future progress. Science and technology are central to the creation of core competencies that can provide needed skills and enhance productivity to transform agriculture, industry and services sectors over the coming years. Constructive change will have to stay permanently on the nation’s agenda. This shall require political will to embrace continuing reform.

Role of Institution of Engineers Pakistan

The Institution of Engineers, Pakistan (IEP) established in 1948, has highly contributed towards bringing the engineers of various disciplines on one platform. This not only resulted in developing unity amongst various caders, but also provided effective interaction for sharing knowledge and experience. Indeed IEP had a capacity to achieve much better results but the vested interests would hardly allow the engineers to perform and to be associated with national planning and decision making in the real sense. The Institution has motivated the engineers to undertake research papers through publication of its periodic journal, holding of symposiums and international expert conferences etc.

The major contribution of the IEP has been the creation of Pakistan Engineering Council (PEC), in 1976. Over a period of years, it has been successful. Present enrolled strength of engineers, with PEC is around 90,000 in various disciplines.

The Pakistan Chamber of Engineers was constituted in 1989. The role of the chamber is to offer advice to Government/Agencies in the field of industries, industrial infrastructure, technical training, efficiency and productivity in the respective fields. In addition, it included to offer solutions on major problems facing the nation in respect of salinity and water logging, energy conservation, environmental control, low-cost housing, indigenization of plant and machinery, cheap transportation, and advise the government on the formulation of fiscal and financial policies related to industrial and economic development.

Role of Overseas Pakistani Engineers in Bringing Technology and Latest Experiences to Pakistan

Engineers abroad are well placed in the society. They are working in the modern environments and have exposure to latest technology. Their professional experiences can be of immense value to Pakistan, either in the form of providing necessary expertise to Pakistani fellows or to promote industrial joint ventures. They must come forward and participate in the development through not only sharing the experiences, but also in bringing the latest technology to the country. They can establish industrial joint ventures in collaboration with foreign or Pakistani investors. The government is already committed to provide necessary incentives and concessions as applicable under the Investment Policy package.

A large enough pool of high quality, accredited engineering graduates is always needed in a developing country to achieve the good results. It must be recognized that there will be some leakage of these graduates to jobs in developed countries, but many will choose to stay where family ties and native country culture provide a comfortable environment.

But the basic need is the creation of good jobs in the home country. Increased demand for engineers will result only when there is a sufficient pool of well qualified graduates to attract direct foreign investment, multinational abjuration operations, offshore outsourcing from developed countries, and entrepreneurial startups. Developing country planners and government officials must pursue effective economic development and job generation strategies in parallel with making the needed investments to enhance the quality and quantity of engineering graduates.

CONCLUSION

T Like the past and the present, the future too belongs to the engineers. The Pakistani engineers, in tens of thousands professionals, are ready to cope with the challenges of the new century, rather millennium, meeting the aspirations of the nation, with a view to accomplish the development goals. Engineers shall continue to perform, with devotion, dedication and commitment, without seeking any reward, taking the nation higher and higher on the path of progress and prosperity, in parallel with the developed countries of the region, in the days to come. Inshallah.

REMEMBER!!!

"An optimist will tell you the glass is half-full; the pessimist, half empty but the engineer will tell you the glass is twice the size it needs to be".

And thus the engineer's advice is, ***"Do not waste money and resources"***.

Note: *An abstract of the presentation made to a galaxy of Pakistani, Saudi and Western countries engineers working in Saudi Arabia in the seminars organized by the IEP SAC Riyadh, Madina Al-Munawwarah and Jeddah on the 30th Nov, 3rd Dec and 5th Dec, 2007 respectively.*

AL-SHARQ POLY CLINIC

RAWDHA -3; PRINCE BANDER St., AL- KHALEEJ DIST. RIYADH
TEL.: 2267128 (5 Lines) FAX: 2262383.

Dr.RASHEED AKTHAR
Bsc; M.B.B.S; M.C.P.S (PULMONOLOGY) (C.A)
17 years Experience in Pakistan & Saudi Arabia
Ex. Registrar (Chest Dept.)
PIMS (Pakistan institute of Medical Sciences Islamabad

Dr.IMTIYAS AHAMED (M.B.B.S)
9 years Experience in Pakistan & Saudi Arabia
General Physician

Experienced & expert Doctors & Paramedical staff

X-ray ; Ultrasound ; E.C.G.

Well Equipped Labortory

Dedicated for Good Health

مطعم مرحبا
marhaba
RESTAURANTS

Kingdom's Largest Pakistani Chain of Restaurants

Our Service:

FREE Home Delivery
DAILY BUFFET LUNCH
OutDoor Catering
WITH
Live BBQ & Tandoor
Family Section
For Reservation Please call

Riyadh Malaz
Tel:477 3404
477 5334
477 3275
Fax:479 4305

Riyadh Olaya
Tel: 462 2070
Fax: 462 2070

Jeddah Al Hamra
Tel: 663 6201
Fax: 667 5174

AL-Khober
Tel: 898 6484
Fax: 898 6484

CORROSION OF STEEL IN CONCRETE AND METHODS OF PREVENTION AND PROTECTION

BY ENGR. S.M.H. KIRMANI
Rashid Engineering (Consultant)
Riyadh, Saudi Arabia
Email: smhkirmani@hotmail.com

ABSTRACT

The corrosion of reinforcing steel in concrete has attained increasing attention in recent years because of its widespread occurrence in certain type of structures and the high cost of repairs. Extensive research has been made on the factors contributing to steel corrosion, especially the chloride ions are considered to be the major cause of premature corrosion of steel reinforcement.

This paper describes the mechanism of corrosion of steel in concrete, factors accelerating the process and remedies for controlling corrosion in new and existing structure.

INTRODUCTION

The study of the reinforced concrete structures and sub structures in coastal areas of Arabian Gulf has revealed that the main factors of concrete deterioration in these regions are as following:

1. Corrosion of reinforcement.
2. Sulphate attack.
3. Salt weathering.
4. Cracks due to environmental factors.

The major cause of premature corrosion of steel reinforcement is the presence of chloride ions. Carbonation is another cause of corrosion, although slow in process. Carbonation of concrete results in reduction of its alkalinity, thus permitting corrosion of embedded steel.

The corrosion of steel reinforcement is an electrochemical process, which is strongly influenced by environmental factors such as oxygen and moisture. Other factors, which affect the rate and level of corrosion are:

- Heterogeneities in the concrete and the steel.
- pH of concrete pour water.
- Carbonation of the Portland cement paste.
- Cracks in the concrete.
- Stray currents.
- Galvanic effects due to contact between dissimilar metals.
- Design features (Mix design, depth of cover over the steel, etc.).
- Construction practices.

Corrosion control and its mitigation include the following methods:

1. Proper mix design.
2. Use of proper admixtures (Fly ash, blast furnace slag and silica fumes).
3. Proper concrete placement and compaction to minimize the air voids and honeycombs.
4. Use of corrosion resisting reinforcement (Galvanised steel, Fusion-bonded epoxy coated steel, fiber-reinforced plastics, and stainless steel).
5. Provide adequate cover (minimum 75 mm) in addition to painting the exterior portion of concrete with proper insulating materials.
6. Use of corrosion inhibitors.
7. Use of external water proofing.
8. Apply cathodic protection.

Out of the remedies listed above, **only cathodic protection has proven the most versatile and effective method of stopping corrosion on an existing as well as new structure**. This method is discussed in detail in the following Articles.

REINFORCEMENT CORROSION

Portland cement concrete provides both chemical and physical protection to the reinforcing steel. The chemical protection is provided by the highly alkaline nature of the pore solution (pH > 13), whereas the physical protection to steel is provided by the dense and impermeable structure of concrete that retards the diffusion of aggressive materials like chlorides, carbon dioxide, oxygen and moisture to the steel concrete interface.

Once the passive film is destroyed, the metallic iron goes into the solution by oxidation, the process is known as electrochemical (corrosion) [1]. At the anode, which is the negative pole, iron is oxidized to ferrous ions.

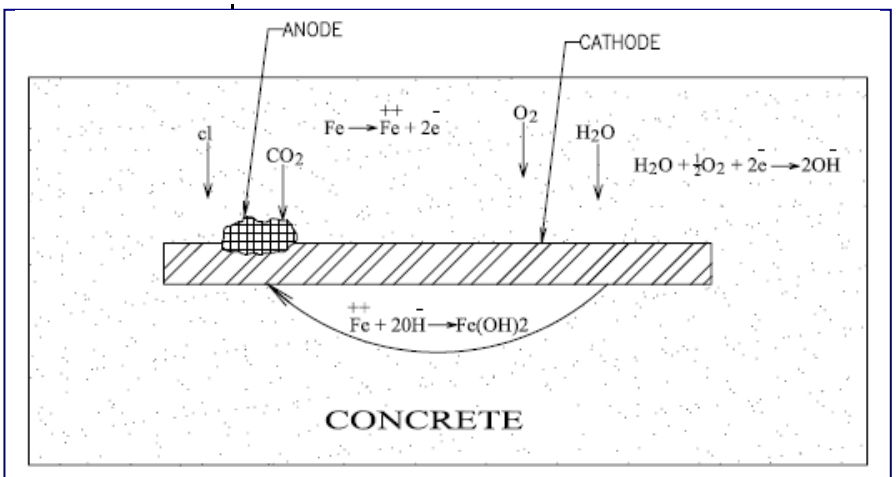


Figure 1: Schematic Representation of the Mechanism of Corrosion

$$F_e \rightarrow Fe^{++} + 2e^- \quad \text{---------- (1)}$$

E^o = -0.440 standard Redox potential.

[Standard redox potential is the potential generated when the metal is connected to a hydrogen electrode and is one method of expressing electromotive force (1)].

At the cathode, dissolved oxygen in the pore water that has diffused to the steel surface is reduced by electrons supplied by the anodic reaction to form hydroxylions.

$$O_2 + 2\,H_2O + 4e^- \rightarrow 4\,OH^- \quad \text{---------- (2)}$$

The current completes the circuit back to the anode through the concrete electrolyte in the form of negative hydroxylions. The rate of this transfer depends on the temperature, moisture content, ionic concentration and electrical resistivity of concrete.

The OH^- ions at the anode can then combine with the Fe^{++} cation to form a fairly soluble ferrous hydroxide, $Fe(OH)_2$

$$Fe^{++}\,2OH^- \rightarrow Fe(OH)_2 \quad \text{---------- (3)}$$

With additional oxygen, this product is further oxidized to form insoluble hydrated red rust. The volume of the reaction product is several times the volume of iron.

FACTORS EFFECTING CORROSION OF REINFORCEMENT

1. Effect of Chloride Ions

Experts agree that the chloride ion acts as an essential catalyst in the corrosion reaction. It is believed that chloride ions initiate the corrosion reaction by depassivating the natural oxide film on the steel surface, allowing the iron to dissolve into solution. According to Uhlig (1983), the chloride ions oxidize the iron to form F_eCl_3 and draws its unstable ferrous ion into solution, where it reacts with the available hydroxyl ions to form $F_e(OH)_2$. This releases the Cl^- ions back into solution as indicated by the following reaction:

$$F_e\,Cl_3 + 3OH^- \rightarrow Fe(OH)_3 + 3Cl^- \quad \text{---------- (4)}$$

According to this reaction three chloride ions are released as a by-product, indicating that once the chloride ion reaches the metal surface no further chlorides are required for further corrosion and depending on the electrical resistivity of concrete either general or local corrosion proceeds.

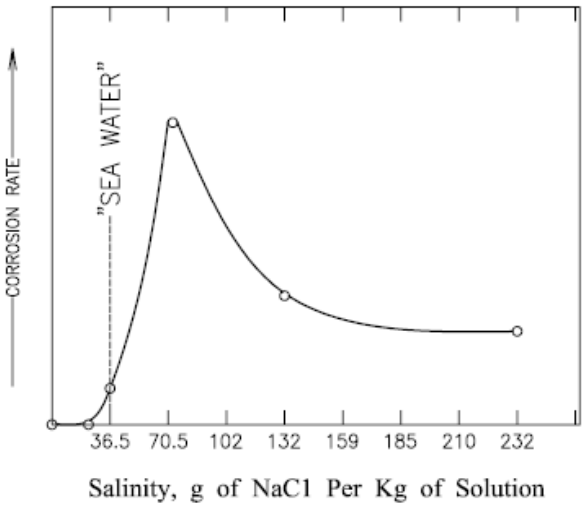


Figure 2: Effect of Concentration of Sodium Chloride on Corrosion Rate [2]

Table 1: OH^-, Cl^- and Cl^-/OH^- in Type 1 and Silica Fume Cement Mortar Specimens Contaminated with Sodium Chloride and Sodium Sulphate and Exposed to 25° C (Maslehuddin et al., 1995)

	Sodium Chloride			Sodium Chloride plus Sodium Sulphate		
Cement	**OH^- (mM/l)**	**Cl^- (mM/l)**	**Cl^-/OH^-**	**OH^- (mM/l)**	**Cl^- (mM/l)**	**Cl^-/OH^-**
Type 1	400.8	302.0	0.75	724.6	553.0	0.76
Silica Fume	71.9	312.0	4.34	212.8	638.3	2.99

Table 2: Effect of Chloride and Chloride-Sulphate Contamination on the Electrical Resistivity of Plain and Blended Cement Concretes

	Electrical Resistivity, K.Ω. cm		
Cement Type	**No contamination**	**Cl^-**	**$Cl^-+SO_4^-$**
Type 1	18.01	20.7	7.97
Fly Ash	35.60	13.70	12.70
Blast furnace slag	32.30	17.40	15.37
Silica fume	30.43	18.62	18.52

2. Effect of Sulphate Contamination on Reinforcement Corrosion

Destruction of concrete by the sulphate ions can occur in either or both of the two ways:

a) By expansion and cracking due to formation of tri-calcium sulphoduminate hydrate, also called ettringite and
b) By surface softening due to the formation of gypsum.

The combined effect of chloride and sulphate salts is to increase the concentration of free chloride ions in the pore solution. This increase in the free chloride ion concentration (Table 1) accelerates the corrosion activity. Also the electrical resistivity of concrete contaminated with sodium chloride and sodium sulphate is lower than that in specimens contaminated with only sodium chloride (Table 2). This facilitates the flow of corrosion current from the anodic to the cathodic site and vice versa.

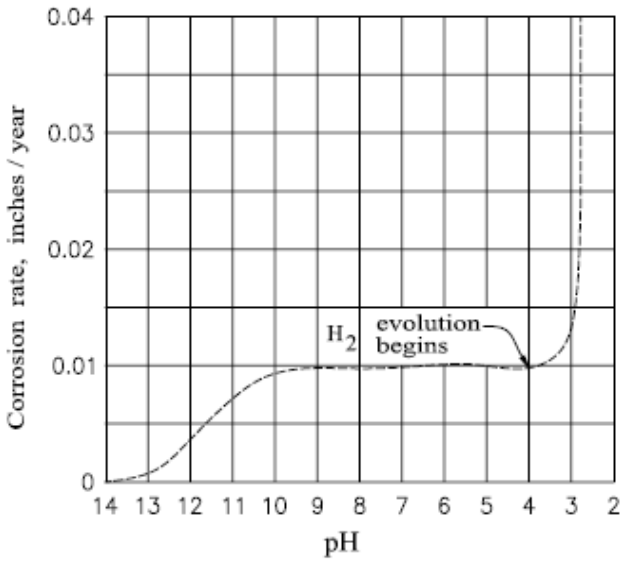


Figure 3: Effect of pH on Corrosion of Iron in Aerated Soft Water at Room Temperature [3]

3. Effect of pH on Steel Corrosion

Figure 3 illustrates that the corrosion rate of iron is reduced as the pH increases. Since the concrete has pH greater than 12.5, it is usually an excellent medium for protecting steel from corrosion. it is the case where salts are present or the concrete cover has carbonated, the steel becomes vulnerable to corrosion.

4. Effect of Temperature on Corrosion.

It is concluded as a result of various tests carried out on the effect of temperature and humidity on the corrosion process that the rate of corrosion appears to be sharply increased by an increase in temperature in the range of 20 to 40° C, especially at high humidity.

5. Effect of the Type of Cement on Steel Corrosion.

The quantity of tri-calcium aluminate (C_3A) in cement has a direct effect on reinforcement corrosion. It is concluded that chloride ions react with tri-calcium aluminate hydrate in cement paste to form tri-calcium chlorideminate ($C_3A.CaCl_2.10H_2O$). In view of this reaction, a threshold concentration of chloride ions is suggested to destroy the passive film surface. In this regard the American Building Codes (ACI 318, 1966) limit the water-soluble chloride to 0.15% by weight of cement. ACI committee 224 (1996) has suggested that the acid-soluble chloride concentration should not be more than 0.2% by weight of cement. The British Standard BS 8110 (1985) allows a total chloride content of 0.6%, Australian standard for the concrete structure, (AS-3600) allows an acid-soluble chloride content of 0.8 kg/m^3 of concrete (0.22% by weight of cement for a typical concrete mix). It was further verified that the chloride threshold limits for cements with up to 8% C_3A agree very well with ACI 318 (1996) limit of 0.15% water-soluble chlorides, as well as with the BS 8110 (1985) limit of 0.4% acid-soluble chlorides.

The higher chloride complexing and reduced chloride ion diffusivity of high C_3A cements enable them to perform

better than low C_3A cements in terms of corrosion protection of reinforcing steel. However, high C_3A cements are susceptible to sulphate damage when exposed to soil and ground water contaminated with chloride/sulphate soils. In such conditions, type V cement (C_3A: 1.9%) usually provides adequate protection against sulphate attack, but would fail to remove free chlorides to any extent.

In such situations, a reasonable solution would be to specify, for both substructures and super structures, use of moderate C_3A cement (In type 1 Portland cement C_3A = 14.3%) with a suitable admixture. Such a cement would be simultaneously resistant to sulphate attack as well as chloride induced reinforcement corrosion. [4, 5]

6. Effect of Pozzolanic Materials

Supplementary cementitious materials such as fly ash, blast furnace slag and silica fume, which are aluminous and siliceous in composition, react with calcium hydroxide (CH), liberated in the hydration of tri-calcium silicate (C_3S) and di-calcium silicate (C_2S) in the Portland cement to form secondary calcium silicate hydrate. This effectively fills up the large voids in the hydrated Portland Pozzolan cement concrete. As a result, the permeability of the concrete is reduced. Also the electrical resistivity of the concrete is increased. Thus the penetration of chloride ions is minimized and anodic reaction is retarted. [6, 7]

7. Effect of the Type of Re-inforcing Steel

In a corrosive environment, the normally used mild steel is not resistant to chloride induced reinforcement corrosion. (i.e. $Cl^-/OH^- \geq 0.6$ or 0.6 to 0.9 CL^- kg/m^3 of concrete or 0.15% CL^- by weight of cement are considered as threshold values for corrosion inhabitation. [10]

a) Galvanized steel:
Steel coated with thin layer of zinc is better than mild steel, however at high chloride concentration, the superficial layers of zinc may be more detrimental as compared with mild steel.

b) Epoxy -coated steel:
Fusion – bonded epoxy-coated rebars are provided to be highly effective in mitigating the problems associated with corrosion reinforcing. However some draw backs have been observed.
Any damage to the epoxy coating during transportation, installation or casting of concrete is known to be highly damaging to the reinforcing steel as a result corrosion will be localized at a small area thereby leading to reduction in cross-section.
There is simple evidence to conclude that chlorides at extremely high concentration can diffuse through the epoxy layer or otherwise can soften it rendering it ineffective.

c) Stainless steel:
In view of the cost of repair and/or rehabilitation which could be excessive, particularly in substructure or foundations in costal areas, the stainless steel could have been the best choice of protection.

8. Effect of Mix Design Gradings and Contents

These parameters have to be adjusted to produce dense, impermeable concrete to inhibit the penetration of external chlorides into the concrete matrix. These parameters include:

a) Cement factor:
By increasing the cement content, durability of concrete is improved. in normal practice a minimum cement content of 400 kg/m^3 is specified.

b) Aggregates:
Attention is paid to proportion the aggregates (fine and course…) in such a way to produce the maximum workability, maximum strength and minimum permeability.
Generally aggregates have little effect on corrosion of steel in concrete. However, serious problems arise when the aggregates contain chloride salts. This can happen when sand is dredged from the sea or taken from seaside or arid locations.

c) Water:
An important effect of the moisture content of concrete is its effect on electrical resistivity of the concrete. Progressive drying of initially water-saturated concrete results in the electrical resistivity increasing from about 7 x 10^3 ohm. cm to about 6000 x 10^3 ohm. cm [5]. Field observations indicate that when the resistivity exceeds a level of 40 to 70 x 10^3 ohm. cm, steel corrosion would be negligible. A high moisture content will also substantially reduce the rate of diffusion of carbon dioxide and hence the rate of carbonation of the concrete.

d) W/C ratio:
Water to cementitious materials ratio is the most important factor affecting the permeability of the concrete. As a result a minimum W/C ratio of 0.4 (or even 0.35) is typically specified in aggressive environments. [12]

e) Other factors:
Other factor which improve the quality of concrete in terms of permeability, resistance against chloride ions and carbonation and thus corrosion of reinforcing steel is controlled, include:

- Aggregate washing.
- Consolidation of concrete.
- Curing
- Concrete cover on reinforcing bars.
- Use of water proofing membrane.

PRINCIPLES OF CATHODIC PROTECTION AND ITS APPLICATION TO STEEL IN CONCRETE

As explained earlier, steel in concrete is usually protected against corrosion by passivation of the steel arising from the high alkalinity of the pore solutions within the concrete. A stable oxide layer is formed on the steel surface which prevents the anodic dissolution of iron. The necessity for additional protective measures arises if this stable oxide layer is rendered unstable (if depassivation occurs) due to the ingress of chlorides to the steel/concrete interface or carbonation of the concrete reducing the alkalinity of the pore solution at the steel/concrete interface.[1, 16]

In the case of chloride contamination of concrete, the chloride ions initiate depassivation which leads to corrosion if there is access of oxygen to the remaining passive areas. The objective of cathodic protection is to shift the steel/concrete potential into a region where:

a) The initiation of corrosion; or
b) If corrosion has already started, the continuation/propagation of corrosion; is suppressed to the extent that a corrosion failure is unlikely during the lifetime of the structure.

In steel reinforced concrete structure cathodic protection can be achieved by polarising the reinforcement with an "external" current. For this purpose anodes are surface mounted, embedded in the concrete and connected to the positive pole of a D.C. power supply in the case of impressed current protection.

Some applications of sacrificial (galvanic) anode cathodic protection have been reported as successful in lower resistivity concrete; no d.c. power supply is required for such applications as the preferential corrosion of the sacrificial anode (typically zinc) provides the "external" current for cathodic protection.

The system cathode is formed by the steel reinforcement. in the case of impressed current, the negative pole of the D.C. power supply is connected to the steel reinforcement. In the case of sacrificial anode cathode protection the sacrificial anode (typically zinc) is connected directly to the steel reinforcement.

The concrete, in particular the pore solution, provides the electrolyte to allow current flow and the associated ionic movement. The change of steel/concrete potential is indicated by electrodes which are embedded in the concrete or placed on the surface of the concrete and used, in conjunction with suitable instrumentation and connections to the reinforcement, to measure steel/concrete/electrode potentials.

The criteria of protection under this system are based on electrochemical considerations regarding corrosion process and on practical experience.

In practice two cases are to be distinguished. If the aim of cathodic protection is to improve the corrosion resistance of steel in reinforced and pre-stressed concrete structures which are expected to become contaminated by chlorides during their service life, a small cathodic polarisation of the steel/concrete interface should be applied from the beginning in the service life. This polarisation should maintain the steel/concrete potential lower than (more negative than). Epit (pitting potential) to prevent the initiation of corrosion. The negative polarisation achieved also limits or prevents migration of the chloride ions to the steel reinforcement thereby preventing them from depassivating the steel if the cathodic protection anode system is on the surface through which the contamination will arise. This precautionary protection measure is called "cathodic prevention" and applied to the new structure or structure in service where the chloride ions have not reached the steel and depassivation has not yet started.

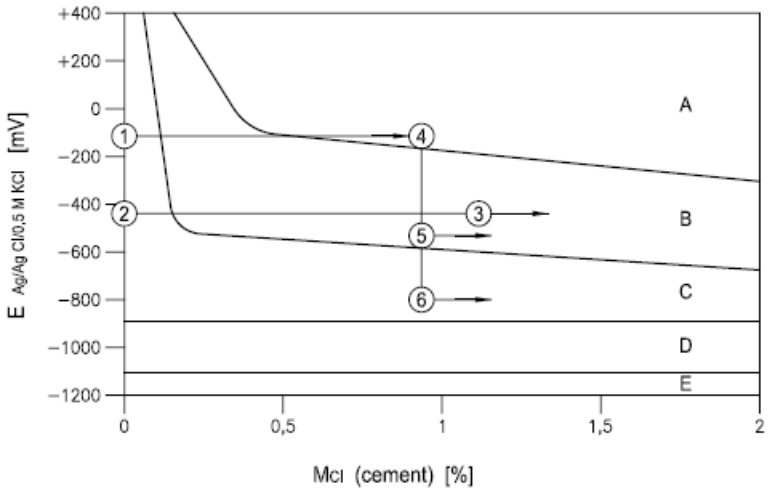


Figure 4: Pitting Potential Chloride Content in Weight% of Cement, after Pedeferri [14]

Schematic illustration of evaluation paths of potential and chloride content on steel reinforcement surface during service life for

Area A: Pitting initiates and propagates
Area B: Pitting does not initiate but propagate
Area C: Pitting does not initiate and propagate
Area D: Hydrogen embrittlement risk to high strength steels
Area E: Reduction of steel/concrete bond

Cathodic prevention (1 → 2 → 3)
Cathodic protection restoring passivity (1 → 4 → 5)
Cathodic protection reducing corrosion rate (1 → 4 → 6)

Cathodic prevention is applied from the beginning at 1, cathodic protection only after corrosion has initiated at 4.

In older structures with corroding steel reinforcement, cathodic protection is part of the rehabilitation concept and is aimed to decrease the corrosion rate of the reinforcement from significant to negligible values. For this purpose the steel/concrete potential should be lowered to values in the range of the protection potential Eprot. The corrosion potential Ecorr and the protection potential Eprot are dependent upon environmental conditions (cathodic content, pH at local anodic sites, temperature, oxygen content and humidity etc.)

It is the complex interaction of these factors that dictates the range of design criteria for cathodic protection (Figure 4).

The high consumption rates, as well as low-driving voltage, are the primary disadvantage of the galvanic mode method of cathodic protection. The other way in which the favourable electrochemical circuit can be established is by introducing electrical current from an external source. Due to outside source of current, this method is termed as impressed current cathodic protection.

This method requires the installation of an external electrode in the electrolyte with the structure to be protected. However, since the current flow is not dependent on the favourable potential difference between the electrode and the structure to be protected, more noble materials like platinised-titanium or platinised-niobium can be selected for the anode. These metals corrode or are consumed very slowly, less than 1 lb per amp. year. These anodes are coupled to the structure via the external source of electrical power. This source can be in the form of batteries, thermoelectric generators, generators or photovoltaic cells.

Design process

Hypothesis for design of the cathodic protection system in compliance with ACI 222 R-27 and NFEN 12696 (2004).

a) Conceptual design:

Based on feasibility assessment and confirmation of cathodic protection as the repair option, preliminary location selection and sizing of anode zones is worked out based on factors which include but not limited to , concrete chloride content, concrete resistivity, concrete moisture content, reinforcement surface area, distribution and estimated current demand, lifetime requirements, service environment, weight, installation sequence and constrains. Similarly due consideration is given to anode type, cable routing and possible transformer-rectified location(s).

b) Anode system type:

By using the reinforcement surface area and distribution cathodic current density for desired level of protection, cathodic current requirements and then the operating anodic current density on each anode is calculated. This value is further used to confirm the anode type with due consideration the factors discussed in item (i) above.

Freyssinet France ILE-DE-France has suggested that a titanium anode of the LIDA type wire mesh (thickness 1.8 mm and grid 85 mm x 38 mm) allows proper polarisation of the rebar in a uniform manner over the entire surface of the structure in question. This wire mesh can support an anodic current of 110 mA/m^2 with a theoretical life span of 75 years. This type of anode will allow injection of the required current even in the case of a variation in resistivity of the concrete even in the case of a variation in resistivity of the concrete or if there was a more or less high density of rebar. [15]

c) Anode system layout:

Attention is given in planning the anode zone size and its layout. Feeder spacing is determined to ensure that local cathode current requirements are respected, keeping the minimum voltage differentials within zones. Primary mode materials, its cross-section, its distribution and primary mode/"positive cable" connection to provide the required redundancy and to minimise voltage drops.

The division of the cathodic protection system into zones should not exceed 130m^2 of rebar steel per zone or 4 Amperes per zone in order to polarise the rebar properly and to reduce the possibility of formation of over-polarised or under-polarised areas. Freyssinet has verified that polarising little surfaces leads to better polarised steel. [15]

Surface mounted activated titanium mesh and grid anodes require cementitious overlays and surface preparation, pre-treatment, design and application of the cementitious overlay is critic. Some failures have occurred due to loss of bond of the overlay. These failures are generally accepted to be attributable to deficient in substrate surface preparation, pre-treatment and/or application procedures not related to cathodic protection.

d) Current provision:

Based upon operating current demand and reserve capacity required, total current provision is estimated.

Table 3: Comparison of Electro Chemical Circuit Characteristics

	Galvanic or Sacrificial Anode	Impressed Current
1	No external power required	External power required
2	Fixed, small driving voltage	Voltage variable over wide range
3	Limited, small current output	Current variable over wide range
4	Interference of adjacent structure not likely	Interference can result
5	Overprotection not likely	Overprotection can result
6	Anodes rapidly consumed	Anodes slowly consumed.
7	Sensitive to temperature and moisture conditions	

Typical current demands for cathodic protection are 2 mA/m^2 to 20 mA/m^2 of steel for steel in chloride contaminated concrete and 0.2 mA/m^2 to 2 mA/m^2 for passive steel in nonchloride contaminated concrete, for cathodic prevention.

A more conservative recommendation [13] for the cathodic current required to polarise the rebar to an adequate level is of 30 mA/m^2 of steel. This value of the current takes into account the resistivity of the concrete.

A 12 V DC supply will be capable of correctly polarising a cathodic protection zone. In fact, by taking into account the technical properties of each component of the cathodic protection system, we can take for the electrical resistance of the anode the value of 0.066 ohm/m^2, with a maximum surface of $30m^2$ of each component of the structure. We can adopt the electrical resistance of the electric cables as 8 ohm/km, with 100 meters maximum cable length for the structure in question. If we adopt the electrical resistance of the rebar in contact with the concrete the value of 4 ohm in a closed circuit and we take for the maximum current required a value of about 1.5 A for each specified zone of the structure in question, then

$$V = \left[(0.066 \times 30) + \frac{8 \times 100}{1000} + 4 \right] \times (1.5) = 10.17 \text{ V}$$

(Example for calculation)

e) Reinforcement connection:

Connection to the reinforcement, both for current circuits and for monitoring circuits is established. Number and location of connections to provide the required redundancy and to minimise the voltage drop is ensured. The rebars inside the structure in question are connected and their electrical continuity is ensured.

An analysis of the drawings of the existing rebar of the referred structure must be carried out in order to establish the groups of rebar which will be connected and thus to ensure the electrical continuity of the rebar in the structure in question.

The drop in potential due to the electric cable is 7.8 mv/A.M. For the specified zone of the structure at 100 m distance from the power supply and a necessary maximum electric current of 1.5 A, the drop in potential = 7.8 x 100 x 1.5 = 1170 mV.

f) Cabling:

To determine the cross-sectional areas and routes for positive and negative cabling to provide redundancy and to minimise voltage differences, similarly, determine the locations of any junction boxes. The joint electric circuit in Figure 6 shows the cabling principle for the cathodic protection system and the electric assembly.

g) Transformer-rectifier:

Based on operating current and reserve capacity circuit resistance to calculate transformer rectifier output voltage, also determine ancillary transformer-rectifier facilities required for monitoring etc. and to provide A.C. supply requirements.

h) Reference electrodes:

Reference electrode type Ag/Agcl shall be placed in each zone of structure (say pile cap) to monitor the cathodic protection system. This electrode will be placed as close as possible to the rebar to be monitored and if possible in contact with the old concrete.

These electrodes are calibrated in the laboratory during the manufacturing process. The electrode that is used for calibration is a "calomel electrode" [Freyssinet]. The manufacturer ensures that the deviation is not more than ± 10 mV between the calomel electrode and Ag/Agcl electrode.

i) Monitoring:

Determine the type, frequency and position of sensors and the appropriate instrumentation for the level of monitoring and control required. A computerized monitoring system including a recording of the key parameters of the cathodic protection system (electric potential, electric current, electrode potential) will be put in place to ensure the correct functioning of the system.

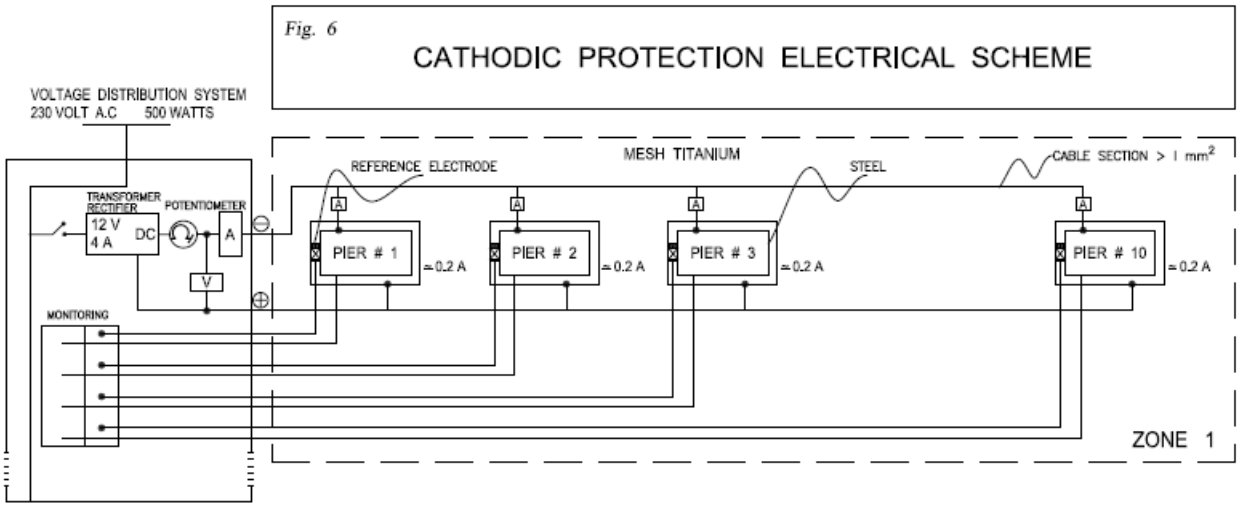


Figure 6: Cathodic Protection Electrical Scheme

CONCLUSION

All reinforced concrete structures are susceptible to corrosion. Remedial measures for controlling corrosion of steel embedded in Portland cement concrete include:

1. Insulating the concrete surface from the corrosive environment.
2. Modifying the environment to make it less corrosive.
3. Actively controlling the electron flows within the environment so that no metal is lost from the structure.
4. To make the concrete impervious by using selected additives.
5. By adopting more reliable and safe design parameters and construction method.

However, not all the remedies discussed here are applicable to all types of reinforced concrete structures in the various environments. Cathodic protection is by far the most versatile method of corrosion control in new as well as old structure. These systems equally apply for prevention as well as for protection of steel against corrosion.

Briefly the principle of setting up the cathodic protection of a structure, say pile caps is the following:

- Connect the first rank (and sometimes the second one) of the reinforcement steel of the required structure (say pile cap) to the cathode.
- Check the electrical continuity of the connected steels.
- Set in place the titanium mesh (anode) on the concrete surface.
- Set in place the reference electrodes.
- Set in place the rest of the electrical network (Devices to measure current intensity, voltmeters, and electrical cables. D.C. power supply etc.).

REFERENCES

[1] ACI-22R-96, P-2, 3

[2] **Griffin, Donald F, and Henry Rolurt L,** *"Effect of salt in corrosion of reinforcement"*, ASTM V. 63, 1963, PP. 1046-1078

[3] **Uhlig, Herbert H,** *"Corrosion and corrosion control"*, 2nd ed, John Wiley & Sons, New York 1971, 419 pp.

[4] ACI 200 (1996), *"Guide to durable concrete"*, American Concrete Institute, Detroit USA

[5] **Al-Amoudi, O.S. B and M. Maslehuddin (1993),** *"The effect of chloride and sulphate ions on reinforcement corrosion – Cement and concrete research"* V. 23, pp.139-146.

[6] **Mehta, P.K. (1983),** *"Influence of Pozzolanic admixtures on the transition zone in concrete",* Presented at the international seminar on industrial by-products and durability of concrete, Cholmes University of Technology.

[7] **Cohen, M.D. and A. Bentur (1988),** *"Durability of Portland cement silica fume pastes in magnesium sulphate and sodium sulphate solution"*, ACI Materials Journal, May-June, pp – 148-157.

[8] **Holden, W.R., C.L. page and N.R. Short (1983),** *"The influence of chlorides and sulphates on concrete durability, corrosion of reinforcement in concrete construction"*, A.P. Crane (Ed.), society of chemical industry, pp 143-149.

[9] **Kudo, N. (1993),** *"Corrosion of reinforcement in concrete and its prevention"*, Corrosion Engineering, V. 42, pp 565-581.

[10] **Boyd, W.K. and Tripler, A.B,** *"Corrosion of reinforcing steel bars in concrete",* Materials protection, V.7, No. 10, 1968, pp 40-47.

[11] **Powers, T.C; L.E. Copeland, J.C. Haynes and H.M. Mann (1954), "Permeability of Portland cement paste"** Journal of American concrete Institute, proceedings, V.51, pp. 285-298.

[12] **Clear, K.C,** *"Time-to-corrosion"* of reinforcing steel in concrete slabs, V.3, report no. FHWA-RD-76-70, Federal High way administration, Washington D.C, 1976, pp. 64.

[13] Corrosion and protection of steel in concrete (by A. Raharinaivo, G. Alighieri, T. Chaussadant, G. Grimoldi)

[14] P. Pedeferri, cathodic protection and cathodic prevention, construction and building materials, vol. 10, p.391-402, 1996.

[15] **Freyssinet,** France ILE-DE-FRANCE: M0169203/007, (2005).

[16] NFEN 12696, A05-668, July 2000 [French standard for cathodic protection].

INTRODUCTION TO WIMAX: THE WIRELESS BROADBAND ACCESS TECHNOLOGY

BY ENGR. KHALIL AHMED
Royal Saudi Naval Forces
Riyadh, Saudi Arabia

ABSTRACT

WiMAX is presently the most promising Broadband Wireless Access (BWA) technology that focuses on solving the problems of point to multipoint broadband outdoor wireless networks. It has several possible applications, including last mile connectivity for homes and businesses, and backhaul for wireless hot spots. The same technology will also offer high-speed data services to all nomadic terminals (laptops, PDAs, etc.) with an optimized trade off between throughput and coverage. The purpose of this paper is to provide an introduction to the technology, latest standards, applications and its standing in similar wireless technologies.

The paper gives an overview of the broadband wireless access and data networks, followed by an introduction to the WiMAX. It also provides a brief description of the standards and the profiles developed by the Institute of Electrical and Electronics Engineers (IEEE) and the WiMAX Forum. Later, the paper discusses the WiMAX technology basics and outlines the security aspects. The paper also examines the currently available technologies that address broadband wireless access, followed by a comparison with WiMAX in terms of usage, range, throughput, modulation techniques and the frequencies. At the end, the paper identifies the potential applications of the technology and its deployment status.

INTRODUCTION

The start of the new millennium is witnessing a telecommunication world that is very different from even the recent past. The rapid evolution of wireless networking technologies over the last few years has opened up new possibilities for wireless delivery of multimedia services and content. As a result, in addition to third generation (3G) mobile networks, new broadband wireless access technologies such as WiMAX and IEEE 802.20 are also emerging as alternative means to provide services to the users. The WiMAX products and services hold the promise of greatly increasing access to networking through increased bandwidth, reducing connectivity costs, and enabling bandwidth-intensive business applications. The WiMAX technology is also offering possibilities for new players to enter the market, inducing competition, and possibly threatening the businesses of established players. But before we explore WiMAX technology, let us first get familiar with broadband wireless access and wireless data networks.

Broadband Wireless Access (BWA)

The staggering growth of the Internet is driving demand for higher-speed Internet-access services, leading to a parallel growth in broadband adoption. Broadband access not only provides faster Web surfing and quicker file downloads but also enables multimedia applications, such as real-time audio and video streaming, multimedia conferencing, and interactive gaming. Broadband connections are also being used for voice telephony using Voice-over-Internet Protocol (VoIP) technology.

The two predominant mass-market broadband access technologies today are the Digital Subscriber Line (DSL) and the cable modem. The DSL delivers broadband over twisted-pair telephone wires, while the cable modem delivers it over television coaxial cable. The broadband wireless solutions simply deliver the broadband over air interface using wireless technology.

Broadband wireless is a technology that promises high-speed connection over the air. It uses radio waves to transmit and receive data directly to and from the potential users whenever they want it.

BWA is a point-to-multipoint system which is made up of base station and subscriber equipment. Instead of using the physical connection between the base station and the subscriber, the base station uses an outdoor antenna to send and receive high-speed data and voice to subscriber equipment. This technology reduces the need for wire-line infrastructure and provides a flexible and cost-effective last-mile solution.

There are two types of BWA services. The first type, called *fixed wireless broadband,* attempts to provide a set of services similar to that of the traditional fixed-line broadband but using wireless as the medium of transmission. This type can be thought of as a competitive alternative to DSL or cable modem. The second type of broadband wireless, called *mobile broadband,* offers the additional functionality of portability, nomadic and mobility. Mobile broadband attempts to bring broadband applications to new user experience scenarios and hence can offer the end user a very different value proposition.

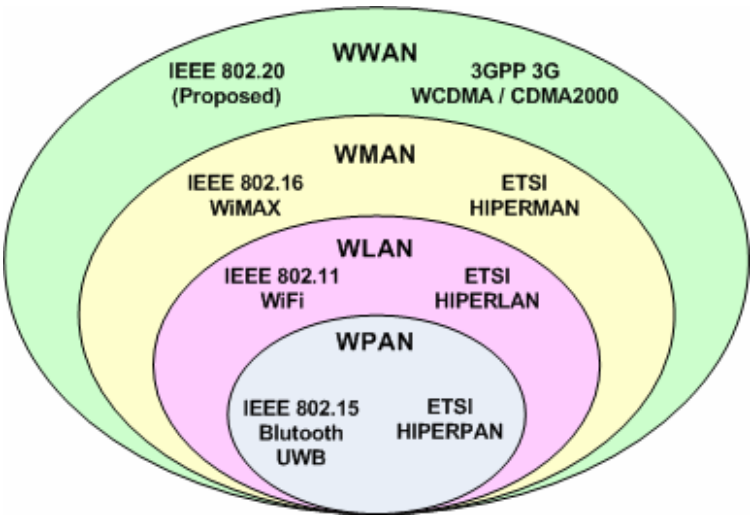


Figure 1: Data Network Types and Wireless Standards

Wireless Data Networks

The word *"Wireless"* means transmitting signals using radio waves as the medium instead of wires. A wireless infrastructure has more flexibility than a fixed infrastructure, in which at least part of the access network closest to the user is dedicated to a specific location. Wireless networks do not suffer from this limitation – their use can be shared and reassigned much more easily. This tether-less nature of connectivity provides wireless network users with almost unrestricted mobility and the facility to access the network from anywhere. While in a wired network an address represents a physical location; in a wireless network the addressable unit is a station, which is the destination for a message and is not (necessarily) at a fixed location. Devices commonly used for wireless networking include laptop computers, desktop computers, handhelds, personal digital assistants (PDAs) and cellular phones.

A wide variety of different wireless data networking technologies now exist, ranging from global voice and data networks to infrared light and radio frequency technologies optimized for short-range wireless connections. These technologies can be distributed over different network families, based on a network scale. Figure 1 shows a classical representation of wireless network categories, with the most famous technologies for each type of network. The network categories are described as follows:

Wireless Personal Area Network (WPAN): A WPAN is a data network used for short range communication among data devices typically controlled by a single person. While data speeds are fast compared with the data rates of mobile telecommunications technology, their range is very limited, generally of the order of 10 meters, although some WPAN technologies may have a greater reach. The WPAN is designed to enable the users to access the Internet, or to connect nearby devices, via laptop computer, PDA or a cellular phone. Examples of WPAN technologies are Bluetooth, UWB and Wireless USB.

Wireless Local Area Network (WLAN): A WLAN is a data network used for communication among data devices: computer, printer and PDAs. This network covers a relatively small area, like a home, an office or a small campus. While data speeds are very fast compared with the data rates of mobile telecommunication technology, their range is limited, generally of the order of 100 meters. The WLAN is designed to enable users to access the Internet, and access other devices on the local network, in localized hotspots via a laptop computer, handheld, PDA or a cellular phone. Among the various WLAN solutions WiFi is the most widespread and popular. Other systems that provide WLAN functionality include DECT and HIPERLAN.

Wireless Metropolitan Area Network (WMAN): A WMAN is a data network that may cover up to several kilometers, typically a large campus or a city. For instance, a university may have a WMAN that joins together many of its WLANs situated around the site. The data speeds of WMANs are very fast compared with the data rates of mobile telecommunication technology. Examples of WMAN technologies are Fixed WiMAX and IEEE 802.20.

Wireless Wide Area Network (WWAN): A WWAN is a data network covering a wide geographical area. The data speeds are very fast compared with the data rates of mobile telecommunications technology, and their range is also extensive. Cellular and mobile networks based on 3G, GSM and CDMA are good examples of WWAN.

The IEEE has established a hierarchy of complementary wireless standards. These include IEEE 802.15 for the WPAN, IEEE 802.11 for the WLAN, 802.16 for the

WMAN and the proposed IEEE 802.20 for the WWAN. Each standard represents the optimized technology for a distinct market and usage model, and is designed to complement the others. These standards with respect to the data network types are shown in Figure 1.

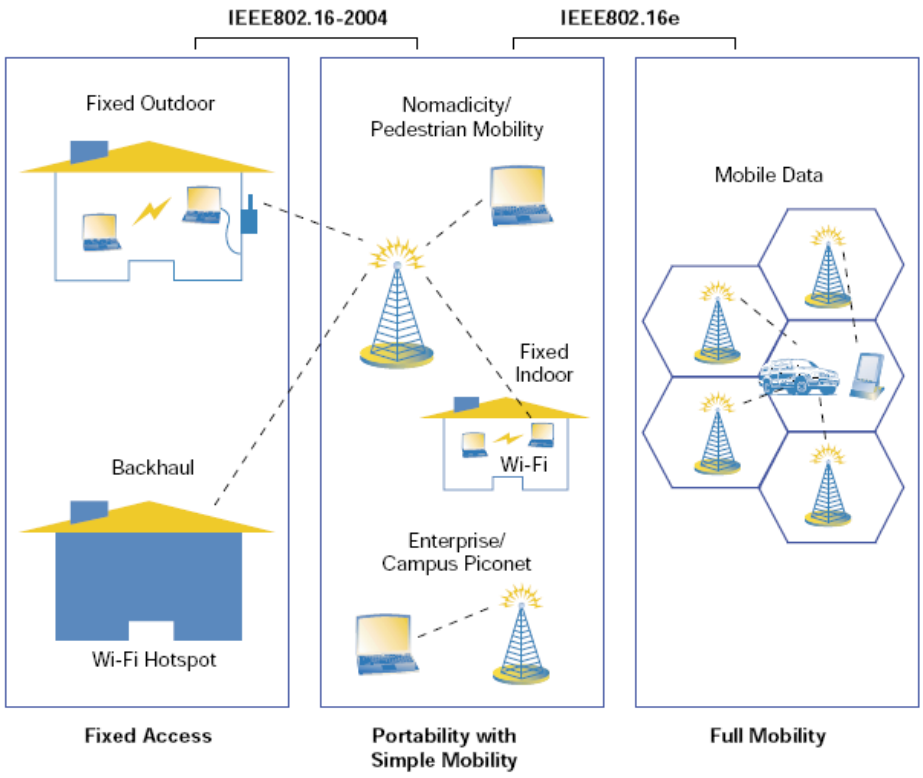


Figure 2: Fixed and Mobile WiMAX Solutions

WiMAX

WiMAX is a short name for Worldwide Interoperability for Microwave Access and it is described in IEEE 802.16 Wireless Metropolitan Area Network (WirelessMAN) air interface specification. The IEEE 802.16 is a suite of standards for fixed, portable, nomadic and mobile broadband wireless access in metropolitan area network and these standards supports point-to-multipoint (PMP) as well as mesh network architectures. It should be noted that WiMAX is not a standard, but a trade name for IEEE 802.16 wireless standards. In that respect, WiMAX and WiFi are analogous – WiFi is also a trade name that can be applied to a series of IEEE 802.11 standards, including 802.11a, 802.11b and 802.11g.

WiMAX is the hottest wireless technology that delivers broadband access services to customer premises in an economical way. It is easy to deploy, provides scalable solution for extension of a fiber-optic backbone, provides possibility for interoperability between equipment from different vendors, and promises to become a significant means of delivering bundled voice, data and video services over a single network.

Although it has one name, WiMAX represent two different market technologies. The first is for fixed wireless and falls under the IEEE 802.16-2004 standard, and the second for mobile applications and falls under the IEEE 802.16e specification. The fixed WiMAX supports point-to-multipoint connections across licensed and license-exempt frequency bands and is capable of becoming a replacement for cable modem, DSL or T1/E1 links, or for network backhaul. In future, WiMAX will transform the world of mobile broadband by enabling the cost-effective deployment of metropolitan area networks based on the IEEE 802.16e standard to support notebook PC and mobile users on move. Figure 2 illustrates some solutions provided by fixed and mobile WiMAX technologies.

The principal advantages of systems based on IEEE 802.16 are multi-fold: the ability to quickly provide service, even in areas that are difficult for wired infrastructure to reach; the ability to overcome the physical limitations of traditional wired infrastructure; avoidance of steep installation costs; and widespread wireless reach. Providing a wired broadband connection to a currently underserved area through cable or DSL can be a time-consuming and expensive process. This is the reason that a surprisingly large number of areas in United States, Europe, and especially in developing countries, still do not have access to broadband connectivity. WiMAX wireless technology provides a flexible, cost-effective, standards based means of filling existing gaps in broadband coverage and reach millions of new residential and business customers worldwide.

The WiMAX 802.16-2004 standard is used today for:

- Last mile access to customer premises for basic telephony services where wire-line infrastructure doesn't exist.
- T1/E1 service for small businesses and enterprises.
- Competitive access backhaul for businesses and cell sites.
- Provision of broadband backhaul for 3G cell sites.
- Provision of Wireless Internet Service Provider (ISP) services.
- Temporary backhaul for sporting events and tradeshows.

With IEEE 802.16e, WiMAX will also be used for:

- Mobile multi-media services based on IP.
- Mobile telephony services using Voice over IP (VoIP).
- Low cost data downloads through "Hot Zones".

How WiMAX Works

WiMAX Building Blocks

Typically, a WiMAX system consists of two parts; WiMAX Base Station and WiMAX Subscriber Station.

WiMAX Base Station (BS): A WiMAX base station (consists of electronics and a tower) provide wireless coverage over an area called a "cell". Typically, the radius of this cell is from 3 to 10 km (theoretically, a base station can cover up to a 50 km radius; however, practical considerations limit it to about 10 km). As with conventional cellular mobile networks, the base-station antennas can be omni-directional, giving a circular cell shape, or directional to give a range of linear or sectoral shapes for point-to-point use or for increasing the network capacity.

WiMAX Subscriber Station (SS): A WiMAX subscriber station, also referred as Customer Premise Equipment (CPE), is a receiver at the customer premises that could be a stand-alone box or a PC card that sits in a laptop or a computer. In certain instances, the CPE consists of an outdoor unit (an antenna) and an indoor modem. Access to a WiMAX base station is similar to accessing a wireless access point in a WiFi network, but the coverage is greater. The subscriber station typically serves a building (business or residence) using wired or wireless LAN.

The WiMAX MAN is schematically similar to a point-to-multipoint layout of a cellular network. It revolves around strategically positioned, highly elevated base stations that beam signals to subscriber stations within their radii. A base station connects directly to Internet backbone (core network) using a high-bandwidth, wired connection, or it connects to another base station using a line-of-sight, microwave link. This microwave connection to a second base station (or **backhaul**) is what allows WiMAX to provide coverage to remote rural areas. While the backhaul connects the system to the core network, it is not the integrated part of WiMAX system. Figure 3 shows WiMAX building blocks and a typical MAN setup.

The WiMAX Scenario

Here's what would happen if you got WiMAX. An Internet service provider sets up a WiMAX base station within a range of 10 km from your home. You would buy a WiMAX-enabled computer or upgrade your old computer to add WiMAX capability. You would receive a special encryption code that would give you access to the base station. The base station would beam data from the Internet to your computer (at speeds potentially higher than today's cable modems), for which you would pay the provider a monthly fee. The cost for this service could be much less than current 3G Internet subscription fees.

If you have a home network, things wouldn't change much. The WiMAX base station would send data to a WiMAX-enabled router, which would then send the data to the different computers on your network. You could even combine WiFi with WiMAX by having the router send the data to the computers via WiFi.

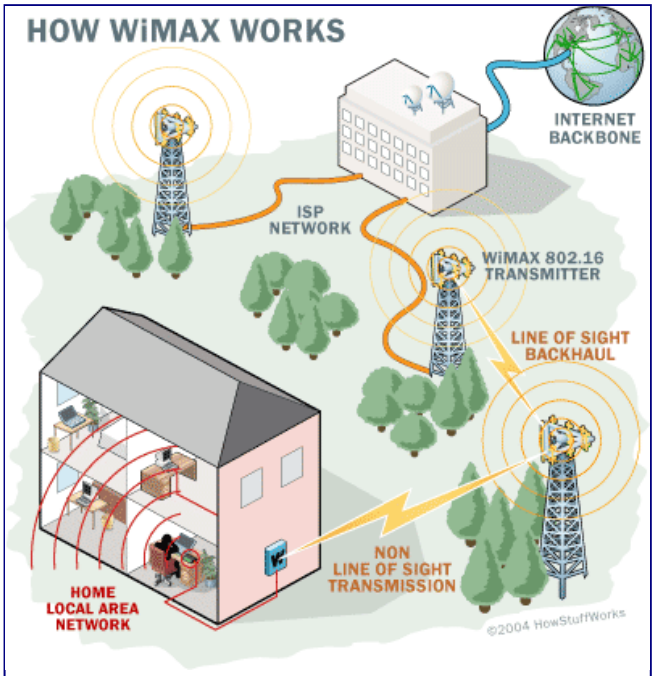


Figure 3: WiMAX Building Blocks & Typical MAN

WiMAX Forum

Figure 4: WiMAX Forum Logo

The IEEE 802 standards provide only the technology. It is then needed to have some mechanism for the certification of conformity and the verification of interoperability. The WiMAX Forum was formed in June 2001 by equipment and component suppliers with the same objectives. The Forum is an industry-led, non-profit organization that facilitates the deployment of broadband wireless networks based on the IEEE 802.16 standard by providing the certification of conformity, and by ensuring the compatibility and interoperability of the equipment. WiMAX Forum Certified™ products not only adhere to IEEE 802.16 standard but they also offer higher bandwidth, lower costs, and broader service capabilities than most of the proprietary solutions. The Forum believes that the adoption of industry standards will be a key factor in any successful deployment of WiMAX technology. The forum also hopes that creating a widely accepted standard and certifying products as compliant with that standard will generate rapid growth of WiMAX based wireless products and services, similar to the growth of WiFi and IEEE 802.11 based products and services over the past several years.

The WiMAX Forum Certified™ products have significant advantages over proprietary broadband wireless solutions:

- They provide a high speed internet access solution for the delivery of voice, video and data.
- They create a forward looking transport and access network platform.

- They are generally based upon Ethernet, which has proven to be the most effective infrastructure for data networks over the past decade.
- They have the advantage of worldwide support from not only the WiMAX Forum but also the IEEE and ETSI.

The WiMAX Forum strategy has been formed in an effort to promote worldwide adoption of WiMAX equipment. Components of the WiMAX Forum strategy include:

- Select workable subset of the many available system profiles and variations in the IEEE 802.16 standard.
- Create a single interoperable standard from the IEEE 802.16 and European Telecommunications Standards Institute's (ETSI's) HiperMAN standards.
- Develop a testing and certification process to validate that equipment submitted by vendors conforms to "WiMAX" certification requirements of standard compliance and multi-vendor interoperability
- Continue to support IEEE 802.16 standard updates and corrections, including the current mobile WiMAX 802.16e standard.

The WiMAX Forum has over 300 members from equipment manufacturers, semiconductor suppliers, network operators, services providers and other telecommunication actors. Some of the noted members are Airspan, Alcatel, Alvarion, AT&T, Ericsson, Fujitsu, Huawei, Intel, LG, Lucent, Motorola, Nokia, Nortel, Proxim, Samsung, Siemens, ZTE, British Telecom, France Telecom and Korea Telecom.

WIMAX STANDARDS

The WiMAX standards for broadband wireless access provide the possibility for interoperability between equipment from different vendors. The first WiMAX standard was approved in December 2001. Since then, the standard went through many revisions, and many documents were approved and published by 802.16 Subcommittees. These standards are presented in Table 1 and a brief explanation of major standards is given below:

IEEE 802.16

In 1998, the IEEE began a standards project to specify a point-to-multipoint broadband wireless access system suitable for the delivery of data, voice, and video services to fixed customer sites. The initial standard, IEEE 802.16, was developed for the licensed 10-66 GHz radio spectrum where Line-Of-Sight (LOS) between system antennas is required for reliable service. The standard specifies the physical layer (PHY) and medium access control layer (MAC) of the air interface. The standard was approved in December 2001 but it failed to have a significant impact. Factors beyond equipment cost, such as installation, roof rights, backhaul, and spectrum costs, were significant contributors to the poor economics of the high-frequency multipoint systems.

IEEE 802.16a

The IEEE 802.16 standard provides the foundation for a wireless MAN industry. However, the physical layer is not

Table 1: Main IEEE 802.16 standards

IEEE Standard	Date Approved	Date Published	Description
802.16-2001	6 Dec. 2001	8 Apr 2002	10–66.GHz licensed band; Line-of-sight (LOS); 2–5 km; Channel bandwidth values: 20, 25 and 28 MHz
802.16a	29 Jan. 2003	1 Apr 2003	2-11 GHz licensed and unlicensed bands; Non-line-of-sight (NLOS); Amendment to 802.16-2001
802.16c	11 Dec 2002	15 Jan 2003	Interoperability; Amendment to 802.16-2001
802.16-2004	24 Jun 2004	1 Oct. 2004	Revises and consolidates previous 802.16 standards; Replaces 802.16, 802.16a and 802.16c; 5–50 km
802.16e	7 Dec. 2005	28 Feb 2006	Mobility; OFDMA (SOFDMA); Amendment to 802.16-2004
802.16f	22 Sep 2005	1 Dec 2005	Management information base; Amendment to 802.16-2004
802.16g	27 Sep 2007	31 Dec 2007	Management plane procedures and services; Efficient handover, QoS and radio resource management; Amendment to 802.16-2004
802.16k	22 Mar 2007	14 Aug 2007	Media access control bridges; Amendment to 802.1D
802.16h, i, j			Projects to amend 802.16-2004
802.16Rev2			Second revision of 802.16; Consolidates 802.16-2004, 802.16e-2005, 802.16f-2005 and 802.16g; Under development

suitable for lower frequency applications where Non Line-Of-Sight (NLOS) operation is required. For this reason, the IEEE approved the 802.16a standard in January 2003 that allows users to get broadband connectivity without needing direct line of sight with the base station. The standard operates in licensed and unlicensed frequencies between 2 GHz and 11 GHz, and it is an extension of the IEEE 802.16 standard. These sub 11 GHz frequency ranges enable non line-of-sight performance, making the IEEE 802.16a standard the appropriate technology for last-mile applications where obstacles like trees and buildings are often present and where base stations may need to be unobtrusively mounted on the roofs of homes or buildings. In addition, IEEE 802.16a provides an ideal wireless backhaul technology to connect WiFi wireless LANs and commercial hotspots with the Internet. The 802.16 standard received wide attention after IEEE ratified the 802.16a standard.

IEEE 802.16a supports data rates of up to 71 Mbps, over distances of up to 50 km, with a typical cell radius of 6-10 km. Within the typical cell radius, non-line-of-sight performance and throughputs are optimal. With shared data rates up to 71 Mbps, a single "sector" (a single transmit/receive radio pair at the base station) of an IEEE 802.16a base station provides sufficient bandwidth to simultaneously support more than 60 businesses with T1-level connectivity and hundreds of homes with DSL-rate connectivity, using 20 MHz of channel bandwidth.

IEEE 802.16-2004

The IEEE 802.16-2004 standard revises and consolidates the earlier IEEE 802.16 standards, including 802.16-2001, 802.16a-2003 and 802.16c-2002. A corrected and modified version of IEEE 802.16a, known as 802.16d (also referred as 802.16-REVd) was started in September 2003 with the objective of taking into account the ETSI HiperMAN broadband wireless access standard. The 802.16d project was later concluded with the approval of IEEE 802.16-2004 in June 2004, and withdrawal of the earlier 802.16 documents, including a and c amendments.

IEEE 802.16-2004 is a fixed wireless access technology and utilizes Orthogonal Frequency Division Multiplexing (OFDM) to serve multiple users in a time division fashion in a sort of a round-robin technique. It is designed to serve as a wireless alternative to DSL or cable modem, or to provide basic voice and broadband access in underserved areas where no other access technology exists. The IEEE 802.16-2004 is also a viable solution for wireless backhaul for WiFi access points or potentially for cellular networks. The main features of IEEE 802.16-2004 standard are the following:

- NLOS and LOS service capability.
- Multiple radio modulation options (single carrier, OFDM).
- Licensed and unlicensed band implementations.
- Versatile access control and Quality of Service (QoS) features, including Time Division Multiplexed (TDM) and packet services, and advanced security.

IEEE 802.16e

IEEE 802.16-2004 is definitely very useful, replacing a set of documents all describing different parts of the same technology, with different modification directions. Yet, it lacks the mobility features. This gave the way to IEEE 802.16e amendment approved on 7th December 2005 and published in February 2006. IEEE 802.16e is a mobile extension to 802.16-2004 and supports portability and eventually full-scale mobility – making it possible to deliver broadband data to moving wireless terminals, such as laptop computers, smartphones and PDAs. This IEEEE 802.16e utilizes Orthogonal Frequency Division Multiple Access (OFDMA) and can serve multiple users simultaneously by allocating sets of "tones" to each user. The standard requires a new hardware/software solution since it is not backward-compatible with 802.16-2004.

It should be noted that IEEE 802.16e is not a standalone document. It only proposes changes and additions to IEEE 802.16-2004 document. Hence, a person wishing to read the details of specific information in 802.16e has first to read the related part of 802.16-2004 and then go on to read the possible changes that took place in 802.16e.

IEEE 802.16Rev2

The work on IEEE 802.16Rev2 standard was started in April 2007 and will result in second revision of IEEE 802.16, following 802.16-2001 and 802.16-2004. It will consolidate 802.16-2004, 802.16e, 802.16f and 802.16g (and possibly 802.16i, if completed in time).

Other 802.16 Standards

In addition to the IEEE 802.16e amendment of the 802.16-2004, other amendments have been made or are still in preparation. The goal of these amendments is to improve certain aspects of the system or to clarify other aspects. These amendments are as follows:

802.16f: This standard was approved in Sep 2005 and provides enhancements to 802.16-2004. The amendment defines a Management Information Base (MIB) for the MAC and PHY, and associated management procedures.

802.16g: This standard was approved in September 2007 and provides enhancements to IEEE 802.16-2004. The amendment defines the elements for efficient handover, high-performance Quality of Service (QoS) management and radio resource management procedures.

802.16k: This standard was approved in March 2007 and it amends IEEE 802.1D standard). This amendment is for Media Access Control (MAC) Bridges (Bridging of 802.16.

Other amendments at the draft stage are the following:

802.16h: Improved coexistence mechanisms for license-exempt operation.
802.16i: Management plane procedures and services
802.16j: Multi-hop relay specification

WIMAX SPECTRUM

Successful WiMAX deployment depends largely upon the availability and suitability of spectrum resources. For entities providing WiMAX services, two types of frequency bands are available:

1. Licensed bands
2. License-exempt bands

Licensed bands require an authorization/license from a regulatory commission, which offers that individual user (or Licensee) the exclusive rights to operate on a specific frequency at a particular location or within a defined geographic area. In contrast, license-exempt bands (unlicensed spectrum) permit any user to access specific frequencies within any geographic area without prior authorization from a regulatory commission. While users of these bands do not have to apply for individual licenses or pay to use the band, they are still subject to certain rules:

- Unlicensed users must not cause interference to licensed users and must accept any interference they receive.
- Any equipment that will be utilized on license-exempt band must be approved in advance.

WiMAX operates on frequencies between 2-11 GHz. At these frequencies, radio waves can penetrate into buildings, and can bend and reflect around obstacles to some extent, so the base station and client antennas do not need a clear line-of-sight between them.

Because of its broad operating range, licensed and license-exempt band options for WiMAX technology are extensive. The frequency bands that will be used internationally are as below:

Licensed Bands: 2.3 GHz, 2.5 GHz, 3.3 GHz and 3.5 GHz bands. The 2.4 GHz band is ISM (Industrial, Scientific and Medical), a free band used by WiFi and many other systems.

License-exempt Bands: 5 GHz (this frequency range includes bands between 5.25 and 5.85 GHz.). In future, various bands between 5 GHz and 6 GHz can be used for unlicensed WiMAX, depending on the country involved. It should be noted that the 5 GHz spectrum is partially licensed in some countries.

Table 2 shows the present WiMAX frequencies around the world. Other frequencies are sought. These frequencies should not be higher than the 5.8 GHz because, for relatively high frequencies, NLOS operation becomes difficult, which is an evident problem for mobility. The minimum channel bandwidth for WiMAX usage is 1.75 MHz per channel, while 10 MHz is considered as an optimum.

Table 2: Worldwide Allocation of Licensed and License-exempt Bands

Region or Country	Licensed Bands	License-exempt Bands
North America, Mexico	2.5 GHz	5.8 GHz
Central and South America	2.5 and 3.5 GHz	5.8 GHz
Western and Eastern Europe	3.5 GHz	5.8 GHz
South-East Asia	2.3, 2.5, 3.3 and 3.5 GHz	5.8 GHz
Middle East and Africa	3.5 GHz	5.8 GHz

In some countries, a WiMAX licensed band may only be used for WiMAX operation. Additional constraints may also exist. For example, WiMAX cannot be used for mobile operation in some countries.

WIMAX TECHNOLOGY BASICS

The IEEE 802.16 standard is a real revolution in wireless MANs that enables high-speed access to data, video, and voice services. It is mainly aimed at providing fixed, portable, nomadic and eventually mobile wireless broadband connectivity without the need for direct line-of-sight with a base station (BS). WiMAX operates on two frequency bands, 2-11 GHz and 10-66 GHz and has a range of about 50 km with speeds of up to 71 Mbps. At the 2-11GHz frequency range it works by non-line-of-sight (NLOS), where a computer inside a building communicates with a WiMAX tower at the base station. Higher frequency transmissions are used for line-of-sight (LOS) service. Since LOS connection is stronger and more stable, it enables the towers to communicate with each other over a greater distance. Due to infrastructure and costs involved it would be more suited to provide the backbone services for ISPs and large corporations providing wireless networking and internet access.

ViMAX Architecture

The WiMAX architecture framework is based on the following major principles:

- Support for deployment in both license and license-exempt frequency bands.
- Support for different radio access network topologies.
- Independent radio access network architecture to enable seamless integration and interworking with 3G, WiFi and existing IP operator core networks (e.g. DSL, cable, etc).
- Support for IPv4 and IPv6 clients and application servers.
- Support for IP technologies to build scalable all-IP broadband wireless access networks.

- Support for a broad range of TCP and UDP real-time and non-real-time applications, and delivery of rich broadband multimedia.
- Functional extensibility to support future migration to full mobility.
- Strong security, encryption and service authentication. Bilateral user authentication based on a variety of authentication mechanisms.

The IEEE 802.16 standard defines a Medium Access Control (MAC) Layer that supports multiple PHYsical (PHY) Layer specifications customized for the frequency band of use and their associated regulations. Through the IEEE 802.16 MAC, every base station (BS) dynamically distributes uplink and downlink bandwidth to subscriber stations (SS) using Time-Division Multiple Access (TDMA).

The IEEE only defined the PHY and MAC layers in 802.16 standards. This approach has worked well for technologies such as Ethernet and WiFi, which rely on other bodies such as the Internet Engineering Task Force (IETF) to set the standards for higher layer protocols such as TCP/IP, SIP, VoIP and IPSec. In the mobile wireless world, however, standards bodies such as 3GPP and 3GPP2 set standards over a wide range of interfaces and protocols. To resolve this issue, and to develop standard network reference models for open inter-network interfaces, WiMAX Forum has formed two additional working groups. These are the WiMAX Forum's Network Working Group, which is focused on creating higher-level networking specifications for fixed, portable, nomadic and mobile WiMAX systems beyond what is defined in the IEEE 802.16 standard, and Service Provider Working Group which helps write requirements and prioritizes them to help drive the work of Network Working Group.

The WiMAX network architecture is based an all-IP platform, all packet technology with no legacy circuit telephony. The use of all-IP means that a common network core can be used, without the need to maintain both packet and circuit core networks. This results in lower cost, high scalability, and rapid deployment, and offers the advantage of reduced total cost of ownership during the lifecycle of a WiMAX network deployment.

MAC Layer

The Medium Access Control (MAC) Layer is a common interface that interprets data between the lower physical layer and the upper data link layer. The IEEE 802.16 MAC accommodates both continuous and burst traffic to support the variety of services required by multiple end users. It is designed mainly to support point-to-multipoint architecture with a central base station controlling the subscriber stations connected to it.

The IEEE 802.16 MAC protocol is connection oriented. Upon entering the network, each subscriber station creates one or more connections over which data are transmitted to and from the base station. The application must establish a connection with the base station as well as associated service flows. Downlink connections are either unicast or multicast, while uplink connections are always unicast.

The IEEE 802.16 MAC layer provides the option of allowing a smart subscriber station to manage its bandwidth allocation among its users, and this is due to the MAC characteristic that offers the choice of conceding bandwidth to a subscriber station rather than to the individual connection it supports.

The IEEE 802.16 MAC layer is adaptable and flexible, and it supports several multiplexing and duplexing schemes. The MAC is divided into three sublayers:

1. **Service Specific Convergence Sublayer (SSCS):** The WiMAX supports a variety of convergence sublayer types, including Ethernet, IPv4 and IPv6. The SSCS interfaces to higher layers.
2. **Common Part Sublayer (CPS):** The CPS represents the kernel of the MAC layer and it carries out the key MAC functions. The CPS provides bandwidth allocation and establishes and maintains connections. It also provides a connection-oriented service to the subscriber stations.
3. **Privacy Sublayer (PS):** The PS provides authentication, secure key exchange and encryption.

The MAC incorporates several features suitable for a broad range of applications at different mobility rates. These include:

- Four QoS traffic classes – unsolicited grant service (UGS), real-time polling service (rtPS), non-real-time polling service (nrtPS) and best effort (BE).
- Three power management levels – normal operation, sleep and idle.
- Header suppression, packing and fragmentation for efficient use of spectrum.
- Security and encryption – triple DES security.
- Privacy key management (PKM) for MAC layer security.
- Broadcast and multicast support.
- High-speed handover and mobility management primitives.
- Support for adaptive modulation.

PHYsical Layer

The PHYsical (PHY) Layer establishes the physical connection between the two sides, often in both directions (uplink and downlink). It defines the type of signal used, the kind of modulation and demodulation, the transmission power and also other physical characteristics. The IEEE 802.16 PHY layer contains several specifications customized for the frequency band of use and their associated regulations. Since, general frequency ranges for 802.16 are very wide and takes from 2 to 66 GHz, a number of PHY considerations were taken into account for the target environment.

Table 3: PHYsical Interfaces Defined in the 802.16 Standard

	Designation	Frequency Band	Duplexing
1	WirelessMAN-SC (known as SC)	10–66 GHz (LOS)	TDD and FDD
2	WirelessMAN-SC (known as SCa)	Below 11 GHz (NLOS); licensed	TDD and FDD
3	WirelessMAN-OFDM (known as OFDM)	Below 11 GHz; licensed	TDD and FDD
4	WirelessMAN-OFDMA (known as OFDMA)	Below 11 GHz: licensed	TDD and FDD
5	WirelessHUMAN	Below 11 GHz; license exempt	TDD only

Propagation of data in higher frequency range needs a direct line-of-sight. Because of this limitation, the IEEE opted for single-carrier modulation (WirelessMAN-SC) for frequencies in 10 to 66 GHz interval. Since line-of-sight transmission requires a fixed antenna on the roof, with a strong and stable connection capable of transmitting large amounts of data, these antennas and their installation are costly.

For WiMAX technology to be accessible by small and residential applications, a non-line-of-sight system is needed. Since lower frequencies allow waves to bend over obstacles like houses and trees, IEEE opted for sub 11 GHz frequency range for non-line-of-sight capability. The 2 to 11 GHz frequency band supports three specifications:

- **WirelessMAN-SCa:** using single carrier modulation.
- **WirelessMAN-OFDM:** using OFDM with 256-point Fast Fourier Transform (FFT). Access is by TDMA.
- **WirelessMAN-OFDMA:** using OFDMA with a 2048-point FFT. Multiple access is provided by addressing a subset of the multiple carriers to individual receivers.

In order to create a single interoperable standard, WiMAX has decided to focus on the OFDM 256-FFT which is common between IEEE 802.16-2004 and ETSI's HiperMAN. In Dec. 2005, IEEE approved the 802.16e standard that adds mobility features to WiMAX in the 2 to 11 GHz licensed bands. The 802.16e allows for fixed wireless and mobile non-line-of-sight applications primarily by enhancing the OFDMA.

WiMAX is designed to accommodate either Time Division Duplexing (TDD), which is more adapted to asymmetrical traffic, or Frequency Division Duplexing (FDD), which is more suited to enterprise traffic and delivers both full and half duplex transmission on the same signal. Cohabitation of FDD and TDD techniques is possible within the same bands, provided guard bands are implemented.

Some specifications are given for the unlicensed frequency bands used for 802.16-2004 in the framework of Wireless High-speed Unlicensed Metropolitan Area Network (WirelessHUMAN) PHYsical Layer. Unlicensed frequency is included in fixed WiMAX certification. The IEEE 802.16 physicals interfaces are summarized in Table 3.

Multiplexing Techniques

OFDM

IEEE 802.16 standard is based on Orthogonal Frequency Division Multiplexing (OFDM), which is a very powerful transmission technique. It is based on the principle of subdividing the bandwidth into many narrow-band orthogonal frequencies (often called sub-carriers), and transmitting these frequencies simultaneously. These frequencies are orthogonal to each other which eliminate the interference between channels. Each frequency channel is modulated with a possibly different digital modulation. The frequency bandwidth associated with each of these channels is then much smaller than if the total bandwidth was occupied by a single modulation.

The smaller frequency bandwidth for each channel is equivalent to greater time periods and then better resistance to multipath propagation. Better resistance to multipath and the orthogonal nature of carriers allows a high spectral efficiency. OFDM is often presented as the best performing transmission technique used for wireless systems and it is a very effective means of transferring data when carriers of width of 5 MHz or greater can be used. Below 5MHz carrier width, current CDMA based 3G systems are comparable to OFDM in terms of performance.

OFDMA

The IEEE 802.16e standard uses Orthogonal Frequency Division Multiple Access (OFDMA), which is similar to OFDM in that it divides the carriers into multiple sub-carriers. OFDMA, however, goes a step further by then grouping multiple sub-carriers into sub-channels. The sub-carriers forming one sub-channel may be adjacent or not. A single client or subscriber station might transmit using all of the sub-channels within the carrier space, or multiple clients might transmit with each using a portion of the total number of sub-channels simultaneously.

SOFDMA

OFDMA multiple access is not the only specificity of OFDMA Physical Layer. Another major difference is the fact that its OFDM transmission is scalable (SOFDMA). The scalability is the change of the FFT size and then the number of sub-carriers. The supported FFT sizes are 2048, 1024, 512 and 128. Only 1024 and 512 are mandatory for mobile WiMAX profiles.

WIMAX PROFILES

The IEEE 802.16-2004 is very flexible and the only way to achieve interoperability is to narrow it down to a certain set of system options. Since 802.16 addresses the entire 2-11 GHz frequency range, there is an inherent need for a number of different solutions or profiles to use the vernacular of the WiMAX Forum. Therefore, the WiMAX Forum has devised system profiles (set of features of the 802.16 standard) that are required or mandatory for WiMAX certification. The 802.16 standard indicates that a system profile consists of five components: MAC profile, PHY profile, RF profile, duplexing mode (TDD or FDD) and power class. The frequency bands and channel bandwidths are chosen such that they cover as much as possible of the worldwide spectra allocations expected for WiMAX. Equipments can then be certified by the WiMAX Forum according to a specific system profile.

The use of profiles is clearly needed in order to support a wide range of deployment options; in particular it reduces the abundance of options to a manageable number and also causes the industry to focus on those profiles that should be implemented first. WiMAX Forum has released profiles based on three spectrum bands for global deployment: 5, 3.5 and 2.5 GHz. Each of these bands is briefly discussed below.

Licensed 3.5 GHz: The bands between 3.4 and 3.6 GHz have been allocated for broadband wireless access in the majority of countries, with the exception of the United States. In United States, this spectrum is designated for use by the Federal Government. Because the WiMAX Forum is focusing its efforts internationally, however, much of this spectrum is available for WiMAX use in Europe and elsewhere.

Licensed 2.5 GHz: The bands between 2.5 and 2.69 GHz have been allocated for broadband wireless access in the United States, Mexico, Brazil and some Southeast Asian countries. In United States, much of this spectrum has been licensed for use in the Multipoint Distribution Service (MDS) and the instructional television fixed service. This band is also currently underutilized and potentially available in many countries throughout South America and Europe. The WiMAX Forum also includes 2.3 GHz in this band category because it expects to cover 2.3 GHz with the 2.5 GHz radio.

Unlicensed 5 GHz: This frequency range includes bands between 5.25 and 5.85 GHz. In the upper 5 GHz band (5.725–5.850 GHz), many countries allow higher power output (4 W) which can improve the coverage. This makes the 5.8 GHz band more attractive to WiMAX applications globally. Because much of this spectrum is unlicensed in the United States, it is readily available for WiMAX deployment without individual FCC licensing.

WiMAX Forum has defined two types of system profiles: fixed and mobile. These profiles are briefly introduced in the following sections.

Fixed System Profiles

Presently, the WiMAX Forum has identified five system profiles for 802.16-2004 that allow the technology to accommodate different frequency bands, channel bandwidths and duplexing schemes (FDD / TDD). These profiles are shown in Table 4. These system profiles are based on the OFDM PHYsical Layer IEEE 802.16-2004 standard and they all use point-to-multipoint topology.

Mobile System Profiles

The WiMAX Forum has also defined five system profiles for 802.16e mobile amendment. These profiles were approved in February 2006 and are shown in Table 5.

These system profiles are based on the OFDM PHYsical Layer IEEE 802.16e amendment and they all use only the point-to-multipoint topology.

Table 4: Fixed WiMAX Certification Profiles

Frequency Band (GHz)	Duplexing Mode	Channel Bandwidth (MHz)	Profile Name
3.5	TDD	7	3.5T1
3.5	TDD	3.5	3.5T2
3.5	FDD	3.5	3.5F1
3.5	FDD	7	3.5F2
3.5	TDD	10	5.8T

Table 5: Mobile WiMAX Certification Profiles (All using OFDMA PHY and PMP modes)

Frequency Band (GHz)	Duplexing Mode	Channel Bandwidth and FFT Size (Number of OFDMA Sub-Carriers)
2.3–2.4	TDD	5 MHz, 512; 8.75 MHz, 1024; 10 MHz, 1024
2.305–2.320	TDD	3.5 MHz, 512; 5 MHz, 512; 10 MHz, 1024
2.496–2.690	TDD	5 MHz, 512; 10 MHz, 1024
3.3–3.4	TDD	5 MHz, 512; 7 MHz, 1024; 10 MHz, 1024
3.4–3.8	TDD	5 MHz, 512; 7 MHz, 1024; 10 MHz, 1024

WIMAX SECURITY

A wireless system uses the radio channel, which is an open channel. Hence, security procedures must be included in order to protect the traffic confidentiality and integrity and to prevent different network security attacks such as theft of service. The IEEE 802.16 MAC layer contains a security sub-layer that supports best in class security features. Support exists for mutual device/user authentication, flexible key management protocol, strong traffic encryption, control and management plane message protection and security protocol optimizations for fast handovers. The usage aspects of the security features are described below:

Privacy Key Management (PKM) Protocol

Privacy Key Management Version 1 (known as PKMv1) in 802.16-2004 standard provide secure distribution of keying data from the base station to the subscriber station. In addition, PKM is used to apply conditional access to network services, making it the authentication protocol, protecting them from theft of service and providing a secure key exchange. Many ciphering algorithms are included in 802.16 standard for encrypting packet data across the 802.16 network.

Due to different security requirements for mobile and fixed wireless services, the security has been redefined in the IEEE 802.16e amendment. PKMv2 include two main component protocols; a data encapsulation protocol for securing packet data across the fixed wireless network, and a key management protocol for providing secure distribution of keying data from the base station to subscriber station. PKMv2 manages the MAC security using Traffic Encryption Control, Handover Key Exchange and Multicast/Broadcast security messages.

ViMAX allow using many encryption algorithms. These include DES (Data Encryption Standard), RSA (Rivest Shamir Adleman), AES (Advanced Encryption Standard) and HMAC (Hashed Message Authentication Code). These algorithms can be used for securing ciphering key exchange and for the encryption of transport data.

Authentication

The WiMAX architecture supports device and user authentication using IETF EAP (Extensible Authentication Protocol). The strong bilateral user authentication is based on a variety of authentication mechanisms, such as username/password, X.509 digital certificates, Subscriber Identity Module (SIM), Universal SIM (USIM) and Removable User Identity Module (RUIM).

The architecture also supports subscriber station authorization using client/server key management protocol. The base station (BS) authenticates a subscriber station (SS) during the initial authorization exchange using digital-certificate-based SS authentication. The PKM protocol uses public key cryptography to establish a shared secret between the SS and the BS. The SS also uses the PKM protocol to support periodic reauthorization and key refresh.

Traffic Encryption

WiMAX uses cipher techniques for protecting all the user data over the MAC interface. Encryption is applied only to the MAC PDU payload – the generic MAC header is never encrypted. All MAC management messages are sent in the clear to facilitate registration, ranging and normal operation of the MAC Layer. Only the secondary management connections and the transport connections are encrypted.

The PKM protocol uses X.509 digital certificates, the RSA public key encryption algorithm and strong encryption algorithms to perform key exchanges between the SS and the BS. After the use of PKM as a public key cryptography to establish a shared secret (the authorization key) between the SS and the BS, this shared secret is used to secure further PKM exchanges of Traffic Encryption Keys (TEKs). The main operation is that the SS asks the BS for encryption keys. The use of the shared secret, authorization key, for a two-tiered mechanism for key distribution permits TEKs to be refreshed without incurring the overhead of computation intensive operations.

Fast Handover Support

WiMAX uses a 3-way Handshake scheme to optimize the re-authentication mechanisms for supporting fast handovers. This mechanism is also useful to prevent any man-in-the-middle-attacks.

COMPARISION TO OTHER WBA TECHNOLOGIES

The wireless world continues to grow as engineers develop faster, more robust technologies to free us from wires for greater simplicity, convenience, and efficiency. From short range to long range, the wireless landscape has taken shape in our lives. A wide variety of different wireless data technologies now exist, some in direct competition with one another, others designed to be optimal for a distinct market and they complement the others.

The major contenders of WiMAX are the current 3G technologies such as W-CDMA and CDMA2000. However, in addition to 3G technologies, four IEEE working groups are of special importance. The 802.11 working group develops standards for WLANs, whereas the 802.16 working group is responsible for WMANs, both fixed and mobile. Products conforming to these standards are certified and promoted by WiFi (Wireless Fidelity) Alliance and WiMAX Forum respectively. The third working group, 802.15, is responsible for WPANs. The

standards in this group include Bluetooth, Ultra Wide Band (UWB) and Wireless USB. Yet another working group, 802.20, is developing a standard for mobile broadband access networks.

To appreciate what WiMAX brings to us, and to decide which technologies to implement or products to purchase, we need to understand what additional features it provides over existing technologies. Existing broadband wireless access technologies that are close to WiMAX are third-generation mobile, Wi-Fi, Bluetooth and UWB. Let us first examine these and then compare with WiMAX.

3G Technologies

3G is the third generation of mobile phone standards and technology. It offers a wider range of advanced services while achieving greater network capacity through improved spectral efficiency. Services include wide-area wireless voice telephony and broadband wireless access, thus providing greatest mobility for voice communications and Internet connectivity. In order to realize these services, 3G allows data transmission speed up to 144Kbps in a high-speed moving environment, 384Kbps in a low-speed moving environment, and 2Mbps in a stationary environment. Typically, 3G technologies provide service at 5-10 Mbps.

3G is based on the International Telecommunication Union (ITU) specification under the International Mobile Telecommunications program, IMT-2000. The IMT-2000 standard consists of the following radio interfaces:

- W-CDMA (Wide-band Code Division Multiple Access)
- CDMA2000 (Code Division Multiple Access 2000)
- TD-CDMA / TD-SCDMA (Time-Division Synchronous Code-Division Multiple-Access)

The **W-CDMA** offers a seamless migration for GSM networks (which may or may not have already progressed to GPRS/EDGE) and can provide a migration path for narrow-band CDMA networks. Because of backward compatibility, W-CDMA is a preferred platform for the 3G cellular systems

The **CDMA2000** has emerged out of IS-95 standard and it has undergone a considerable amount of development, particularly in the area of multi-channel working. Operators of narrowband CDMA One (IS-95A/B) can deploy services designated as 3G in existing as well as new spectrum bands.

An organization called 3rd Generation Partnership Project (3GPP) has continued that work by defining a mobile system that fulfills the IMT-2000 standard. This system is called Universal Mobile Telecommunications System (UMTS).

W-CDMA 3GPP Release 5 extends the W-CDMA specification with High Speed Downlink Packet Access (HSDPA). HSDPA adds a new transport channel, which is optimized for shared data. It also provides higher-order modulation, short transmission time interval, fast link adaptation, fast scheduling, and fast hybrid automatic-repeat-request (ARQ).

In Asia and Europe, most of the telecommunication companies use W-CDMA technology because of its backward compatibility to GSM, while in USA CDMA2000 technology is more common.

Comparison of WiMAX to 3G

Since fixed WiMAX, 802.16-2004 represents a market completely different from 3G cellular networks, only mobile WiMAX, 802.16e is considered here for comparison.

- 3G cellular is already here and it has a field advance of two to three years with regard to WiMAX. In addition, some countries have restrictions on WiMAX frequency use, i.e. WiMAX operators can be forbidden to deploy mobility by the regulator.
- 3G cellular is a reliable, secure, long-range and private network with manageable data rates, but data services and the usage cost is too expensive – as much as 10 times the cost of using similar wire-line services. This is due to factors like totally revamping the infrastructure, and high license fees. Contrary to this, the frequency spectrum of WiMAX is cheaper than 3G system frequencies in many countries.
- The WiMAX frequency spectrum changes from one country to another. However, making multi-frequency mobile equipment, for a reduced cost, is now becoming easier for manufacturers.
- Indoor coverage is mandatory for WiMAX in any environment, whereas with cellular systems it is only essential in urban areas.
- The mobile WiMAX utilizes OFDMA where the spectrum is divided into many sub-carriers. In comparison to SC CDMA, this transmission technique has better performance (interference rejection, spectrum-use efficiency, and multi-path tolerance), high data quality of service support, and lower future equipment costs. However, there are plans to upgrade 3G by including OFDM and MIMO in it. This gives a time advance for WiMAX in the implementation of OFDM.
- WiMAX is an all-IP (Internet Protocol) technology. This is not the case for the 3G system where many intermediate protocols (tunneling, etc.) made for the first versions of 3G are not all-IP. However, evolution of 3G should provide end-to-end IP (or all-IP).

Taking into account all these observations, it could be said that there is a place for both of these technologies, depending on the market, the country and the application. In addition, WiMAX and 3G are both required because their optimum platforms differ: WiMAX works best for computing platforms, such as laptops, while 3G is best for mobile devices like PDAs and cell phones.

WiFi

WiFi is a short name for Wireless Fidelity and it is described in IEEE 802.11 Wireless LAN air interface specification. WiFi technologies include the approved

IEEE 802.11a, b and g specifications, as well as the yet-to-be-ratified 802.11n specification. WiFi is the first high-speed wireless technology to enjoy broad deployment, most notably in hotspots around the world – including homes and offices, and increasingly cafes, hotels, and airports. Optimized for indoor and campus environments, WiFi was intended to serve the needs of Ethernet LAN users and is quite limited in terms of range and the number of users that can be accommodated simultaneously. In fact, the wireless technology can only serve signals in a "hotspot" (a WiFi network) with a typical reach of about 100 meter (328 feet) indoors or 300 meter (1000 feet) outside, due to interference.

The IEEE 802.11a standard provides data rates up to 54 Mbps at 5 GHz frequency, which is relatively uncluttered, but has a shorter effective range of the order of about 15-30 meter (50-100 feet). The IEEE 802.11b standard (published in 1999) works at the unregulated, 2.4 GHz frequency spectrum and allows users to transmit data at speeds up to 11 Mbps. However, a number of wireless products, such as cordless phones and garage door openers, also use the 2.4 GHz frequency and can cause disruptions in the service. The IEEE 802.11g standard was approved in June 2003. It is backward compatible with IEEE 802.11b, uses the same 2.4 GHz spectrum and has the same range as the previous 802.11b standard. The major difference is that 802.11g can deliver speeds up to 54 Mbps. Of all these standards, IEEE 802.11b and IEEE 802.11g have been the most widely deployed and are relatively inexpensive. IEEE 802.11a is more expensive and as a result it not available for public access. WiFi uses OFDM that supports high data rates with low latency, over a distributed all-IP wireless network that can penetrate walls and associated structures.

Also of considerable interest is IEEE 802.11n, the high-speed standard. Projected speeds are in excess of 100 Mbps. The new standard will make use of Multiple Input, Multiple Output (MIMO) technology, where arrays of antennas are required for both base stations and subscriber terminals. Ratification is expected to take place in 2008.

Comparison of WiMAX to WiFi

- The main distinction between WiFi and WiMAX is speed and coverage distances. While WiFi typically provides local network access for around a 100 meter with speeds of up to 54 Mbps, a single WiMAX antenna can have a range of up to 50 kilometer with speeds of 70 Mbps or more. As such, WiMAX can bring the underlying Internet connection needed to service local WiFi networks.
- WiFi 802.11 may not be the best way for "last mile" connection. In fact 802.11 has performance limitations when supporting larger numbers of users needing guaranteed bandwidth. WiMAX has a much better performance than WiFi (range, QoS management, spectrum use efficiency, etc.) but this comes at the price of a higher cost and equipment complexity. It may be because of a difference in the chronology. WiFi 802.11 standard was published in 1997 and the WiMAX 802.16-200 was published in 2004. If we consider the standard or the products, there is a difference of about seven years between the two. However, it is expected that, due to competition between manufacturers and larger quantities of products, WiMAX will soon catch up.

To conclude, it can be said that, if a network consists of nothing but short cell radius hotspots, 802.11 will suffice and indeed may be preferable, but for a metropolitan network most 802.11 equipment represents a severe compromise. In fact, WiFi and WiMAX are complementary, specifically if WiMAX is used for the backhauling of WiFi.

Wireless PAN Technologies

The 802.15 standard is an IEEE fixed-point wireless broadband standard, but it is one of even less relevance to public networks. The major technologies in this group are Bluetooth, Ultra Wideband (UWB) and Wireless USB. These are discussed in the following sections:

Bluetooth

Bluetooth is an open architecture, low-cost, low-power wireless communication protocol that is capable of communicating at 1 Mpbs (Enhanced Data Rate specification allows data rates of 3 Mbps) in the 2.4 GHz (unlicensed) spectrum at a range of about 10 meters. Bluetooth operates on radio signals and provides electronic devices a method to communicate over short distances without the line-of-sight required by infrared technology. It is intended for use in close-proximity electronics such as PC's, PDAs, printers, keyboards, cellular phones, headsets, fax machines, digital cameras, video game consoles, and any other electronic device requiring cable connections to communicate. The Bluetooth devices can transmit through solid, non-metal objects and these devices communicate with one another when they are in range.

The Bluetooth technology also provides a universal bridge to existing data networks; therefore, it also offers wireless access from home appliances and portable handheld devices to Internet, local area networks, telephone networks and the mobile phone networks. This not only makes the Internet, local area and phone networks easier to use but also extends its reach.

Bluetooth's output power is between 1 and 100mW. Furthermore, the specification limits the radio output power exactly to that actually required. The range of devices depends upon the power class of the radio. Most devices use Class 2 radio at maximum output power of 2.5mW and allow the devices to communicate in a range of up to 10 meters in an obstacle-free environment. The Class 3 radio works at 1mW and communicates in a range of 1 meter, and the Class 1 radio works at 100mW and communicates in a range of up to 100 meters.

The idea for Bluetooth came from Ericsson in 1994. Ericsson was developing telecommunications infrastructure equipment and saw the need for an inexpensive way that electronics could communicate. The name "Bluetooth" comes from a story about a Viking named Bluetooth who successfully joined two Scandinavian Kingdoms

peacefully. Ericsson looked for partners to help with the development of the technology and in 1998 the Bluetooth special interest group was formed.

With its short range, Bluetooth allows for a wireless personal area network and it is defined in IEEE 802.15.1 PAN air interface specification. The technology creates many useful mobile usage models because the connections can occur while mobile devices are being carried in pockets and briefcases.

Bluetooth specification 3.0 is currently ongoing and has the goal to also use UWB. The specification 3.0 will allow throughput of up to 480 Mbps.

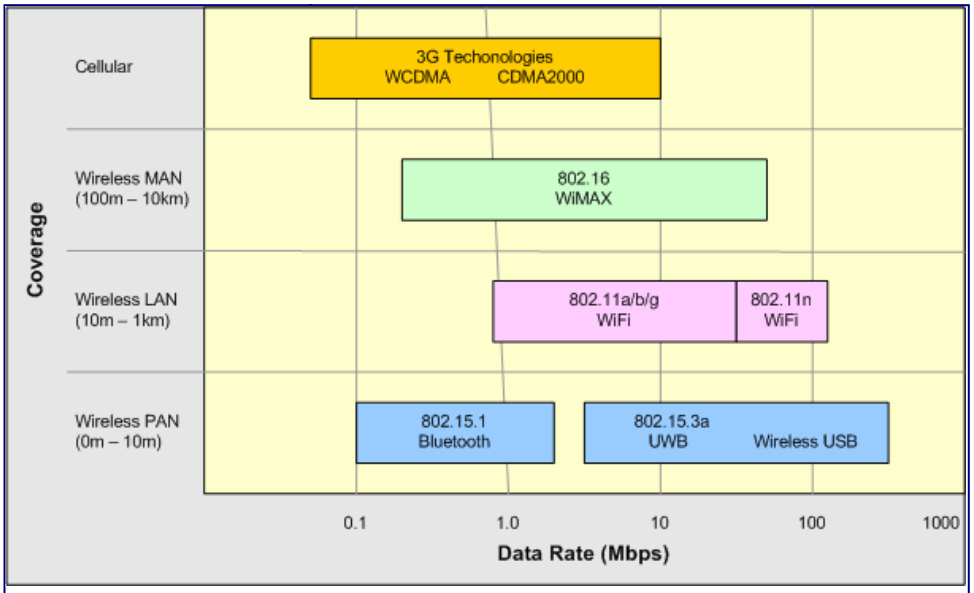


Figure 5: Wireless Standards Coverage

Ultra-Wideband (UWB)

UWB is a revolutionary wireless technology for transmitting digital data over a large-bandwidth with very low power. It uses the same spectrum that is currently being used by conventional radio communication devices, including emergency services. Specifically, UWB is defined as any radio technology having a spectrum that occupies a bandwidth greater than 20 percent of the center frequency, or a bandwidth of at least 500 MHz. Its combination of broader spectrum and lower power improves speed and reduces interference with other wireless spectra.

A significant difference between traditional radio transmissions and UWB radio transmissions is that traditional systems transmit information by varying the power level, frequency, and/or phase of a sinusoidal wave. UWB transmissions transmit information by generating radio energy at specific time instants and occupying wide bandwidth, thus enabling a pulse-position modulation technique. Modern UWB systems use other modulation techniques, such as OFDM, to occupy these extremely wide bandwidths.

UWB has two competing standards. The UWB Forum is promoting a standard based on direct sequence (DS-UWB); while WiMedia Alliance is promoting a standard based on OFDM. Each standard allows for data rates from approximately 0-480 Mbps at a range of 2 meters and a data rate of approximately 110 Mbps at a range of up to 10 meters

In United States, the Federal Communications Commission (FCC) has mandated that UWB radio transmissions can legally operate in the range from 3.1-10.6 GHz, at a limited transmit power of -41dBm/MHz. The UK regulator Ofcom has announced a similar decision on 9 August 2007. Many national jurisdictions around the globe are also expected to act on national regulations very soon. However, some national regulatory bodies apparently are somewhat reluctant to allow common unlicensed use.

UWB brings the convenience and mobility of wireless communications to high-speed interconnects in devices throughout the digital home and office. Designed for wireless personal area networks (IEEE 802.15.3a draft PAN standard), UWB is the leading technology for freeing people from wires, enabling wireless connection of multiple devices for transmission of video, audio and other high-bandwidth data. UWB has traditional applications in non cooperative radar imaging. Most recent applications target sensor data collection, precision locating and tracking applications. However, the UWB products are slow to come to market due to the disagreements over the standard and the lack of global regulatory approval

The UWB platform also serves as the underlying transport mechanism for different applications that would operate on top of the single radio, such as Wireless Universal Serial Bus (WUSB), IEEE 1394, and the next generation of Bluetooth. As such, it can also be utilized for connecting computer peripherals to a PC and multiple components in the consumer electronics stack, e.g. home movie theater and the entertainment center.

Wireless USB (WUSB)

WUSB is a short-range, high-bandwidth wireless radio communication protocol created by the Wireless USB Promoter Group. It is based on the WiMedia Alliance's UWB common radio platform, which is capable of sending 480 Mbps at distances up to 3 meters and 110 Mbps at up to 10 meters. It was designed to operate in the 3.1-10.6 GHz frequency range, although local regulatory policies may restrict the legal operating range for any given country.

The WUSB architecture allows up to 127 devices to connect directly to a host. Because there are no wires or ports, there is no longer a need for hubs. However, to facilitate the migration from wired to wireless, WUSB introduced a Device Wire Adapter (DWA) class. A DWA

Table 6: Summary of the Broadband Wireless Technologies

TECHNOLOGY (STANDARD)	USAGE	THROUGHPUT	RANGE	FREQUENCY RANGE	MODULATION	LICENSED / UNLICENSED
Bluetooth (802.15.1)	WPAN	1 Mbps 3 Mbps (EDR)	10 meter (Class 2) 100 meter (Class 1)	2.4 GHz	Adaptive FHSS	Unlicensed
UWB (802.15.3a)	WPAN	110 Mbps (10 meter) 480 Mbps (2 meter)	10 meter	3.1-10.6 GHz	OFDM or DS-UWB	Unlicensed
Wireless USB	WPAN	110 Mbps (10 meter) 480 Mbps (3 meter)	10 meter	3.1-10.6 GHz	MB-OFDM	Unlicensed
Wi-Fi (802.11a)	WLAN	54 Mbps	15-30 meter	5 GHz	OFDM	Unlicensed
Wi-Fi (802.11b)	WLAN	11 Mbps	100 meter	2.4 GHz	DSSS with CCK	Unlicensed
Wi-Fi (802.11g)	WLAN	54 Mbps	100 meter	2.4 GHz	OFDM, DSSS with CCK	Unlicensed
Wi-Fi (802.11n)	WLAN	200 Mbps	100 meter	2.4 GHz	OFDM-MIMO	Unlicensed
WiMAX (802.16-2004)	WMAN	70 Mbps (20 MHz BW) 1-3 Mbps (typical)	50 Km (max) 3-10 Km (typical)	10-66 GHz (LOS) 2-11 GHz (NLOS)	OFDM/OFDMA	Licensed & Unlicensed
WiMAX (802.16e)	Mobile WMAN	30 Mbps (10 MHz BW) 1-3 Mbps (typical)	2-7 Km (typical)	2-6 GHz	SOFDMA- MIMO	Licensed & Unlicensed
3G (WCDMA/UMTS)	WWAN	2 Mbps < 750 Kbps (typical)	2-10 Km (typical)	1800, 1900, 2100 MHz	CDMA/FDD	Licensed
WCDMA/UMTS (HSDPA)	WWAN	10.8 Mbps 1-2 Mbps (typical)	2-10 Km (typical)	1800, 1900, 2100 MHz	CDMA/FDD	Licensed
3G (CDMA2000 1xEVDO)	WWAN	2.4 Mbps 300-600 Kbps (typical)	2-10 Km (typical)	400, 800, 900, 1700, 1800, 1900, 2100 MHz	CDMA/FDD	Licensed
2.5G (EDGE)	WWAN	384 Kbps < 130 Kbps (typical)	30 Km (max) 2-10 km (typical)	1900 MHz	TDMA/FDD	Licensed

allows existing USB 2.0 devices to be used wirelessly with a WUSB host.

WUSB is used in game controllers, printers, scanners, digital cameras, MP3 players, hard disks and flash drives. It is also suitable for transferring parallel video streams.

The Wireless USB Promoter Group was formed in February 2004 to define the Wireless USB specification. The group consists of Agere Systems, Hewlett-Packard, Intel, Microsoft, NEC Corporation, Philips and Samsung. The USB Implementers Forum (USB-IF) tests and certifies the "Certified Wireless USB" based wireless equipment.

Although the Wireless USB specification was completed in May 2005, the companies started shipping the products in mid 2007. The first few products included embedded cards in notebook computers and Hub/Adapter solutions for the PCs. These products are from WiQuest, Belkin, Dell, Lenovo and D-Link.

Comparison of WiMAX to Wireless PAN

If we take a look into wireless PAN technologies, it is easy to say that they are meant for creating very small networks. Bluetooth has been used in a few hotspot public networks, but the range is so short that it is utterly inapplicable in pervasive MANs. The UWB may well represent the far future of broadband wireless, but current power restrictions confine it to very short ranges and it is also not suitable for overarching MANs as it is currently configured. On the other hand, the WPAN technologies complement WiMAX and other longer range radio technologies such as WiFi and 3G cellular communications.

Summary of Comparison

The large number of technologies and standards in the broadband wireless space, coupled with the rapid pace of change, makes this a very dynamic and broad field to study. However, based on our comparison, it can be said that WiMAX, Wi-Fi, 3G and other wireless PAN technologies are all necessary to form a global wireless infrastructure needed to deliver high-speed communications and Internet access worldwide.

Table 6 summarizes the key characteristics of each of these technologies.

WIMAX APPLICATIONS

WiMAX help the industry in providing solutions across multiple broadband segments. It is mainly designed to address three challenges associated with traditional wired access deployment types. These are large area coverage, last-mile access and the backhaul. Each of these applications is briefly discussed below:

Large Area Coverage

Metropolitan area networks are intended to serve an area approximately the size of a large city and these serve as the intermediary network between LANs and WANs. Today, MANs are being implemented mainly by running underground fiber optic and copper cables. However, due to problems associated with civil work and the cost of running fiber optic cable, there has been a growing interest in the development of wireless technologies that achieve the same results as traditional MANs without the difficulty of supplying the actual physical medium for transmission, such as fiber or copper.

What makes WiMAX so attractive is its potential to provide broadband wireless access to entire sections of metropolitan areas as well as small and remote locales throughout the world. People who could not afford broadband will now be able to get it, and in places where it may not previously have been available.

As a wireless MAN solution, WiMAX provides more capacity at lower cost than DSL or cable for extending the fiber networks. It also enables coverage of a large area very quickly and cost-effectively. WiMAX is also a good option for extending the range of WiFi networks to a large area, providing canopies of coverage anywhere from 1 to 10 kilometers wide.

Last-mile Access

The WiMAX wireless broadband access provides a missing link for the "last-mile" connection in metropolitan area networks where DSL or cable broadband access services are not available or too expensive. Typical solutions in this area are as given below:

Residential Broadband Access: The main contenders for residential market are the DSL and the cable technologies. However, practical limitations prevent these technologies from reaching many potential broadband customers. Traditional DSL can only reach about 5 km from the central office switch, and this limitation means that many locations may not be served by DSL connections. On the other hand, many areas are either not served by the cable or the cable networks have not been equipped to provide a return channel. WiMAX not only provides an alternative to these access methods but it is also expected to be more reliable due to wireless nature of communication between the customer premises and the base station. Moreover, the range of WiMAX solution, the absence of a line of sight requirement, high bandwidth and low cost helps to overcome the limitations of traditional wired access methods. Typical application will be in remote areas where it is not economically feasible to have a DSL or cable Internet. This is particularly useful in developing countries where the reliability and quality of land-line communications infrastructure is often poor.

Rural and Underserved Areas: The WiMAX is well suited to provide the reliability and speed for meeting the requirements of residents and small-size businesses in low population density and underserved rural areas. It also offers an alternative to satellite Internet services for these areas and allows mobility of the customer equipment. The spectral limitation of WiMAX is advantageous here, as a single base station can serve most of the residents in a large area.

Backhaul

With support for long range and high throughput, WiMAX is capable of delivering backhaul for carrier infrastructure, enterprise campuses and WiFi hotspots. Typical solutions include:

Cellular Backhaul: The robust bandwidth of 802.16 technology makes it an excellent and cost-effective choice for point-to-point backhaul applications such as cellular towers. This provides an opportunity to cellular operators to lessen their independence on backhaul facilities leased from their competitors or proprietary microwave solutions.

Clustered WiFi Hotspots: As the number of WiFi hotspots proliferates, users will naturally want to be wirelessly connected, even when they are outside the range of the nearest hotspot. The WiMAX technology makes it an excellent choice for backhaul of these hotspots. WiMAX backhaul can significantly reduce the hotspot costs and, with nomadic capability, it can also fill in the coverage gaps between WiFi hotspot coverage areas. Last-mile broadband wireless access using WiMAX can also help to accelerate the deployment of WiFi hotspots and small wireless LANs, especially in those areas not served by DSL or cable.

Miscellaneous Applications

In addition to three main areas that we have discussed, WiMAX supports a variety of other applications. These include:

- Automatic Teller Machines
- Multimedia Communication
- Online Gaming
- Security and Surveillance
- Sensor Networks
- Telematics and Telemetry
- Vehicular Data and Voice
- Video-on-Demand (VoD)
- Virtual Private LAN Services (VPLS)
- Wireless VoIP

WIMAX DEPLOYMENT

With the finalization of the IEEE 802.16e standard, the operators all over the world are beginning to focus on the opportunities presented by the WiMAX. According to *"Global WiMAX Market Analysis"*, a market research report published in March 2008, large subscriber base, inadequate broadband

infrastructure, along with the need for faster Internet access, will propel growth in WiMAX deployments in the Asia-Pacific and Middle East Africa regions. The report also mentions that the countries such as China, India and Russia, with their underdeveloped infrastructure and large populations, represent strong potential for WiMAX growth. However, Europe is slightly lagging behind in WiMAX deployments due to its well-built cellular infrastructure, intense competition, and strong presence of 3G services.

Currently the high prices of CPE make WiMAX more expensive than fiber, cable or DSL. However, most of the companies are counting on the trend of falling hardware prices. Also, as a last mile solution, WiMAX may not compete on price at this time, but as a solution for rural and underserved areas, customers do not have much choice available.

Pakistan

Two companies, Wateen Telecom and LINKdotNET, are actively participating in WiMAX deployment. Another company, Burraq Telecom also has plans to offer WiMAX in near future.

Wateen started its services in December 2007 with the installation of WiMAX network in 17 cities of Pakistan – the largest WiMAX deployment anywhere in the world. Wateen Telecom is using Motorola's wi4 WiMAX technology, based on the IEEE 802.16e standard. This solution would not only enable Wateen to offer both fixed and mobile broadband data and voice services on a single platform, it would also integrate a seamless mobility vision allowing interoperability across GSM, WiMAX and WiFi networks. Through its new WiMAX network, Wateen now offers a triple play service – a bundled solution that include local and long distance telephony, high-quality TV, and broadband Internet connectivity.

LINKdotNET (an Orascom Telecom Company) has launched its operations with the installation of WiMAX network in 3 cities of Pakistan. They plan to bring the Internet revolution to Pakistan and, therefore, have already started work to add more cities to their network.

PTA, the communications regulatory body in Pakistan, has allocated a WiMAX spectrum in 3.5 GHz range. Since CDMA wireless phone operators such as Vfone and WorldCall, also have licenses in the same 3.5 GHz range, they are also likely to offer WiMAX services after getting approvals from PTA.

Saudi Arabia

The Middle East is also going for early adopter status with WiMAX. In Saudi Arabia, Bayanat Al-Oula has already started offering WiMAX services in four major cities; Riyadh, Jeddah, Dammam, and Makkah Al-Mukkaramah. According to their agreement with Samsung (valued at over $100 million), Samsung will supply mobile WiMAX equipment and devices to Bayanat Al-Oula over a period of two years starting from 2007. As such, the partnership will result in the largest mobile WiMAX deployment in Middle East region.

Another Saudi company, Atheeb, has also signed an agreement with Motorola to provide a WiMAX network for Saudi Arabia. With the completion of these projects, an increase of mobile WiMAX adoption is expected in other Middle East countries as well.

CONCLUSIONS

- In today's world wireless communication is no longer just about voice calls; instead it is heading in the direction in which it can be used, not only for voice calls, but also for getting information, multimedia contents, and real-time voice and video, at anytime and at anyplace.
- WiMAX is a powerful wireless MAN technology that can help in achieving the objective of getting information at anytime and at anyplace by providing broadband wireless connectivity to fixed, portable, nomadic, and ultimately to mobile users. It can satisfy a variety of access needs. Potential applications include extending broadband capabilities to bring them closer to subscribers, filling gaps in DSL, cable and T1/E1 services, backhaul to cellular networks and WiFi hotspots, providing "last mile" access to residences and businesses, and giving service providers another cost-effective option for supporting broadband services.
- WiMAX is aiming at providing a universal ubiquitous, and equitable and affordable access to Information and Communication Technology (ICT) infrastructure and services, and thus highly contributing to bridge the **Digital Divide**. The scope of WiMAX deployment will cover markets where the low telephone penetration, poor copper quality, or high DSL unbundling costs have acted as a brake on extensive high-speed Internet.
- WiMAX provides up to 50 km of service area range, allows users to obtain broadband connectivity without needing direct line-of-sight with the base station, and provides total data rates of hundreds of Mbps per base station – a sufficient amount of bandwidth to simultaneously support hundreds of businesses with T1/E1-type connectivity and thousands of homes with DSL-type connectivity with a single base station.
- WiMAX can provide wide area coverage and quality of service capabilities for applications ranging from real-time delay-sensitive voice and video to non-real-time downloads, ensuring that subscribers obtain the performance they expect for all types of communications.
- WiMAX is an all-IP-based wireless broadband technology. Thus, it can be integrated into wide-area

3G mobile networks, WiFi wireless networks and wire-line networks, allowing it to become part of a seamless anytime, anywhere broadband access solution.

- The WiMAX forum, backed by industry leaders, including operators, component suppliers and infrastructure suppliers, helps the widespread adoption of broadband wireless access by establishing a brand for the technology.
- With the flexibility of wireless technology, combined with the high throughput, scalability, long range and quality of service features, WiMAX promises an economically viable solution to accelerating the Internet adoption that can revolutionize lifestyles in developing countries.
- WiMAX market prospective looks very optimistic. With a huge market potential and the ability to be affordably deployed, WiMAX is on the verge of a major breakthrough. Many developing countries, including Pakistan, have already started offering the WiMAX services. This alone can prove why the estimated growth of this technology can be so vast.
- **WiMAX has the potential to do to broadband Internet access what cell phones have done to phone access.** In the same way that many people have given up their "land lines" in favor of cell phones, WiMAX could replace DSL and cable modem services, providing universal Internet access just about anywhere you go.
- WiMAX was developed to provide low-cost, high-quality, flexible, broadband wireless using certified, compatible and interoperable equipments from multiple vendors. As WiMAX is based on interoperability tested systems that were built using the IEEE 802.16 standard-based silicon solutions, WiMAX will reduce costs.

REFERENCES

[1] **Belk, Jeffrey K.,** "Why MAX? A Wireless Primer and Discussion on Wireless Reality", Qualcomm Inc., Sep 2005.

[2] **Burrows, Kathy; Fielbrandt, Lutz,** "*Overcoming the limitations of today's fixed wired access technologies"*, Siemens & Alvarion, White Paper, 2004.

[3] **Cayla, Guy; Cohen, Stephane; Guigon, Didier,** *"WiMAX: An Efficient Tool To Bridge The Digital Divide"*, WiMAX Forum., Nov 2005.

[4] **Laine, Philippe; Boscher, Christophe; Boettle, Dietrich; Feijt, Laurence,** *"WiMAX, making ubiquitous high-speed data services a reality"*, Alcatel, Strategy Whitepaper, 2004.

[5] **Langos, Geoffrey P.,** *"An Assessment of New Broadband Wireless Technologies and Their Impact on Adoption Strategies for the Dominant providers"*, Massachusetts Institute of Technology, Thesis, Sep 2003.

[6] **Nuaymi, Loutfi (2007),** *"WiMAX: Technology for Broadband Wireless Access"*, John Wiley & Sons.

[7] **Omerovic, Sanida,** *"WiMax Overview"*, Faculty of Electrical Engineering, University of Ljubljana, Slovenia.

[8] **Pareek, Deepak (2006),** *" The Business of WiMAX"*, John Wiley & Sons Ltd

[9] **Sargeant, Paul,** *"The Promise of WiMAX: Broadband Access to the Last Mile"*, Motorola, Inc., 2005.

[10] **Smura, Timo,** *"Competition Between Emerging Wireless Network Technologies: Case HSPA Vs. WiMAX in Europe"*, Helsinki University of Technology.

[11] **Sweeney, Daniel (2006),** "WiMax Operator's Manual: Building 802.16 Wireless Networks (2nd ed.)", Apress Forums

[12] **Usmani, Abdul Rehman,** *"WhyMax"*, Wateen Telecom.

[13] **Xiao**, **Yang (2008),** *"WiMAX/MobileFi: Advanced Research and Technology"*, Auerbach Publications.

[14] **Zhang, Yan; Chen, Hsiao-Hwa (2008),** *"MOBILE WiMAX: Toward Broadband Wireless Metropolitan Area Networks"*, Auerbach Publications.

[15] *"Broadband Wireless: The New Era in Communications",* Intel Corporation, White Paper, 2004.

[16] *"IEEE 802.16 and WiMAX: Broadband Wireless Access for Everyone",* Intel Corporation, White Paper, 2003.

[17] *"Introducing WiMAX: The next broadband wireless revolution",* Alvarion, 2004.

[18] *"The Broadband Wireless Access Market: Evolution of WiMAX Standard"*, Proxim Wireless Corp., White Paper, 2005.

[19] *"Understanding Wi-Fi and WiMAX as Metro-Access Solutions",* Intel Corporation, White Paper, 2004.

[20] *"WiMAX IEEE 802.16a Standard and WiMAX Igniting Broadband Wireless Access"*, WiMAX Forum, White Paper.

[21] **HowStuffWorks Website** http://computer.howstuffworks.com/wimax1.htm.

[22] **WiMAX Forum Website** http://www.wimaxforum.org/.

REVERSE ENGINEERING

BY ENGR. S. MASOODUL HASSAN
Saudi Electricity Company-EOA
Dammam, Saudi Arabia

ABSTRACT

Reverse Engineering is a process of producing new components from the dimensional measurements and metallurgical analysis of new or damaged parts. The components & parts produced by this process meet the original design criteria, and are identical in geometry and functions to those produced by OEM (Original Equipment Manufacturers). The repair of damaged parts and replacement with new non-OEM parts, using Reverse Engineering Process, is a viable alternative and new trend in maintenance of power plants components, emerged during the recent years.

INTRODUCTION

The principle and process of reverse engineering is very old in the industry to produce parts and components. The process starts from the collection of basic data and elementary information about the components. The parts produced by this process meet the original design specifications and operational requirements. These are identical in geometry and functions to those produced by OEM (Original Equipment Manufacturers). The repair of damaged parts and replacement with new non-OEM parts, using Reverse Engineering Process, has become a common practice in maintenance of Gas Turbine Power Stations.

Reverse Engineering Process Steps

The reverse engineering technology has improved significantly in the last 20 years, due to availability of high-tech manufacturing software & hardware. Intensive dimensional and metallurgical analysis is necessary before manufacturing of components. As a minimum, the vendors need one damaged part and one new part to start the process. The major steps of the Reverse Engineering Process are: (Reference 2)

- Collection of technical data and specifications of the components.
- Functional evaluation to determine the service and criticality; it is specially needed when complete design specifications are not available.
- Dimensional measurements of the parts/ clearances, using laser techniques
- Metallurgical investigations to understand material specifications of damaged parts and to decide the manufacturing process.
- Establishing interface with the other systems and components.
- Preparation of manufacturing drawings. (OEM drawings are not used by Reverse Engineering Companies)
- Definition of manufacturing procedures; casting, machining, and coating requirements.
- Approval of prototype casting
- Definition of heat treatment cycle to achieve required mechanical properties
- Establishing tolerances and acceptance criteria.
- Machining of prototype castings in solution heat treated condition
- Establishing final tests and NDT to be done after manufacture of parts.
- Preparation of Quality Control Plan.
- Dimensional check and final approval of the machined components.

Facilities & Skills Used in Reverse Engineering

The following equipment and facilities are generally needed to do reverse engineering of any component:

- Metallurgy Labs
- Coordinate Measuring Machines
- Spark Emission Analysis
- Finite Element Modeling Tools
- Computational Fluid Dynamics (CFD) Software
- CNC Machining Methods
- Electro-Chemical Machining (ECM)

- Laser Welding Machines
- Heat Treatment Facilities
- Special Coating Powder Application Machines
- NDT Facilities
- Facilities for Prototype Testing

Some Advanced Techniques Employed in the Process

The Reverse Engineering Process has got a tremendous boost due to availability of the latest advanced analytical & engineering techniques. Some of these advanced techniques are listed below: (Reference 3)

1. Robots are employed for continuous scanning, and to develop 360 degree image of the parts.
2. Three-dimensional CAD images are developed to define the exact geometry of components, using CMM (coordinate measuring machine) and non-contact laser measuring equipment.
3. Finite Element Analysis (FEA) is done to verify original design and specifications.
4. Advanced casting techniques are available to enhance the life and performance of the components.
5. Special laser welding and electron beam welding techniques are applied to manufacture parts.

A brief description of some special machines and techniques are given in the following paragraphs.

Electron Microscope

The electron microscope is used to get information about the metallurgical structure of component. This is a destructive method of material investigations. A small section is cut out and put under the electron microscope. The studies are done to understand the metallurgical microstructure of the material. Typical metallurgical investigation results, obtained through light microscopy analysis, are shown in Figure 1.

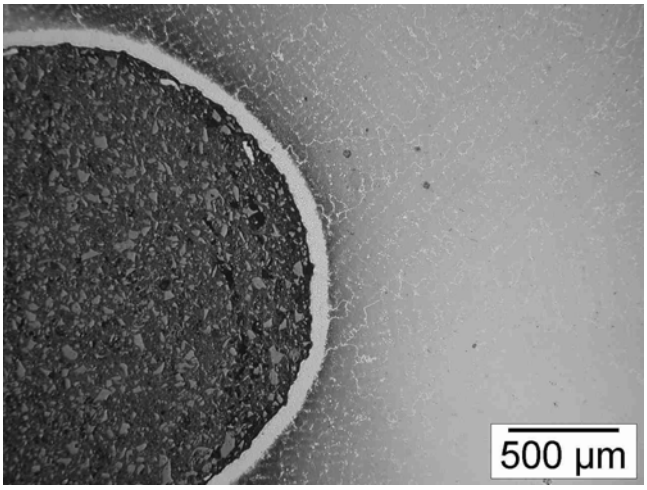


Figure 1: Light Microscopy Analysis Results (Metallurgical Investigations)

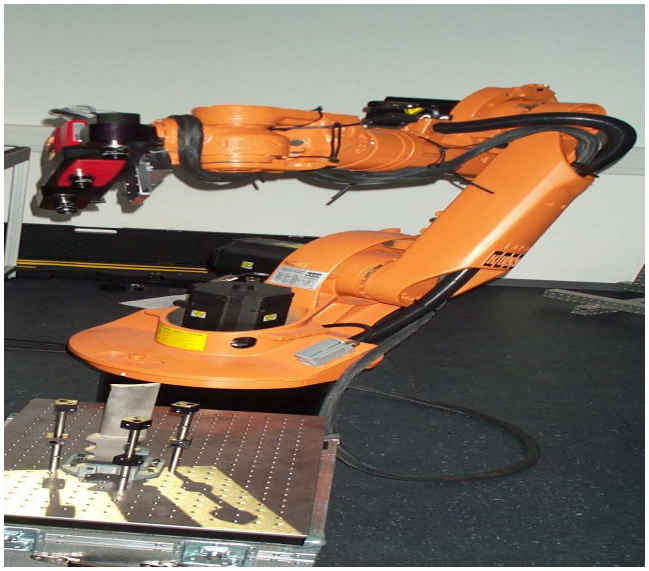


Figure 2: Dimensional Inspection of Parts & Measurement Devices

Emission Anaysis

The chemical composition analysis is carried out by a mobile Spark Emission Analyzer. This is a non-destructive technique to get an accurate analysis of materials. This machine generates a spark between the part and analyzer. The light rays, emitted by the spark generate an electromagnetic spectrum, which is converted into the chemical composition. (Reference 4)

Coordinate Measuring Machines (CMM)

CMM Device is a programmable measuring robot. It completely scans the component in 3 dimensions and takes 360 degree images and photographs of components. This special and sensitive device gives full geometry of component, and produce new manufacturing drawings, using 3D CAD software. At this stage, the tolerances are added and modifications are done to improve performance & life of components. The final drawings go to Shops to manufacture the components.

Small portable CMM machines have also been developed. The machine digitizes the coordinates in a large sphere. In case the dimensions of the component exceed the range of the digitizer, repositioning of the equipment is done to get another set of readings. All set of measurements are coupled together by means of a reference method (leap frog method). This technique is used to produce drawings of large components; such as gas turbine casings and rotor assemblies. (Reference 3)

A typical common system for dimensional measurement is shown in Figure 2.

Laser Scanning Machines

This is a non-contact measuring device used to digitize the parts and components. It consists of 2 digital cameras and non-contact optical devices. The Scanner projects a pattern of light on the sample part, after which the double camera takes a pair of photographs. Due to slight difference between the positions of the two cameras, a 3D perception (image) is created. This (technique) is comparable to the visualization of depth by two human eyes. The sample is then slightly rotated and another pair of photographs is taken. When the part has made the full circle, a full 3D image is created with an accuracy of 0.1 mm. This accuracy is acceptable for all parts manufactured by casting methods. (Reference 2)

X-Ray Technique For Measurements

The dimensions of internal cavities of components are taken by X-ray techniques. The X-ray machines visualize the internal cavity details. The real time digital pictures are taken to examine the internal details of the component. There is no need to wait for X-ray films to get the measurements. (Reference 4)

Examples of Studies For Gas Turbine Components

Structure Analysis of Turbine Blades:

- In the first step, 3D models are created with CMM and non-contact type laser measuring equipment.

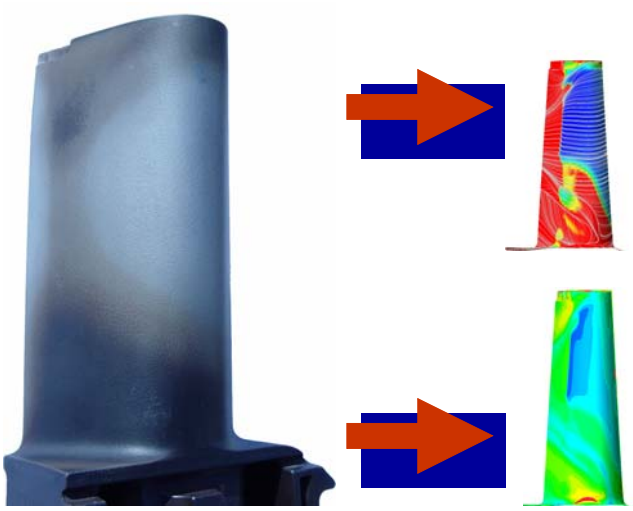


Figure 3: Structural Analysis of Turbine Blades

- This is simulated with the operational conditions. These models are calibrated, comparing them with the operational characteristics of traditional component.
- The metallurgy information is obtained by spark erosion machine or similar techniques. (Reference 5)

A typical structural analysis pattern is shown in Figure 3.

Quality Management

All companies (Non-OEM) have their own dedicated Quality Control Systems. The common features of their quality control mechanism are:

- The repair and manufacturing procedures meet the relevant international codes & standards.
- QA/ QC Groups work independently from the Production Units.
- The companies have ISO 9000 certification.
- The production facilities can be visited to audit their procedures.
- The vendors also accept the third party inspections during repair and manufacturing process.
- Some critical procedures are reviewed and approved by the Insurance Companies, whenever necessary..

Known Companies with Reverse Engineering Capability

Many independent Non-OEM companies are using this technique to produce significant parts and components. Some of these companies, engaged in producing parts and components for Gas Turbine Plants, are listed below:

1. Leistritz Turbomachines Technik, Germany
2. Sermatech Gas Path International, USA
3. Advanced Generator Technology Services Inc. USA

4. Wood Group Industrial Turbines Inc. UK
5. Turbine Blades Limited (TBL)/ GE, UK
6. Sulzer/ Elbar Turbomachinery Services, Netherlands
7. Turbine Services Limited, UK
8. Turbo Care, Italy
9. Chromalloy Heavy Industrial Turbine Ltd., USA
10. Allied Dynamics, USA
11. Turbomachinery Group of Industries, India
12. Mitsubishi Heavy Industries, Japan
13. Masood John Brown Gas Turbine Services, UAE
14. Pratt & Whitney Power Systems, Canada
15. Liburdi Turbo Services, Canada

Benefits of Using Reverse Engineered Parts

Substantial savings of 30 to 40 % have been noted by Reverse Engineering Process. Additional benefits of this process are:

- Upgrades and improvements in the original design of the component are possible with the modest incremental cost.
- New parts can be manufactured in the latest advanced materials using the advanced manufacturing technology.
- Life of the components is increased by selecting superior materials and special coating applications.
- Delivery time of components can be improved.
- The obsolete parts can also be manufactured with some design improvements.
- Alternate sourcing creates a competition among vendors.

Modifications & Upgrades Through Reverse Engineering Process

Following are some examples of modifications and upgrades achieved in Gas Turbine Components as a result of reverse engineering process: (Reference 5)

- Improvements are done in the material specifications and metallurgical structure of Blades to enhance their capability at high temperatures.
- Modification of cooling holes design in the blades.
- Addition of cooling holes in the vane segments.
- Application of special coatings to the turbine blades and other hot gas path components to enhance the component life.
- Application of special coatings to compressor blades to reduce the power consumption.
- Modification of locking pins of blades to reduce the vibration stress.
- Modification of blades shank stiffness to reduce the vibration amplitudes due to resonance condition.

Disadvantages / Risks Involved

There are some risks involved in using the parts manufactured by reverse engineering process. Sometimes, premature failure of components and their consequential damages have been noted due to sub-standard parts. The insurance companies may also charge high premium due to installation of non-OEM components and parts.

A careful evaluation & pre-qualification of vendors/ manufacturers is necessary to minimize the risks. Special warranty conditions should be negotiated with the vendors before the award of contracts. Here are some suggestions to enhance the confidence level in these companies:

- The simplest way is to give preference, to the internationally well-known companies, who have previous experience in this field.
- Start the reverse engineering with a less critical part.
- Form a committee of highly skilled professionals to develop specifications and QA/QC requirements.
- Get better warranties from the Vendors, especially for the consequential damages, when the (Reverse Engineered) part fails.

Warranty Conditions

The warranty conditions are generally negotiated with the vendors before signing the contract. In case of components failure, the Vendors are committed to complete replacement of damaged parts and also to compensate for consequential damages. The following is the typical set of warranty conditions: (Reference 6)

1. Warranty to replace any failed component within 12 months from the date of operation, or 18 months from the date of delivery, which ever comes earlier.
2. Warranty for the consequential damages of components, which may be up to $ 10 million.

International Law / Legal Problems

The fabrication of parts, by reverse engineering techniques, does not violate the international laws of patents, copy right, and intellectual property rights. These components are not produced as per original OEM drawings. New and revised drawings are prepared after doing modifications in the components. Sometimes, the improvements in materials are also done, to get enhanced thermal & mechanical performance. Such modifications/ upgrades also relieve the Non-OEM vendors from the legal aspects. (Reference 2)

Figure 4: Vane Segment - TBC Coating Done By LPPS Plasma Spray

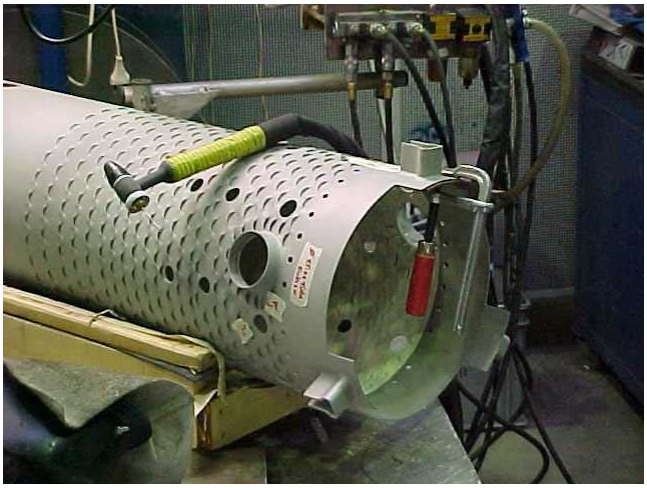


Figure 5: Combustion Liner GE MS 5001

Case Studies

The Power Generation Companies have arranged the manufacture of the following components through Reverse Engineering Process after a comprehensive survey of various production centers.

1. Rotor Buckets, Stage 1-3, GE Frame 7EA
2. Stator Nozzles, Stage 1-3, GE Frame 7EA
3. Rotor Blades, Stage 1-5, ALSTOM 11D5
4. Stator Vanes, Stage 1-5, ALSTOM 11D5
5. Seal Housing, Row 2 & 3, WH W501 D4
6. Combustion Baskets, WH W501 D5

Considerable savings have been made in manufacture of these components without affecting the operational reliability of the plants. Images of some components are shown in the Figures 4 & 5.

CONCLUSION

The manufacture of components through reverse engineering process is economically and technically feasible. Substantial savings have been noted after using the parts manufactured by Reverse Engineering Process. Alternate sourcing has also created a competition in the market; even OEM vendors have offered a reduction in their prices. In specific cases, savings of 40 to 50 % in material cost have been achieved. The large organizations should explore the Reverse Engineering as an option for the replacement of parts.

Reverse Engineering is very important for the industries in Pakistan. At present the techniques are being used in many organizations, but the activities are not organized in a proper way. It is strongly recommended that the Development Cell/ Divisions should be established in all industries and Engineering Establishments. This will enhance domestic participation and self sufficiency in the engineering industries.

REFERENCES

[1] **Willium D.Calliser. Jr.,** *"Materials Science & Engineering"*

[2] **James Luckey,** *"Reverse Engineering for Gas Turbines"*, Power Generation, Feb 2004

[3] *"Training Course Manual"*, SULZER-ELBAR, Holland

[4] **Jan Hermans & Jan Prins,** *"Gas Turbine Repairs"*, SULZER-ELBAR

[5] *"Repair Of Gas Turbine Components"*, Wood Group Presentation

[6] *"Repair of Gas Turbine Blades"*, Turbine Blades Limited/ GE Presentation

PEC RECOGNIZED ENGINEERING PROGRAMS

Following Engineering Programs of various Universities/Institutions in Pakistan are accredited with Pakistan Engineering Council (PEC):

ISLAMABAD

1. **COMSATS Institute of Information Technology (CIIT), Islamabad**
   B.Sc. Electrical (Telecommunication) Engineering, B.Sc. Computer Engineering
2. **Bahria Institute of Management & Computer Sciences, Islamabad**
   Bachelor of Computer Engineering, Bachelor of Software Engineering
3. **Air University, Islamabad**
   Bachelor of Engineering (Electronic, Telecommunication, Mechatronics)
4. **Islamic International Engineering College, Islamabad**
   B.Sc. Electrical Engineering (Communication)
5. **Muhammad Ali Jinnah University, Islamabad**
   B.Sc. Electronic Engineering
6. **Institute of Space Technology (IST), Islamabad**
   B.S. (Communication Systems Engineering, Aerospace Engineering)
7. **NUST Institute of Information Technology (NIIT), Rawalpindi**
   Bachelor of Information & Communication Systems Engineering, Bachelor of Engineering (Electronic)
8. **National University of Computer & Emerging Sciences (NUCES-FAST), Islamabad**
   B.Sc. Telecommunication Engineering

PUNJAB

1. **University of Engineering and Technology, Lahore**
   B.Sc. Engineering (Architectural, Chemical, Chemical – Polymer, Civil, Electrical, Mechanical, Mining, Metallurgical & Materials, Industrial & Manufacturing, Mechatronics & Control, and Petrogas)
   B.Sc. Computer Science and Engineering
2. **Institute of Chemical Engineering and Technology, Lahore**
   B.Sc. Engineering (Chemical, Mining, Metallurgical), B.Sc. Metallurgy & Materials Science, M.Sc. Tech
3. **University of Agriculture, Faisalabad**
   B.Sc. Agricultural Engineering
4. **NFC Institute of Engineering and Technological Training, Multan**
   B.Sc. Engineering (Chemical, Computer System, Electronics)
5. **NUST College of Electrical & Mechanical Engineering, Rawalpindi**
   B.E. (Electrical, Mechanical, Computer, Mechatronics)
6. **NUST Military College of Signals, Rawalpindi**
   B.E. (Electrical, Computer Software)
7. **University of Engineering and Technology, Taxila**
   B.Sc. Engineering (Civil, Electrical, Mechanical, Computer, Software Engineering)
8. **University College of Engineering and Technology, Multan**
   B.Sc. (Civil Engineering, Electrical Engineering)
9. **National Textile University, Faisalabad (Former National College of Textile Engineering)**
   B.Sc. Textile Engineering
10. **NFC, Institute of Engineering & Fertilizer Research, Faisalabad**
    B.Sc. Chemical Engineering
11. **Foundation University, Rawalpindi**
    B.Sc. Software Engineering
12. **University of Central Punjab, Lahore**
    B.Sc. Electrical Engineering
13. **COMSATS Institute of Information Technology (CIIT), Wah**
    B.Sc. Computer Engineering
14. **The University of Lahore**
    B.Sc. Electrical Engineering
15. **COMSATS Institute of Information Technology (CIIT), Lahore**
    B.Sc. Computer Engineering
16. **University College of Engineering and Technology, Bahawalpur**
    B.Sc. Electronic Engineering
17. **National University of Computer & Emerging Sciences (NUCES-FAST), Lahore**
    B.Sc. (Computer Engineering, Telecommunication Engineering)

AJ&K

1. **Ali Ahmed Shah, University College of Engineering & Technology, Mirpur**
   B.Sc. Electrical Engineering

NWFP

1. **NWFP University of Engineering & Technology, Peshawar Campus**
   B.Sc. Engineering (Civil, Electrical, Chemical, Computer Information Systems, Computer System, Agricultural, Mining, and Mechanical)
2. **NUST College of Aeronautical Engineering, Risalpur**
   B.E. (Aerospace and Avionics)
3. **NUST Military College of Engineering, Risalpur**
   B.E. Civil.
4. **Ghulam Ishaque Khan Institute of Engineering Sciences and Technology, Topi - Swabi**
   B.Sc. Engineering (Mechanical, Electronic, Metallurgy & Materials, Computer Systems, Computer Software)
   B.Sc. Engineering Sciences
5. **CECOS University of Information Technology and Emerging Sciences, Peshawar**
   B.Sc. (Civil Engineering, Electrical Engineering)
6. **Peshawar College of Engineering, Peshawar**
   B.Sc. Electrical Engineering
7. **Gandhara Institute of Science & Technology, PGS Engineering College, Peshawar**
   B.Sc. (Civil Engineering, Electrical Engineering)
8. **COMSATS Institute of Information Technology, Abbottabad**
   B.Sc. (Computer Engineering, Electronics Engineering)
9. **N.W.F.P. University of Engineering and Technology, Mardan**
   B.Sc. (Telecommunication Engineering, Computer Software Engineering)
10. **National University of Computer & Emerging Sciences (NUCES-FAST), Peshawar**
    B.Sc. Telecommunication Engineering

SINDH

1. **Bahria Institute of Management & Computer Sciences, Karachi**
   B.Sc. (Computer Engineering, Software Engineering)
2. **NED University of Engineering and Technology, Karachi**
   B.E. (Civil, Electrical, Mechanical, Computer Systems, Computer & Information Systems, Textile, Electronics, Industrial & Manufacturing)
3. **Institute of Industrial Electronics Engineering (PCSIR), Karachi**
   B.E. Industrial Electronics
4. **Mehran University of Engineering and Technology, Jamshoro**
   B.E. (Civil, Electrical, Mechanical, Electronics, Industrial, Pet-gas, Computer System, Chemical, Metallurgical, Mining, Textile, Telecommunication, Software)
5. **Usman Institute of Technology, Karachi**
   B.E. (Computer Systems, Telecommunication, Electronic)
6. **Sir Syed University of Engineering & Technology, Karachi**
   B.S. Engineering (Civil, Electronic, Bio Medical, Computer)
7. **NUST Pakistan Navy Engineering College, Karachi**
   B.E. (Mechanical, Electrical, Electronics)
8. **Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah**
   B.E. (Computer Systems, Civil, Electrical, Mechanical)
9. **Sindh Agriculture University, Tandojam**
   B.E. (Agricultural)
10. **Hamdard Institute of Information Technology (HIIT) Karachi**
    B.E. (Telecommunication, Computer System)
11. **Dawood College of Engineering and Technology, Karachi**
    B.E. (Electronics, Chemical, Metallurgical, Industrial & Management,)
12. **Iqra University, Karachi**
    B.E. Electronics
13. **Pakistan Air Force - Karachi Institute of Economics & Technology, Karachi**
    B.E. Electronics
14. **National University of Computer & Emerging Sciences (NUCES-FAST), Karachi**
    B.Sc. (Computer Engineering, Telecommunication Engineering)

BALOCHISTAN

1. **Balochistan University of Engineering & Technology, Khuzdar**
   B.E. (Civil, Electrical, Mechanical)
2. **Balochistan University of Information Technology and Management Sciences, Quetta (Takatoo Campus)**
   B.Sc. (Computer Engineering, Electronics Engineering)

CHARTERED UNIVERSITIES & DEGREE AWARDING INSTITUTES IN PAKISTAN

FEDERAL

No	University Name	URL	City	Sector
1	Air University	http://www.au.edu.pk/	Islamabad	Public
2	Allama Iqbal Open University	http://www.aiou.edu.pk/	Islamabad	Public
3	Bahria University	http://www.bci.edu.pk/	Islamabad	Public
4	COMSATS Institute of Information Technology	http://www.ciit.edu.pk/	Islamabad	Public
5	Federal Urdu University of Arts, Sciences and Technology	http://www.fuuast.edu.pk/	Islamabad	Public
6	Foundation University	http://www.fui.edu.pk/	Rawalpindi	Private
7	Institute of Space Technology (IST)	http://www.ist.edu.pk/	Islamabad	Public
8	International Islamic University,	http://www.iiu.edu.pk/	Islamabad	Public
9	National Defence University	http://www.ndu.edu.pk/	Islamabad	Public
10	National University of Computer and Emerging Sciences	http://www.nu.edu.pk/	Islamabad	Private
11	National University of Modern Languages	http://www.numl.edu.pk/	Islamabad	Public
12	National University of Science and Technology	http://www.nust.edu.pk/	Rawalpindi	Public
13	Pakistan Institute of Development Economics	http://www.pide.org.pk/	Islamabad	Public
14	Pakistan Institute of Engineering Applied Sciences	http://www.pieas.edu.pk/	Islamabad	Public
15	Quaid-i-Azam University	http://www.qau.edu.pk/	Islamabad	Public
16	Riphah International University	http://www.riu.edu.pk/	Islamabad	Private
17	Virtual university of Pakistan	http://vu.edu.pk/	Lahore	Public

PUNJAB

No	University Name	URL	City	Sector
1	Bahauddin Zakariya University	http://www.bzu.edu.pk/	Multan	Public
2	Beaconhouse National University	http://www.bnu.edu.pk/	Lahore	Private
3	Fatima Jinnah Women University	http://www.fjwu.edu.pk/	Rawalpindi	Public
4	Forman Christian College	http://fccollege.edu.pk/	Lahore	Private
5	GIFT University	http://www.gift.edu.pk/	Gujranwala	Private
6	Government College University	http://www.gcu.edu.pk/	Lahore	Public
7	Government College University Faisalabad	http://www.gcuf.edu.pk/	Faisalabad	Public
8	Hajvery University	http://www.hajvery.edu.pk/	Lahore	Private
9	Imperial College of Business Studies	http://www.imperial.edu.pk/	Lahore	Private
10	Institute of Management Sciences	http://www.pakaims.edu.pk/	Lahore	Private
11	Islamia University	http://www.iub.edu.pk/	Bahawalpur	Public
12	King Edward Medical University	http://www.kemc.edu/	Lahore	Public
13	Kinnaird College for Women	http://www.kinnaird.edu.pk/	Lahore	Public
14	Lahore College for Women University	http://www.lcwu.edu.pk/	Lahore	Public
15	Lahore School of Economics	http://www.lahoreschoolofeconomics.edu.pk/	Lahore	Private
16	Lahore University of Management Sciences	http://www.lums.edu.pk/	Lahore	Private
17	Minhaj University	http://www.mul.edu.pk/home/home.php	Lahore	Private
18	National College of Arts	http://www.nca.edu.pk/	Lahore	Public
19	National College of Business Admin. & Economics (NCBA&E)	http://www.ncbae.edu.pk/	Lahore	Private
20	National Textile University, Faisalabad (Federal Chartered)	http://www.ntu.edu.pk/	Faisalabad	Private
21	The Superior College	http://www.superior.edu.pk/	Lahore	Private
22	University of Agriculture	http://www.uaf.edu.pk/	Faisalabad	Public
23	University of Arid Agriculture, Murree Road	http://www.uaar.edu.pk/	Rawalpindi	Public
24	University of Central Punjab	http://www.ucp.edu.pk/	Lahore	Private
25	University of Education	http://www.ue.edu.pk/	Lahore	Public
26	University of Engineering & Technology	http://www.uet.edu.pk/	Lahore	Public
27	University Of Engineering & Technology, Taxila	http://www.uettaxila.edu.pk/	Rawalpindi	Public
28	University of Faisalabad	http://www.tuf.edu.pk/	Faisalabad	Private
29	University of Gujrat	http://www.uog.edu.pk/	Gujrat	Public
30	University of Health Sciences	http://www.uhs.edu.pk/	Lahore	Public
31	University of Lahore	http://www.ulhr.edu.pk/	Lahore	Private
32	University of Management & Technology	http://www.umt.edu.pk/index.htm	Lahore	Private
33	University of Sargodha	http://www.uos.edu.pk/	Sargodha	Public
34	University of South Asia	http://www.usa.edu.pk/	Lahore	Private
35	University of the Punjab	http://www.pu.edu.pk/	Lahore	Public
36	University of Veterinary and Animal Sciences	http://www.uvas.edu.pk/	Lahore	Public

BALOCHISTAN

No	Univeristy Name	URL	City	Sector
1	Balochistan University of Engineering and Technology	http://buetk.edu.pk/	Khuzdar	Public
2	Balochistan University of IT and Management Sciences	http://www.buitms.edu.pk/	Quetta	Public
3	Iqra University	http://www.iqra.edu.pk/	Quetta	Private
4	Lasbela University of Agriculture, Water & Marine Science	http://www.luawms.edu.pk/	Lasbela	Public
5	Sardar Bahadur Khan Women University	http://www.sbkwu.edu.pk/	Quetta	Public
6	University of Balochistan	http://www.uob.edu.pk/	Quetta	Public

SINDH

No	University Name	URL	City	Sector
1	Agha Khan University	http://www.aku.edu/	Karachi	Private
2	Baqai Medical University	http://www.baqai.edu.pk/	Karachi	Private
3	Dadabhoy Institute of Higher Education	http://www.dadabhoy.edu.pk/	Karachi	Private
4	Dawood College of Engineering & Technology	http://www.dcet.edu.pk/	Karachi	Public
5	DHA Suffa University *		Karachi	Private
6	Dow University of Health Sciences	http://www.duhs.edu.pk/	Karachi	Public
7	Greenwich University	http://www.greenwichuniversity.edu.pk/	Karachi	Private
8	Hamdard University	http://www.hamdard.edu.pk/	Karachi	Private
9	Indus Institute of Higher Education	http://www.indus.edu.pk/	Karachi	Private
10	Indus Valley School of Art and Architecture	http://www.indusvalley.edu.pk/	Karachi	Private
11	Institute of Business & Technology BIZTEK	http://www.biztek.edu.pk/	Karachi	Private
12	Institute of Business Administration	http://www.iba.edu.pk/	Karachi	Public
13	Institute of Business Management	http://www.cbm.edu.pk/	Karachi	Private
14	Iqra University	http://www.iqra.edu.pk/	Karachi	Private
15	Isra University	http://www.isra.edu.pk/	Hyderabad	Private
16	Jinnah University for Women	http://www.juw.edu.pk/	Karachi	Private
17	Karachi Institute of Economics & Technology	http://www.pafkiet.edu.pk/	Karachi	Private
18	KASB (Khadim Ali Shah Bukhari) Institute of Technology	http://www.kasbit.edu.pk/	Karachi	Private
19	Liaquat University of Medical and Health Sciences	http://www.lumhs.edu.pk/	Jamshoro	Public
20	Mehran University of Eng. & Technology	http://www.muet.edu.pk/	Jamshoro	Public
21	Mohammad Ali Jinnah University	http://www.jinnah.edu/	Karachi	Private
22	Nazeer Hussain University *		Karachi	Private
23	NED University of Engineering & Technology	http://www.neduet.edu.pk/	Karachi	Public
24	Newports Institute of Communications and Economics	http://www.newports.edu.pk/	Karachi	Private
25	Pakistan Naval Academy	http://www.paknavy.gov.pk/	Karachi	Public
26	Preston Institute of Management Sciences and Technology	http://pimsat-khi.edu.pk/	Karachi	Private
27	Preston University	http://www.prestonpak.edu.pk/	Karachi	Private
28	Quaid-e-Awam University of Engineering, Science & Technology	http://www.quest.edu.pk/	Nawabshah	Public
29	Shah Abdul Latif University	http://www.salu.edu.pk/	Khairpur	Public
30	Shaheed Zulfikar Ali Bhutto Institute of Science & Technology	http://www.szabist.edu.pk/	Karachi	Private
31	Sindh Agriculture University	http://www.sau.edu.pk/	Tandojam	Public
32	Sir Syed University of Engg. & Technology	http://www.ssuet.edu.pk/	Karachi	Private
33	Sukkur Institute of Business Administration	http://www.iba-suk.edu.pk/	Sukkur	Public
34	Textile Institute of Pakistan	http://www.tip.edu.pk/	Karachi	Private
35	University of East *	http://www.uoe.edu.pk/	Hyderabad	Private
36	University of Karachi	http://www.uok.edu.pk/	Karachi	Public
37	University of Sindh	http://www.usindh.edu.pk/	Jamshoro	Public
38	Ziauddin Medical University	http://www.zmu.edu.pk/	Karachi	Private

NWFP

No	Univeristy Name	URL	City	Sector
1	Abasyn University	http://www.abasyn.edu.pk/	Peshawar	Private
2	CECOS University of Information Technology and Emerging Sciences	http://www.cecos.edu.pk/	Peshawar	Private
3	City University of Science & Information Technology	http://www.cityuniversity.edu.pk/	Peshawar	Private
4	Frontier Women University		Peshawar	Public
5	Gandhara University	http://www.gandhara.edu.pk/	Peshawar	Private
6	Ghulam Ishaq Khan Institute of Engineering Sciences & Technology	http://www.giki.edu.pk/	Topi	Private
7	Gomal University	http://www.gu.edu.pk/	D.I.Khan	Public
8	Hazara University, Dodhial	http://www.hu.edu.pk/	Mansahra	Public
9	Institute of Management Sciences (IMSciences)	http://www.imsciences.edu.pk/	Peshawar	Public
10	Khyber Medical University	http://www.kmc.edu.pk/	Peshawar	Public
11	Kohat University of Science & Technology	http://www.kust.edu.pk/	Kohat	Public
12	Northern University	http://www.northern.edu.pk/	Nowshera	Private
13	NWFP Agriculture University	http://www.aup.edu.pk/	Peshawar	Public
14	NWFP University of Engineering & Technology	http://www.nwfpuetp.edu.pk/	Peshawar	Public
15	Pakistan Military Academy		Abbottabad	Public
16	Preston University	http://www.prestonpak.edu.pk/	Kohat	Private
17	Qurtaba University of Science & Information Technology	http://www.qurtuba.edu.pk/	D.I.Khan	Private
18	Sarhad University of Science & Information Technology	http://www.suit.edu.pk/	Peshawar	Private
19	University of Malakand,Chakdara		Malakand	Public
20	University of Peshawar	http://www.upesh.edu/	Peshawar	Public
21	University of Science & Technology Bannu	http://www.ustb.edu.pk/	Bannu	Public

AZAD JAMMU KASHMIR & NORTHERN AREAS

No	University Name	URL	City	Sector
1	Al-Khair University	http://www.angelfire.com/ak/alkhair/	AJK	Private
2	Mohi-ud-Din Islamic University	http://www.miu.edu.pk/	AJK	Private
3	University of Azad Jammu & Kashmir, Muzaffarabad	http://www.ajku.edu.pk/	AJK	Public
4	Karakurum International University	http://www.kku.edu.pk/	Gilgit	Public

** Universities are not being recognized/attested by the HEC because of non-availability of infrastructure requirements as set out in the Cabinet Criteria.*

HEC RANKING OF PAKISTANI UNIVERSITIES

Based On Data Collected For the Years 2001-2002, 2002-2003 and 2003-2004

UNIVERSITY NAME	Research Max = 26	Student Max = 17	Facilities Max = 15	Finances Max = 15	Faculty Max = 27	RANK SCORE
AGRICULTURE / VETERINARY						
University of Agriculture (UAF), Faisalabad	17.35	14.26	10.51	7.98	16.34	66.44
NWFP University of Agriculture , Peshawar	19.17	7.49	8.97	8.22	20.25	64.10
University of Arid Agriculture, Rawalpindi	6.50	9.16	1.65	12.48	13.78	43.57
Sindh Agriculture University, Tandojam	3.57	5.09	9.49	9.32	11.85	39.31
ART / DESIGN						
National College of Arts, Lahore	8.40	10.90	6.96	9.04	17.25	52.55
Textile Institute of Pakistan, Karachi	7.00	4.62	10.76	10.53	18.60	51.51
Indus Valley School of Art & Architecture, Karachi	0.00	6.22	4.84	10.84	6.40	28.30
BUSINESS / INFORMATION TECHNOLOGY						
Lahore Uni. of Management Sciences (LUMS), Lahore	12.37	6.08	8.68	9.66	20.41	57.20
Institute of Business Administration (IBA), Karachi	7.45	9.01	5.75	8.08	10.00	40.30
Shaheed Zulfikar Ali Bhutto Institute of Sci. & Tech. Karachi	4.97	7.48	5.21	5.00	11.07	33.73
Iqra University, Defence View, Karachi	6.37	4.48	3.47	6.50	7.99	28.82
Lahore School of Economics, Lahore	2.48	2.71	4.43	10.07	6.69	26.37
Institute of Business Management (IBM), Karachi	7.06	2.54	1.63	6.47	4.72	22.41
Qurtuba Uni. of Science & Information Technology D.I.Khan	1.00	1.54	3.70	3.09	8.35	17.67
Karachi Institute of Economic & Technology (KIET), Karachi	1.02	2.84	4.60	3.79	3.49	15.74
CECOS , Peshawar	0.00	3.03	4.43	2.38	3.57	13.40
City University of Science & Information Tech., Peshawar	0.00	2.11	1.43	3.00	3.76	10.30
ENGINEERING						
Pakistan Institute of Engg. and Applied Sciences, Islamabad	11.70	9.73	6.52	12.42	20.98	61.35
National University of Sciences & Technology Rawalpindi	10.10	9.27	8.33	6.84	14.53	49.07
Ghulam Ishaq Khan Institute of Engineering, Swabi	10.07	7.69	6.05	8.73	13.24	45.78
University of Engg. & Technology (UET), Lahore	7.87	13.00	6.23	2.36	12.81	42.26
Mehran University of Engg. & Technology (MUET), Jamshoro	6.30	6.27	4.51	1.80	10.29	29.17
University of Engg. & Technology (UET), Taxila	4.90	5.94	3.30	5.72	5.15	25.00
National Univ. of Computer and Emerging Sciences, Islamabad	2.47	5.53	3.69	3.88	9.26	24.84
COMSATS Institute of Information Technology, Islamabad	3.36	4.35	2.55	3.26	8.91	22.42
NWFP University of Engg. & Technology, Peshawar	2.70	5.23	2.87	2.05	6.00	18.85
NED University of Engg. & Technology, Karachi	2.79	5.52	4.40	1.50	4.44	18.65
Quaid-e-Awam University, Nawabshsh	2.23	3.58	3.50	3.72	5.61	18.64
Sir Syed University of Engineering & Technology, Karachi	1.56	4.95	3.00	4.64	2.91	17.06
Balochistan University of Engg & Tech. Khuzdar	0.00	2.49	4.18	3.17	5.74	15.57
GENERAL						
Quaid-i-Azam University (QAU), Islamabad	17.63	8.14	7.98	4.91	19.50	58.16
University of the Punjab, Lahore	10.49	12.04	6.91	5.07	11.41	45.92
University of Karachi, Karachi	9.71	7.97	6.99	5.48	11.87	42.01
University of Peshawar, Peshawar	10.18	10.86	3.49	3.28	8.98	36.78
Bahauddin Zakariya University, Multan	8.56	7.49	3.04	4.03	10.23	33.34
Government College Lahore University, Lahore	6.44	4.98	4.19	7.03	9.14	31.78
Isra University, Hyderabad	2.16	4.28	2.67	11.65	9.08	29.84
International Islamic University, Islamabad	6.45	6.33	4.58	4.15	8.31	29.82
University of Sindh, Jamshoro	6.67	6.65	3.46	3.68	8.54	29.00
Hamdard University, Karachi	0.96	2.99	8.65	10.43	4.65	27.68
University of Balochistan, Sariab Road, Quetta	5.60	2.16	2.74	7.15	7.04	24.69
Gomal University, D.I.Khan	3.60	5.45	2.68	4.49	7.37	23.60
Islamia University, Bahawalpur	3.65	5.34	2.32	3.45	8.16	22.92
University of Azad Jammu & Kashmir , Muzaffarabad	2.20	2.86	2.31	4.87	9.81	22.05
Lahore College for Women University, Lahore	1.18	4.66	2.84	6.65	5.66	20.99
Hazara University , Dhodial, Mansehra	2.00	2.97	2.60	5.38	7.52	20.47
Muhammad Ali Jinnah University, Karachi	0.73	3.33	2.43	8.23	4.81	19.52
Fatima Jinnah Women University, Rawalpindi	1.48	6.42	2.24	5.42	3.73	19.29
Bahria University, Islamabad	0.61	5.97	2.66	5.87	3.49	18.60
Shah Abdul Latif University, Khairpur	1.69	1.21	2.08	6.27	5.95	17.20
University of Malakand Chakdara, Dir, Malakand	0.66	7.36	1.36	2.01	2.10	13.49
Kohat University of Science & Technology, Kohat	1.26	2.16	2.17	5.22	2.03	12.84
National University of Modern Languages, Islamabad,	1.82	2.06	2.56	2.94	2.85	12.23
Jinnah University for Women (JUW), Karachi	0.64	2.44	0.84	3.41	1.91	9.24
HEALTH SCIENCES						
Aga Khan University, Karachi	15.87	7.27	10.68	14.85	21.24	69.91
Liaquat University of Medical and Health Sciences, Jamshoro	8.40	11.47	7.67	5.81	14.94	48.29
Baqai Medical University, Karachi	7.64	9.88	4.11	5.19	5.87	32.69
Zia-ud-din Medical University, Karachi	6.47	3.52	4.29	7.67	8.43	30.38

Note 1: *Universities awarded Charters after 2001 or not meeting minimum criteria (Categories Y & Z) have been excluded from this Ranking.*
Note 2: *This ranking is to be used simply as one kind of reference to assist in the decision making process.*

UNIVERSITIES NOT INCLUDED IN THE RANKING

Either Chartered After 2001 or Belong To Category Y or Z

NO	PUBLIC SECTOR UNIVERSITY / DEGREE AWARDING INSTITUTE	CHARTER YR.
1	Air University, Islamabad	2002
2	Balochistan Univ. of Information Tech. and Manag. Sciences, Quetta	2002
3	Dow University of Health Sciences Karachi	2003
4	Federal Urdu University of Arts, Sciences and Technology, Islamabad	2002
5	Frontier Women University	2005
6	Government College University, Faisalabad	2002
7	Institue of Space Technologies, Islamabad	2005
8	Institute of Management Sciences, Peshawar	2002
9	Karakurram International University (KIU), Gilgit	2002
10	Kinnaird College for Women, Lahore	2002
11	Lasbela University of Agriculture, Water and Marine Science, Lasbela	2005
12	Sardar Bahadur Khan University, Brewery Road, Quetta.	2004
13	Sukkur Institute of Business Administration, Sukkur	2006
14	University of Education (UE), Lahore	2002
15	University of Gujrat, Gujrat	2004
16	University of Health Sciences, Lahore	2002
17	University of Sargodha, Sargodha	2002
18	University of Science & Technology, Bannu	2005
19	University of Veterinary and Animal Sciences, Lahore	2002
20	Virtual University, (VU), Lahore	2002

NO	PRIVATE SECTOR UNIVERSITY / DEGREE AWARDING INSTITUTE	CATEGORY	CHARTER YR.
1	Al-Khair University, Muzaffarabad	Z	1994
2	Beaconhouse National University, Lahore	X	2005
3	Dadabhoy Institute of Higher Education, Karachi	Y	2004
4	DHA Suffa University, Karachi	Z	2002
5	Forman Christian College, Lahore (University Status)	X	2004
6	Foundation University, Islamabad	W	2002
7	Gandhara University, Peshawar	X	2002
8	Gift University, Gujrawala	X	2004
9	Greenwich University (GU), Karachi	Y	1998
10	Hajvery University, Lahore	X	2002
11	Imperial College of Business Studies (ICBS), Lahore	X	2002
12	Indus Institute of Higher Eduaction , Karachi	W	2004
13	Institute of Business & Technology, Korangi Creek, Karachi	W	2004
14	Institute of Management Sciences (IMS), Lahore	X	2002
15	Iqra University, Quetta	Z	2002
16	Khadim Ali Shah Bukhari Institute of Technology (KASBIT), Karachi	Y	2001
17	Kinniard College for Women	X	2002
18	Minhaj University, Lahore	X	2005
19	Mohi-ud-Din Islamic University (MIU), AJK	Z	2000
20	National College of Business Administration & Economics, Lahore	X	2002
21	National Textile University Mannawala, Faisalabad	W	2002
22	Nazeer Hussain University, Karachi	Z	2003
23	Newports Institute of Communications and Economics	X	2002
24	Northern University, 3 The Mall, Nowshera Cantt.	Y	2002
25	Preston Institute of Management, Science and Technology, Karachi	Y	2001
26	Preston University, Karachi	Y	2004
27	Preston University, Kohat	X	2002
28	Riphah International University, Islamabad	W	2002
29	Sarhad University of Science & Information Technology (SU), Peshawar	X	2001
30	Superior College, Lahore	X	2004
31	University of Central Punjab (UCP) Lahore	X	2002
32	University of East, Hyderabad	Z	2004
33	University of Faisalabad, Faisalabad	X	2002
34	University of Lahore, Lahore	X	2002
35	University of Management and Technology (IMT) Lahore	X	2004
36	University of South Asia, Lahore Cantt.	X	2003

Categorization of Private Universities/Degree Awarding Institutions

Category W: University/Institution Meeting Requirements of Criteria
Category X: University/Institution with Minor Shortfalls, Expected to Meet Requirements of Criteria
Category Y: University/Institution Not Meeting the Requirements of Criteria
Category Z: University/Institution Seriously Deficient

***Note** 1: The Rankings are based on data collected on key issues: Students (17%), Facilities (15%), Finances (15%), Faculty (27%) and Research (26%). For Ranking Methodology and details, please visit http://www.hec.gov.pk*

Note 2: Universities/Institutes awarded Charters after 2001, not meeting minimum criteria (Categories Y & Z) or imparting education via Distance Learning have been excluded from the Ranking

TIMES WORLD UNIVERSITY RANKINGS 2007

9TH NOVEMBER 2007

The *Times Higher-QS World University Rankings 2007* shows that the top universities, on a number of measures, are in the English-speaking world. In a head-to-head contest between Europe and North America, Europe's 86 listed universities easily defeat 57 in the US or even 71 for the whole of the Americas. The UK has 32 universities in the top 200 and the Germany has 11.

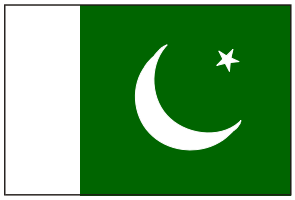
The rankings also contain a more subversive message. The top 200 universities are in 28 countries. Four are in the developing world: in Brazil (with two entrants), Mexico and South Africa. The story is less favourable in Mediterranean Europe. Italy and Spain muster only three universities between them in this analysis.

A more interesting comparison may be with the Asia-Pacific region. This area musters only 41 entries in this year's rankings. Australia's important role in the English speaking world and the energetic marketing of its universities across the Pacific give it 12 spots, with 11 for Japan, the world's second-biggest economy.

2007	2006	University Name	Country	Score
1	1	Harvard University	US	10.0
2	2	University of Cambridge	UK	97.6
2	3	University of Oxford	UK	97.6
2	4	Yale University	US	97.6
5	9	Imperial College London	UK	97.5
6	10	Princeton University	US	97.2
7	7	California Institute of Technology	US	96.5
7	11	University of Chicago	US	96.5
9	25	University College London	UK	95.3
10	4	Massachusetts Institute of Technology	US	94.6
11	12	Columbia University	US	94.5
12	21	McGill University	Canada	93.9
13	13	Duke University	US	93.4
14	26	University of Pennsylvania	US	93.3
15	23	Johns Hopkins University	US	92.9
16	16	Australian National University	Australia	91.6
17	19	University of Tokyo	Japan	91.1
18	33	University of Hong Kong	Hong Kong	90.7
19	6	Stanford University	US	90.6
20	35	Carnegie Mellon University	US	90.0
20	15	Cornell University	US	90.0
22	8	University of California, Berkeley	US	89.7
23	33	University of Edinburgh	UK	88.8
24	46	King's College London	UK	88.2
25	29	Kyoto University	Japan	87.2
26	18	Ecole Normale Supérieure, Paris	France	87.1
27	22	University of Melbourne	Australia	85.9
28	37	Ecole Polytechnique	France	85.1
29	42	Northwestern University	US	85.0
30	40	University of Manchester	UK	84.7
31	35	University of Sydney	Australia	84.6
32	54	Brown University	US	84.5
33	50	University of British Columbia	Canada	84.3
33	45	University of Queensland	Australia	84.3
33	19	National University of Singapore	Singapore	84.3
36	14	Peking University	China	84.2
37	64	University of Bristol	UK	84.1
38	50	Chinese University of Hong Kong	Hong Kong	83.8
38	29	University of Michigan	US	83.8
40	28	Tsinghua University	China	83.3
41	31	University of California, Los Angeles	US	82.8
42	24	ETH Zurich	Switzerland	82.5
43	38	Monash University	Australia	82.1
44	41	University of New South Wales	Australia	81.8
45	27	University of Toronto	Canada	80.6
46	70	Osaka University	Japan	80.0
47	66	Boston University	US	79.7
48	69	University of Amsterdam	Netherlands	78.6
49	43	New York University	US	77.8
50	46	University of Auckland	New Zealand	77.5
51	63	Seoul National University	South Korea	77.1
51	32	University of Texas at Austin	US	77.1
53	58	Hong Kong Univ. of Science & Tech.	Hong Kong	76.9
53	78	Trinity College Dublin	Ireland	76.9
55	84	University of Washington	US	76.7
55	79	University of Wisconsin-Madison	US	76.7
57	73	University of Warwick	UK	76.4
58	44	University of California, San Diego	US	76.3
59	17	London School of Economics	UK	75.7
60	58	Heidelberg University	Germany	75.5
61	96	Katholieke Universiteit Leuven	Belgium	75.0
62	105	University of Adelaide	Australia	74.7
63	86	Delft University of Technology	Netherlands	74.4
64	111	University of Western Australia	Australia	74.3
65	90	University of Birmingham	UK	74.1
65	98	Ludwig-Maximilians-Univ. München	Germany	74.1
67	82	Technische Universität München	Germany	73.9
68	102	University of Sheffield	UK	73.7
69	61	Nanyang Technological University	Singapore	73.6
70	85	University of Nottingham	UK	73.2
71	61	Dartmouth College	US	73.0
71	111	Uppsala University	Sweden	73.0
73	77	University of Illinois	US	72.6
74	56	Emory University	US	72.4
74	124	University of York	UK	72.4
76	109	University of St Andrews	UK	72.3
77	88	University of Pittsburgh	US	72.2
77	127	Purdue University	US	72.2
79	111	University of Maryland	US	72.1
80	121	University of Leeds	UK	72.0
80	141	University of Southampton	UK	72.0
82	53	Vanderbilt University	US	71.9

2007	2006	University Name	Country	Score
83	81	University of Glasgow	UK	71.8
84	90	Leiden University	Netherlands	71.7
85	60	Case Western Reserve University	US	71.6
85	116	Fudan University	China	71.6
85	87	University of Vienna	Austria	71.6
88	176	Queen's University	Canada	71.2
89	95	Utrecht University	Netherlands	70.9
90	99	Pennsylvania State University	US	70.5
90	118	Tokyo Institute of Technology	Japan	70.5
92	102	Rice University	US	70.3
93	54	University of Copenhagen	Denmark	70.1
93	181	University of Montreal	Canada	70.1
95	48	University of Rochester	US	69.3
96	170	University of California, Davis	US	69.1
97	133	University of Alberta	Canada	68.8
97	145	Georgia Institute of Technology	US	68.8
99	141	Cardiff University	UK	68.6
100	116	University of Helsinki	Finland	68.2
101	139	University of Liverpool	UK	68.1
102	102	Georgetown University	US	68.0
102	108	National Taiwan University	Taiwan	68.0
102	168	Tohoku University	Japan	68.0
105	39	University of Geneva	Switzerland	67.2
106	122	Lund University	Sweden	66.9
107	211	University of Colorado	US	66.8
108	155	McMaster University	Canada	66.6
109	132	Durham University	UK	66.5
110	130	University of Virginia	US	66.4
111	172	Maastricht University	Netherlands	66.2
112	128	Nagoya University	Japan	66.1
112	204	University of Waterloo	Canada	66.1
114	126	University of Aarhus	Denmark	65.6
114	75	University of Basel	Switzerland	65.6
114	79	University of Otago	New Zealand	65.6
117	141	University of California, Santa Barbara	US	65.5
117	64	Ecole Polytech. Fédérale De Lausanne	Switzerland	65.5
119	101	University of Southern California	US	65.4
120	219	Ohio State University	US	65.3
121	105	University of Sussex	UK	65.2
122	150	Texas A&M University	US	64.9
123	76	Université Catholique de Louvain	Belgium	64.8
124	141	University of Ghent	Belgium	64.5
125	180	Nanjing University	China	64.4
126	105	Humboldt-Universität zu Berlin	Germany	64.3
126	215	University of Western Ontario	Canada	64.3
128	119	Hebrew University of Jerusalem	Israel	64.0
129	133	Newcastle University	UK	63.9
130	194	Technical University of Denmark	Denmark	63.8
130	67	Eindhoven University of Technology	Netherlands	63.8
132	198	Korea Institute of Science & Technol	South Korea	63.7
132	93	Université Pierre et Marie Curie, Paris VI	France	63.7
134	224	University of Arizona	US	63.1
135	226	University of Florida	US	63.0
136	128	Kyushu University	Japan	62.8
137	195	University of Aberdeen	UK	62.7
137	232	Indiana University Bloomington	US	62.7
139	282	Simon Fraser University	Canada	62.6
140	198	University of California, Irvine	US	62.5
140	109	University of Zurich	Switzerland	62.5

2007	2006	University Name	Country	Score
142	187	University of Minnesota	US	62.3
142	170	Universität Tübingen	Germany	62.3
144	219	Universität Freiburg	Germany	62.2
145	153	University of Bath	UK	62.0
146	149	Freie Universität Berlin	Germany	61.9
147	228	University of Lancaster	UK	61.7
148	97	Wageningen University	Netherlands	61.5
149	154	City University of Hong Kong	Hong Kong	61.2
149	99	Queen Mary, University of London	UK	61.2
151	133	Hokkaido University	Japan	61.1
151	123	University of North Carolina	US	61.1
151	147	Tel Aviv University	Israel	61.1
154	165	Université Libre de Bruxelles	Belgium	61.0
155	165	University of Science and Technology	China	60.9
155	152	University of Notre Dame	US	60.9
157	72	Ecole Normale Supérieure de Lyon	France	60.8
158	140	Cranfield University	UK	60.7
159	163	Michigan State University	US	60.6
159	130	Tufts University	US	60.6
161	120	Keio University	Japan	59.9
161	48	Washington University in St Louis	US	59.9
163	92	Erasmus University Rotterdam	Netherlands	59.7
163	179	Shanghai Jiao Tong University	China	59.7
165	201	Universität Stuttgart	Germany	59.4
166	266	University of Calgary	Canada	58.9
166	138	Vienna University of Technology	Austria	58.9
168	156	Universität Göttingen	Germany	58.8
168	82	Macquarie University	Australia	58.8
170	291	Helsinki University of Technology	Finland	58.7
171	238	University of Dundee	UK	58.3
171	222	Universität Karlsruhe	Germany	58.3
173	207	University of Bologna	Italy	58.2
173	232	University of Groningen	Netherlands	58.2
175	124	University of Massachusetts, Amherst	US	57.9
175	284	University of São Paulo	Brazil	57.9
177	448	University of Campinas	Brazil	57.8
177	219	University College Dublin	Ireland	57.8
177	215	Rutgers, The State Univ. of New Jersey	US	57.8
180	190	University of Reading	UK	57.7
180	158	Waseda University	Japan	57.7
182	172	Rheinisch-Westfälische Technische	Germany	57.5
183	197	Università Degli Studi Roma, Sapienza	Italy	57.3
184	161	Université Louis Pasteur Strasbourg I	France	57.1
185	239	University of Leicester	UK	57.0
185	115	University of Twente	Netherlands	57.0
187	252	University of Antwerp	Belgium	56.9
188	333	University of Canterbury	New Zealand	56.6
188	177	University of Oslo	Norway	56.6
190	258	University of Surrey	UK	56.4
191	255	Rensselaer Polytechnic Institute	US	56.2
192	172	KTH, Royal Institute of Technology	Sweden	56.1
192	74	Universidad Nacional Autónoma	Mexico	56.1
194	190	University of Barcelona	Spain	55.9
195	137	Radboud Universiteit Nijmegen	Netherlands	55.8
195	192	Queensland University of Technology	Australia	55.8
197	147	Chalmers University of Technology	Sweden	55.5
197	181	Kobe University	Japan	55.5
199	196	University of Wollongong	Australia	55.3
200	257	University of Cape Town	South Africa	54.8



With sincere appreciation and heartfelt gratitude, we are thankful to all of our advertisers who have graciously sponsored this issue of

IEP-SAC JOURNAL

2008-2009

YOUR SEAL OF APPROVAL

IEP Saudi Arabian Center provides you a unique opportunity of professional development and networking with fellow engineers.

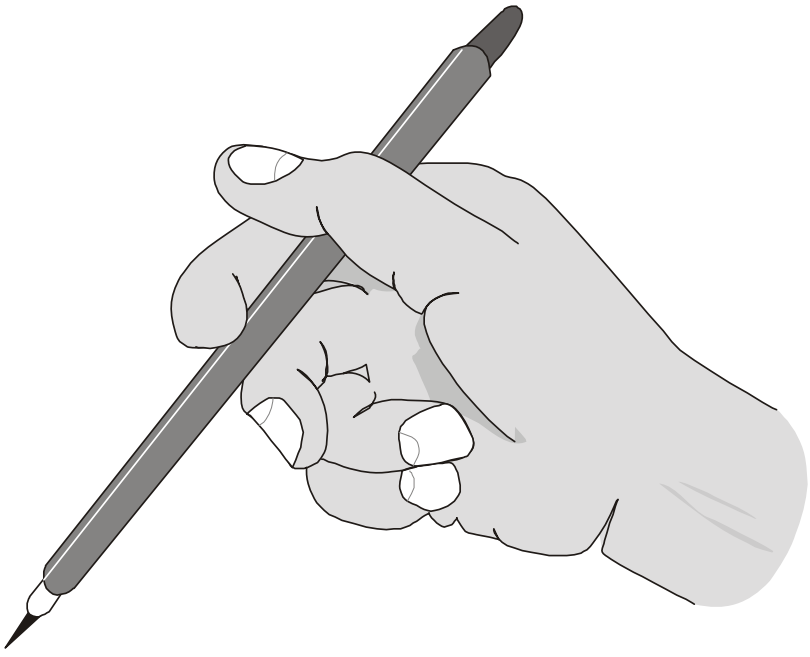
BE A MEMBER!

For more information, visit http://www.iepsac.org

BUILD BETTER WORLD

PAKISTAN

SAUDI ARABIAN CENTRE

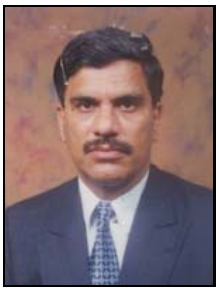


DIRECTORY OF PAKISTANI ENGINEERS IN THE KINGDOM OF SAUDI ARABIA

Architects and Town Planners

ARSHAD M. CHOHAN
Project Manager
Zuhair Fayez Partnership
P.O. Box 5445, Jeddah 21422
Tel. (02) 675-7253 (Off)
(02) 663-2590 (Res)
Fax. (02) 675-7252
Mob. 050-365-4760
M.Sc (UP) PSU USA 87

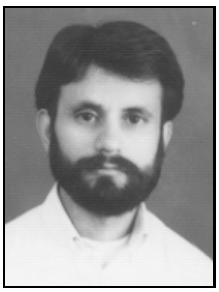
ASHFAQ MOHAMMAD QURESHI
Senior Architect
Rashid Engineering
P.O. Box 4354, Riyadh 11491
Tel. (01) 464-1188 x 207 (Off)
(01) 477-4171 (Res)
Fax. (01) 465-6245
Mob. 050-991-4635
Email: ashfaqm45@hotmail.com
G.D Arch 69



FAROOQ AHMED BHATTI
Sr. project Engineer
M/S Saud Consult
P.O. Box 1293, Dammam 31431
Tel. (03) 895-5004 x 1510 (Off)
Fax. (03) 895-1722
Mob. 050-925-0417
Email: fabruk@saudconsult.com.sa
B. Arch NCA 79

KHALID IQBAL WARRAICH
Project Manager
Jadawel Int'l Company
P.O. Box 61539, Riyadh 11575
Tel. (01) 240-6483 (Off)
Fax. (01) 240-6486
Mob. 050-523-6868
Email: khd219@hotmail.com
B.Arch UETL 73, AMIE (C) IEP 77
MIE, No. M5727

MOHAMMAD MANSOUR AZAM
Architect
Saud Consult
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975-703 (Off)
Mob. 050-863-0685
Email: basramk@hotmail.com
B.Arch UETL 98



MOHAMMAD WASEEM
Architect
Dar Al Majd Consulting Office
P.O. Box 60212, Riyadh 11545
Tel. (01) 252-0088 x 4563 (Off)
(01) 237-0546 (Res)
Fax. (01) 252-0088 x 4580
Mob. 050-890-7613
Email: samawafarjad@yahoo.com
B.Arch DCET 85

MOHAMMED SALEEM BUKHARI
Project Manager
Saudi Binladen Group
P.O. Box 8918, Jeddah 21492
Mob. 050-364-8974
Email: sesame2c@hotmail.com
M.Sc. Univ Lond 68, Dip (Dev. Plann) UL 76

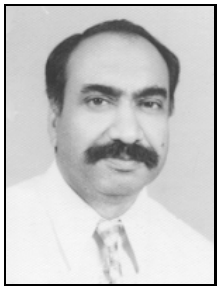
NOOR ULLAH KHALID
Construction Manager
Elseif Engineering Contracting Est.
P.O. Box 2774, Riyadh 11461
Tel. (01) 461-6087 x 166 (Off)
(01) 406-9715 (Res)
Fax. (01) 465-4898
Email: nukhalid@hotmail.com
B.Arch UETL 76

RUKHSUDDIN SHAIKH
Senior Architect
A.M. Al-Issa
P.O. Box 41984, Riyadh 11531
Tel. (01) 408-9051 (Off)
Fax. (01) 492-0705
Mob. 050-281-0665
B. Arch UETL 80

SYED NAEEM ALI
Architect
Zuhair Fayez Partnership
P.O. Box 5445, Jeddah 21422
Tel. (02) 654-7171 (Off)
(02) 605-4539 (Res)
Fax. (02) 654-3430
Mob. 050-869-2898
B. Arch. NCA 94

Chemical Engineers

ABDUL ALI SIDDIQUI
Process Engineer
Saudi Aramco
P.O. Box 50, Riyadh 11383
Tel. (01) 285-1867 (Off)
(01) 416-3727 (Res)
Fax. (01) 285-1851
Email: abdulali_s@yahoo.com
B.Sc (Chem) MUET 79



ABDUL REHMAN RATHORE
Valves Products Manager
A. Abunayyan Trading Corp.
P.O. Box 321, Riyadh 11411
Tel. (01) 477-9111 x 322 (Off)
(01) 432-7041 (Res)
Fax. (01) 476-7718
Mob. 050-412-2134
Email: abdulrahman-
B.Sc (Chem E) Punjab U 77, MBA Punjab U
MIE

AFZAAL SHAIQ QADRI
Production Manager
Saudi White Cement Company
P.O. Box 17775, Riyadh 11494
Tel. (01) 523-1489 (Off)
(01) 291-3019 (Res)
Fax. (01) 523-5247
Mob. 050-240-4091
Email: afzaalqadri@hotmail.com
B.Sc (Chem E) U Punjab 87

FAHEEM ELAHI ANSARI
Chemical Engineer
Saudi Arabian Airlines
P.O. Box 167, CC 826, Jeddah 21231
Tel. (02) 686-4288 (Off)
(02) 682-0030 x 3514 (Res)
Fax. (02) 631-5188
Email: fansari_us@yahoo.com
M.Sc KU 75, M.S (Chem) UOB 77
MIE, No. M5686

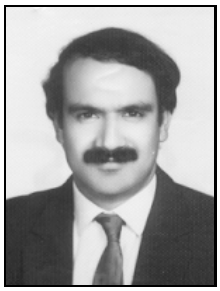
FAROOQ SALEEM IKRAM
SAFCO
P.O. Box 11044, Jubail 31961
Tel. (03) 340-6663 (Off)
B.E (Chem) UETL 81

IFTIKHAR AHMAD QAZI
Sr. Planning Engineer
Saudi Aramco
P.O. Box 50 Riyadh 11383
Tel. (01) 285-1889 (Off)
(01) 403-8710 (Res)
Fax. (01) 285-1863
Mob. 050-813-4844
Email: Qazi51_pk@yahoo.com
B.Sc (Chem) PUL 73

IKRAM HUSSAIN
Research Engineer
KFUPM
P.O. Box 769 , Dhahran 31261
Tel. (03) 860-3085 (Off)
(03) 860-5871 (Res)
Mob. 056-514-1625
Email: ikram@kfupm.edu.sa
B.E (Chem) NED 78, M.S KFUPM 83

IMTIAZ AHMAD
Director Projects
Jubail Chemical Industries Co. (JANA)
P.O. Box 10661, Jubail 31961
Tel. (03) 358-5002 x200 (Off)
(03) 361-8061 (Res)
Fax. (03) 358-5112
Mob. 050-496-0638
Email: imtiaz-a@jana-ksa.com
B.Sc. (Chem) METU TK 84, M.E. McGill 87

KAZIM HUSSAIN RIZVI
Sr. Safety & Fire Engr.
SABIC
P.O. Box 11669, Jubail 31961
Tel. (03) 359-9297 (Off)
(03) 361-3217 (Res)
Fax. (03) 359-9292
Mob. 050-828-2109
Email: rizvikh@sabic.com
B.E. (Chem) NED 82



MAQSOOD HAMID
Process Engineer
PETROKEMYA
P.O. Box 10002, Jubail 31961
Tel. (03) 357-7220 (Off)
(03) 340-0864 (Res)
Fax. (03) 358-4480
Mob. 050-819-0654
Email: maqsoodha@petrokemya.sabic.com
B.Sc (Chem) UK 79, M.S (Chem) Leeds UK

MOHAMMAD SHAKIL HARIS
Process Engineer
Basic Chemical Industries Ltd.
P.O. Box 1053 Dammam 31431
Tel. (03) 847-2466 x 152 (Off)
(03) 826-5179 (Res)
Mob. 056-156-4740
Email: shakil_haris@hotmail.com
B.Sc (Chem E) UP 95

MOHAMMAD TARIQ BARLAS
Vice Chairman & CEO
Al-Tuwairqi Group of Companies
P.O. Box 2705, Dammam 31461
Tel. (03) 857-9922 (Off)
(03) 882-7060 x 1027 (Res)
Fax. (03) 857- 0141
Email: barlas@altuwairqi.com.sa
B.Sc (Chem) UETL 65
MIE

Chemical Engineers

MOHAMMAD YOUNAS
Process Engineer
Saudi Aramco (Riyadh Refinery)
OEU Bldg, P.O. Box 3946, Riyadh 11194
Tel. (01) 285-1878 (Off)
(01) 404-1163 (Res)
Fax. (01) 285-2204
Email: mohammadyounas@aramco.com
B.Sc (Chem) UETL 69, M.Sc (Chem) UOC 74

MOHAMMAD YOUNAS TAHIR
Plant Superintendent
Saudi Aramco Shell Refinery Co.
P.O. Box 10088, Jubail 31961
Tel. (03) 357-2327 (Off)
Mob. 050-246-5319
B.Sc (Chem) UETL 78

MOHAMMAD ZAFAR
Project Engineer
S&A Abahsain Co. Ltd.
P.O. Box 209, Al-Khobar 31952
Tel. (03) 898-4045x 252 (Off)
(03) 899-3268 (Res)
Fax. (03) 895-1160
Mob. 055-135-2503
Email: m.zafar@abahsain.net
B.Sc. (CE) PU 85

MOHAMMAD ZAFAR HUSSAIN
Technical Manager
SAPTEX
P.O. Box 40042, Riyadh 11499
Tel. (01) 265-0980 (Off)
(01) 291-8630 (Res)
Fax. (01) 265-1041
Email: muhammad1234567@yahoo.com
M.Sc (Chem) Pun U 71, PGD (Chem E) Pun U

MUHAMMAD JAVAID AGHA
Staff Planner
Petrokemya
P.O. Box 10002, Jubail 31961
Tel. (03) 358-7124 (Off)
(03) 348-7173 (Res)
Fax. (03) 357-7005
Email: plnmja@petrokemya.sabic.com
B.E. (Chem) NED 81, MBA AIM 90

MUHAMMAD NASIR SHAHAB
ECH & LA Engineer
Jana Chemical Industries
P.O. Box 10661, Alkhobar
Mob. 053-164-7911
Email: nasir79@gmail.com
B.Sc. (Chem Engg) NFC UET 02

MUNAWAR A. SAUDAGAR, DR.
Researcher
SABIC R&D
Tel. (01) 265-3333 x 5545 (Off)
(01) 280-2695 (Res)
B.E (Chem) NED 76, M.S KFUPM 82, Ph.D

NABEEL PERVAIZ MALIK
Ind. Sales Engineer
Al-Hamrani Fuchs Petro
P.O. Box - 1930, Al-Khobar - 31952
Tel. (03) 361-0115 (Off)
(03) 361-0115 (Res)
Fax. (03) 361-0115
Mob. 050-054-3360
Email: nmalik@fuchs.com.sa
B.Sec. (CE) UETL 05

OMER FAROOQ SALAM
Chemical Engineer
Procter and Gamble
Mob. 050-258-1353
Email: omer_fs@hotmail.com
B.Sc. (Chem) UETL 2000

RANA MUHAMMAD ASIF JAMIL
ECH & CA Engineer
Jana Chemical Industries
P.O. Box 10661, Alkhobar 31961
Mob. 053-022-8694
Email: asif_214@yahoo.com
B.Sc. (Chem) PU 02, MS (TQM) PU 05

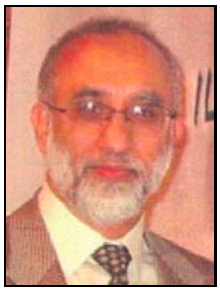
SARMAD RIZWAN AHMAD
Chemical Engr.
Tel. (03) 857-2275 (Res)
Fax. (03) 857-3771
Mob. 050-130-6720
Email: sarmad_aikari@hotmail.com
M.Engg. UON Uk 07

SYED AZHAR MOIN
Safety Advisor
SABIC
P.O. Box 10040, Jubail 31961
Tel. (03) 341-9065 (Off)
(03) 346-6385 (Res)
Fax. (03) 341-6055
Mob. 050-802-3649
Email: moinsa@sabic.com
B.E. (CE) NED 79

Chemical Engineers

SYED FASEEH-UDIN
Marketing Executive
S&A Abahsain Co. Ltd.
P.O. Box 209, Al-Khobar 31952
Tel. (03) 898-4045 x 221 (Off)
Fax. (03) 895-1160
Mob. 056-411-8636
Email: faseehuddin@abahsain.net
B.E. (Chem) DCET 02

SYED MOHAMMAD ASHFAQ
Project Engineer
Jubail Chemical Industries
P.O. Box 10661, Jubail 31961
Tel. (03) 358-5002 x 409 (Off)
(03) 362-4148 (Res)
Fax. (03) 358-5112
Mob. 055-627-9785
Email: ashfaq@jana-ksa.com
BE (Chem) NED 86



SYED NADEEM ALI
Staff Process Engr.
Petrokemya
P.O. Box 10002, Jubail 31961
Tel. (03) 357-7655 (Off)
Mob. 050-819-0596
Email: alisn@petrokemya.sabic.com
B.Sc. (Chem) PU 81, M.E Bradford 84

TAHIR J. BAIG
Staff Process Engineer
Petrokemya
P.O. Box 10002, Jubail
Tel. (03) 357-7399 (Off)
(03) 348-6153 (Res)
Fax. (03) 348-6153
Mob. 050-410-3342
B.Sc. (Chem) UETL 81, MBA OhioU 84

TARIQ ALI KHAN
Advisor Business Affairs
Tamimi Group of Companies
P.O. Box 172, Dammam 31411
Tel. (03) 847-4050 (Off)
Fax. (03) 847-2060
Mob. 050-538-4672
Email: tkhan@al-tamimi.com
BS (ChE) CSPU USA 75

TARIQ MAHMOOD
Process Engineer
Saudi Aramco Riyadh Refinery Dept.
P.O. Box 3946, Riyadh 11199
Tel. (01) 498-4000 x 1888 (Off)
(01) 448-8896 (Res)
M.Sc (Chem) UOA 75

Civil Engineers

ABDUL BASIT AMJAD
Senior Engineer
SSOC, KAAB Dhahran
Operation & Maintenance, P.O. Box 633,
Tel. (03) 330-6666 x 75120 (Off)
(03) 864-8297 (Res)
B.Sc (CE), UETL. 68

ABDUL WAHEED KHAN
Senior Civil Engineer
Ministry of Municipal & Rural Affairs
P.O. Box 1985, Riyadh 11441
Tel. (01) 477-7222 x 168 (Off)
(01) 473-0815 (Res)
Email: waheed39@netscape.net
B.E (C) NED 65
MIE, No. M7131

ABDUR RASHID HAQ
Project Engineer
Saudi BEMCO
Riyadh
Mob. 050-337-0483
Email: abdurrasheed_haq@yahoo.com
B.Sc (CE) UETL 76

ABDUR RASHID SHAD
Construction Manager
Al-Khodari Sons Co
Tel. (04) 622-4874 (Off)
Fax. (04) 622-4875
Mob. 055-504-3898
Email: arsba49@hotmail.com
B.Sc (CE) UETL 73
FIE, No. F1773/SA9

ABID WASEEM ASLAM
Project Manager
Manwa Est.
P.O. Box 52169, Riyadh 11563
Tel. (01) 476-8118 (Off)
(01) 461-0543 (Res)
Fax. (01) 476-8121
B.E (C) NED 79

AFAQ HUSSAIN SIDDIQI
Quality Control Chief Engr.
ABV ROCK Group KB
P.O. Box 89426, Riyadh 11682
Tel. (01) 403-7878 x 430 (Off)
Fax. (01) 402-8100 / 402-8800
B.E (C) NED 80

AFTAB AHMED
Construction Manager
Saudi Consulting Services (Saudconsult)
P.O. Box 7352, Jeddah 21462
Tel. (02) 667-0500 x 117 (Off)
(02) 052-752-863 (Res)
Fax. (02) 665-3587
Mob. 050-300-4285
B.Sc (CE) UETL 84

AFTAB ALAM
Project Manager
Associated Consulting Engineer (ACE)
P.O. Box 543, Makkah
Tel. (02) 542-6421 (Off)
(02) 675-4091 (Res)
Fax. (02) 546-0243
Mob. 050-650-3856
Email: ace_daabag@yahoo.com
B.E (C) NED 68

AHMAD WARAICH
Cost Control Engineer
Elseif Engineering Contracting Est.
P942, P.O. Box 2774, Riyadh 11461
Tel. (01) 454-9191 x 245/267 (Off)
(01) 493-1703 (Res)
Fax. (01) 454-2759
Mob. 050-641-5368
Email: ahmadwaraich@yahoo.com
B.Sc (CE) NEU Turkey 96

AKHTAR JAWAID NIAZI
Geneal Manager
Al-Najam Cont. & Trad Est.
P.O. Box 2578, Dammam 31461
Tel. (03) 882-2299 (Off)
Fax. (03) 833-0112
Mob. 050-585-4106
Email: ajniazi@arab-online.net
B.Sc (CE) UETL. 66

ANIS AL-HASAN
Project Engineer
Abdullah Tasan Consulting Bureau Jeddah
P.O. Box 5196, Jeddah 21422
Tel. (02) 667-6612 (Off)
(02) 672-4059 (Res)
Mob. 050-118-2531
B.E. (Civil) NED 66

ANIS UR REHMAN KHAN
Project Engineer
Ali M- Al Ajinah Est.
P.O. Box 344, Al-Khobar 31952
Tel. (03) 864-2642 (Off)
Fax. (03) 898-4917
Mob. 050-890-10
B.Sc (CE) KWU 93

Civil Engineers

ANWAR UL HAQ
Civil Engineer
Saudi Consulting Services (Saudconsult)
P.O. Box 2341, Riyadh 11451
Tel. (01) 485-4644 (Off)
(01) 479-1409 (Res)
B.Sc (CE) UETL 73

ARSHAD ALI AMJAD, DR.
Sr. Contracts Engineer
SABIC Engineering and Project management
Jubail
Tel. (03) 460-5989 (Res)
Mob. 050-787-3685
Email: amjadaa@petrokemya.sabic.com
B.Sc.(C) Sussex 86, M.Sc. HWU 99, PhD.

ASRAR KHAN GHORI
Consultant
Saudi Arabian Amiantit Company
P.O. Box 1029, Riyadh 11431
Tel. (01) 465-8665 x 258 (Off)
Fax. (01) 463-1389
Mob. 050-442-7082
Email: akghori@amiantit.com
B.E (C) NED 66, M.E AIT 76
MIE, No. M4057

ASRAR M AHMED
Resident Director ACE-DABBAGH
Associated Consulting Engineers (ACE)
P.O. Box 543, Makkah
Tel. (02) 542-6421 (Off)
Fax. (02) 546-0243
Email: ace_dabbag@yahoo.com
B.E (C) NED 59
FIE

ATIF USMAN
Projects Engineer
Al-Hokair Group
P.O. Box 859, Riyadh 11421
Tel. (01) 464-3361 (Off)
Mob. 050-726-5419
Email: atifkh_48@yahoo.co.uk
B.Sc (CE) NUST 03, MSc. (MP) UOMUK 05

BABAR SULTAN
Manager Business Development
AETCON
P.O. Box 172, Dammam 31411
Tel. (03) 889-1576 x 14 (Off)
(03) (973) 394-24001 (Res)
Fax. (03) 889-1640
Mob. 050-587-4706
Email: bsultan@batelco.com.bh
B.Sc (CE) UETL 81, M.Sc (Const Mgmt)
FIE

CHAUDHARY GULRAIZ SAEED
Lead Engineer
Elseif Engineering Contracting Est.
P.O. Box 2774, Riyadh 11461
Tel. (01) 211-0087 (Off)
(01) 440-1061 (Res)
Fax. (01) 211-0086
B.Sc (C) UETL 78

EBRAR AHMED SHAMS
Site Manager
ABB Contracting Co. Ltd
P.O. Box 2873 Al Khobar 31952
Tel. (03) 586-2144 (Off)
(03) 587-4096 (Res)
Fax. (03) 587-8990
B.E (C) NED 81
MIE, No. M7777

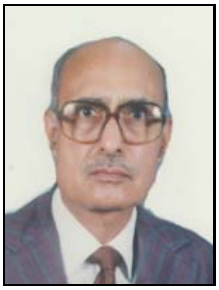
FAQIR HUSSAIN
Manager Civil Projects
Al-Tuwairqi Group of Companies
P.O. Box 7922, Dammam - 31472
Tel. (03) 812-2966x 450 (Off)
(03) 897-9659 (Res)
Fax. (03) 812-2991
Mob. 050-383-9075
Email: faqir@altuwairqi.com.sa
B.Sc. (CE) UETL 89

FASIH AHMED
Senior Plumbing Engineer
Rashid Engineering
P.O. Box 4354,, Riyadh 11491
Tel. (01) 482-3380 (Off)
(01) 486-0278 (Res)
Fax. (01) 482-3295
Mob. 050-212-4565
Email: s_fasih90@hotmail.com
B.E (C) NED 66
MIE, No. LM2565

GHULAM SAFDAR
General Manager
Ghulam Safdar & Partner Contracting Co.
Tel. (01) 226-3727 (Off)
(01) 228-6470 (Res)
Fax. (01) 226-6703
Mob. 050-462-5701
Email: gsafdar@yahoo.com
B.Sc (CE) UETL 80

HAFIZ KHADIM HUSSAIN
Structural Engineer
Saudi Oger Ltd.
GPCD-8413, P.O. Box 1449, Riyadh 11431
Tel. (01) 477-3115 x 5244 (Off)
(01) 477-5832 (Res)
Fax. (01) 477-3115 x 5331
Mob. 050-294-9093
Email: hafizkhadim@hotmail.com
B.Sc (CE) UETL 89

Civil Engineers



HAMID ALI KHAN
Civil Engineer
Elseif Engineering Contracting Est.
P.O. Box 2774, Riyadh 11461
Tel. (01) 454-9191 x 239 (Off)
(01) 278-6853 (Res)
Fax. (01) 454-2759
B.Sc (C) GCET 58
MIE, No. M3976

IJAZ AHMAD KHAN
Project Manager, Infra. Dept.
Saudi Consulting Services (Saudconsult)
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 x 115 (Off)
(01) 435-3469 (Res)
Email: scr@zajil.net
B.Sc (CE) UETL 79
MIE, No. M8256/L426

IMTIAZ AHMED
Construction Manager
Asfar Al-Jazirah Est.
P.O. Box 220569, Riyadh 11311
Tel. (01) 295-3015 (Off)
(01) 493-7918 (Res)
Fax. (01) 493-7918
Mob. 050-417-9532
Email: imtiazpindwala@hotmail.com
B.Sc (CE) UETL 73
MIE

IMTIAZ AHMED DURRANI
Highway Engineer
Rashid Geotech & Materials Engineers
P.O. Box 9182, Jeddah 21413
Tel. (02) 671-5621 (Off)
(02) 671-0945 (Res)
Fax. (02) 671-5426
Email: imtiazdurrani@yahoo.com
B.Sc (C) NWFPUET 92, M.S KFUPM 97

IQBAL HUSSAIN
Civil & Material Engineer
Riyadh Roads Deptt, M.O.C
P.O. Box 380367, Riyadh 11345
Tel. (01) 478-1444 / 477-8309 x 38 (Off)
(01) 451-0337 (Res)
Fax. (01) 451-0337
Mob. 050-594-3179
B.E (C) PU 68
MIE, No. M9415/S7

IRFAN AHMAD CHISHTI
Regional Manager
Riyadh Geotechnique & Foundations (RGF)
P.O. Box 2870, Al-Khobar 31952
Tel. (03) 859-8503 (Off)
(03) 889-8439 (Res)
Fax. (03) 859-8507
Mob. 055-332-2837
Email: irfanchishti@yahoo.com
B.Sc (CE) UETL 95, M.Engg (Geotech E) AIT

IRSHAD NABI
Project Manager
AETCON
P.O. Box 250974, Riyadh 11391
Tel. (01) 465-6975 (Off)
(01) 465-6975 (Res)
Fax. (01) 464-3651
Mob. 050-481-7692
B.E (C) UET Kabul 88

ISMET AMIN KHAWAJA
General Manager
Foundations Building Contracting Company
P.O. Box 31269, Al-Khobar 31952
Tel. (03) 864-6593 (Off)
(03) 864-5809 (Res)
Fax. (03) 894-5869
Mob. 050-588-0792
Email: 786ttc@cyberia.net.sa
B.Sc (CE) UETL 66
FIE

JAVAID IQBAL
Chief Engineer
Abal Khail Consulting Engineers
P.O. Box 4074, Riyadh 11491
Tel. (01) 465-0283 (Res)
Mob. 050-412-8793
Email: javaid7860@hotmail.com
B.Sc (CE) UETL 75

JAVED IQBAL
Construction Manager
North Eastern Est.
P.O. Box 3401, Khobar 31952
Tel. (03) 865-6982 (Off)
(03) 661-1004 (Res)
Fax. (03) 865-6982
Mob. 050-482-9040
Email: noorjaved@yahoo.com
B.Sc (C) UETL 83

JAWED IQBAL
Sr. Outside Plant Engineer
Bayanat Al-Oula for Network Services
P.O. Box 16431, Riyadh 11464
Tel. (01) 419-1818 (Off)
(01) 408-3451 (Res)
Fax. (01) 419-1188
Email: jimoda@hotmail.com
B.E (C) NED 82

KHALID HUSSAIN
Operations Manager
Mohammed Daffer al-Qahtani Est.
P.O. Box 16, Al-Khobar 31952
Tel. (03) 867-1708 (Off)
(03) 897-5491 (Res)
Fax. (03) 867-8459
Mob. 050-384-7053
Email: khalidmdqest@yahoo.com
B.E. (CE) NED 94

Civil Engineers

KHALID MAHMOOD DR.
Professor of Civil Engg
King Abdul Aziz University
P.O. Box 9027, Jeddah 21413
Tel. (02) 695-2250 (Off)
(02) 372-5494 (Res)
B.Sc (CE) UETL 65, Ph.D UNSW 73

KHALID MAHMOOD MALIK
Project Manager
Zuhair Fayez Parternership Consultants
P.O. Box 9486, Riyadh 11413
Tel. (01) 476-3030 (Off)
(01) 419-7162 (Res)
Mob. 050-347-8426
Email: khalidmmalik@hotmail.com
B.Sc. (CE) UETL 76, M.Sc. (CE) CTU USA

KHURAM RAZZAK MOHIB
Technical Manager
Ground Engineering Contractors
P.O. Box 2870, Al-Khobar 31952
Tel. (03) 898-2240 (Off)
Fax. (03) 894-8378
Email: gec@zajil.net
B.Sc.(CE) UETL 95, M.S. (Geo) AU CA 05,

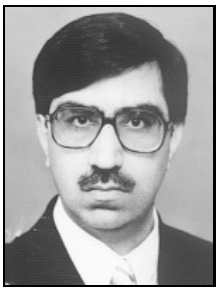
KHURRAM KARAMAT
Vice President / Manager Engg
Saudi Consulting Services (Saudconsult)
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 x 107 (Off)
(01) 462-9398 (Res)
Fax. (01) 464-7540
Mob. 050-586-8352
Email: bd@saudconsult.com
B.Sc (CE) UETL 72
MIE, No. M5339

KIRMANI SYED MUBASHIR HUSSAIN
Chief Engineer
Rashid Engineering
P.O. Box 4354, Riyadh 11491
Tel. (01) 465-3127 (Off)
(01) 473-8034 (Res)
Fax. (01) 465-6245
Mob. 050-725-4876
Email: smhkirmani@hotmail.com
B.Sc. (Honours) KU, B.E (C) NED 67, P.G.D
MIE, No. LM2541

LAIQUE HAIDER
Civil / Str. Engineer
Al-Hoty Establishment
P.O. Box 31729, Al-Khobar 31952
Tel. (03) 862-5481 (Off)
(03) 864-6661 (Res)
Fax. (03) 862-5424
Mob. 050-380-4829
B.E (C) NED 83, MSCE LSU USA 87
MIE

M. WAHEED CHUGHTAI
Regional Manager
W NORCONSULT
P.O. Box 2026, Riyadh 11451
Tel. (01) 239-7619 (Off)
(01) 419-0686 (Res)
Fax. (01) 419-0686
Mob. 050-646-9754
B.Sc (CE) UETL 66, MBA OSU 77

MAJOR WAHID AHMED BHUTTA
Managing Director
P.O. Box 42763, Riyadh 11551
Tel. (01) 260-0087 (Off)
(01) 213-4037 (Res)
Fax. (01) 260-0098
Mob. 050-975-9706
Email: wabwammz@yahoo.com
B.Sc (Civil) MCE 92
AMIE, No. AM/5837-K/308



MALIK HUMAYOON IQBAL
Civil / Strt. Engineer
Military Works Dept., MODA
P.O. Box 8633, Riyadh 11492
Tel. (01) 478-9000 x 4635 (Off)
(01) 406-5135 (Res)
B.Sc (CE) WPUETL 69

MIR SARFARAZ ALI KHAN
Project Manager
Saudi Consulting Services (Saudconsult)
P.O. Box 1293, Dammam 31431
Tel. (03) 895-5004 x 465 (Off)
(03) 867-5002 (Res)
Fax. (03) 895-1722
Mob. 050-681-6437
Email: msak41@yahoo.com
B.E (C) OU 65

MIRZA AHTESHAM UD DIN
Civil Engineer
Saudi Consulting Services (Saudconsult)
P.O. Box 3313, Jeddah 21471
Tel. (02) 667-2082 (Off)
(02) 654-4264 (Res)
Fax. (02) 695-1393
B.E (C) NED 67, B.Sc KU 63

MOHAMMAD ABDUL KHALID
Project Engineer
Saudi Electric Company (ERB)
EDSD/CMED 1-200W, P.O. Box 5190,
Tel. (03) 858-6629 (Off)
Fax. (03) 858-6880
Mob. 050-285-5357
B.E (C) NED 76

Civil Engineers

MOHAMMAD ABDUL RAUF
Project Engineer
Saudi Consulting Services
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 (Off)
(01) 463-6615 (Res)
Fax. (01) 464-7540
Mob. 055-966-0751
Email: mrauf@saudconsult.com
B.Sc. (CE) UETL 92

MOHAMMAD ADIL
Deputy GM Marketing Sales
Saudi Arabian Amiantit Co.
P.O. Box 589, Dammam 31421
Tel. (03) 847-1500 x 1502 (Off)
(03) 889-0337 (Res)
Fax. (03) 847-1398
Mob. 050-481-3591
Email: madil@amiantit.com
B.E (C) NED 74
MIE, No. LM4215

MOHAMMAD AFZAL
Project Manager
Saudi Consulting Services
P.O. Box 10056, Jubail 31961
Tel. (03) 341-3096 (Off)
B.Sc (CE) EPUET 63, M.E AIT 67
MIE, No. M3179

MOHAMMAD ALIUDDIN
Project Controls Specialist
Dar Al Handassah Shair & Partners
P.O. Box 182, Al-Khobar 31952
Tel. (03) 766-0055 x 4079 (Off)
(03) 814 2308 (Res)
Fax. (03) 767-1361
Mob. 050-680-2194
Email: aliuddin61@yahoo.com
B.E (C) NED 83, M.E (C) RUH 84

MOHAMMAD ANWAR CHAUDHARY
Cost Engineer SBG-ABCD
Saudi Binladin Group
Binladin Plaza, P.O. Box 41007, Jeddah 21521
Tel. (02) 631-2280 x 514 (Off)
(02) 673-6728 (Res)
Fax. (02) 631-1596
B.Sc (CE) UETL 76

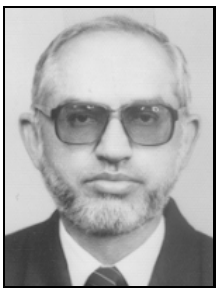
MOHAMMAD ANWAR HAYAT KHAN
Senior Civil Engineer
MODA, Presidency of Civil Aviation
P.O. Box 203, Dhahran 31932
Tel. (03) 883-2377 (Off)
Fax. (03) 883-2010
Mob. 050-794-4012
B.E (C) NED 69

MOHAMMAD FAHEEM
Project Engineer
Al-Tuwairqi Group of Companies
N.S.I.F, P.O. Box 7600, Dammam 31492
Tel. (03) 812-2967 x 239 (Off)
(03) 867-4602 (Res)
Fax. (03) 812-2991
Mob. 050-384-6892
B.E (CE) NED 92

MOHAMMAD FAHIM UDDIN
Deputy Project Engineer
Abalkhail Consulting Engineers
P.O. Box 4074, Riyadh 11491
Tel. (01) 465-9143 (Res)
Mob. 050-897-9982
Email: fhm_uddin@yahoo.com
B.E (C) NED 88, M.Sc (Nucleor E) QAU 90

MOHAMMAD FAWAD KARBARI
Project manager
Hashem Contracting & Trading Co. Ltd.
P.O. Box 10005, Riyadh 11433
Tel. (01) 464-9835 / 462-3955 (Off)
(01) 406-9814 (Res)
Fax. (01) 465-2389
Mob. 050-418-4921
B.E (C) NED 83, M.Sc (C) NED 91

MOHAMMAD HASAN
Operations Manager
Kanadiley Est.
P.O. Box 582, Dammam 31421
Tel. (03) 891-2838 (Off)
(03) 898-1615 (Res)
Fax. (03) 887-0357
Mob. 050-721-1489
Email: tkanadiley@yahoo.com
B.Eng (C) McGill U 61



MOHAMMAD IBRAHIM
Structural Consultant
MODA GDMW
P.O. Box 21555, Riyadh 11485
Tel. (01) 478-9000 (Off)
(01) 448-3079 (Res)
Fax. (01) 401-5058
B.E (C) NED 67, M.E (S) UOF 71
MIE, No. LM3187

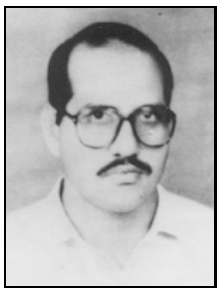
MOHAMMAD IFTEKHAR-UD-DIN
Civil Engineer
Dar-Al-Majd Consulting Engineers
P.O. Box 60212, Riyadh 71545
Tel. (07) 722-1477 (Off)
(07) 722-8042 (Res)
Fax. (07) 722-5397
Mob. 050-825-8665
Email: ifsara@hotmail.com
B.Sc (CE) MLQU- 90, MCM, UE- 91

Civil Engineers

MOHAMMAD JAFAR KHAN
Projects Manager
Nesma & AlFadl Cont. Co Ltd.
P.O. Box 1498, Al-Khober 31952
Tel. (03) 897-1050 (Off)
(03) 891-7570 (Res)
Fax. (03) 864-3121
Mob. 050-582-0847
Email: mjkhan@nesma.com.sa
B.E (C) NED 77

MOHAMMAD KALIMUR REHMAN, DR.
Research Engr. (Assoc. Prof)
King Fahd Unveristy of Petroleum
P.O. Box 151, Dhahran 31261
Tel. (03) 860-1129 (Off)
(03) 860-6692 (Res)
Fax. (03) 860-3996
Mob. 050-277-7158
Email: mkrahman@kfupm.edu.sa
B.E (C) NED 80, MS UCB 84, Ph.D KFUPM

MOHAMMAD MAHFOOZ ALAM
Civil Engineer
Al-Mashrik Contracting Co.
P.O. Box 6108, Riyadh 11442
Tel. (01) 462-7799 (Off)
Fax. (01) 241-8242
Mob. 050-892-7336
Email: mma@almashrik.com
B.Sc (CE) EPUET 68



MOHAMMAD MOAZAM KHAL
Resident Engineer
Dar-Al-Riyadh Consultant
P.O. Box 5364, Riyadh 11422
Tel. (01) 464-1611 (Off)
Fax. (01) 464-8853
B.Sc (CE) UETL 78
MIE, No. M7884/L172

MOHAMMAD SAJJAD HUSSAIN
Project Manager
SOFCON-Stanley
P.O. Box 3998, Khobar 31952
Tel. (03) 887-9525 x 1536 (Off)
(03) 889-4299 (Res)
Mob. 056-428-6189
Email: msajjadh58@hotmail.com
B.E (C) NED 83, M.Sc (Nuclear) QAU 84
AMIE, No. KCA1410

MOHAMMAD SHAFIQ MAITLA
Consultant
Business Development & Promotion (Interna.
P.O. Box 220969, Riyadh 11311
Tel. (01) 464-5142 (Off)
Fax. (01) 464-5142
Mob. 050-528-8680
Email: shafiqmaitla@yahoo.com
B.Sc (CE) UETL 75

MOHAMMAD JASIM AKHTAR
Civil Engineer
Darul Majd Consulting Engineers
P.O. Box 60212, Riyadh 11545
Tel. (01) 252-0088 x 4559 (Off)
(01) 477-2156 (Res)
Fax. (01) 462-1727
Mob. 050-606-2326
Email: jasimakhtar@hotmail.com
B.E (C) NED 79, M.S UPM 87

MOHAMMAD KHURSHID
Civil Engineer
Dar Al- majd Engineering Consultants
P.O. Box 60212, Riyadh 11545
Tel. (01) 464-9688 (Off)
Mob. 050-792-0045
B.Sc (CE) NWFPUET 91

MOHAMMAD MASOOD ANJUM
Lead Engineer (CIVIL)
Elseif Engineering & Contracting Est.
P.O. Box 2774, Riyadh 11461
Tel. (01) 454-9191 x 214 (Off)
(01) 278-5503 (Res)
Fax. (01) 454-2759
Mob. 050-286-3128
Email: masood@el-seif.com.sa
B.Sc (CE) UETL 75
MIE, No. M4933

MOHAMMAD RASHID
Civil Engineer
Saudi Oger Ltd.
P.O. Box 30435, Al-Hassa 31982
Tel. (03) 592-4445 (Off)
Fax. (03) 592-5444
B.E (C) NED 87

MOHAMMAD SALEEM
Lecturer
King Fahad Univ. of Petroleum & Minerals
KFUPM 398, Dhahran 31261
Tel. (03) 860-2691 (Off)
(03) 860-6107 (Res)
B.E (C) NED 88, MS (Env) KFUPM 97

MOHAMMAD TAHIR JAMIL
Structural Design Engineer
Al-Id Engineering Consultants
P.O. Box 5967, Dammam 31432
Tel. (03) 833-2266 (Off)
(03) 827-4901 (Res)
B.Sc (CE) UETL 92

Civil Engineers

MOHAMMAD TAHIR SALEEM
Project Manager
M & M Company Ltd.
P.O. Box 10514, Riyadh 11443
Tel. (0) 477-8556 (Off)
Fax. (0) 477-8529
Mob. 050-629-2171
Email: mtskhan02@hotmail.com
B.E. (Civil), NED 1977

MOHAMMAD TAYYIB WARAICH
Senior Structural Engineer
Elseif Engineering Contracting Co. Ltd
P.O. Box 2774, Riyadh 11461
Tel. (01) 454-9191 x. 256 (Off)
Fax. (01) 454-2759
Email: ahmadwaraich@yahoo.com
B.Sc (CE) UETL 68
MIE, No. M3361

MOHAMMAD YAHYA KHAN
Adminstrator III Contract
Elseif Engineering Contracting Co.
P.O. Box 2774, Riyadh 11461
Tel. (01) 454-9191 x 292 (Off)
(01) 455 4188 (Res)
Fax. (01) 454-2759
Mob. 050-286-1859
Email: myahya@el-seif.com.sa
B.Sc (CE) NWFPUET 84

MOHAMMAD YOUSUF
Section Engineer
Elseif Engineering Contracting Est.
P.O. Box 2774, Riyadh 11461
Tel. (01) 249-7336 (Res)
Mob. 050-649-7523
B.E (C) NED 83

MUBEEN UDDIN AHMED
Subcontract Engineer
JGC ARABIA LTD.
P.O. Box 2414, AL-KHOBAR 31952
Tel. (03) 576-0650 x. 195 (Off)
Fax. (03) 576-0670
Mob. 050-245-7195
Email: mubeenz99@hotmail.com
M. Inst. CES ICES 84

MUNEEB ASLAM KHAN
Projects Manager
Ground Engineering Contractors
P.O. Box 2870, Al-Khobar 31952
Tel. (03) 898-2240 (Off)
Fax. (03) 894-8378
Mob. 050-027-5764
Email: gec@zajil.net
B.E. (CE) NED 93

MUNEER AHMED RANA
Planning & Project Engineer
Int. Center of Commerce & Contracting
P.O. Box 9778, Riyadh 11423
Tel. (01) 460-7667 (Off)
(01) 409-4031 (Res)
Fax. (01) 464-6247
Mob. 050-829-9004
Email: icriyadh@shabakah.com
B.E (C) NED 89

MUNIR AHMAD
Project Manager
Saudi Binladin Group
P.O. Box 105, Riyadh 11411
Tel. (01) 403-1103 (Off)
(01) 477-1196 (Res)
Fax. (01) 403-1103
Email: munirsa3@yahoo.com
B.Sc (CE) UETL 75
MIE, No. M4884

MUNIR AHMED
Plant & Operations Manager
Saif Noman Said & Partnership Co.
P.O. Box 40843, Riyadh 11511
Tel. (01) 490-0116 (Off)
(01) 401-5085 (Res)
Fax. (01) 490-1076
Mob. 050-424-4765
B.Sc (CE) UETL 79

MUNIR AHMED JAVID
Senior Engineer
AETCON
P.O. Box 172, Dammam 31411
Tel. (03) 889-1609 (Off)
(03) 674-0858 (Res)
Fax. (03) 889-1640
Mob. 050-480-9523
Email: engrmunirjavid@hotmail.com
B.Sc (CE) UETL 92

MUSHTAQ AHMED WASSAN
PM&Head of Specification Dept.
Zuhair Fayez Partnership
P.O. Box. 5445, Jeddah 21422
Tel. (02) 612-9999 x 9480 (Off)
(02) 691-8938 (Res)
Fax. (02) 612-9910
Mob. 050-464-0934
Email: mushtaqa1@hotmail.com
B.E. (Civil) US 73
MIE, No. M/6883

MUSTAFA IQBAL NASIM
Procurement Manager
Al-Rashid Trading & Contracting (RTCC)
P.O. Box 307, Riyadh 11411
Tel. (01) 401-2550 x 617 (Off)
(01) 403-3480 (Res)
Fax. (01) 402-2055
Email: miqbal@rtcc.com.sa
B.Sc (CE) AMU 75

Civil Engineers

MUSTAFA NOEED AHMED KAMRAN
Operations Manger
SAUDIK Contracting Co.Ltd.
P.O. Box 6609, Dammam 31452
Tel. (03) 842-2442 (Off)
Fax. (03) 841-7734
Mob. 050-586-8071
Email: mail@saudik.com
B.Sc (CE) MCER 79, MBA CSML 96, M.Phil
AMIE, No. A-4783

NADEEM ARSHAD SHEIKH
Structural Engineer
Saudi Consulting Services (Saudconsult)
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 x 213 (Off)
Fax. (01) 464-7540
B.Sc (CE) UETL 90, M.S UTA 91
MIE

NAEEM AKHTAR
Research Assistant
KFUPM
P.O. Box 723, Dhahran 31261
Tel. (03) 860-2691 (Off)
(03) 860-5327 (Res)
B.Sc (CE) UETL 2000

NAVEED ULLAH
Operations manager
Saudi Archtrodon Ltd.
P.O. Box 2242, Dammam 31451
Tel. (03) 859-4015 (Off)
(03) 859-1014 x 190 (Res)
Fax. (03) 859-3564
B.Sc UETL 89

OBAIDULLAH SIDDIQI
Sr. Engg.Consultant
Zuhair Fayez Partnership Consultant
P.O. Box 9486, Riyadh 11413
Tel. (01) 476-3030 x 289 (Off)
(01) 405-0167 (Res)
Fax. (01) 405-0167
Mob. 050-744-9291
Email: obaid41@hotmail.com
B.E (C) NED 65, PGD UETL 70
FIE, No. F1195

PARVEZ A. NAUSHAHI
General Manager
Ground Engineering Contractors
P.O. Box 2870, Al-Khobar 31952
Tel. (03) 898-2240 (Off)
(03) 887-1416 (Res)
Fax. (03) 894-8378
Mob. 050-580-9867
Email: gec@zajil.net
B.Sc (CE) UETL 81, M.E (C) AIT 92

PERVAIZ IQBAL QURESHI
Field Engineer
M/S Sharif KEC
P.O. Box 549, Riyadh 11391
Tel. (01) 465-6150 (Off)
B.Sc (CE) 93

QAIYYUM HASHMI
Senior Civil Engineer
Saudi Oger Ltd.
P.O. Box 1449, Riyadh 11431
Tel. (01) 477-3115 x 5361 (Off)
Fax. (01) 477-3115 x 5350
Mob. 050-861-6825
Email: qhashmi@saudioger.com
B.E. (Civil), NED 1980

QAIYYUM HASHMI
Engineer Estimation
Nesma & AlFadl Cont. Ltd
P.O. Box 1498, Al-Khobar 31952
Tel. (03) 897-1050 x 788 (Off)
(03) 865-1228 (Res)
B.E (C) NED 80

RAIS MIRZA
Civil Engineer
King Saud University
Email: rmamsa@hotmail.com
M.S (CE)

RAJA SHAHID SALEEM
Site Engineer
Keller Turki Co. Ltd.
P.O. Box 718, Dammam 31421
Tel. (03) 833-3997 (Off)
Fax. (03) 833-5325
B.Sc (CE) UETL 95

RIZWAN AHMED BHATTI
Civil Estimation Unit Head
NESMA and Partners Contracting Co.
P.O. Box 1498, Al-Khobar 31952
Tel. (03) 897-1050 x 159 (Off)
Fax. (03) 894-7825
Email: saadrizwan60@hotmail.com
M.Sc (C) AIT
MIE, No. 015342

Civil Engineers

SADAR DIN
Water & Waste Water Engineer
Saudi Consulting Services (Saudconsult)
Infra Str. Dept., P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 x 203 (Off)
(01) 472-7553 (Res)
Fax. (01) 464-7540
Email: infra@saudconsult.com
B.Sc (CE) UETL 90

SALEEM BAIG MIRZA
Project Manager
Saudi Consolidated Eng. Co.
P.O. Box 3928, Riyadh 11481
Tel. (01) 477-8384 (Off)
(01) 402-0290 (Res)
Fax. (01) 477-9793
Mob. 050-328-4518
Email: sbmirza50@hotmail.com
B.Sc (CE) UETL 75
MIE, No. M5495

SALMAN M. KHAN
Business Manager
Saudi Aramco
P.O. Box 1862, Ras Tanura 31311
Tel. (03) 874-6859 (Off)
(03) 673-0091 (Res)
Fax. (03) 673-2461
Email: khansmoaexchange@aramco.com.sa
B.E (C) NED 68

SHABBIR A. KHOKHAR
Senior Technical Consultant
Saudi Industrial Development Fund
P.O. Box 4143, Riyadh 11149
Tel. (01) 477-4002 x 248 (Off)
(01) 464-0589 (Res)
Fax. (01) 479-0165
Email: s.khokhar@sidf.gov.sa
B.Sc (CE) UETL 70
MIE

SHAHID ANWAR
General Manager
Wilber Smith Associates
P.O. Box. 301285, Riyadh 11372
Tel. (01) 249-9270 (Off)
(01) 248-3366 x 2024 (Res)
Fax. (01) 249-9285
Mob. 050-437-713
Email: sanwar@wilbursmith.com
BE Hatfield U 84, M.E. ICUL 87, MBA City U 91

SHAIKH MOHAMMAD ASHRAF
Sr. Engineer
Military Works Dept. (MODA)
P.O. Box 20379, Riyadh 11455
Tel. (01) 472-4338 (Off)
(01) 419-0915 (Res)
Fax. (01) 419-1030
B.E (C) NED 71, MEA GWU 79
MIE, No. M5077

SHEIKH AKHTAR HUSAIN
Project Manager
Saudi Consulting Services (Saudconsult)
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 x 240 (Off)
(01) 442-1161 (Res)
Fax. (01) 464-7540
Mob. 050-911-4871
Email: shaikh@saudconsult.com
B.E (C) NED 65, M.E UW 70
MIE

SHEIKH KHALIL AHMED
Commercial Manager
Elseif Engineering Contracting Est.
P.O. Box 2774, Riyadh 11461
Tel. (01) 454-9191 x 225 (Off)
(01) 249-2467 (Res)
Fax. (01) 211-0087
Mob. 050-548-3466
Email: skanazir@hotmail.com
B.Sc (CE) UETL 76, AMIE IEP 82
MIE, No. M9843/L1755

SYED FAIZ AHMAD
Chief Structural Engineer
Saudi Oger Ltd.
GPCD-8413, P.O. Box 1449, Riyadh 11431
Tel. (01) 477-3115 x 3845 (Off)
(01) 412-1966 (Res)
Fax. (01) 477-3115 x 5331
Mob. 050-816-9304
Email: syedfaiz23@hotmail.com
B.E (C) NED 79, M.E (Str.) AIT 82
MIE, No. M6074

SYED GHULAM MUSTAFA SHAH
Project Engineer
Elseif Engineering Contracting Est.
P.O. Box 2774, Riyadh 11643
Tel. (01) 454-9191 (Off)
(01) 248-1258 (Res)
Fax. (01) 454-2759
Mob. 050-244-9790
B.E (C) SU 72

SYED IBNE MOHAMMAD NAQVI
Civil Engineer
Al-Hejailan Consultants
Tel. (03) 340-1249 (Off)
(03) 897-0233 (Res)
Fax. (03) 882-6117
Mob. 050-380-5938
B.E (C) NED 70
MIE

SYED MOHAMMAD ALI
Geotechnical Engineer
Keller - Turki Co. Ltd.
P.O. Box 718, Dammam 31421
Tel. (03) 833-3997 (Off)
Fax. (03) 833-5325
Mob. 050-481-7703
Email: kaller-turki@atco.com.sa
M.Sc (C) KFUPM

Civil Engineers

SYED SAMIUDDIN AHMED
Civil Engineer
Saudi Consulting Services (Saudconsult)
P.O. Box 1293, Dammam 31431
Tel. (03) 895-5004 x 242 (Off)
Fax. (03) 895-1722
Mob. 050-891-2986
Email: ahmeds@arrazi.sabic.com
B.E (C) NED 79

SYED WASI IMAM
Sr. Project Engineer (Civil)
Saudi Consulting Services (Saudconsult)
P.O. Box 1293, Dammam 31431
Tel. (03) 895-5004 x 239 (Off)
(03) 897-4519 (Res)
Fax. (03) 895-1722
Mob. 050-191-5329
Email: imam_wasi@hotmail.com
B.E (C) NED 77

SYED ZAHIR-UL-HUSNAIN SHAH
Business Development Manager
Al Osais
P.O. Box 13376, Dammam 31493
Tel. (03) 820-4309 (Off)
(03) 893-1821 (Res)
Fax. (03) 820-3407
Mob. 050-586-9227
B.E (CE), OBU. 92, MBA CUL. 94

TARIQ AZIZ BHUTTA
Sales Manager
SIKA GULF BSC
P.O. Box 365, Jubail 31951
Tel. (03) 847-3556 (Off)
(03) 867-4793 (Res)
Fax. (03) 847-1763
Mob. 050-593-4655
Email: engr_tariq@hotmail.com
B.Sc. (CE) UETL 93

WASIM NOOR MALIK
Project Manager
El-Seif Engineering Contracting
P.O. Box 2774, Riyadh 11461
Tel. (01) 454-9191 x 309 (Off)
(01) 493-0438 (Res)
Fax. (01) 454-9191 x 356
Mob. 050-429-6470
Email: wasimnoormalik@hotmail.com
B.Sc (CE) UETL 78, MBA (Const.) UR UK,
MIE, No. M3726

ZAINULABDIN PATHAN
Senior Civil Engineer
Saudi Electric Company
P.O. Box 63221, Riyadh 11516
Tel. (01) 403-2222 x 29758 (Off)
(01) 406-5905 (Res)
Fax. (01) 245-0745
Mob. 050-440-7678
Email: pathanzain@hotmail.com
B.E (C) NED 71
MIE, No. M5449

IMPORTANT GOVERNMENT WEBSITES

DEPARTMENT	WEBSITE	DEPARTMENT	WEBSITE
Board of Investment	http://www.pakboi.gov.pk	National Reconstruction Bureau	http://www.nrb.gov.pk
Central Board of Revenue	http://www.cbr.gov.pk	National Savings Organization	http://www.savings.gov.pk
Civil Aviation Authority	http://www.caapakistan.com	National Tariff Commission	http://www.ntc.gov.pk
Export Promotion Bureau	http://www.epb.gov.pk	Overseas Employment Corporation	http://www.oec.gov.pk
Federal Board of Inter/Sec Education	http://www.fbise.edu.pk	Overseas Pakistan Foundation	http://www.opf.gov.pk
Federal Bureau of Statistics	http://www.fbs.gov.pk	Pakistan Housing Authority	http://www.pha.gov.pk
Geological Survey of Pakistan	http://www.gsp.gov.pk	Pakistan International Airline	http://www.piac.com.pk
Government Forms	http://www.forms.gov.pk	Pakistan Medical Research Council	http://www.pmrc.gov.pk
Government of Pakistan Info	http://www.pak.gov.pk	Pakistan Meteorological Department	http://www.met.gov.pk
Government of Pakistan Portal	http://www.pakistan.gov.pk	Pakistan Post	http://www.pakpost.gov.pk
Government of Punjab	http://www.punjab.gov.pk	Pakistan Railways	http://www.pakrail.com
Government of Sindh	http://www.sindh.gov.pk	Pakistan Science Foundation	http://www.psf.gov.pk
Higher Education Commission	http://www.hec.gov.pk	Pakistan Software Export Board	http://www.pseb.gov.pk
Karachi City Government	http://www.karachicity.gov.pk	Pakistan Sports Board	http://www.sports.gov.pk
Lahore City Government	http://www.lahore.gov.pk	Pakistan Telecom Authority	http://www.pta.gov.pk
Ministry of Finance	http://www.finance.gov.pk	Pakistan Telecom Company Limited	http://www.ptcl.com.pk
Ministry of Foreign Affairs	http://www.forisb.org	Pakistan Television	http://www.ptv.gov.pk
Ministry of Interior	http://www.interior.gov.pk	Pakistan Tourism Develop. Corp.	http://www.tourism.gov.pk
Ministry of Labor/Overseas Pakistanis	http://www.labour.gov.pk	Private Power & Infrastructure Board	http://www.ppib.gov.pk
Ministry of Privatization	http://www.privatisation.gov.pk	Privatization Commission	http://www.privatisation.gov.pk
Ministry of Religious Affairs	http://www.mra.gov.pk	Radio Pakistan	http://www.radio.gov.pk
Ministry of Science and Technology	http://most.gov.pk	Securities & Exchange Commission	http://www.secp.gov.pk
National Accountability Bureau	http://www.nab.gov.pk	Small/Medium Enterprise D Authority	http://www.smeda.org.pk
National Assembly of Pakistan	http://www.na.gov.pk	State Bank of Pakistan	http://www.sbp.org.pk
National Database & Reg. Authority	http://www.nadra.gov.pk	State Engineering Corporation	http://www.sec.gov.pk
National Library of Pakistan	http://www.nlp.gov.pk	Water & Power Develop. Authority	http://www.pakwapda.com

Computer Engineers

KHALIL AHMED
System Software Engineer
Royal Saudi Naval Forces
P.O. Box 61721, Riyadh 11575
Tel. (01) 499-6666 x 2907 (Off)
(01) 235-5873 (Res)
Fax. (01) 235-5873
Mob. 050-712-0047
Email: khalil999@gmail.com
B.E (Ecs) DCET 80, M.S (Comp E) USC 84
FIE, No. F1772/SA8

KHURRAM SHAHID QURESHI
Sales Engineer
Apral International Group
P.O. Box 27045, Riyadh 11417
Tel. (01) 478-1212 x 227 (Off)
Fax. (01) 477-8333
Mob. 050-429-9984
Email: ksq_2000@yahoo.com
B.Sc (Comp E) AUM 96

MOHAMMAD HASEEB NAZ
Computer Engineer
LM Ericsson
P.O. Box 6121, Riyadh 11442
Tel. (01) 230-3111 x 2003 (Off)
(01) 442-1306 (Res)
Fax. (01) 227-9453
Mob. 050-421-3462
Email: naz_haseeb@hotmail.com
B.S (Comp E) EMU Cyprus 2000

MOHAMMED AHSAN KHAN
Product Manager
Mishaal Al Sudairy Office
P.O. Box 87881 Riyadh 11652
Tel. (01) 462-5766 (Off)
Fax. (01) 461-1556
Mob. 050-018-5509
Email: ahsan@mso.com.sa
B.S. (CS) SSUET 06

MOHAMMED ANEEQ KASHAN
Network Engineer
SIEMENS Ltd.
P.O. Box 27503, Riyadh 11427
Tel. (01) 206-0000 x 3277 (Off)
(01) 472-9628 (Res)
Fax. (01) 477-5979
Mob. 050-944-7695
Email: aneeq.kashan.ext@siemens.com
B.S. (CS) SSUET 06

QAMAR UL ISLAM
System Analyst
International Systems Engineering
P.O. Box 54002, Riyadh 11514
Tel. (01) 478-3603 x 263 (Off)
(01) 465-8832 / 461-2990 (Res)
Fax. (01) 476-3099
Mob. 050-310-2418
Email: qamar@ise-ltd.com
B.Sc(EE) UETL 80, M.E. Rensselaer Poly Inst

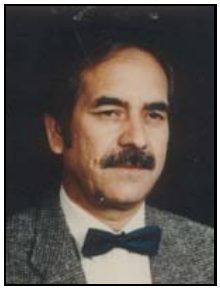
SYED IQBAL ALAM
Systems Analyst
Arabic Computer Systems Ltd.
Rashid Building, P.O. Box 2645, Riyadh 11461
Tel. (01) 476-3777 x 367 (Off)
Fax. (01) 476-3196
B.E (Comp) NED 93

SYED SALMAN SHAFIQ
Internet Product Manager
Saudi Telecomm. Company
P.O. Box 84681, Riyadh 11681
Tel. (01) 452-6275 (Off)
(01) 454-1282 (Res)
Email: sshafiq2000@hotmail.com
MBA IBA 79, M.S (Comp E) USC 84

ZAHOOR ALI KHAN
Lecturer
College of Applied Medical Sciences, KSU
P.O. Box 13128, Riyadh 11493
Tel. (01) 435-5010 x 731 (Off)
(01) 412-8497 (Res)
Fax. (01) 435-5883
Mob. 050-795-9057
Email: zali@ksu.edu.sa
MS (Comp E) UET Taxila 06, MS (Elect.)

Electrical Engineers

ABDUL GHAFOOR
Superintendent, Electrical
Saud Consult
Tel. (01) 578-0337 (Off)
(01) 472-7031 (Res)
Fax. (01) 578-0677
Mob. 050-246-2302
Email: abdulghafoor01@hotmail.com
B.Sc (EE) CET 83
MIE



ABDUL GHAFOOR KHAN
Chief Electrical Engineer
Rashid Engineering
P.O. Box 4354, Riyadh 11491
Tel. (01) 464-1188 (Off)
Fax. (01) 465-6245
B.E (PESH), B.Sc Hons. M.Sc UK, SMIEEE

ABDUL HAFEEZ ANJUM
Senior Design Engineer
Saudi Electric Company (EOA)
P.O. Box 85, Jubail 31951
Tel. (03) 362-1824 x 76580 (Off)
(03) 362-5043 (Res)
Fax. (03) 362-1824 x 76505
Mob. 050-201-0209
Email: abdulhafeezanjum@hotmail.com
B.Sc (EE) UETL 1990

ABDUL HAFEEZ MUGHAL
Electrical Engineer
Min. of Defence & Aviation (Air)
P.O. Box 16431, Riyadh 11464
Tel. (01) 476-7407 x 2257 (Off)
(01) 291-2420 (Res)
Fax. (01) 479-0990
B.E (E) MUET 83

ABDUL HANNAN
Estimation Engineer
Adwan Marketing Co. Ltd.
P.O. Box 64273, Riyadh 11536
Tel. (01) 495-5332 x 124 (Off)
Fax. (01) 495-1929
B.Sc (EE) AUM 94

ABDUL JALAL
Technical Manager
Saudi Services for E/M Works Co. Ltd.
P.O. Box 6341, Riyadh 11442
Tel. (01) 402-6809 (Off)
(01) 465-3089 (Res)
Fax. (01) 402-8213
Mob. 050-441-1932
Email: jalal_roshan@hotmail.com
B.Sc (EE) UOP 73

ABDUL MAJEED KALAIR
Electrical Engineer
Saudi Consulting Services (Saudconsult)
P.O. Box 1293, Dammam 31431
Tel. (03) 895-5004 x 1610 (Off)
(03) 897-4620 (Res)
Fax. (03) 895-1722
B.Sc (EE) UETL 71

ABDUL MAJID KHAN
Director Strategic Development
Yasir Al-Muqabqab Trading Corp.
P.O. Box 79326, Khobar 31952
Tel. (03) 864-9612 (Off)
Fax. (03) 864-9612
Mob. 050-789-4538
Email: amk@zajil.net
B.Sc (EE) UETL 76

ABDUL QAYYUM
Sr. Electrical Engineer
Ansaldo
P.O. Box 4430, Riyadh 11491
Tel. (01) 462-2011 / 465-6613 (Off)
(01) 458-0945 (Res)
Fax. (01) 465-9786
Mob. 050-343-6725
Email: ansaldo@nesma.net.sa
B.Sc (EE) UETL 70

ABDUL QAYYUM QURESHI
Project Manager
ABB Contracting Co. Ltd.
P.O. Box 10101, Dammam 31433
Tel. (03) 889-8748 (Off)
Fax. (03) 843-3696
B.Sc (EE) EUP 76

ABDUL RAHMAN LALDIN
Consultant
Saudi Electricity Company
SEC HQ Faisliah Tower
Tel. (01) 461-9274 (Off)
(01) 401-5367 (Res)
Fax. (01) 461-9365
Mob. 050-818-2476
Email: arlaldin@hotmail.com
B.Sc (EE) EPUET 70, M.S (EE) KFUPM 83,

ABDUL RAUF
Manager Electrical Dept.
Jabria Est.
P.O. Box 6128, Riyadh 11442
Tel. (01) 478-5448 (Off)
(01) 476-6246 (Res)
Fax. (01) 478-9331
Mob. 050-545-3591
AMIE UK 81

Electrical Engineers

ABDUL SATTAR
Sr. Engineer (Transmission)
Lucent Technology
P.O. Box 4945, Riyadh 11412
Tel. (01) 239-7320 (Off)
(01) 406-9475 (Res)
AMIE IEP 72
MIE, No. M5284

ABDUL WAHEED MIR
Engineering Specialist
Saudi Electric Company (CRB)
P.O. Box 60528, Riyadh 11555
Tel. (01) 403-2222 x 14546 (Off)
(01) 460-5633 (Res)
Mob. 050-286-2318
Email: akmir@se.com.sa
B.E (EE) SU 74, M.Sc UOB

AHMAD NADEEM KHAWAJA
Area Sales Manager
Saudi Transformers Co.
P.O. Box 5785 Dammam 31432
Tel. (03) 847-3020 (Off)
(03) 897-6584 (Res)
Fax. (03) 847-3303
Mob. 050-587-2014
B.E (EE) NED 91, MBA IBA 97

AHMAD SOHAIL SIDDIQUI
Electrical/Telecom Engineer
Saudi Telecomm. Company (STC)
P.O. Box 69422, Riyadh 11547
Tel. (01) 452-8896 (Off)
(01) 405-0144 (Res)
Fax. (01) 405-0144
Email: basilasq.iep@zajil.net
B.E (E) NED 70
FIE, No. F1699/48K

AHMAD ZAHEER TAHIR
Projects Manager
ABB Electrical Materials Center Co.
P.O. Box 2873, Al-Khobar 31952
Tel. (03) 882-4603 x 204 (Off)
(03) 882-1416 (Res)
Fax. (03) 882-4603
Mob. 053-063-6624
Email: ahmad.tahir@sa.abb.com
B.Sc. (EE) UET Mirpur 93

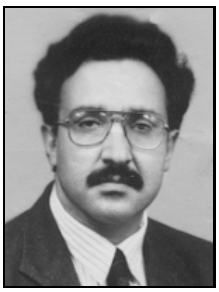
AHMED FARRAKH MANZOOR
Sales Manager
Siemens Ltd
P.O. Box - 719, AL-Khobar - 31952
Tel. (03) 882-6506 Ext. 4245 (Off)
(03) 865-4085 (Res)
Fax. (03) 887-0165
Mob. 050-459-0157
Email: farrakh@hotmail.com
B.Sc. (EE) NUST 00

AJAZ AHMAD QUDDUSI
Strategic Account Manager
ABB Saudi Arabia
P.O. Box 2873, Al-Khobar
Tel. (03) 882-9394 x 322 (Off)
Mob. 055-330-0257
Email: ajaz.quddusi@bh.abb.com
B.Sc. (EE) UETL 82

AKHTAR HAYAT
Manager Materials & Logistics
SESCO
P.O. Box 3298, Al-Khobar 31952
Tel. (03) 882-9546 x 222 (Off)
(03) 887-4819 (Res)
Fax. (03) 882-9547
Mob. 050-681-8741
Email: akhtar.hayat@sesco-ge.com
B.Sc. (EE) UETL 74

AKIF ALI
Manager - QC Section
Mitsubishi Electric Saudi Limited
P.O. Box 2391, Riyadh 11451
Tel. (01) 477-7947 Ext 181 (Off)
Fax. (01) 477-7950
Mob. 050-665-6548
Email: aakif@melsa.com.sa
B.Sc. (EE) UETL 92

ALI AKBAR
Field Engineer
Al Sharif KEC
P.O. Box 549, Al-Riyadh 11391
Tel. (01) 465-6150 (Off)
(01) 293-5661 (Res)
Fax. (01) 462-5080
B.E (EE) MUET 90



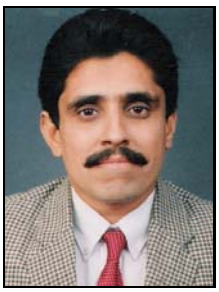
ALTAF HUSSAIN KHAN
Senior Electrical Engineer
Saudi Consulting Services
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 x 206 (Off)
(01) 447-3169 (Res)
Fax. (01) 464-7540
Mob. 050-889-8385
Email: scc@saudconsult.com
B.Sc (EE) UOP 72
MIE

AMJAD RASHEED
Design / Tender Engineer
Al Fanar Co.
P.O. Box 301, Riyadh 11411
Tel. (01) 275-5999 x 815 (Off)
(01) 291-2817 (Res)
Fax. (01) 2752839
Mob. 056-513-0425
Email: amjad_rashid@gmail.com
B.Sc (EE) UETL 81

Electrical Engineers

ANWAR NAZAR ALI JIWANI
Sr. Electrical Engineer
Abdullah Abal Khail Consulting Engrs.
P.O. Box 4074, Riyadh 11491
Tel. (01) 465-2260 / 463-3417 (Off)
(01) 465-9136 (Res)
Fax. (01) 465-2260
Mob. 050-889-0637
B.E (E) NED 77

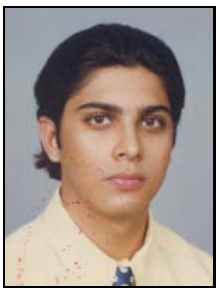
ARSHAD ALI
Protection Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1328 (Off)
(07) 227-4473 (Res)
Mob. 050-867-8286
Email: arshadali67@hotmail.com
B.Sc. (EE) UETL 78



ASADULLAH ABDUL GHANI
Senior Design Engineer
ABB Contracting Co. Ltd.
P.O. Box. 91926, Riyadh 11643
Tel. (01) 265-3030 x 1423 (Off)
(01) 217-5795 (Res)
Fax. (01) 265-1211
Mob. 050-689-0256
Email: asad.khokhar@sa.abb.com
B.Sc. (EE) UETL 85

ASIF RASUL
Lecturer
King Saud University
P.O. Box 10219, Riyadh 11433
Tel. (01) 435-5125 x 1868 (Off)
B.Sc (EE) WPUETL 72, M.Sc GWU 81
MIE

ASRARUL HAQ SHEIKH
Chair Professor
KFUPM
KFUPM Box 167, Dammam
Tel. (03) 860-1182 (Off)
(03) 860-5171 (Res)
Fax. (03) 860-1183
Mob. 050-222-2514
Email: sheikh.asrar@gmail.com
B.Sc (EE) UETL 64, M.Sc UOBE 66, Ph.D



AZHAR I. KHAN
Project Engineer
Arabia Electric / Siemens
P.O. Box 4621 Power Eng. Dept., Jeddah
Tel. (02) 665-8420 (Off)
(02) 672-9018 (Res)
B.Sc PSU 95

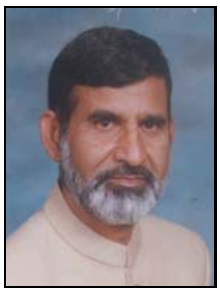
AQIL NASIR MIRZA
Control Systems Engineer
PETROKEMYA
P.O. Box 10002, Jubail 31961
Tel. (03) 357-7603 (Off)
(03) 361-0664 x 12 (Res)
Fax. (03) 358-2056
Email: mirzaan@petrokemya.sabic.com
B.Sc (EE) HP 83

ASAD NAVEED
Electronic Engg.
KFUPM
P.O. Box 591, Dhahran 31261
Tel. (03) 860-4069 (Off)
B.Sc.(EE) UETL 91, M.Sc (EE) UPM 94
MIE

ASIF MAJEED
Lead Engineer, I&C, PP-9
NESPAK
P.O. Box 2341, Riyadh 11451
Tel. (01) 403-2222 x 29310 (Off)
(01) 486-0523 (Res)
Fax. (01) 403-2222 x 29357
Mob. 050-420-4164
Email: asifmajeed58@hotmail.com
B.Sc (EE) UETL 80

ASRAR HUSSAIN
Managing Engineer
SIEMENS Ltd.
P.O. Box 9510, Riyadh
Tel. (01) 206-0000 x 3681 (Off)
Fax. (01) 472-5930
Mob. 050-460-4921
Email: asrar.hussain@siemens.com
B.Sc. (EE) UETL 76

ATHER JAMIL DAR
Planning Engineer
Saudi Telecomm. Company (STC)
Rm 208, STC HQ, P.O. Box 87912, Riyadh
Tel. (01) 452-8847 (Off)
Fax. (01) 452-6623
Email: ather62@hotmail.com
B.Sc (EE) UETL 87, M.Sc (EE) UETL 98



AZIMUDDIN QURESHI
Senior Electrical Engineer
Saudi Biad Co. Ltd.
P.O. Box 6121, Jeddah 21442
Tel. (02) 653-1765 x 233 (Off)
(02) 673-2631 (Res)
Fax. (02) 653-4548
Mob. 050-661-7057
Email: auq_sa@hotmail.com
B.E (E) NED 75

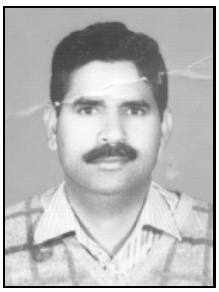
Electrical Engineers

BASHARAT AHMED QURESHI
Projects Manager
Al-Najdain Est. for Contracting
P.O. Box 286, Riyadh 11411
Tel. (01) 476-2841 x 208 (Off)
(01) 291-9480 (Res)
Fax. (01) 476-1355
Mob. 050-578-3408
Email: bashqureshi@hotmail.com
B.Sc. (EE) UETAJK 88

BASHIR AHMAD MALIK
Data Network Expert
Saudi Telecomm. Company
Tel. (01) 452-1764 (Off)
(01) 275-4039 (Res)
Fax. (01) 452-5079
Mob. 050-637-9612
Email: bmalik@stc.com.sa
B.Sc.(EE) UETL 75

BAZURJ MEHR KHAN
Electrical Engineer
Min. of Finance & National Economy
Nasseriah P. Station, P.O. Box 5789, Riyadh
Tel. (01) 442-2000 x 360 (Off)
(01) 441-9003 (Res)
Mob. 050-955-3437
Email: bazurjkhan@hotmail.com
B.Sc (EE) UETL 71
MIE, No. M1439

BILAL AKHTAR
Sales Engineer
Saudi Electric Supply Company (SESCO)
P.O. Box 3298, Al-khobar 31952
Tel. (03) 882-5669 x 244 (Off)
(03) 898-2187 (Res)
Fax. (03) 882-5768
Mob. 055-517-6945
Email: bilallakhtar@hotmail.com
B.Sc (EE) UETL 02



CHAUDHARY M. SHARIF RIFAT
Unit Engineer
Saudi Electric Company
P.O. Box 57, Riyadh 11411
Tel. (01) 464-3333 x 14354 (Off)
(01) 405-7142 (Res)
B.Sc (EE) UETL 71

CHAUDHARY MOHAMMAD ASHRAF
Projects Manager
A. Abunayyan Trading Corp.
P.O. Box 321, Riyadh 11411
Tel. (01) 477-9111 x 155 (Off)
(01) 457-6630 (Res)
Fax. (01) 476-7718
B.Sc (EE) UETL 88

CHAUDHARY SARFARAZ AHMED BAJWA
Senior Engineer
CNT Technology Computer Network
KFUPM Box 781, Dammam
Tel. (03) 860-2134 (Off)
(03) 899-7663 (Res)
Email: sarfaraz_ahmed@cnt.com
B.E (E) UOM 97

DIWAN Y. DAWOOD
Supervision Electrical Eng
Petrocon Arabia Ltd. (Ras Tannra ARAMCO)
P.O. Box 31699, Al-Khobar 31952
Tel. (03) 673-2833 (Off)
(03) 858-1077 x 269 (Res)
Fax. (03) 894-8700 x 192
Email: dawooddiwan@hotmail.com
B.E (E) NED 68, M.S (EE) IET 70

DR. AZIZ UR-REHMAN MALIK
Protection Engineer
Saudi Electric Company (SEC-COA)
P.O. Box 57, Riyadh 11411
Tel. (01) 403-22222 x 23543 (Off)
(01) 478-2732 (Res)
Fax. (01) 406-7351
Mob. 050-899-5221
Email: azizmalik750@yahoo.com
B.Sc. (EE) UETL 86, M.S.& Ph.D. (ECE) UMF

EHSANUL HAQUE
Electrical Engineer
Saud Consult (NESMA)
P.O. Box 50344, Riyadh 11523
Tel. (01) 465-9975 x 292 (Off)
(01) 403-1995 (Res)
Mob. 050-284-4597
Email: ehsank_sa@hotmail.com
B.E (E) NED 74
MIE, No. LM1779

EHSAN-UL-HAQUE
Electrical Engineer
NESPAK
P.O. Box 50344, Riyadh 11523
Tel. (01) 246-2776 x 36 (Off)
(01) 403-1995 (Res)
B.Sc (EE) UETL 81

ENAYATULLAH KHAN SHERWANI
Chief Engineer
Min. of Finance & National Economy
Nasseriah P. Station, P.O. Box 5789, Riyadh
Tel. (01) 442-2000 x 312 (Off)
(01) 441-5939 (Res)
Fax. (01) 441-7008
Mob. 050-716-7130
Email: enayat_sherwani@hotmail.com
B.E (E) NED 73
MIE, No. LM5372

Electrical Engineers

FAHAD KARIM KHAN
Sales Engineer
Al-Quraishi Electrical Services of Saudi Arabia
P.O. Box 7386, Dammam 31462
Tel. (03) 857-2537 (Off)
(03) 867-0677 (Res)
Fax. (03) 857-2541
Mob. 050-685-6246
Email: fahadkarim@aqesa.com
B.E. NED 02

FAISAL JAN MOHAMMAD
Manager Eastern Region
SESCO
P.O. Box 3298, Al-Khobar 31952
Tel. (03) 882-5669 x 262 (Off)
(03) 881-2151 (Res)
Fax. (03) 882-5768
Mob. 050-685-7998
Email: faisal.jan@sesco-ge.com
B.Sc. (EE) NED 90, MBA IBA 96

FAREED AHMED MEMON
Telecom Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1493 (Off)
(07) 227-1111 Ext 2827 (Res)
Fax. (07) 227-1695
Mob. 050-855-0768
Email: fahaji@se.com.sa
B.E. (E) NED 90

FAROOQ AHMED KHANANI
Branch Manager
Saudi Electric Company
P.O. Box 7557, Riyadh 11472
Tel. (01) 498-3844 (Off)
(01) 461-0558 (Res)
Fax. (01) 498-5180
Mob. 050-548-6706
B.Sc (EE) NED 82

FATEH KHAN
Section Engineer
Saudi Electric Company
P.O. Box 57, Riyadh 11411
Tel. (01) 241-2228 x 4126 (Off)
(01) 476-3896 (Res)
Fax. (01) 241-1674
Email: fatehkhan692@hotmail.com
B.Sc (EE) UETL 74

FAZLE RAFEY
Design SCADA Engineer
ABB Automation CO.
P.O. Box 330109, Riyadh 11373
Tel. (01) 265-3030 x 1658 (Off)
Mob. 050-384-9187
Email: fazle.rafey@sa.abb.com
B.Sc. (EE) USA 96

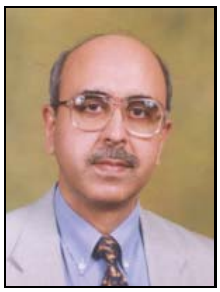
GHAZANFAR ALI IQBAL
Division Manager
Saudi Electricity Company
P.O. Box 220982 Riyadh 11311
Tel. (01) 408-7805 (Off)
Fax. (01) 408-7811
Email: gaiqbal@yahoo.com
B.Sc (EE) UETL. 79

GHUFRAN AHMED
Sales Engineer
Saudi Electric Supply Company (SESCO)
P.O. Box 3298, AL-Khobar 31952
Tel. (03) 882-5669 x 240 (Off)
Fax. (03) 882-5768
Mob. 050-686-7589
B.E. NED 93

GHULAM ABBAS
Chief Engineer, T.S Dept.
Saudi Electric Company (COA)
Protection Engineering Division, P.O. Box 57,
Tel. (01) 405-5143 (Off)
(01) 403-5898 (Res)
Email: gabbas@sceco.com
M.Sc (EE) WSU 80, B.Sc (EE) NWFPUET 74

GHULAM RASUL MERCHANT
Project Manager
Zamel & Turbag Consulting Engineers
Jeddah
Tel. (02) 271-8581 (Off)
Fax. (02) 271-8581
Mob. 055-468-2212
Email: grasulm@hotmail.com
B.E. (EE) SUEngg Jamshoru 68

HAMID ALI
Electrical Engineer
Saudi Electric Company (ERB)
P.O. Box 30, Hofuf 31582
Tel. (03) 586-8600 x 2627 (Off)
Fax. (03) 582-0826
B.Sc (EE) UETL 86
MIE, No. M360



HAMID MOHSIN
Medical & Sci. Div. Manager
Abdul Rehman AlGosaibi Gtb
P.O. Box 215, Riyadh 11411
Tel. (01) 479-3000 (Off)
(01) 464-3843 (Res)
Fax. (01) 477-1374
Mob. 050-527-8024
Email: hmohsin@zajil.net
B.Sc (EE) UETL 71

Electrical Engineers

HAMIDUR RAHMAN ADNAN
Marketing Manager
Danger Management System
Energy House, P.O. Box 92102, Riyadh 11653
Tel. (01) 478-0320 (Off)
Fax. (01) 473-1604
Mob. 050-284-4651
Email: hr_adnan@hotmail.com
B.E (E) NED 97

HAROON RASHID RAJA
Industrial Sales Engineer
Schneider Electric
P.O. Box 118132, Jeddah 21312
Tel. (02) 697-7723 (Off)
(02) 617-2965 (Res)
Fax. (02) 697-3308
Mob. 055-655-7473
Email: haroon35@hotmail.com
B.Sc.(EE) CSN US 06

HASSAN SIDDIQUI
Marketing Activity Manager
Schneider Electric
Riyadh
Tel. (01) 291-2877 x 243 (Off)
(01) 419-0173 (Res)
Fax. (01) 473-4013
Mob. 050-446-9142
Email: siddiqui.hassan@sa.schneider-
B.E (E) NED 92, MBA IBA 97

HUMAYUN AKHTAR
Management Information System
Saudi Telecom Company (STC)
P.O. Box 59726, Riyadh 11535
Tel. (01) 443-1570 (Off)
(01) 463-3745 (Res)
Fax. (01) 443-1279
Mob. 050-005-5342
Email: hakhtar@stc.com.sa
B.Sc (EE) UETL 79, PMP

HUSAIN AHMED
Engineer
Saudi Electric Company
P.O. Box 5190, Dammam 31422
Tel. (03) 341-2444 x 77592 (Off)
(03) 363-2984 (Res)
Fax. (03) 341-2444 x 77518
Mob. 050-496-0557
Email: husain_ahmed8@yahoo.com
B.E (E) NED 73
MIE, No. M/4668

IFTIKHAR AHMED CHEEMA
Manager Projects
Newland Est.
P.O. Box 21626, Riyadh
Tel. (01) 404-0910 (Off)
Fax. (01) 405-4332
Mob. 050-410-0496
B.Sc (EE) CUC 81

IJAZ HUSSAIN
Electrical Engineer
Al-Awad
P.O. Box 87681, Riyadh 11652
Tel. (01) 472-4473 (Off)
Fax. (01) 283-0704
Mob. 050-349-8141
Email: ijaz92uet@hotmail.com
B.Sc (EE) UETL 92

IMRAN IDREES MEMON
Tendering Engineering (SCADA)
ABB Automation
P.O. Box 414, riyadh 11383
Tel. (01) 265-3030 x 1592 (Off)
(01) 291-9514 (Res)
Fax. (01) 265-1211
Mob. 050-197-0623
Email: iimemon@hotmail.com
B.Sc.(EE) EMU 01

INAM KHAN
Managing Director
SAUDIK
P.O. Box 6609, Dammam 31452
Tel. (03) 842-2442 (Off)
(03) 864-4970 (Res)
Fax. (03) 841-7734
Mob. 050-481-3609
Email: mail@saudik.com
B.Sc (EE) UETL 64

INAYAT ULLAH MEMON
Electrical Engineer
Saudi Consulting Services, Saudconsult
P.O. Box 470, Rahima 31941
Tel. (03) 678-8288 x 1071 (Off)
Fax. (03) 678-8103
B.E (EE) MUET 88

IQBAL AHMED
Sr. Engineer SCADA & Telcom
VA TECH Schneider, T&D Ltd. Co.
P.O. Box. 91357, Riyadh 11633
Tel. (01) 478-2027 x 35 (Off)
(01) 412-3979 (Res)
Fax. (01) 473-1217
Mob. 050-749-2628
Email: iqbalahmed@engineer.com
B.Sc.(EE) UETL 98

IQBAL ISMAIL KHURRAM
Business Manager
Lucent Technolog
P.O. Box 4945, Riyadh
Tel. (01) 239-7497 (Off)
Fax. (01) 239-7514
Mob. 050-529-1879
Email: kismail@lucent.com
B.Sc (EE) UETL 91

Electrical Engineers

ISLAM AHMAD ASIF
General manager
Arabian Electrical Transmission Line Co.
P.O. Box 172, Dammam 31411
Tel. (03) 889-1609 x 12 (Off)
(03) 882-5725 (Res)
Fax. (03) 889-1640
Mob. 050-586-8876
Email: aetcon@aetcon.com
B.Sc (EE) AMU 64

ISRAR UL HAQ
Maintenance Engineer
Riyadh Water Works
P.O. Box 12622, Riyadh 11483
Tel. (01) 246-6500 x 235 (Off)
Fax. (01) 246-5488
B.Sc (EE) UOP 73

JALEEL HASAN
Chief Executive Officer
Int. Telecomm. Systems Operations
P.O. BOX 250472, RIYADH 11391
Tel. (01) 225-0428 (Off)
(01) 269-4235 (Res)
Fax. (01) 217-9022
Mob. 050-448-7027
Email: jaleel@canada.com
B.E (E) SGW 70, M.Phil UOB 72
MIE

JAMSHED AHMED
Project Manager
Al-Fanar Const. Co.
P.O. box - 13103, Dammam - 31493
Tel. (03) 835-3234 x 600 (Off)
(03) 867-8158 (Res)
Fax. (03) 835-1406
Mob. 056-772-5584
Email: jamshed@alfanardm.com
B.Sc. (EE) UETL 78

JAVAID HAMEED
Dispatch Engineer
Saudi Electric Company (ERB)
SOD/PDD, P.O. Box 5190, Dammam 31422
Tel. (03) 858-6350 (Off)
(03) 899-2215 (Res)
Fax. (03) 858-6889
Mob. 050-687-5306
Email: javaids2000@hotmail.com
B.Sc (EE) UETL 81
MIE, No. M8523/L660

JAVED SAFDAR
Performance Engineer
Saudi Electric Company (ERB)
Rm. 2-21-W SCECO HQ, P.O. Box 5190,
Tel. (03) 858-6747 (Off)
(03) 899-2603 (Res)
Fax. (03) 858-5465
Mob. 056-765-5920
Email: javedsc@hotmail.com
B.Sc (EE) UETL 78

JAVED SHAMIM
Technical Advisor
Saudi Telecomm. Company (STC)
P.O. Box 86004, Riyadh 11622
Tel. (01) 452-7928 (Off)
(01) 248-0378 (Res)
Fax. (01) 454-4807
Mob. 050-575-0615
Email: jshamim@stc.com.sa
B.S (EE) NU 76

JAWAID INAM
General Manager
Al-Guhaidan Est.
P.O. Box 242, Dhahran 31932
Tel. (03) 864-8371 (Off)
(03) 895-4373 (Res)
Fax. (03) 864-6907
Mob. 050-584-1275
Email: jawaidinam@hotmail.com
B.E (E) NED 74
MIE, No. LM4966

JUNAID AHMAD HASHMI
EDP Manager
National Gas & Industrialization
P.O. Box 564, Riyadh 11421
Tel. (01) 401-4806 (Off)
(01) 461-3221 (Res)
Fax. (01) 401-4088
B.Sc (EE) Madras 67, M.E UOL 69

KARAMAT ULLAH
Project Manager
Saudi Services For E&M Works Ltd
P.O. Box 12276, Jeddah 21473
Tel. (02) 608-5833 (Off)
(02) 681-6323 (Res)
Fax. (02) 608-5911
Mob. 050-548-2257
Email: karamat107@hotmail.com
B.E (E) NED 74
MIE

KAUSER MAHMOOD BUTT
Consultant Engineer
Saudi Electric Company (CRB)
P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 23196 (Off)
(01) 461-5604 (Res)
Fax. (01) 406-7351
Mob. 050-916-8981
Email: kmbutt43@hotmail.com
B.Sc (EE) UETL 69
MIE, No. M9102

KHIZAR JUNAID USMANI
Group Quality Manager
ABB Saudi Arabia
P.O. Box 91926, Riyadh 11463
Tel. (01) 265-3030 x 1562 (Off)
(01) 482-8305 (Res)
Fax. (01) 265-2077
Mob. 050-442-5273
Email: khizar.usmani@sa.abb.com
B.Sc (EE) UP 73

Electrical Engineers

KUNWAR MUHAMMAD IDRIS
Project Manager
Faisal Hamid Al Sehli Est.
P.O. Box 50014, Jeddah 21533
Tel. (02) 672-9913 (Off)
(02) 670-1982 (Res)
Fax. (02) 671-2677
Mob. 055-655-0895
B.Sc (EE) UETL 72

LIAQAT ALI KHAN
Senior Engineer
Saudi Electric Company (ERB)
P.O. Box 1233, Hofuf, Al-Hassa 31982
Tel. (03) 586-8600 x 62739 (Off)
(03) 582-3091 (Res)
Fax. (03) 586-5124
Mob. 050-692-8112
Email: lakhan12@hotmail.com
B.Sc (EE) UETL 75
MIE, No. M9029/L1112

M. ASHRAF KHAN
Manager Training
Schneider Electric
P.O. Box 89249, Riyadh 11682
Tel. (01) 265-1515 x 626 (Off)
(01) 403-1544 (Res)
Email: ashraf99ca@yahoo.com
B.Sc (EE) UETL 76, M.A.Sc (EE) UW 98
MIE, No. M8513

M. IRSHAD A. USMANI
Senior Engineer Electrical
Al-Khodary Sons.
Al-Khobar 31952
Tel. (03) 843-1874 (Off)
Fax. (03) 843-1874
B.E (EE) NED 68
MIE

M. JAVED AKHTAR
Electrical Engineer
SaudConsult
P.O. Box 1293, Dammam 31431
Tel. (03) 845-0000 (Off)
Fax. (03) 845-1818
Email: muhammad-javedakhtar@hotmail.com
B.Sc (EE) UETL 89

M. JAVED IQBAL
Senior Technical Officer
Arabia Electrical T/Line Const. Co. (AETCON)
P.O. Box 172, Dammam 31411
Tel. (03) 889-1609 x 19 (Off)
(03) 867-1952 (Res)
Fax. (03) 889-1640
Mob. 050-183-7143
Email: javed_132@hotmail.com
B.Sc (EE) UETL 90
MIE, No. M11941/LHR3189

M. SHABBIR SHEKHANI
Business Administrator
Saudi Aramco
P.O. Box 11640, Dhahran 31311
Tel. (03) 882-9430 (Off)
(03) 878-0455 (Res)
Fax. (03) 882-9425
Mob. 050-498-5173
Email: mohammad.shekhani@aramco.com
B.E (E) NED 70

MAHMOOD SARWAR MALIK
Elec. Engr. (Projects-SEC COA)
Dar Al-Riyadh
P.O. Box Box 57, Riyadh
Tel. (01) 464-3333 x 14573 (Off)
Mob. 056-128-4628
Email: MSKMalik@se.com.sa
B.Sc. (EE) UETL 73
MIE, No. M429

MAHMOOD USMAN
Project Engineer
VATECI + T&D
P.O. Box 917, Alk-Khobar 31952
Mob. 056-286-0124
Email: mah_usman@yahoo.com
B.E(EE) NED 85, MSc. (EE) NED 00

MAQSOOD AHMED ZAFAR
Sr. Power Trans. Engr.
Saudi Electric Company (SEC)
P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 14875 (Off)
Fax. (01) 293-2536
Mob. 050-225-8306
B.Sc. (EE) UETL 74

MAQSOOD ALAM
Factory Manager
Middle East Electric Meter Factory
P.O. Box 61891, Riyadh 11575
Tel. (01) 265-0515 (Off)
(01) 473-4823 (Res)
Fax. (01) 265-0360
Email: memf99@hotmail.com
B.Sc (EE) UETL 87

MAQSOOD HUSSAIN TARIQ
Project Manager
Saudi Consulting Services (Saudconsult)
P.O. Box 7352, Jeddah 21462
Tel. (02) 667-0500 (Off)
(02) 676-0392 (Res)
Fax. (02) 665-3587
Email: maqsoodtariq@saudconsult.com
B.Sc (EE) UETL 70
MIE, No. M9414

Electrical Engineers

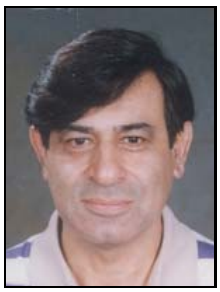
MASOOD HAMID
Chief Project Manager
National Power Construction Corporation
P.O. Box 31220, Jeddah 21497
Tel. (02) 697-2620 / 697-6958 (Off)
Fax. (02) 639-1128
Mob. 050-568-0706
Email: masoodhamid@yahoo.com
B.Sc (EE) UETL 74

MASOOR AHSAN SIDDIQUI
Communication Specialist
Saudi Arabian Airlines
P.O. Box 167, Jeddah 21231
Tel. (02) 686-4855 (Off)
(02) 682-0030 x 2190 (Res)
B.Sc (EE) WSC 70

MASROOR AKBAR RAMZI
Electrical Engineer
Saudi Electric Company (CRB)
Al-Marooj Area
Tel. (01) 403-2222 x 18593 (Off)
Fax. (01) 403-2222 x 18526
B.Sc (EE) UETL 90

MASUD KHAN
Project Engineer
Al-Fanar
P.O. Box 301, Riyadh 11411
Mob. 050-443-0642
B.Sc. (EE) NWFP UET 74
MIE, No. M-511

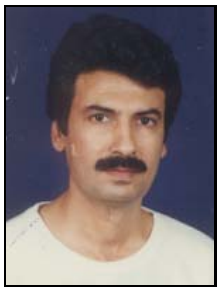
MASUD UL HASAN
Lecturer
KFUPM
KFUPM P.O. Box 947, Dhahran 31261
Tel. (03) 860-3880 (Off)
(03) 860-6163 (Res)
Fax. (03) 860-3059
Mob. 056-754-6594
Email: masud@kfupm.edu.sa
B.E (E) NED 88, MS KFUPM 93



MAZHAR NAWAZ KHAN
Senior Contract Engineer
Foster Wheeler Energy
Sharq Project
Tel. (03) 358-3072 x 113 (Off)
Mob. 055-612-4911
Email: mnkhakwani@yahoo.com
B.Sc (EE) EUP 72
MIE, No. M8502/L639

MAZHAR NOOR
Telecommunication Engineer
Siemens
P.O. Box 25703, Riyadh 11423
Tel. (01) 206-0000 x 3326 (Off)
Fax. (01) 283-2963
B.Sc (EE) UETL 85
MIE

MIAN MUHAMMAD ISRAIL
Transmission Engineer II
SRACO (SEC)
R# 2-306 W TSD/OED, SEC-EOA, HQS
Tel. (03) 857-8900 x 87068 (Off)
Mob. 053-282-1099
Email: 599705@se.com.sa
B.E. (E) NWFP UET 02, B.Tech (Honrs.)



MIR MAJID TAUSEEF
Sr. Engineer (Planning)
Saudi Electric Company
P.O. Box 57, Riyadh 11411
Tel. (01) 464-3333 x 14443 (Off)
(01) 484-0872 (Res)
Fax. (01) 463-3316
Mob. 050-982-8649
Email: mirmajidtauseef@hotmail.com
B.Sc (EE) UETL 75

MOBASHIR AHMED SHEIKH, DR
Technical Advisor
Al-Afandi Est.
P.O. Box 452, Jeddah 21411
Tel. (02) 663-4442 (Off)
(02) 256-6859x601 (Res)
Fax. (02) 665-7597
Mob. 050-461-3922
Email: mobashir1@saudionline.com.sa
B.E (E) NED 72, M.S (EE) USC 74, Ph.D

MOHAMMAD ABDUL HALIM BUKHARI
Electrical Engineer Power & Co
Abdulla Fouad Co. Ltd
P.O. Box 257, Dammam
Tel. (03) 832-4400 x 148 (Off)
(03) 830-0860 (Res)
Fax. (03) 834-5722
B.E (E) NED 70

MOHAMMAD ABDULLAH
Project Manager
Saudi Consulting Services
P.O. Box 1293, Dammam 31431
Tel. (03) 845-0000 x 150 (Off)
(03) 845-1818 (Res)
Fax. (03) 895-1722
Mob. 050-211-3076
Email: mabch_pk@yahoo.com
B.Sc (EE) UETL 87

Electrical Engineers

MOHAMMAD ABRAR SHAMI
SCADA & Communication Engr.
Saudi Electric Company (SEC-SOA)
P.O. Box. 616, Abha,
Tel. (07) 227-1111 x 1328 (Off)
(07) 221-8809 (Res)
Fax. (07) 227-1627
Mob. 050-164-0674
Email: smohammad)a@se.com.sa
B.Sc. (EE) UETL 90, M.Sc. (EE) UETL 94

MOHAMMAD ADNAN KHAN
Sales Engineer
S&A Abahsain Co. Ltd.
P.O. Box 38994, Dhahran 31942
Tel. (03) 859-5912 (Off)
Fax. (03) 857-1570
Mob. 056-847-558
Email: adnank@abahsain.net
B.E. (E) NED 01

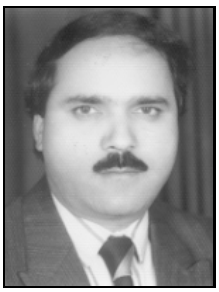
MOHAMMAD AFTAB ALAM KHAN
Power Plant Manager
Yamama Saudi Cement Co.
P.O. Box 293, Riyadh 11411
Tel. (01) 495-1300 x 322 (Off)
(01) 495-1300 x 344 (Res)
Fax. (01) 495-4132
Mob. 050-820-9316
Email: maak65@hotmail.com
B.Sc. (EE) NWFP UET 89

MOHAMMAD AFZAL
Transmission Engineer
Saudi Electric Company (ERB)
P.O. Box 5190, Dammam 31422
Tel. (03) 857-2300 x 84894 (Off)
Fax. (03) 858-5211
Mob. 055-132-9582
Email: H5MXE@se.com.sa
B.Sc (EE) UETL 67

MOHAMMAD AFZAL NADEEM
Electrical Engineer
Saudi Electricity Co.
P.O. Box 31759, Al-Khobar 31952
Tel. (03) 858-5909 (Off)
Mob. 050-290-9241
Email: mafzalnadeem@yahoo.com
B.S (EE) Kensington U, CA USA 03

MOHAMMAD AJMAL KHAN
Naval Engineer (R&D)
Royal Saudi Naval Forces
P.O. Box 61721, Riyadh 11575
Tel. (01) 477-6777 x 1553 (Off)
(01) 235-0574 (Res)
Fax. (01) 402-0549
Mob. 050-224-0186
Email: ajmal873@hotmail.com
B.Sc (Eng) London U UK 66

MOHAMMAD AKHTAR CHAUDHRY
Senior Transmission Engineer
Saudi Electric Company (EOA)
Technical Services Department, P. O. Box
Tel. (03) 858-6516 (Off)
Fax. (03) 858-6797
Mob. 050-668-3852
Email: machaudhry@se.com.sa
B.Sc (EE) UETL 84, M.E KFUPM 88



MOHAMMAD AKRAM
Project Manager
Jash Tech. Services
P.O. Box 51230 , Riyadh 11543
Tel. (01) 476-9777 x 42550 (Off)
(01) 473-1264 (Res)
Fax. (01) 476-9777 x 42551
Mob. 050-414-5827
AMIE Pak 76

MOHAMMAD AKRAM ARAIN
Project Manager
Saudi Arabian BECHTEL Co.
P.O. Box 10011, Jubail 31961
Tel. (03) 341-4276 (Off)
(03) 341-7317 (Res)
Fax. (03) 341-6401
Email: maarain@bechtel.com
M.S (E) Drexel U 76, B.E.(E) Staston U 73

MOHAMMAD AMIN
Project Advisor
Saudi Cement Company, Hofuf Plant
P.O. Box 2464, Dammam 31451
Tel. (03) 534-2774 x 105 (Off)
(03) 533-0592 (Res)
Fax. (03) 534-2625
Mob. 050-592-8132
Email: mamin@saudicement.com.sa
B.E (E&M) NED 61, PGC UK/AEI 68
MIE

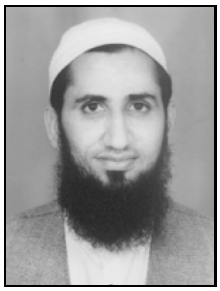
MOHAMMAD AMIN UDDIN AHMED
Product Manager (T&D)
EGS Electrical Group
P.O. Box 845, Dammam 31411
Tel. (03) 833-7110 (Off)
(03) 882-2859 (Res)
Fax. (03) 833-8242
Mob. 050-482-0796
Email: maminuddin@akte.com.sa
B.E (E) NED 91

MOHAMMAD ARSHED CHAUDHRY
Specialist, Power Trans. Engg.
Saudi Electric Company
P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 23397 (Off)
(01) 406-5191 (Res)
Fax. (01) 406-7351
Mob. 050-740-4989
Email: mchaudry@se.com.sa
B.Sc (EE) UETL 76
MIE, No. M803

Electrical Engineers

MOHAMMAD ASHFAQ
Asstt Vice President
MEMF Iradya Intl.
P.O. Box 61891, Riyadh 11575
Tel. (01) 265-0515 / 406-6669 (Off)
(01) 276-5266 (Res)
Fax. (01) 406-9691
Mob. 050-342-0391
B.Sc (EE) UETL 91

MOHAMMAD ASHRAF
Project Manager
Mitsubishi Elevators Saudi Arabia (MELSA)
P.O. Box 14166, Jeddah 21424
Tel. (02) 650-3507 (Off)
(02) 675-3976 (Res)
Mob. 050-440-0378
Email: ashraf@melsa.com.sa
B.Sc. (EE) UETL 92



MOHAMMAD ASHRAF RABBANI
Lab Engineer
King Saud University
P.O. Box 800, Riyadh 11421
Tel. (01) 467-6692 (Off)
Mob. 050-798-6648
Email: mrabbani@ksu.edu.sa
B.E (E) NED 83, M.E SIU 87

MOHAMMAD ASIF
Service Engineer
Al-Khazindar Co. For Medical Maintenance
P.O. Box 457, Riyadh 11411
Tel. (01) 403-6670 x 125 (Off)
(01) 447-2842 (Res)
Fax. (01) 403-8112
Mob. 050-553-2545
Email: muhammadasif_99@yahoo.com
B.Sc. (EE) NEU 03

MOHAMMAD ASIM SIDDIQUI
Telecom Engineer
MSI (Mobile Software International)
C/O Raja Mushtaq, P.O. Box 1467, Riyadh
Mob. 050-621-6637
Email: siddiquiyusuf@yahoo.com
M.Sc (Phy) QAU 95, MS (EE) USA 99

MOHAMMAD ASLAM
Project Manager
STESA
P.O. Box 5463, Riyadh 11422
Tel. (01) 291-2000 x 415 (Off)
(01) 454-5294 (Res)
Fax. (01) 291-8410
Mob. 050-516-5347
Email: aslam@stessa.com
B.Sc (EE) UETL 69, PGD PII 71
MIE, No. M2732

MOHAMMAD ASLAM
Electrical Engineer
M.H. AITAH - NESPAK
P.O. Box. 50344, Riyadh 11523
Tel. (01) 464-1498 (Off)
(01) 465-0532 (Res)
Fax. (01) 462-6769
Email: tarnes.iep@zajil.net
MIE Pak (IEP LHR) 2000
MIE, No. M12941/LHR3628

MOHAMMAD ASLAM IQBAL
Senior Electrical Engineer
Saud Consult
P.O. Box 1293, Dammam 31431
Tel. (03) 895-5004 x 425 (Off)
(03) 867-1924 (Res)
Fax. (03) 895-1722
Email: maiqbal@zajil.net
M.Sc (EE) UETL 67
MIE, No. M3133

MOHAMMAD ATIQULLAH
Electrical Design Engineer
Saudi Consolidated Engineering Co.
Tel. (03) 894-6816 (Off)
Fax. (03) 894-2341
B.E (E) NED 79

MOHAMMAD AWAIS
Senior Engineer Planning
Saudi Electric Company (ERB)
P.O. Box 85, Jubail 31951
Tel. (03) 363-1824 x 76585 (Off)
(03) 361-5718 (Res)
Fax. (03) 362-3733
Mob. 050-819-0390
Email: mohammadawais@hotmail.com
B.Sc (EE) UETL 75
AMIE

MOHAMMAD AYAZ QUTUB
Sr. Unit Engineer Operations
Saudi Electric Company (COA)
P.O. Box 18335, Riyadh 11415
Tel. (01) 408-6630 (Off)
(01) 276-0203 (Res)
Mob. 050-840-8858
Email: ayazqutub@hotmail.com
B.Sc (EE) UETL 72
MIE, No. M11878/SA50

MOHAMMAD AZAM
Senior Electrical Engineer
Saudi Binladin
P.O. Box 7698, Makkah
Tel. (02) 574-9045 x 404 (Off)
(02) 556-2927 (Res)
B.Sc (EE) UETL 78
MIE, No. M9551

Electrical Engineers

MOHAMMAD AZAM
Elect Engr (Maintenance)
Saudi Electric Company SEC-SOA
P.O. Box 149, Najran
Tel. (07) 523-8263 (Res)
Mob. 050-876-9612
Email: mazamsaleem@hotmail.com
BE (E) NED 90

MOHAMMAD FAROOK KHAN
BDM - Oil & Gas
Siemens Ltd
P.O. Box - 719, AL-Khobar - 31952
Tel. (03) 882-6506 Ext. 4228 (Off)
Fax. (03) 887-0165
Email: farook_k@hotmail.com
BE (EE) NED 93

MOHAMMAD HAFEEZ-UR-RAHMAN
Power Section Head
Royal Commission Jubail
P.O. Box 10001, P&T Dept., Jubail 31961
Tel. (03) 341-4223 (Off)
(03) 346-0156 (Res)
Fax. (03) 341-6401
Mob. 050-263-4665
Email: rahmanmh@ieee.org
B.Sc (EE) UETL 76

MOHAMMAD HASSAN SHEIKH
Electrical Engineer
Zuhair Fayez Consultants
P.O. Box 5445, Jeddah 21422
Tel. (02) 542-2836 (Off)
(02) 472-6269 (Res)
Fax. (02) 694-7661
Mob. 050-791-1252
Email: shaikhhassan48@hotmail.com
B.E (E) SU 72

MOHAMMAD HUSSAIN
Unit Engineer
Saudi Electric Company (CRB)
P.O. Box 41263, Riyadh 11521
Tel. (01) 458-2222 x 3502 (Off)
(01) 458-8344 (Res)
B.Sc (EE) UETL 72
MIE

MOHAMMAD IDREES FAROOQI
Unit Engineer
Saudi Electric Company
P.O. Box 7604, Al-Khobar 11472
Tel. (03) 231-2222 x 3742 (Off)
(03) 231-4915 (Res)
B.E (E) SU 76
MIE

MOHAMMAD IDREES QURESHI
Power Transmission Specialist
Saudi Electric Company (SEC-COA)
P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 23243 (Off)
Mob. 050-319-5860
Email: midrees@se.com.sa
B.Sc (E) MUET 71

MOHAMMAD ILYAS
Telecom Engineer
Saudi Telecom Co.
P.O. Box 220780, Riyadh 11311
Tel. (01) 452-7664 (Off)
Mob. 050-189-9745
Email: milyas@stc.com.sa
B.Sc (EE) UETL 92

MOHAMMAD ILYAS
Electronic Engineer
Jeddah Water Works
P.O. Box 8504, Jeddah 21492
Tel. (02) 671-4774 (Off)
(02) 676-3122 (Res)
Fax. (02) 671-7708
Mob. 050-752-1136
Email: milyasabd@yahoo.com
B.Sc (EE) UETL 71

MOHAMMAD IMRAN
Tech Sales/Support Engineer
S&A Abahsain Company
P.O. Box 31781, Al-Khobar 31952
Tel. (03) 899-1930 (Off)
Fax. (03) 899-0197
Mob. 050-984-5654
Email: muhammadimran@abahsain.net
B.E. (EE) NUST 02

MOHAMMAD IMTAR
Lecturer
King Faysal University
Tel. (03) 857-7000 (Off)
(03) 858-1833 (Res)
Fax. (03) 857-8048
Mob. 055-924-5303
B.Sc (EE) UETL 76, M.S KFUPM 81

MOHAMMAD IQBAL GHADAI
Sr. Specialist, Aircraft Engr.
Saudi Arabian Airlines
CC905, Box 620, Jeddah 21231
Tel. (02) 684-1693 (Off)
(02) 682-0030 x 6779 (Res)
Fax. (02) 684-1761
Mob. 050-765-9504
Email: iqbalg1@yahoo.com
B.S (EE) CSU 72

Electrical Engineers

MOHAMMAD IQBAL QURESHI DR.
Research Scientist
King Saud University
P.O. Box 800, Riyadh 11421
Tel. (01) 467-6963 (Off)
(01) 461-1906 (Res)
Fax. (01) 467-6225
Email: mqureshi@ksu.edu.sa
B.Sc (EE) UOP 69, Ph.D UOS 92

MOHAMMAD IQBAL YOUSAF
Telecom Engineer Com Systems
Saudi Telecomm. Company (STC)
Room #201, P.O. Box 73, Riyadh 11313
Tel. (01) 452-9362 (Off)
(01) 454-4711 (Res)
Fax. (01) 452-9544
Mob. 050-641-1259
Email: myousf@stc.com.sa
AMIE IEP 92
MIE, No. M10597

MOHAMMAD ISHTIAQ ASLAM MALIK
Manager Instt / Elec. Services
Olayan Descon Ind. Co.
P.O. Box 10108, Jubail 31961
Tel. (03) 341-7493 (Off)
(03) 346-1503 (Res)
Fax. (03) 341-0950
Mob. 050-490-0142
Email: iamalik@olayandescon.com
B.Sc (EE) UETL 81

MOHAMMAD JAVAID SIDDIQUI
Electrical Engineer
Al-Rashid Trading & Contracting Co.
P.O. Box 307 Riyadh 11411
Tel. (01) 468-3031 (Off)
(01) 291-6180 (Res)
Fax. (01) 468-3043
Mob. 050-801-7841
BE (EE) MUET 76
MIE, No. LM4272

MOHAMMAD JAWAID IQBAL
Sr. Sales Engineer
Adwan Marketing Co. Ltd.
P.O. Box 40151, Jeddah 21499
Tel. (02) 682-7337 (Off)
B.Sc (EE) UETL 90
MIE, No. LHA626

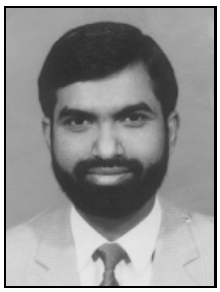
MOHAMMAD KASHIF SAIR
Design Engineer
TIEPCO
P.O. Box 2705, Dammam 31461
Tel. (03) 857-9922 (Off)
(03) 867-1216 (Res)
Fax. (03) 859-4695
Mob. 056-951-1280
Email: kashif.sair@altuwairqi.com.sa
B.Sc. (EE) UETL 05

MOHAMMAD KASSIM HUSSAIN
Product Manager - MVS Div.
ABB Electrical Industries Ltd.
P.O. Box 251, Riyadh 11383
Tel. (01) 265-3030 x 1337 (Off)
(01) 402-6175 (Res)
Mob. 050-648-9157
A.E (EE) GCOT 75

MOHAMMAD KHALID AHMAD KHAN
Manager - Western Province
Centronic Int.
P.O. Box 10441, Jeddah 21331
Tel. (02) 627-1400 (Off)
(02) 675-0041 (Res)
Fax. (02) 627-0965
Mob. 050-635-4571
Email: centromic_imtl@awalnet.net.sa
B.E (E) NED 88

MOHAMMAD KHALID BHATTI
Head Human Res. CCTS Dept.
Saudi Consulting Services (Saudconsult)
P.O. Box 1293, Dammam 31431
Tel. (03) 895-5004 x 322 (Off)
(03) 899-1935 (Res)
Fax. (03) 895-1722
B.Sc (EE) UETL 71
MIE, No. M4256

MOHAMMAD MAHMUD
Projects Manager
Al-Shaharani Group for Contracting
P.O. Box 86820, Riyadh 11632
Tel. (01) 278-9247 (Off)
(01) 409-1833 (Res)
Fax. (01) 278-9248
Mob. 050-023-9543
Email: gct_lhr@yahoo.com
B.Sc (EE) UETL 75, M.Sc UETL 91
MIE, No. M7160



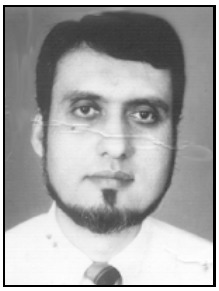
MOHAMMAD MAHTAB ALAM KHAN
Senior Specialist Aircraft Eng
Saudi Arabian Airlines
P.O. Box 167, Jeddah 21231
Tel. (02) 684-2691 (Off)
(02) 682-0030 x 3496 (Res)
Fax. (02) 684-2884
Mob. 050-279-6877
Email: mahtabkhan@saudicity.com
B.E (E) NED 69
MIE, No. M3180

MOHAMMAD MANSHA VIRK
Unit Engineer
Saudi Electric Company
P.O. Box 7604 , SCECO-C, Riyadh 11472
Tel. (01) 2312222 x13733 (Off)
(01) 403-5211 (Res)
Fax. (01) 231-6135
Mob. 050-445-431
Email: 5647@sceco.com
B.Sc (EE) UETL 74
MIE

Electrical Engineers

MOHAMMAD MAROOF-UZ-ZAMAN
Sr. Sales Manager
Schneider Electric
P.O. Box 118132, Jeddah 21312
Tel. (02) 697-7723 (Off)
Fax. (02) 697-3308
Mob. 050-527-6177
B.Sc (EE) Zakazik U Egypt 80

MOHAMMAD MUSHTAQUE TUFAIL
Electrical Trade Manager
Saudi Binladen Group, Ind. & Power Projects
P.O. Box 13837, Riyadh 11414
Tel. (01) 426-0018 x 8231 (Off)
(01) 249-2315 (Res)
B.E (E) SU 71
MIE, No. M11722/SA47



MOHAMMAD MUSLIM KHAN
Technology Manager
Saudi Telecomm. Company (STC)
P.O. Box 87912, Room 201, Riyadh 11652
Tel. (01) 454-8121 (Off)
Mob. 050-544-5406
B.Sc (EE) METU 73

MOHAMMAD NADEEM IQBAL WARAICH
Automation Tender Manager
Schneider Electric
P.O. Box 89249, Riyadh 11682
Tel. (01) 265-1515 x 517 (Off)
(01) 291-0982 (Res)
Fax. (01) 265-1860
Mob. 050-340-3587
Email: nadeem.waraich@gmail.com
B.Sc. (EE) UETL 95
MIE

MOHAMMAD NAEEM HASSAN
Engineer-I
Saud Consult
SOD/ESPD, Rm 2-303W, SEC-ERB HQ, P.O.
Tel. (03) 857-2300 x 84561 (Off)
B.Sc (EE) UETL 84, M.Sc (EE) UETL 91

MOHAMMAD NASIM
Senior Unit Engineer, Planning
Saudi Electric Company (CRB)
Tech. Studies Dept., P.O. Box 57, Riyadh
Tel. (01) 403-2222 x 10208 (Off)
(01) 457-2924 (Res)
Email: mnasim@hotmail.com
B.Sc (EE) EPUET 69
MIE, No. M3371

MOHAMMAD NAVEED ARSHAD
Relay & Prot. Design Engineer
Dar Al Riyadh Consultants
P.O. Box 1832, Jubail 31951
Tel. (03) 361-3407 (Off)
Fax. (03) 362-2540
Email: n547676@yahoo.com
B.Sc (EE) UETL 91

MOHAMMAD NOOR ALAM
Electrical Engineer
Consulting Engineering Group (MOH)
P.O. Box 1604, Riyadh 11311
Tel. (01) 401-5555 x 1364 (Off)
(01) 473-2824 (Res)
Fax. (01) 473-2824
Mob. 050-725-5583
Email: mohammadnooralam@gmail.com7
B.Sc (EE) BCE 67
MIE, No. M3117

MOHAMMAD RAFIQUE MOGHAL
Project Engineer
NESPAK / (Saudconsult)
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-0532 (Res)
Fax. (01) 246-4861
Email: mr_mughal@hotmail.com
B.Sc (EE) UETL 72

MOHAMMAD RASHAD BHATTI
Electrical Design Engineer
MODA - GDMW
P.O. Box 59105, Riyadh 11525
Tel. (01) 478-9000 x 3761 (Off)
Email: bmr243@hotmail.com
B.Sc (EE) AUM 90, M.Sc (Mgt.E) AUM 92

MOHAMMAD RASHID QAZI
Senior Planning Engineer
Saudi Electric Company (EOA)
P.O. Box 85, Al-Jubail
Tel. (03) 362-1824 x 76597 (Off)
(03) 361-2748 (Res)
Fax. (03) 362-3733
Mob. 050-059-2160
Email: engrmrashidqazi@hotmail.com
B.Sc (EE) UETL 82

MOHAMMAD RIAZ
Field Opertaion Manager
Telefonaktiebolaget LM Ericsson
P.O. Box 6121, Riyadh 11442
Tel. (01) 230-3111 (Off)
(01) 454-0003 / 456-1744 (Res)
Fax. (01) 456-1744
Mob. 050-422-8637
Email: riazsetv@yahoo.com
B.Sc (EE) UETL 71

Electrical Engineers

MOHAMMAD SADIQ KHAN
Section Head
Saudi Electric Company (CRB)
P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 223 (Off)
(01) 401-1914 (Res)
Fax. (01) 406-7351
Mob. 050-319-6476
Email: mbaksh@se.com.sa
B.Sc (EE) UETL 70
MIE, No. M7436

MOHAMMAD SAFDAR
Senior Engineer
Mitsubishi Electric Saudi Ltd.
P.O. Box 2710, Dammam 31461
Tel. (03) 858-7536 x 3303 (Off)
(03) 867-1251 (Res)
Fax. (03) 894-5889
Mob. 050-450-2868
B.Sc (EE) UETL 84
MIE, No. M8562/I264

MOHAMMAD SALEEM
Project Manager
ZJ Contracting
B.Sc (EE) UETL 71
MIE

MOHAMMAD SARDAR KHAN
Microwave Engineer
Saudi Telecomm. Company (STC)
P.O. Box 87912, Room 201, Riyadh 11652
Tel. (01) 452-7493 (Off)
(01) 454-0878 (Res)
Fax. (01) 452-7006
Email: mskhan@stc.com.sa
AMIEP IEP 69

MOHAMMAD SHAUKAT ALI
Electrical Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1410 (Off)
Mob. 050-855-1305
B.Sc. (EE) UET 90

MOHAMMAD TARIQ SHAFI
Project Engineer (Aut & Cont)
Al-Tuwairqi
P.O. Box 2705, Dammam 31461
Tel. (03) 857-9922 (Off)
Fax. (03) 859-4695
Mob. 050-197-7507
BSc (EE) UET 01, MSc (Cont) UET 01

MOHAMMAD SAEED IQBAL
Electrical Engineer
SATECH
P.O. Box 31759, Al-Khobar 31952
Tel. (03) 899-7629 (Off)
Fax. (03) 864-7930
Mob. 056-354-2241
Email: saeediqbal@satech.com.sa
B.Sc. (EE) UETL 01

MOHAMMAD SAJID MUSHTAQUE
Regulatory Analyst-A
Saudi Electric Company
P.O. Box 57, Riyadh 11411
Tel. (01) 403-2229 x 18355 (Off)
(01) 412-1385 (Res)
Fax. (01) 403-2222 x 18391
Mob. 056-125-2758
Email: engrsajid@hotmail.com
B.E (E) NED 80, M.S. (EM) SHU 84
MIE, No. M6684

MOHAMMAD SALEEM
Sales Engineer
Saudi Transformers Co. Ltd.
P.O. Box 5785, Dammam 31432
Tel. (03) 847-3020 x 232 (Off)
Fax. (03) 847-1718
B.E (E) NED 93

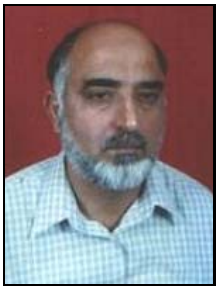
MOHAMMAD SHAFIQ
Electronics Engineer
Saudi Technical Engineering System Ass.
PP9, P.O. Box 5463, Riyadh 11422
Tel. (01) 464-9811 x 430 (Off)
Fax. (01) 464-2810
B.E (E) NED 89, Ph.D Chiba U Japan 97

MOHAMMAD SHER UMAR KHAN
Sales Engineer
Saudi Electric Company (Dist. GE)
P.O. Box 3298, Al-Khobar 31952
Tel. (03) 857-7738 x 242 (Off)
(03) 834-1506 (Res)
Fax. (03) 857-3293 / 834-1506
B.E (E) UETL 94, MBA CBA 96

MOHAMMAD TAUSIF
Consultant
Saudi Electric Company
P.O. Box 40393, Riyadh 11499
Tel. (01) 403-2222 x 21157 (Off)
(01) 448-8695 (Res)
Fax. (01) 448-8695
Mob. 050-310-2493
Email: mtausifm@hotmail.com
BE (E) NED 68
MIE, No. M403

Electrical Engineers

MOHAMMAD TOUSEEF ASLAM
Project Engineer (GES)
Saud Consult
P.O. Box 1293, Dammam 31431
Tel. (03) 577-1405 (Off)
(03) 582-5571 (Res)
Fax. (03) 577-1405
B.Sc (EE) UETL 89

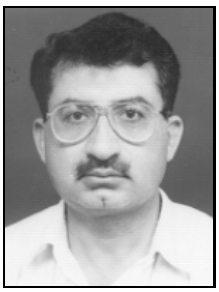


MOHAMMAD ZAFAR ULLAH
Electrical Engineer
Min. of Finance & National Economy
Nasseriah P. Station, P.O. Box 5789, Riyadh
Tel. (01) 441-5958 (Off)
(01) 441-0210 (Res)
B.Sc (EE) UETL 74

MOHAMMED MAHMOOD
Site Manager
Ministry of Defense & Aviation K.SA.
P.O. Box. 320, MODA SAFWA 31921, KSA
Tel. (03) 892-2300 x 2503 (Off)
Mob. 050-948-7629
B.E. (EE) MUET 90, MBA (HMU) 95

MOHAMMED RASHID SARWAR
General Manager
Mohammed Rashid Sarwar Est. (EUROTECH)
P.O. Box 8906, Jeddah 21492
Tel. (02) 663-7854 (Off)
(02) 617-2965 (Res)
Fax. (02) 663-7854
Mob. 050-559-3724
Email: mr_albarq@hotmail.com
B.Sc.(EE) UOP 79

MOHSIN TANVIR MALIK
Area Manager - FSD
Al-Kurdi Trading & Contracting Co.
P.O. Box 22454, Jeddah 21495
Tel. (02) 672-5405 (Off)
(02) 693-5270 x 4 (Res)
Fax. (02) 671-9860
B.Sc (EE) UETL 72
MIE



MUJAHID AHMAD
Senior Electrical Engineer
Mobiley
P.O. Box 69179, Riyadh 11423
Tel. (01) 273-5050 (Off)
(01) 479-0741 (Res)
Fax. (01) 273-5050 x 6154
Mob. 056-111-0256
Email: mujahid_ahmad_mumtaz@hotmail.com
B.Sc (EE) UETL 76

MUKESH KUMAR
Senior Electrical Engineer
Al-Bassam Contracting & Commerce
P.O. Box 24, Al-Khobar 31952
Tel. (03) 899-5605 / 898-0071 (Off)
Fax. (03) 899-3282
B.E (E) NED 83

MUKHTAR AHMAD FAZAL KARIM
Senior Engineer
Saudi Electric Company
P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 23222 (Off)
(01) 479-1798 (Res)
Fax. (01) 406-7351
Mob. 050-319-5407
Email: mukhtar4533@hotmail.com
B.Sc. (EE) UETL 74

MUNEEB AHMAD DAR
Project Engineer
Dar Al-Riyadh Engineering Consultants
P.O. Box. 616, Abha, KSA
Tel. (07) 227-1111 x 1106 (Off)
(07) 224-2847 (Res)
Fax. (07) 227-1020
Mob. 050-763-5476
Email: mustajab07@hotmail.com
B.Sc.(EE) UETL 89

MUNIR AHMAD HASRAT
Electrical Engineer
Riyadh Municipality
Projects Dept., Room 248, Riyadh 11146
Tel. (01) 411-2222 x 3324 (Off)
Fax. (01) 411-2222 x 3313
Mob. 050-739-6951
B.Sc (EE) UETL 74
MIE, No. M7168

MUNIR AHMED
Sr. Section Head QC
ABB Automation Co. Ltd.
P.O. Box 414, Riyadh 11383
Tel. (01) 265-3030 x 1330 (Off)
(01) 403-6899 (Res)
Fax. (01) 265-1211
Mob. 050-312-1148
Email: munir.ahmed@sa.abb.com
B.Sc (EE) UETL 86

MUSHARRAF ALI KHAN
Director
PLASCOM
P.O. Box 18595, Riyadh 11425
Tel. (01) 265-0255 x 15 (Off)
(01) 234-6109 (Res)
Fax. (01) 265-0270
Mob. 050-646-5350
Email: alikhanmusharraf@hotmail.com
ET CEI 76, MIQA IQA 81

Electrical Engineers

MUSHIR AHMED SIDDIQUI
Head of Electrical Department
SHARACO
P.O. Box 5500, Riyadh 11422
Tel. (01) 481-6666 x 318 (Off)
(01) 473-3570 (Res)
Fax. (01) 480-1666
Mob. 050-894-6453
Email: mushirsiddiqui@hotmail.com
B.E (E) NED 76
MIE, No. LM5835

MUSHTAQ AHMED M. BHUTTO
Telecom Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 231-9177 (Off)
(07) 231-9833 (Res)
Fax. (07) 231-9171
Mob. 050-251-5914
Email: bhuttomushtaq@hotmail.com
BE MUET 90

MUZAFFAR UL HASSAN
Distribution Engg. Specialist
Saudi Electric Company
P.O. Box 57, Riyadh 11411
Tel. (01) 408-6345 (Off)
(01) 456-1542 (Res)
Fax. (01) 408-6113
Mob. 050-328-0284
Email: muzaffar_ul_hassan@hotmail.com
B.E (E) NED 75
MIE, No. M7539

NAEEM ULLAH SHEIKH
Operations Manager
B.P Solar Arabia Ltd
P.O. Box 191, Riyadh 11383
Tel. (01) 265-1573 x 240 (Off)
(01) 276-1795 (Res)
Fax. (01) 265-1556
Mob. 050-528-9674
Email: naeem@bpsarabia.com.sa
B.Sc (EE) UETL 88

NAVEED AKHTAR
P.O. Box 40988, Riyadh 11511
Tel. (01) 464-9390 (Off)
(01) 447-0380 (Res)
Fax. (01) 448-5976
Mob. 050-172-0529
Email: chakhtar2000@yahoo.com
B.Sc (EE) NEU 02, MBA, AIC

NISAR AHMAD PIRACHA
Design Engineer
TIEPCO
P.O. Box 2705, Dammam 31461
Tel. (03) 857-9922 (Off)
Fax. (03) 859-4695 x 410
Mob. 056-478-6107
Email: nisarpiracha@hotmail.com
B.Sc. (EE) UCET AJK 00, M.Sc. (EE) UETL

MUSHTAQ AHMED AZAD
Senior Transmission Engineer
Saudi Electricity Company (SEC)
Transmission Building No. C, Al-Marooj,
Tel. (01) 403-2222x 18587 (Off)
(01) 450-4991 (Res)
Fax. (01) 403-2222x 18526
Mob. 050-687-1507
Email: mushtaqazad@hotmail.com
M.Sc (EE) UETL 90, B.Sc (EE) UETL 76
MIE

MUSHTAQ AHMED SOOMRO
Unit Engineer "A" Prot. Sec.
Saudi Electric Company (CRB)
PP3, Prot. Sec. P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 23203 (Off)
(01) 477-0248 (Res)
B.E (E) MUET 85
MIE

NAEEM UD DIN
Electrical Maintenance Eng.
Saudi Electric Company
P.O. Box 57, Riyadh 11411
Tel. (01) 241-3236 x 4165 (Off)
(01) 448-8086 (Res)
Fax. (01) 241-1674
B.Sc (EE) UETL 73

NAVEED AHMAD, PMP
Head of Project Management
ABB Automation Co. Ltd.
P.O. Box 414, Riyadh 11383
Tel. (01) 265-3030 x 1534 (Off)
Fax. (01) 265-1211
Mob. 050-549-1307
Email: engr.naveedahmad@yahoo.com
BSc (EE) UETL92, MS (CE) ICUL UK 95,

NAZAR HUSSAIN MALIK, DR.
Professor of E.E
King Saud University
P.O. Box 800, Riyadh 11421
Tel. (01) 467-6783 (Off)
(01) 468-2048 (Res)
Fax. (01) 467-6757
Mob. 056-845-2834
Email: nmalik@ksu.edu.sa
B.Sc(EE) UETL 73, M.E UOW 77, Ph.D UOW
FIE

NISAR BALOCH
Riyadh Branch manager
Schneider Electric
P.O. Box 89249, Riyadh 11682
Tel. (01) 291-2877 x 24 (Off)
Fax. (01) 472-5335
Mob. 050-441-6267
Email: nisar_baloch@mail.schneider.fr
B.E (E) UETL 89

Electrical Engineers

NOMAN BIN NASIR
Sales Manager
S&A Abahsain Co. Ltd.
P.O. Box 38994, Dhahran 31942
Tel. (03) 859-5912 (Off)
Fax. (03) 857-1570
Mob. 050-943-3239
Email: noman@abahsain.net
B.E. (EE) NED 03

NOOR MOHAMMAD KHAN
Electrical Engineer
Saud Consult
SEC-COA, P.O. Box 57, Riyadh
Tel. (01) 464-3333 x 14851 (Off)
(01) 462-1406 (Res)
Fax. (01) 461-5933
Mob. 056-876-6947
Email: inkhan3@se.com.sa
B.Sc. (EE) NWFP UET 68
MIE

QAIM MAHDI
Project Manager
Schneider Electric
P.O. Box 89249, Riyadh 11682
Tel. (01) 265-1515 x 316 (Off)
Fax. (01) 265-1860
Mob. 050-004-6196
Email: qaim.mahdi@sa.schneider-electric.com
B.E (E) NED 88, M.Sc QAU 91, PGD CTC 93

QAMARUL HAQUE SIDDIQUI
Sr. Electrical Engineer
BEMCO
P.O. Box 3143, Jeddah 21471
Tel. (02) 669-5851 x 242 (Off)
(02) 668-3172 (Res)
Fax. (02) 660-9432
Mob. 056-423-6160
Email: qamarul@sbg-ipp.com
B.Sc (EE)

QAZI SALEEM AHMED
Electrical Engineer
Saudi Binladin Group - Ind. & Power Projects
P.O. Box 3143, Jeddah 21471
Tel. (02) 673-6033 x 251 (Off)
(02) 673-9541 (Res)
Fax. (02) 660-9432
Email: qazi@sbg-ipp.com
B.E (E) NED 88

RAFIQ AHMED
Senior Engineer
AETCON
P.O. Box 250974, Riyadh 11391
Tel. (01) 465-6975 (Off)
Fax. (01) 464-3651
Mob. 050-480-9524
B.E (E) MUET 89

RANA SARFRAZ AHMED
Technical Specialist
Saudi Telecomm. Company (STC)
Deployement Plng., STC HQ, P.O. Box 87912,
Tel. (01) 452-8905 (Off)
Fax. (01) 452-8138
Mob. 050-693-5062
Email: rahmed@stc.com.sa
B.Sc (EE) UCET 87

RAO ABDUL RAQEEB KHAN
Engineer (Switching)
Saudi Telecomm. Company (STC)
STC Headquarters, Mursalat, Riyadh
Tel. (01) 452-6964 (Off)
(01) 472-5370 (Res)
Fax. (01) 452-7684
Email: rkhan@stc.com.sa
B.Sc (EE) UETL 87

RASHEED A. BHUTTO
TRANSMISSION Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 231-9197 (Off)
Fax. (07) 231-92127
Mob. 050-850-7465
Email: engr_rasheed@hotmail.com
BE (E) MUET 93

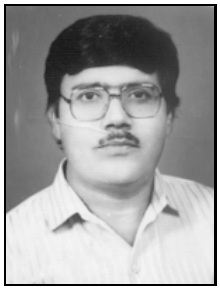
RAZA HUSAIN
Sr. Electrical Engineer
Saudi Consulting Services (Saudconsult)
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 x 205 (Off)
(01) 462-8315 (Res)
Fax. (01) 464-7540
Mob. 056-747-6824
Email: husainraza@hotmail.com
B.Sc (EE) AUUP 67

RAZAUR RAHMAN
Business Development Manager
Schneider Electric
P.O. Box 89249, Riyadh 11682
Tel. (01) 265-1515 x 255 (Off)
Fax. (01) 265-1860
Mob. 050-440-6269
B.Sc (EE) UETL 83
MIE

RIZWAN AHMAD
Business Development Director
Naba International Commercial Enterprises
P.O. Box 4049, Dammam 31491
Tel. (03) 834-1730 (Off)
(03) 857-2275 (Res)
Fax. (03) 834-3971
Mob. 050-490-5682
Email: rizwan_asr@yahoo.com
B.E (E) NED 74
FIE, No. F1809/SA13

Electrical Engineers

RIZWAN UL HAQ FAISAL
Senior Engineer Production
Al-Tuwairqi Group of Companies
P.O. Box 2705, Dammam 31461
Tel. (03) 857-9922 x 227 (Off)
(03) 859-4695 (Res)
Email: rizwan@altuwairqi.com.sa
B.E (E) NED 93



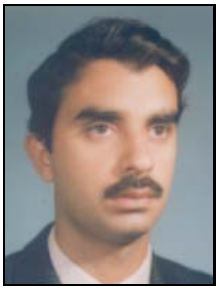
S. AFZAL HASAN KAZMI
Application Engineer
Montaser Technical Services
P.O. Box 85106, Riyadh 11691
Tel. (01) 465-2511 x 14 (Off)
(01) 405-1929 x 19 (Res)
Fax. (01) 465-2511
Mob. 050-433-4937
B.E (E) SU 71
MIE, No. M3948

S. AIJAZ HAIDER
Project Manager
Siemens Ltd
P.O. Box 4621, Jeddah 21412
Tel. (02) 661-8957 (Off)
Fax. (02) 661-9007
Email: ajzhyder@hotmail.com
B.E (E) NED 91

SAFDAR IQBAL AWAN
Unit Engineer
Saudi Electric Company
P.O. Box 57, Riyadh 11411
Tel. (01) 464-3333 x 14386 (Off)
(01) 486-0587 (Res)
Fax. (01) 464-3333 x 4345
Mob. 050-447-5281
Email: safdar777@hotmail.com
B.Sc (EE) UETL 76

SAGHIR AHMED
Elect. Maint. Dept. Chief
Saline Waer Conversion Corporation
P.O. Box 8064, Jubail 31951
Tel. (03) 343-0333 x 39204 (Off)
(03) 343-0508 (Res)
Email: saghir55@hotmail.com
B.Sc (EE) UOP 79

SAJJAD AHMAD SAJID
Senior Project Manager
Arabia Electric Ltd (Siemens)
P.O. Box 4621, Jeddah 21412
Tel. (02) 665-8420 x 2047 (Off)
(02) 673-7674 (Res)
Fax. (02) 665-8490
B.Sc (EE) UETL 76
MIE, No. M8924



SALEEM AHMAD
Planning Engineer
Saudi Electric Company (ERB)
P.O. Box 30, Hofuf 31982
Tel. (03) 586-8600 x 62679 (Off)
(03) 587-6626 (Res)
Fax. (03) 586-8600 x 2841
B.Sc (EE) UETL 88

SALIS USMAN
Regulatory Analyst
Saudi Electric Company (SEC)
P.O. Box Box 57 , Riyadh 1411
Tel. (01) 403-2222 x18385 (Off)
(01) 201-0439 (Res)
Fax. (01) 403-2222 x 18391
Mob. 056-061-5109
Email: SUsman@se.com.sa
B.Sc. UETT 85, MAS PU 92
MIE, No. M8366-L/521

SALMAN MUSTAFA
Project Manager
Saud Consult
P.O. Box 550, Abqaiq 31992
Tel. (03) 566-2072 (Off)
Fax. (03) 566-1401
B.Sc (EE) UETL 73

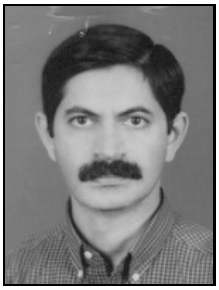
SAQIB SHAH
Sr. Electrical Engineer
Rashid Engineering
P.O. Box 4354, Riyadh 11491
Tel. (01) 464-1188 x 292 (Off)
(01) 441-4613 (Res)
Fax. (01) 465-6245
Mob. 050-814-1168
Email: saqib.iep@zajil.net
B.Sc (EE) UOP 72
MIE, No. M4248

SARFRAZ MAHMOOD
Network Planning Engineer
Saudi Telecomm. Company (STC)
STC Headquarter, Mursalat, Riyadh
Tel. (01) 452-8519 (Off)
(01) 465-4430 (Res)
Fax. (01) 452-8373
Mob. 050-797-2647
Email: sarfraz47@hotmail.com
B.Sc (EE) UETL 74

SHAH NAWAZ KHAN
Sr. Engr (Maintenance)
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1740 (Off)
(07) 221-5695 (Res)
Fax. (07) 227-1175
Mob. 056-841-4527
Email: abu_saadnawaz@hotmail.com
B.Sc (EE) UOP 76

Electrical Engineers

SHAH ZAMAN PANHWAR
Project Manager
Al-Sharif Group (ASG)
P.O. Box 10049, Jeddah 21433
Tel. (02) 660-3672 (Off)
Fax. (02) 660-5290
Mob. 050-071-1823
Email: shah_szp@yahoo.com
B.E (E) MUET 86, MIS CQU 94



SHAHID AKHTAR BUTT
Senior Project Engineer
Petrokemya
P.O. Box 10002, Jubail Ind City
Tel. (03) 357-7320 (Off)
(03) 346-0446 (Res)
Fax. (03) 358-8984
B.Sc (EE) UETL 75

SHAHID ZUBAIR
Sr. Project Manager
Schneider Electric
P.O. Box 89249, Riyadh 11682
Tel. (01) 265-1515 x 507 (Off)
(01) 472-3153 (Res)
Fax. (01) 265-1860
Mob. 050-415-8831
Email: shahid_zubair@mail.schneider.fr
B.E (E) NED 87

SHAHIDMAHMOOD ALVI
Electrical Engineer
Jubail Chem Ind Co.
Mob. 050-451-2725
Email: shahid.118@gmail.com
B.Sc. (EE) UETL 95, MBA PIMSAT 04

SHAHZAD ALI BAIG
Commissioning Engineer
ABB Service Co. Ltd.
P.O. Box 2873, Al-Khobar 31952
Tel. (03) 882-9394 (Off)
Fax. (03) 882-4603
B.E (EE) NED 94

SHAHZAD HABIB GILL
Transmission Eng
SRACO (SEC)
TSD/OED, R # 2-306W
Tel. (03) 857-2300 x 84812 (Off)
Email: gill_sdk@hotmail.com
B.Sc. (EE) UETTax 00, MSc(EE) UETL 04

SHAKEEL AHMAD
Project Manager
Cogelex - Alsthom
P.O. Box 87200, Riyadh 11642
Tel. (01) 402-0227 (Off)
(01) 402-2104 (Res)
Fax. (01) 405-2904
Mob. 050-346-7939
B.Sc (EE) EPUET 71
MIE, No. LM3958

SHAKIL AHMAD
Design Engineer E&C
Saudi Electric Company
P.O. Box 21, SEC(E) Office Hafar Al-Batin
Tel. (03) 386-1750 x 114 (Off)
Fax. (03) 722-3111 x 73277
B.Sc (EE) UETL 89

SHAKIL OMAR
Sales Manager
Saudi Electric Supply Co.
P.O. Box 2398, Al-Khobar 31952
Tel. (03) 882-9546 (Off)
(03) 864-6790 (Res)
Fax. (03) 887-4299
Email: shakil.omar1@gmail.com
B.E (E) NED 74

SHAMIM ALAM KHAN
Electrical Engineer
Saudi Telecomm. Company (STC)
Eng. Plng., STC HQ, P.O. Box 87912, Riyadh
Tel. (01) 403-1128 (Off)
Fax. (01) 452-6623
Email: sakhan@stc.com.sa
B.Sc (EE) EPUET 65
MIE, No. M4045

SHAUKAT ALI
Electronic Engineer
KFUPM
KFUPM Box 1882, Dhahran 31261
Tel. (03) 860-4252 (Off)
(03) 860-5268 (Res)
Fax. (03) 860-2965
Mob. 056-938-3825
Email: ashaukat@kfupm.edu.sa
B.Sc (EE) UOP 75

SHEHZAD AHMED
Lead Project Engineer
Saudi Aramco
P.O. Box 13514, Dhahran 31311
Tel. (03) 397-4005 (Off)
(03) 878-8939 (Res)
Fax. (03) 397-4065
Mob. 050-707-1950
Email: ahmesx0d@aramco.com.sa
B.E (EE) NED 72
MIE, No. LM4859

Electrical Engineers

SHEIKH MAHMOOD AHMED
Electrical Engineer
Saudi Electric Company
P.O. Box 32, Nariyah
Tel. (03) 373-0308 x 72634 (Off)
(03) 373-2720 (Res)
Fax. (03) 3730432
Mob. 050-298-6132
Email: f3sma@hotmail.com
B.Sc (EE) UETL 91

SHOAIB AHMAD
C.E.O.
M.A.Al-Azzaz Contracting
P.O. Box 31172, Al-Khobar-31952
Tel. (03) 897-6283 (Off)
(03) 897-5928 (Res)
Fax. (03) 889-2835
Mob. 050-582-7346
Email: shoaib@nesma.net.sa
B.E (E) NED 74
MIE

SIKANDER H. BHATTI
CEO
Vatech T&D Co. Ltd.
P.O. Box 91357, Riyadh 11633
Tel. (01) 478-2027 x 25/ 479-2126 (Off)
Fax. (01) 473-1217
Mob. 050-566-9536
Email: sikander.bhatti@siemens.com

SULTAN ALI MANZOOR
Senior Engineer, E. Province
Adwan Marketing Co. Ltd.
P.O. Box 2849, Al-Khobar 31952
Tel. (03) 858-7075 x 37 (Off)
Mob. 050-512-4305
Email: sultan@kho.amc.adwn.com
B.Sc (EE) UETL 89

SYED ABUL HASAN JAFRI
Contracts Manager
Salem Agencies & Services (SAS)
P.O. Box 9270, Jeddah 21413
Tel. (02) 665 4616 (Off)
(02) 663-7064 (Res)
Fax. (02) 660 7864
Mob. 050-465-0727
Email: sahjafri@engineer.com
B.E (E) NED 69
MIE, No. M2669

SYED ADNAN MOID
Electrical Engineer
General Electric Company
Riyadh
Tel. (01) 462-5858 x 248 (Off)
Fax. (01) 462-8787
Mob. 050-648-6397
B.E (E) NED 96

SYED AFZAL HUSAIN
Sr. Electrical Engineer
Consulting Engineering Group
P.O. Box 1604, Riyadh 11311
Tel. (01) 465-4406 (Off)
(01) 473-7148 (Res)
Fax. (01) 465-4151
Mob. 050-900-2083
B.E (E) NED 74

SYED AMIR UR REHMAN
Senior Engineer
Saudi Electric Company (ERB)
P.O. Box 74, Dammam 31411
Tel. (03) 835-8875 (Off)
(03) 833-0262 (Res)
Fax. (03) 835-8820
Email: amirurrehman@hotmail.com
B.E (E) NED 74

SYED FARASAT ABBAS
Design Engineer
TIEPCO
P.O. Box 2705, Dammam 31461
Tel. (03) 857-9922x 413 (Off)
Fax. (03) 859-4695
Mob. 056-849-7340
Email: syed.abbas@altuwairqi.com.sa
B.Sc. (EE) UETL 02

SYED HUSSAIN HAIDER
Project Manager
Delta Catalytic Saudi Arabia (Jacobs)
P.O. Box 9, Khobar 31952
Tel. (03) 882-8518 x 2213 (Off)
(03) 857-0101x123 (Res)
Fax. (03) 882-6847
Mob. 050-490-8243
Email: syedhh@yahoo.com
B.E (E) NED 66

SYED MISBAH UL ISLAM SABRI
Electro-Mech Div. Manager
Gulf Consult
P.O. Box 684, Al-Khobar 31952
Tel. (03) 897-1717 (Off)
(03) 865-5675 (Res)
Fax. (03) 864-4758
Mob. 050-437-3694
Email: misbah_sabri@hotmail.com
B.E. (E) NED 69
MIE, No. 7159

SYED MOHAMMAD NASEEM NAVAID
Electrical Engineer
Dar Al-Majd Consulting Engineers
P.O. Box 60212, Riyadh 11545
Tel. (01) 464-9688 (Off)
(01) 226-1123 (Res)
Fax. (01) 462-1727
Mob. 050-720-8450
B.E (E) NED 80

Electrical Engineers

SYED MUBASHIR UL HAQUE
Network Engineer
Getronics / AGCN
P.O. Box 2645, Riyadh 11461
Tel. (01) 474-0555 x 191 (Off)
(01) 477-5297 (Res)
Fax. (01) 474-1854
B.E (E) NED 99

SYED MURSHID PERVEZ
Area Sales Manager
Saudi Transformer Co.
P.O. Box 968, Riyadh 11421
Tel. (01) 406-9200 x 278 (Off)
(01) 465-4358 (Res)
Fax. (01) 402-313-
Mob. 050-580-4270
B.E (E) NED 82

SYED NAVED HAIDER
Sr. Sales Engineer
Saudi Electric Supply Co. (SESCO)
P.O. Box 3298, Al-Khobar 31952
Tel. (03) 882-5669 x 223 (Off)
Fax. (03) 882-5768
Mob. 050-389-4535
Email: naved.haider@sesco-ge.com
B.E. (E) NED 91

SYED RAHEEL AZAM
Electrical Design Engineer
Zadan Consultants
P.O. Box 5967, Dammam 31432
Tel. (03) 864-1012 (Off)
Email: nauman_r@yahoo.com
B.E (E) UB 00

SYED SHABBIR AHMED
Sector Head
SEC-CRB Saudi Electric Company
PP8, P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 29716 (Off)
(01) 412-1825 (Res)
Mob. 050-710-6218
Email: shabbir_44@hotmail.com
B.Sc. (EE) UET 80

SYED SHAHERYAR A SHAH
Head of Electro Mech. Dept.
Al-Rashid Trading & Contracting (RTCC)
P.O. Box 307, Riyadh 11411
Tel. (01) 401-2550 x 608 (Off)
(01) 402-0245 (Res)
Fax. (01) 402-2055
Mob. 050-624-5872
BE (E) POU 74
MIE

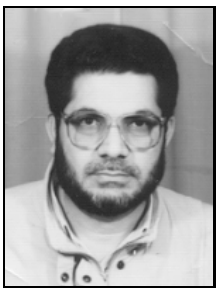
SYED SHAMSUL HAQ
Vice President
Mitsubishi Electric Saudi Ltd.
P.O. Box 2391, Riyadh 11451
Tel. (01) 477-7950 (Off)
Fax. (01) 472-4238
Mob. 050-548-4478
Email: shaq@tgmp3.hbs.edu
B.Sc (EE) PU 73, M.S (NE) IU 75, M.Sc (EE)
MIE, No. M10758/S15

SYED SHUJAAT KHURSHED
OHTL Tendering Manager
SSEM Co. Ltd
Al-Rashid Center, Maater Street, Riyadh
Tel. (01) 402-6809 x 304 (Off)
Fax. (01) 402-8213
Mob. 050-344-9697
Email: shujaatpk@yahoo.com
B.Sc. (EE) NWFP UET 90

SYED TARIQ MUHAMMAD
Project Sales & Support Engr.
S&A Abahsain Co. Ltd.
P.O. Box 209, Al-Khobar 31952
Tel. (03) 898-4045 x 406 (Off)
Fax. (03) 899-0114
Mob. 056-789-8268
Email: tariq@abahsain.net
B.E. (E) NED 03

SYED TASNEEM HUSAIN
Senior Design Engineer
ABB Electric Industries Ltd.
P.O. Box 8796, Riyadh 11492
Tel. (01) 265-1689 x 1482 (Off)
(01) 403-7860 (Res)
Fax. (01) 265-1211
B.Tech (Hons) NED 86

SYED TOUSEEF AHMAD RIZVI
Design Electrical Engineer
Saudi Consulting Services
P.O. Box: 7352, Jeddah 21462
Tel. (02) 662-8049 (Off)
Fax. (02) 662-8049 x 101
Mob. 056-350-2299
Email: touseefrizvi@yahoo.com
B.Sc. (EE) UETL 98



SYED UMER MOIZ
Electrical Engineer
King Saud University
P.O. Box 2454, Riyadh 11451
Tel. (01) 467-2759 (Off)
(01) 484-1256 (Res)
Fax. (01) 467-2760
B.E (E) SU 72
MIE

Electrical Engineers

SYED WAJID HUSSAIN
Electrical Engineer
Al-Noble Est. & Contracting
P.O. Box 1237, Al-Khobar 31952
Tel. (03) 858-4855 x 307 (Off)
Fax. (03) 894-0892
Mob. 050-944-8657
Email: engwajid@yahoo.com
B.E. (E) NED 92

SYED ZAFAR WAHAB
Planning Engineer
Saudi Electric Company (ERB)
P.O. Box 30, Hofuf 31982
Tel. (03) 586-8600 x 62864 (Off)
Fax. (03) 586-8600 x 62841
B.Sc (EE) KU 70

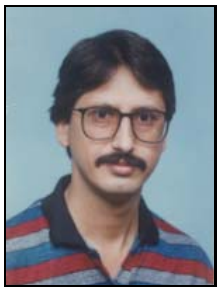
TAHIR S. MIRZA
Instrument Engineer
Tel. (03) 858-6201 (Off)
B.Sc (EE) UETL 76, M.S KFUPM 81

TANWEER EJAZ NAWAZ
Manager Business Coord. Div
Saudi Electric Company (EOA)
Room # 1-309E, P.O. Box 5190, Dammam
Tel. (03) 858-6725 (Off)
(03) 814-0112 (Res)
Fax. (03) 858-5683
Mob. 050-791-3942
Email: nawaz_te@hotmail.com
B.Sc (EE) UETL 74
MIE, No. M11760

TARIQ MUMTAZ SOOMRO
General Manager
e-Solutions Est
P.O. Box 13711, Riyadh 11411
Tel. (01) 293-3617 / 464-3082 (Off)
(01) 269-0480 (Res)
Fax. (01) 218-0900
Mob. 050-548-3263
Email: tariq.soomro@e-solutionsest.com
B.Sc (EE) UETL 76

WAJAHAT HUSSAIN SIDDIQUI
Senior Electrical Engineer
Saudi Binladin Group (PBAD)
P.O. Box 9887, Jeddah 21423
Tel. (02) 640-0004 x 265 (Off)
(02) 698-3372 (Res)
Fax. (02) 640-4368
Mob. 050-850-2072
Email: wajahat@pbad.sbg.com.sa
B.E (E) NED 74

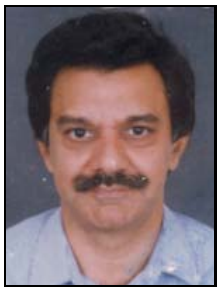
SYED WIQAR FAKHRI
Power Relay Specialist
Saudi Aramco
P.O. Box 4948, Ras-Tanura 31311
Tel. (03) 673-5071 (Off)
(03) 667-2180 (Res)
Fax. (03) 378-3620
Mob. 050-285-1360
Email: fakhrisw@aramco.com
B.E (E) SU 69
MIE, No. LM3138



SYED ZAHID HASSAN RIZVI
Protection Engineer - PP3
Saudi Electric Company (CRB)
P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 18448 (Off)
(01) 402-1787 (Res)
Fax. (01) 408-6875
Mob. 055-239-7705
Email: syedjunaidhassan@hotmail.com
B.Sc (EE) UETL 86

TANWEER AHMED
Technical Engineer
Riyadh Cable Group of Companies
P.O. Box 281539, Riyadh 11392
Tel. (01) 265-0850 (Off)
(01) 213-1483 (Res)
Fax. (01) 265-0850
Mob. 050-215-0869
Email: tanweer66@hotmail.com
B.E. (EE) NED 89

TANWEER NAWAZ MALIK
Project Manager
Al-Fanar Contracting Co.
P.O. Box 301, Riyadh 11411
Tel. (01) 275-5999 x 4702 (Off)
Fax. (01) 275-8811
Mob. 050-446-7814
Email: tanweer@alfanar.com
B.E (E) NED 84



TARIQ MUSHTAQ
Senior Engineer
Saudi Electric Company (ERB)
P.O. Box 5190, Dammam
Tel. (03) 858-5471 (Off)
(03) 826-9874 (Res)
Fax. (03) 858-6851
Mob. 056-725-1612
Email: tmq20@yahoo.com
B.E (E) UETL 73

WAZIR ULLAH KHAN
Project Manager
AETCON
P.O. Box 172, Dammam 31411
Tel. (03) 889-1609 (Off)
Fax. (03) 889-1640
Mob. 050-683-7053
B.E (E) UOP 70

Electrical Engineers

YASER MUSHTAQ, PMP
SCADA Engineering Manager
ABB Automation Co. Ltd.
P.O. Box: 414, Riyadh 11383
Tel. (01) 265-2112 x 1516 (Off)
(01) 435-8235 (Res)
Fax. (01) 265-1211
Mob. 050-648-0466
Email: yaser.mushtaq@sa.abb.com
B.Sc.(EE) UETL 96

YASIN KHAN, DR.
Assistant Professor (Elect)
King Saud University, Riyadh
Deptt. Of Elect Engg. KSU, Riyadh
Tel. (01) 467-9813 (Off)
(01) 462-1528 (Res)
Mob. 050-894-2534
Email: yasink@ksu.edu.sa
BSc (EE) NWFP UET 93, M.Sc. (EE) 97,

ZAFAR IQBAL, PMP
Services Manager
SIEMENS Ltd.
P.O. Box 91357 Riyadh,11633
Tel. (01) 478-2027 (Off)
(01) 406-9339 (Res)
Fax. (01) 473-1217
Mob. 050-528-3724
Email: zafariqal@siemens.com
B.Sc. (EE) UETL 89

ZAKIR RAZA
Sales Engineer
Al-Nassar Co.
P.O. Box 1246, Riyadh 11431
Tel. (01) 477-7000 (Off)
Fax. (01) 478-9469
Mob. 050-797-4597
B.E (E) UOT 85
MIE, No. A/1947-L290

ZUBAIR AHMED
Senior Engineer
AETCON
P.O. Box 250974, Riyadh 11391
Tel. (01) 465-6975 (Off)
(01) 461-4903 (Res)
Fax. (01) 464-3651
Mob. 050-791-9774
Email: zubairahm@hotmail.com
B.E (E) NED 92

ZULFIQAR AHMED BHATTY
Manager S. Centre/Logistics
Digital Natcom Co.
P.O. Box 7190, Riyadh 11462
Tel. (01) 477-1122 x 258 (Off)
(01) 472-0522 (Res)
Fax. (01) 477-6664
B.Sc (EE) UETL 83

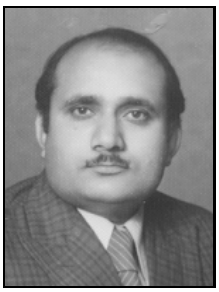
Electronics Engineers

ABDUL MUQEET
Communication Engineer
Saudi Electric Company (CRB)
P.O. Box 57, ECC Building, 3rd Fl, Riyadh
Tel. (01) 403-2222 x 86856 (Off)
B.E (Ecs) DCET 90

AHSAN AHMED RANA
iSeries Tech. Support Engineer
SBM / IBM
P.O. Box 818, Riyadh 11421
Tel. (01) 452-7376 (Off)
(01) 464-9575 (Res)
Mob. 050-417-2124
Email: arana@stc.com.sa
B.E (Ecs) NED 78
MIE

AMJAD IQBAL
Instrument & Control Sys Engr.
Petrokemya
P.O. Box 10002, Jubail
Tel. (0) 358-7000 x 1349 (Off)
Fax. (0) 358-2056
Mob. 050-219-4423
Email: iqbala@sabic.com
B.Sc. (EE) EMU 93

ARIF ISLAM BUTT
Sales Engineer
Mitsubishi Electric Saudi Ltd.
P.O. Box 14166, Jeddah 21424
Tel. (02) 651-9998 x 240 (Off)
(02) 628-5320 (Res)
Fax. (02) 650-3519
Mob. 050-527-9187
B.E (Ecs) NED 94



ARSHAD HUSSAIN
Instrument Engineer
Riyadh Water Works
P.O. Box 2464, Riyadh 11451
Tel. (01) 493-6622 x 260 (Off)
Fax. (01) 491-6265
B.E (Ecs) DCET 69
MIE, No. M7165

ASIF KAMAL
Staff Maintenance Engineer
Petrokemya
P.O. Box 10002, Jubail Industrial City 31961
Tel. (03) 357-7387 (Off)
(03) 362-2870 (Res)
Fax. (03) 358-4480
Mob. 050-590-2847
Email: kamalas@petrokemya.sabic.com
B.E. (E) NED 79
MIE, No. M/8061-K/174

ATIF ALI KHAN
Program Manager
STESA-THALES Co.
P.O. Box 10502, Jubail 31961
Tel. (03) 341-8500 x 210 (Off)
Fax. (03) 341-5590
Mob. 050-591-2832
Email: khanatifali@yahoo.com
BE (EE) NED 96

DEEDAR ALI
Telecom Engineer
Saudi Telecomm. Company (STC)
STC Headquarters, Room 107, Mursalat,
Tel. (01) 452-9187 (Off)
Fax. (01) 454-2704
Mob. 055-962-1622
Email: dshah@stc.com.sa
B.E (Ecs) NED 87

FAREEDUDDIN AHMED
Engineer 1
KFUPM
P.O. Box 1669, Dhahran 31261
Tel. (03) 860-2884 (Off)
(03) 860-6593 (Res)
Fax. (03) 860-2215
Email: fahmed@kfupm.edu.sa
B.S (Ecs) METU 71
MIE, No. M99009/K223

FURQAN ALI SIDDIQUI
Telecom. Engineer
Saudi Electricity Co.
P.O. Box - 981, Al-Khobar
Tel. (03) 858-5955 (Off)
Mob. 050-554-3710
Email: furqan_as@yahoo.com
B.E. (EE) NED 99, M.S (Tel) NED 05

HAFEEZ-UR-REHMAN
Sales Engineer
Siemens
P.O. Box 9510, Riyadh 11423
Tel. (01) 206-0000 (Off)
(01) 476-5448 (Res)
Fax. (01) 478-6783
Mob. 050-544-3781
Email: hafeez.rahman@siemens.com
M.Sc (Ecs) QAU 86

IFTIKHAR AHMED HAJI
District Engineer
Saudi Telecom Co. (STC)
P.O. Box 220169, Riyadh 11311
Tel. (01) 452-8184 (Off)
(01) 453-8611 (Res)
Fax. (01) 452-7117
B.E (Ecs) Osmania 93

Electronics Engineers

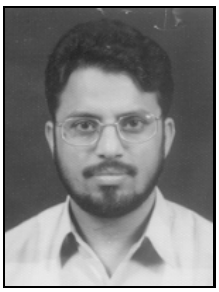
IMRAN ASHRAF
Sr. Engr. Network Security
Etihad Etisalat (Mobily)
P.O. Box 9979, Riyadh 11423
Tel. (01) 560-313031 (Off)
Fax. (01) 560-316140
Mob. 056-560-0667
Email: imranrhl@yahoo.com
B.Sc. (E) SSUET 02

IQBAL AHMED SIDDIQUI
Telecommunication Engineer
Royal Saudi Air Defence Forces
P.O. Box 16431, Riyadh 11464
Tel. (01) 479-5802 (Off)
(01) 235-4759 (Res)
Fax. (01) 479-0990
Email: iqbalsid.iep@zajil.net
B.E (Ecs) NED 79
MIE

IRFANUDDIN AHMED
Sales & Marketing Engineer
Salem Agencies & Services Company (SAS)
P.O. Box 9270, Jeddah 21413
Tel. (02) 660-7860x 249 (Off)
(02) 671-6829 (Res)
Fax. (02) 660-7864
Mob. 056-006-0291
Email: irfanuddinahmed@gmail.com
B.S. (EE) EMU Turkey 01, MBA PAF-KAIET

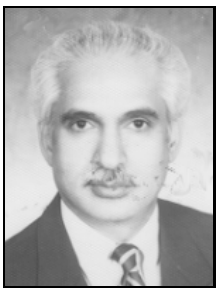
JAVED M. AHSANI
General Manager
Four Corners International
P.O. Box 62877, Riyadh 11595
Tel. (01) 460-0590 (Off)
(01) 454-9356 (Res)
Fax. (01) 460-0574
Mob. 050-410-2764
Email: jahsani@awalnet.net.sa
B.E (Ecs) KU 77
MIE, No. M4935

KAMRAN ASIF ASLAM
Mrktg & Tech Support Manager
Beit Al-Etisalat
P.O. Box 90209, Riyadh 11613
Tel. (01) 473-1300 x 107 (Off)
Fax. (01) 476-6960
Mob. 050-518-6638
Email: kaaslam@hotmail.com
B.E (Ecs) SSUET 99



KHALID NADEEM
Support Engineer
Al-Faisaliah Group
P.O. Box 122209, Jeddah 21332
Tel. (02) 650-4744 x 478 (Off)
(02) 658-7469 (Res)
Fax. (02) 650-4619
Mob. 050-463-1928
B.E (Ecs) DCET 87

M. FARAZ UDDIN QURESHI
Network Administrator
DETECON Al-saudia Co. Ltd
P.O. Box 1038, Riyadh 11431
Tel. (01) 281-9637 (Off)
(01) 287-3458 (Res)
Fax. (01) 452-7818
Mob. 050-125-6295
Email: faraz.qureshi2002@hotmail.com
B.Sc. (Electronics) SSUET 01



MAJID LATIF
Group Genera Managar
Arabic Computer Systems Ltd.
P.O. Box 2645, Riyadh 11461
Tel. (01) 476-3777 x 141 (Off)
(01) 419-4458 (Res)
Fax. (01) 476-3196
Email: majidl@acs.com.sa
B.E (Ecs) DCET 75
MIE

MALIK ZUBAIR
Senior Field Engineer
Al-Faisaliah Medical & Measurement Systems
P.O. Box 2769, Al-Khobar 31952
Tel. (03) 887-0188 x 253 (Off)
(03) 897-7459 (Res)
Fax. (03) 887-0187
Mob. 050-440-5463
B.E (Ecs) NED 87, M.S BU UK 92

MANSOOR JAMIL
Instrument Engineer
JANA Chemical Industries
P.O. Box 10661, Jubail 31961
Tel. (03) 358-5002 (Off)
Mob. 055-519-7895
Email: mansoor.jamil@jana-ksa.com
B.E. (Electronics) DCET 96

MIAN FAHEEM-UL-GHANI
Office Equipment Technician
Riyadh House Est. (Jeraisy)
P.O. Box 5381, Riyadh 11583
B.Sc (Ecs) UETL 98

MOHAMMAD FAWAD RABBANI
Dalma Tech2
P.O. Box.365584, RiyadhH 11393
Tel. (01) 279-1029 (Off)
(01) 472-0168 (Res)
Fax. (01) 466-0412
Mob. 050-857-6431
Email: mrfasko@hotmail.com
B.E (Ecs) SSUET 2000
FIE

Electronics Engineers

MOHAMMAD HANIF
Quality Control Manager
A.B.B Electrical Industries Co. Ltd.
P.O. Box 251, Riyadh 11383
Tel. (01) 265-3030 x 1371 (Off)
Fax. (01) 265-1211
Mob. 050-967-7510
B.E (Ecs) NED 83
MIE, No. M8161/L342

MOHAMMAD IMAMUDDIN
F/Service Engineer
Zahid Tractor
P.O. Box 579, Dammam
Tel. (03) 857-2595 (Off)
(03) 894-5611 (Res)
Mob. 050-484-4107
B.E (Ecs) NED 83

MOHAMMAD IQBAL TAREEN
Computer Network Engineer
King Saud University Computer Center
P.O. Box 2454, Riyadh 11451
Tel. (01) 467-6069 (Off)
(01) 468-2334 (Res)
Fax. (01) 467-4278
Mob. 056-989-9284
Email: mitareen@ksu.edu.sa
B.E (Ecs) NED 86

MOHAMMAD IRFAN
Project Engineer
Al-Jazirah Engineers & Consultants (AJEC)
P.O. Box 616, SEC-SOA Project Deptt Abha
Tel. (07) 227-1111 x 1128 (Off)
(07) 228-3547 (Res)
Fax. (07) 227-1020
Mob. 050-839-4662
Email: irfan1963@hotmail.com
B.Sc. (Electr) DCET 89, MBA (Finan) IBA PU

MOHAMMAD IRFAN AHMAD
Projects Engr Transmission
MOBILY
P.O. Box:5663, Jeddah :21432,KSA
Tel. (02) 056-0313408 (Off)
Fax. (02) 056-0316154
Mob. 056-564-9898
Email: i.ahmed@mobily.com.sa
BE (Electronics), MS (Comm) UK

MOHAMMAD KHALID SYED
Testing Engineer
Al-Tuwairqi Group
Al-Khobar
Tel. (03) 857-9922 x 408 (Off)
Fax. (03) 859-4695
Mob. 056-412-0146
Email: khalid.syed@altuwairqi.com.sa
B.E. (E) NED 93

MOHAMMAD NISAR ASAAD
Senior Instrument Engineer
S.W.C.C.
P.O. Box 8264, Jubail 31951
Tel. (03) 343-0333 x 30713 (Off)
(03) 343-0333 x 32560 (Res)
Email: nisarasaad@hotmail.com
B.E (Ecs) DCET75, M.Sc. (Avn) CIT UK 79

MOHAMMAD ZAMURRAD CHAUDHRY
Advisor COM Systems
Saudi Telecomm. Company (STC)
Tel. (01) 452-5161 (Off)
Fax. (01) 452-5582
Email: ezamarrad@stc.com.sa
B.E NED, M.Sc Essex

MUHAMMAD ILYAS MUGHAL
Instrument & Control Sys Engr.
Petrokemya
P.O. Box 10002, Jubail
Tel. (03) 357-7601 (Off)
Fax. (03) 358-2056
Mob. 050-728-5682
Email: hafeezmi@sabic.com
B.E. (E) UET AJK 89

MUSHTAQ AHMED CHEEMA
Unit Engineer Scada System
Saudi Electric Company
P.O. Box 57 ECC Building, Riyadh 11411
Tel. (01) 403-2222 x 10346 (Off)
(01) 402-9592 (Res)
B.E (Ecs) NED 79

NABEEL AHMAD SIDDIQUE
Access Network Instal. Engr.
Ericsson AB
P.O. Box 6121, Riyadh 11442
Tel. (01) 230-3111 x 9245 (Off)
(01) 465-1782 (Res)
Mob. 050-443-7849
Email: nabeel.siddique@ericsson.com
B.Sc. (EE) NEU 03

NAYER AZAM
Senior Project Manager
Ebttikar Technology
P.O. Box 52908 , Riyadh 11 573
Tel. (01) 416-2222 x 440 (Off)
(01) 292-2133 (Res)
Fax. (01) 416-1414
Email: nayer.azam@gmail.com
B.E (ECS) NED 78

Electronics Engineers

NUSRAT PERVEZ
General Manager Medical Div.
Modern Scientific & Electronics Corp.
P.O. Box 1938, Riyadh 11441
Tel. (01) 463-1277 x 401/404 (Off)
(01) 461-6741 (Res)
Fax. (01) 465-0813
Mob. 050-570-1681
Email: nusrat@moseco.com.sa
B.E (Ecs) DCET 80

RIAZ HUSSAIN
Transmission Specialist
Saudi Telecomm. Company (STC)
P.O. Box 87912, Riyadh 11652
Tel. (01) 452-8712 (Off)
(01) 405-5350 (Res)
Fax. (01) 452-8666
Mob. 050-729-5877
Email: riaz_47@yahoo.com
B.Sc (Ecs) LU 73

SALMAN MEHMOOD
Support Engineer
YOKOGAWA Middle East
P.O. Box 3422, Dammam 31471
Tel. (03) 865-5422 (Off)
Fax. (03) 864-1149
Email: s_mehmood@yahoo.com
B.E (Ecs) GIK 98

SHAIKH ASRAR AHMED
General Manager
Tatweer International Co.
P.O. Box 87912, Room 201, Riyadh 11652
Tel. (01) 473-8995 / 473-8996 (Off)
(01) 450-3773 (Res)
Fax. (01) 473-8330
Mob. 050-442-3772
Email: saahmad_27@yahoo.com
B.E (Ecs) NED 80
MIE

SYED ADNAN ALI
Lead Aix System Administrator
Riyad Bank
Olaya Oprs. Centre, P.O. Box 22622, Riyadh
Tel. (01) 462-9095 x 5313 (Off)
B.Sc (Ecs) UOS 81

SYED ASHFAQUE MAZHAR
Executive Manager
Computer & Engineering Specialists Co.
P.O. Box 14918, Jeddah 21434
Tel. (02) 671-7285 (Off)
(02) 652-7961 (Res)
Fax. (02) 672-1910
Mob. 050-432-8869
B.E (Ecs) MUET 79

SYED IFTIKHAR AHMED
Project Engineer
HAKA
P.O. Box 595, Abqaiq 31992
Tel. (03) 574-4115 (Off)
(03) 895-0290 (Res)
Fax. (03) 572-1426
Email: ahmesiod@aramco.com.sa
B.E (Ecs) NED 76

SYED KHAWAJA NEHAL UDDIN
Computer & X-Ray Engineer
Yamama Saudi Cement Co. Ltd
P.O. Box 293,, Riyadh 11411
Tel. (01) 495-1300 x 228 (Off)
(01) 495-1300 x 340 (Res)
Fax. (01) 495-4132
Mob. 050-714-0872
Email: s_k_nehal@hotmail.com
B.E (Ecs) NED 80

SYED KHURSIED ABBAS
Instrument & Control Engin
Royal Commission For Yanbu Project
P.O. Box 30144, Yenbu
Tel. (04) 325-8716 (Off)
(04) 396-1085 (Res)
Mob. 050-255-4749
Email: abbassk@rc.com.sa
B.E (Ecs) NED 80

SYED NAZEEF AKHTER
Elect. Estimator Engr.
Elseif Engineering Contracting Est.
P.O. Box 2774, Riyadh 11461
Tel. (01) 454-9191 x 275 (Off)
(01) 227-3844 (Res)
Fax. (01) 454-2759
Mob. 050-711-2249
Email: sna@el-seif.com.sa
B.E (Ecs) NED 92

SYED SALIMULLAH
Project / Marketing Engineer
IKE Commercial
P.O. Box 4897, Riyadh 11412
Tel. (01) 419-1394 (Off)
Fax. (01) 419-1287
Mob. 050-962-1926
Email: ike@ikegroup.net
B.E (Electronics) SUJamshoro 75
MIE, No. LM 5923

SYED SHAKEEL AHMED
Electrical Site Engineer
Saud Consultant
Tel. (01) 401-1405 (Res)
Mob. 050-845-0723
Email: shakeelahmed2000pk@yahoo.com
B.E. (E) SSUET 01

Electronics Engineers

TASADDUQ HUSSAIN GILANI
Senior Engineer
SIEMENS
P.O. Box 27503, Riyadh 11423
Tel. (01) 206-0000 x 3334 (Off)
Fax. (01) 283-2963
Mob. 050-868-9839
B.Sc (EE) UCET 93, M.Sc (Ecs) UET 97

TASNEEM AHMED
Area Manager - Eastern Region
Salem Agencies & Servoces Co. (SAS) -
P.O. Box 3033, Khobar 31952
Tel. (03) 858-7505 / 858-7595 (Off)
Fax. (03) 857-1343
Mob. 050-369-2656
Email: saskhobar@sps.net.sa
B.E (Ecs) DCET 87

WAHEED AKHTER
Project Manager
Saudi Technical Engineering System Ass.
PP9, P.O. Box 5463, Riyadh 11422
Tel. (01) 464-9811 x 430 (Off)
Fax. (01) 464-2810
B.E (Ecs) NED 89

ZAHID KHAN
Electrical Shift Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1410 (Off)
(07) 227-1111 Ext 2823 (Res)
Mob. 050-936-2894
BE (Elect) NED 88

PAKISTANI UNIVERSITIES STATISTICS

REGION	UNIVERSITES	PUBLIC	PRIVATE
AJK	3	1	2
Balochistan	6	5	1
Islamabad	17	14	3
Northern Areas	1	1	
NWFP	21	12	9
Punjab	36	19	17
Sindh	38	13	25
Total	**122**	**65**	**57**

RECOGNIZED PROFESSIONAL SOCIETIES

Professional Councils authorized under charter to issue Diploma/Certificates

1. Pakistan College of Physicians and Surgeons
2. Institute of Chartered Accountants Pakistan
3. Institute of Cost & Management Accountants of Pakistan
4. Pakistan Nursing Council

Professional Regulatory Bodies

1. Pakistan Medical and Dental Council
2. Unani, Ayurvedic & Homeopathic Practitioners
3. Pharmacy Council
4. Pakistan Bar Council
5. Pakistan Engineering Council
6. Pakistan Council of Architects and Town Planners
7. Pakistan Veterinary Medical Council

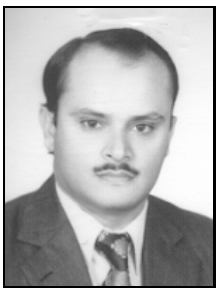
Mechanical Engineers

ABDUL MATEEN AZMI
Sales&Marketing Manager
Saudi Scaffolding Factory
Roll Form Division, P.O. Box 2194, Khobar
Tel. (03) 857-4082 (Off)
(03) 859-5266 (Res)
Fax. (03) 857-8131
B.Sc (ME) DIT 75

ABDUL QADIR AKBANI
Liaison Engineer
Al-Qahtani Pipe Coating Terminal
P.O. Box 20, Dammam 31400
Tel. (03) 857-4150 (Off)
(03) 867-2745 (Res)
Fax. (03) 826-9894
Mob. 050-385-2602
Email: info@aqpct.com
B.E (M) NED 71
MIE, No. M5861

ABDUL QUDDUS
Mechanical Engineer
KFUPM
P.O. Box 1524, Dhahran 31261
Tel. (03) 860-3533 (Off)
(03) 860-5519 (Res)
Fax. (03) 860-3996
Email: amquddus@kfupm.edu.sa
B.Sc (ME) UETL 80, M.Sc. KFUPM 86

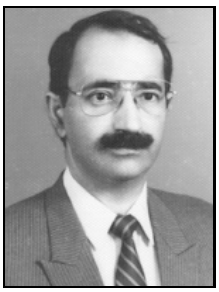
ABDUL QUDDUS M. IBRAHIM
Senior Engineer
Saudi Electric Company (CRB)
P.O. Box 57, Riyadh 11411
Tel. (01) 464-3333 x 4803 (Off)
(01) 448-9808 (Res)
Fax. (01) 464-3333 x 4595
B.Sc (ME) UOP 74, M.E LP 76
MIE, No. M10759/S16



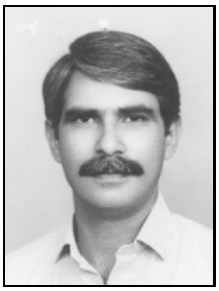
ABDUL WAHEED
Project Engineer
Saudi Electric Company (ERB)
2-210 W, SEC-HQ, P.O. Box 5190, Dammam
Tel. (03) 858-6649 x 86649 (Off)
Fax. (03) 858-5465
Mob. 056-842-2476
Email: waheedsa55@yahoo.com
B.Sc (ME) UETL 74
MIE

ADIL BIN RAUF
Staff Process Engineer
Petrokemya
P.O. Box 10002, Jubail
Tel. (03) 357-7691 (Off)
(03) 347-1787 (Res)
Fax. (03) 358-4480
Mob. 050-595-5609
Email: binraufa@petrokemya.sabic.com
BE (ME) NED 87

AFTAB AHMAD MALIK
Mechanical Engineer
Saad Trading and Contracing Co.
P.O. Box 30353, Al-Khobar 31952
Tel. (03) 801-2806 (Off)
(03) 896-0240 (Res)
Fax. (03) 887-2104
Mob. 056-711-2875
B.Sc (ME) UETL. 77



AGHA ZIA-UL-HASSAH
Principal Laison Engineer
NESPAK
P.O. Box 50344, Riyadh 11523
Tel. (01) 465-4235 x 105 (Off)
(01) 403-3091 (Res)
Fax. (01) 462-6769
Mob. 050-328-7205
Email: tarnes.iep@zajil.net
B.Sc (ME) UOP 80



AHSAN ALI LOONA
Head of Mech. Engg. Dept.
Al Fouzan Trading Co.
P.O. Box 8300, Riyadh
Tel. (01) 476-8686 x 108 (Off)
(01) 493-5071 (Res)
Fax. (01) 476-8686 x 160
Mob. 050-626-1239
B.Sc (ME) UETL 80

AHTSHAM AHMED
Engineering Section Manager
Mitsubishi Electric Saudi Ltd.
P.O. Box 3682, Makkah
Tel. (02) 550-6273 x 330 (Off)
(02) 566-5513 (Res)
Fax. (02) 550-6277
Mob. 050-746-4075
Email: ahtsham@melsa.com.sa
B.E (M) NED 93

AMANULLAH TURK
Director Engineering
BJB Arabia Inc
Tel. (03) 847-7801 x 242 (Off)
Mob. 054-141-7051
Email: aturk@bjbinc.com
BE (M) NED, MS Ind. E USA, MBA USA

AMIR BIN RAUF
Staff Engr. Maint. Planning
PETROKEMYA
P.O. Box 10002, Jubail 31961
Tel. (03) 357-7276 (Off)
(03) 346-3120 (Res)
Fax. (03) 358-4480
Mob. 055-131-0959
Email: binraufa1@petrokemya.sabic.com
B.E (M) NED 81

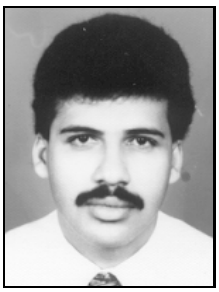
Mechanical Engineers

ANWAR KHALIL SHEIKH DR.
Professor of Mechanical Eng.
King Fahd Univ. of Petroleum & Minerals
KFUPM# 284, Dhahran 31261
Tel. (03) 860-2575 (Off)
(03) 860-6906 (Res)
Fax. (03) 860-6906
Email: anwarks@kfupm.edu.sa
B.Sc (ME) UETL 70, M.E WSU 75, Ph.D
FIE

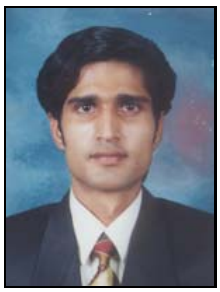
ANWAR RAZA KHAN
Project Staff Engineer
SABIC
P.O. Box 11425, Jubail 31961
Tel. (03) 340-3263 Ext.121 (Off)
(03) 361-3562 (Res)
Fax. (03) 341-2816
Mob. 050-177-9431
Email: khanar@sabic.com
B.E (M) NED 82
MIE

ARSLAN AHMED
Saudi Electric Co.
P.O. Box 7054, Riyadh 11462
Tel. (01) 245-3681 x 9765 (Off)
(01) 441-4410 (Res)
Fax. (01) 245-0745
M.S (ME)
MIE, No. M8209

ASIF ABBAS ZAIDI
Project Engineer
A. Abunayyan Trading Corp.
P.O. Box 321, Riyadh 11411
Tel. (01) 472-4861 (Res)
Mob. 050-719-0268
Email: asifabbaszaidi@hotmail.com
B.Sc (ME) EUP 79



ASIF MAQSOOD SHEIKH
Maintenance & Service Manager
Agricultural Development Co.
P.O. Box 5244, Riyadh 11411
Tel. (01) 477-5192x 265 (Off)
(01) 406-7729 (Res)
Fax. (01) 479-2647
Mob. 050-524-6531
Email: asifmaqsood@hotmail.com
B.Sc (ME) UETL 91



ASIF ZAFAR
Sales & Marketing Engineer
ISCOSA (Siemens - Westinghouse)
P.O. Box 752, Abha
Mob. 050-585-8406
B.E (M) NED 94, MBA IBA 97

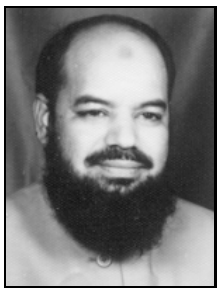
ATHAR ALIM KHAN
Mechanical Engineer
Rashid Engineering
P.O. Box 4354, Riyadh 11491
Tel. (01) 488-2226 x 23 (Off)
B.Tech (Hons) NED 83

AZMAT MUJTUBA
Asstt. Manager Roll-Shop
Al-Ittefaq Steel Products Co.
P.O. Box 7600, Dammam 31472
Tel. (03) 812-1143 (Off)
(03) 889-5864 (Res)
Fax. (03) 812-1059
Mob. 050-587-9180
Email: azmat@altuwairqi.com.sa
B.E. (ME) NED 95

BADAR UZ ZAMAN
Sr. Mechanical Engineer
SABIC EPM
P.O. Box 10110, Jubail 31961
Tel. (03) 357-5757 (Off)
(03) 361-5103 (Res)
Fax. (03) 388-8542
B.E (M) NED 77

FAISAL MALIK
Marketing Manager
Carrier Saudi Arabia - Arabian Air
P.O. Box 9784, Riyadh 11423
Tel. (01) 491-1333 x 385 (Off)
Fax. (01) 491-5325
Email: faisal.malik@carrierSaudi.com
B.Sc (ME) UETL 97, MBA Al-Khair U 97

FAREED AHMED
Area Sales Manager
Arabian Air Conditioning Co. Carrier
P.O. Box 9784, Riyadh 11423
Tel. (01) 491-1333 (Off)
(01) 473-1256 (Res)
Fax. (01) 491-6758
Mob. 050-825-8050
Email: fareed.ahmed@carriersaudi.com
B.E (ME) NED 90



FARHAT ALI BURNEY, DR
Professor
King AbdulAziz University
P.O. Box 80204, Jeddah 21589
Tel. (02) 695-2251 (Off)
(02) 688-6474 (Res)
Fax. (02) 695-2486
Email: fburney@hotmail.com
B.E (E&M) NED 59, M.Sc 74, Ph.D WU 76
MIE

Mechanical Engineers

FAROOQ HAMEED
Olefins Maint.Section Manager
PETROKEMYA
P.O. Box 10002, Jubail 31961
Tel. (03) 357-7332 (Off)
(03) 341-6932 (Res)
Fax. (03) 358-4480
B.Sc (M) UETL 70

FASIH-UZ-ZAMAN KHAN
Senior Mechanical Engineer
Zuhair Fayaz Partnership
P.O. Box 9486, Riyadh 11413
Tel. (01) 476-3030 x 295 (Off)
(01) 474-2796 (Res)
Fax. (01) 476-3920
B.E (M) NED 80
MIE, No. M7169

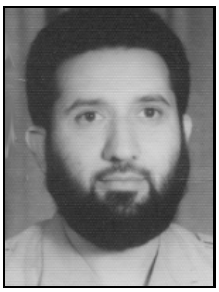
FAYYAZ AHMED KHAN
MMS Specialist
Zuhair Fayez Partnership
P.O. Box 9486, Riyadh 11413
Tel. (01) 476-3030 x 283 (Off)
(01) 473-0882 (Res)
B.S (ME) DIT 79

FAYYAZ MUDDASSIR MUBEEN
Desalination Specialist
ACWA POWER PROJECT CO.
P.O. Box 58, Shuqaiq - Jizan
Tel. (07) 341-1600 x 141 (Off)
(07) 341-1600 x 117 (Res)
Fax. (07) 341-0514
Mob. 055-220-0196
Email: fayyazmubeen@hotmail.com
B.E (M) NED 75, M.S (ME) KFUPM 81
MIE

GHULAM HUSSAIN KHAN
Engineer
King Saud University
P.O. Box 800, Riyadh 11421
Tel. (01) 467-6841 (Off)
(01) 402-1376 (Res)
Fax. (01) 467-6652
B.Sc (ME) UETL 71
MIE

GHULAM SARWAR
HVAC Engineer
Rashid Engineering
P.O. Box 4354, Riyadh 11491
Tel. (01) 464-1188 (Off)
B.Sc (ME) UOP 74
MIE

HABIBULLAH TALPUR
Unit Engineer
Saudi Electric Company, PP4
P.O. Box 57, Riyadh 11411
Tel. (01) 241-4364 x 4220 (Off)
(01) 457-7720 (Res)
B.E (M) SU 73



HAFIZ MUHAMMAD WASEEM
Sales Engineer
Mitsubishi Electric Saudi Ltd.
P.O. Box 14166, Jeddah 21424
Tel. (02) 651-9998 x 233 (Off)
(02) 643-5698 (Res)
Fax. (02) 650-3519
Mob. 050-528-1766
Email: wasim@melsa.com.sa
B.Sc (ME) UOP 90

HAMID MAHMOOD SHAH
Sr. Procurement Officer
Hilal Hussein Al-Tuwairqi
P.O. Box 5667, Dammam 31432
Tel. (03) 812-2212 x 260 (Off)
Fax. (03) 812-2128
Mob. 050-683-3660
Email: hamid.mahmood@altuwairqi.com.sa
B.Sc. (ME) UETT 2000

HAROON SALEEM QAZI
RTD Analyst II
Schlumburger
P.O. Box 2836, Al-Khobar 31952
Tel. (03) 857-4401 (Off)
(03) 867-2129 (Res)
Fax. (03) 867-5660
Email: haroon_sq@hotmail.com
BE (ME) NED 03, MS (TEL) NPUL 05

IMRAN SULTAN
Sales Engineer
Carrier Saudi Services Company
P.O. Box 377, Al-Khobar 31952
Tel. (03) 857-7710 (Off)
(03) 833-0491 (Res)
Fax. (03) 857-8834
Mob. 050-228-3342
Email: sultan@carriersaudi.com
B.E (M) NED 92

INAM MUHAMMAD
Lecturer Mech. Engg. Dept.
KFUPM
P.O. Box 1252, Dhahran 31261
Tel. (03) 860-2520 (Off)
(03) 860-5730 (Res)
Fax. (03) 860-2949
Mob. 050-801-0419
Email: inamgm@kfupm.edu.sa
B.E (M) NED 80, M.S KFUPM 84
MIE, No. LM-6607

Mechanical Engineers

IRFAN ALI KHAN
Chief Engineer
Institute of Public Adminstration
P.O. Box 205, Riyadh 11141
Tel. (01) 474-5296 (Off)
(01) 270-7845 (Res)
Fax. (01) 474-5302
Email: khani@ipa.edu.sa
B.Sc (ME) AMU Aligarh 77, M.S (ME) AMU

IRFAN BROHI
Asst. General Manager
Arab Equipment Est.
P.O. Box 1660, Dammam 31441
Tel. (03) 857-3559 (Off)
(03) 857-2005 x 109 (Res)
Fax. (03) 857-0463
Email: ibrohi@hotmail.com
B.E (M) NED 80

IRSHAD AHMED CHAUDHRY
Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1615 (Off)
Fax. (07) 228-3287
Mob. 055-320-7504
Email: chirshad64@yahoo.com
B.Sc.(ME) UETL 83

ISLAM MUSHEER KHAN
General Manager
Al-Aswad International
P.O. Box 2153, Dammam 31451
Tel. (03) 854-2058 (Off)
(03) 857-7447 (Res)
Fax. (03) 834-6495
B.E (M) NED 75
MIE

ITLAQUE AHMED KHAN
Project Engineer
M. A. Al-Azzaz
Tel. (03) 340-9667 (Off)
Mob. 056-933-8154
Email: khania01@marafiq.com.sa
B.Sc. (ME) UETL 79

JAMIL A. WARSI
Project Director
Al-Zaid Engineering Consultants
P.O. Box 20179, Riyadh 11455
Tel. (01) 463-3330 (Off)
(01) 479-2789 (Res)
Fax. (01) 479-2425
Mob. 050-347-9375
Email: ahmadshaheer@awalnet.net.sa
B.E (M) NED 74
MIE

JAWAID IQBAL
Area Sales Manager
Arabian Air Conditioning Co. (Carrier)
P.O. BOX 11728 , Jeddah- 21463
Tel. (02) 654-5683 / 692-0422 (Off)
Fax. (02) 654-0179
Mob. 050-835-5658
Email: jiqbal@carriersaudi.com
B.E (M) NED 79
MIE

KASHIF ZIA
Technical Field Eng
Saudi Arabian Lubricating Oil Co.
P.O. Box - 7720, Dammam - 31472
Tel. (03) 811-7001 (Off)
(03) 889-3706 (Res)
Fax. (03) 811-6282
Mob. 050-789-3783
Email: kashiftotal@hotmail.com
BE (ME) NED 93, MS (CS) NED 98, MBA

KHALID ALI
Material Purchasing Engr.
Saudi Electric Company SEC-SOA
P.O. Box 2012, Abha
Tel. (07) 227-1111 x 1358 (Off)
(07) 229-6225 (Res)
Fax. (07) 227-1367
Mob. 050-852-5589
B.Sc. (ME) UET 86

KHALID LATIF
Project Manager
PETROKEMYA
P.O. Box 10002, Jubail 31961
Tel. (03) 357-7609 (Off)
(03) 346-1901 (Res)
Fax. (03) 358-4480
B.Sc (M) UETL 76
MIE, No. M9222

KHALID MASOOD BARLAS
Mechanical Engreer
Saleh Abal Khail Consulting Engrs.
P.O. Box 4296, Riyadh 11491
Tel. (01) 476-6500 (Off)
(01) 406-9788 (Res)
B.E (M) SU 69
MIE, No. M9793/K287

KHALIL UR REHMAN SHAH
Project Manager
King Faisal Specialist Hospital
P.O. Box 3354, Riyadh 11211
Tel. (01) 442-7686 (Off)
(01) 479-1637 (Res)
Fax. (01) 442-7681
B.Sc (ME) UETL 69
MIE, No. M2943

Mechanical Engineers

KHAWAR IQBAL KHAN
Sr. Mechanical Engineer
FAKIEH Group
P.O. Box 7797, Makkah
Tel. (02) 531-7420 (Off)
(02) 673-6033 (Res)
Fax. (02) 531-7420
Mob. 050-710-5613
Email: khawar51@yahoo.com
B.Sc (ME) UETL 75

M. FEROZE SAYEED
Senior Mechanical Engineer
Saudi Cement Co.
P.O. Box 339, Dammam 31471
Tel. (03) 834-4500 x 603 (Off)
(03) 899-3834 (Res)
Fax. (03) 834-5460
B.E (M) NED 74

M.J.K. ZARRAR SHARIF
Mechanical Engineer
Dept. Of Biomedicne, KSU
P.O. Box 10219, Riyadh 11433
Tel. (01) 435-8422 x 1686 (Off)
B.Sc (ME) UETL 74

MAQBOOL AHMED BHATTI
General Manager
Modeco Hitec Div.
P.O. Box 93711, Riyadh 11683
Tel. (01) 419-6425 (Off)
(01) 455-0537 (Res)
Fax. (01) 462-2164
B.Sc (ME) UETL 66, P.GD (NE) PINSTC 69

MAROOF AHMED JAFFERI
Mechanical Engineer
Saudi Consulting Services
P.O. Box 1293, Dammam 31431
Tel. (03) 858-0511 x 216 (Off)
Fax. (03) 858-0661
Mob. 050-382-8491
B.E (M) NED 88, M.S (M) CCNY 93

MASOOD SAID
General Manager (Operations)
Alhamrani - Fuchs Petroleum Saudi Arabia
P.O. Box 7103, Jeddah 21462
Tel. (02) 663-5666 (Off)
Fax. (02) 691-5731
Mob. 050-560-0443
Email: masoodsaid@hotmail.com
B.Sc (ME) UETL 71
MIE

LIAQAT ALI SAHI
Project Engineer
Saudi Aramco
P.O. Box 968, Dhahran 31311
Tel. (03) 873-8959 (Off)
(03) 878-8399 (Res)
Fax. (03) 873-8959
B.Sc (ME) UETL 79

M. IMRAN ASGHAR
Sr. Planning & Cost Engineer
National Industrial Gases Co. (GAS)
P.O. Box 10110, Jubail 31961
Tel. (03) 3575709 (Off)
(03) 348-9267 (Res)
Fax. (03) 358-4880
Mob. 050-595-2181
Email: imran1312@hotmail.com
B.E (M) UETL 90, CCE 2000, CIMSC 2005,

MAHMOOD BUTT
Project Engineer
Gulf Consolidated Co.
Tel. (03) 03-572-0849 (Off)
Fax. (03) 03-572-0843
Mob. 050-793-6801
B.Sc.(ME) UETL 85

MAQBUL AHMED
Mechanical Engineer
Al-Jedidi Consulting Co.
Tel. (02) 619-0076 (Res)
B.Sc. (ME) UETL 82

MASOOD ELAHI
Project Manager
Saudi Amoudi Group Company
P.O. Box 56880, Riyadh 11564
Tel. (01) 251-3559 / 251-3465 (Off)
(01) 242-1129 (Res)
Fax. (01) 251-1202
Email: masood@saudionline.com.sa
B.Sc (ME) UETL 75
MIE

MIAN ABDUL REHMAN SARWAR
Project Engineer
National Steel Co.
P.O. Box 3869, Al-Khobar 31952
Tel. (03) 812-2966 x 611 (Off)
Email: mars_uetian@hotmail.com
B.Sc. (ME) UETL 04

Mechanical Engineers

MIAN SHAMIM AHMAD
Sr. Mech Engineer
Rashid Engineering
P.O. Box 4354, Riyadh 11491
Tel. (01) 464-1188 / 254-0886 x 205 (Off)
(01) 291-5501 (Res)
Fax. (01) 465-6245
Mob. 056-911-3364
Email: mianshamim@hotmail.com
B.Sc (ME) UOP 74

MIR ZAMAN KHAN
Chief Engineer(Mechanical)
Zuhair Fayez Partnership
P.O. Box. 5445, Jeddah 21422
Tel. (02) 612-9999 (Off)
(02) 672-0474 (Res)
Fax. (02) 612-9955
Mob. 050-460-2280
Email: khan_mir55@hotmail.com
B.Sc. (ME) UP 76
MIE, No. M/6089

MOHAMMAD ABBAS ANSARI
Field Engineer (Mechanical)
MARAFIQ
MARAFIQ, Potable Water Facilty Tareeq-113,
Tel. (03) 341-0109 x 3517 (Off)
Mob. 050-906-8602
Email: abbasm@marafiq.com.sa
B.Sc (ME) UETL 93

MOHAMMAD ANWAR DAWOOD MEMON
S.Quality Assurance Specialist
Royal Saudi Naval Forces
P.O. Box 22463, Riyadh 11495
Tel. (01) 477-6777 x 1371 (Off)
(01) 231-1957 x 16 (Res)
Email: admemon@hotmail.com
B.E (M) NED 71
MIE, No. M3496

MOHAMMAD ARSHAD
Material Engineer
Grain Silo And Flour Mill Orgnization
P.O. Box 3402, Riyadh 11471
Tel. (01) 464-3500 x 450 (Off)
Fax. (01) 463-1943
Mob. 050-840-1583
Email: arshad@gsfmo.gov.sa
B.E (M) NED 80

MOHAMMAD ARSHED JAVAID
Material Purchasing Engr.
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1358 (Off)
(07) 225-6897 (Res)
Fax. (07) 227-1367
Mob. 050-854-1779
Email: malikarshed@hotmail.com
B.Sc. (M) UET 84

MOHAMMAD ASGHAR MUGHAL
Staff Engineer, Maintenance
PETROKEMYA
P.O. Box 10002, Jubail 31961
Tel. (03) 357-7084 (Off)
(03) 349-3434 (Res)
Fax. (03) 349-3431
Mob. 056-840-0286
Email: mughalma@petrokemya.sabic.com
B.E (M) NED 79
AMIE, No. A3282

MOHAMMAD ASHRAF ZIA
Project Engineer
ABWA Co. Ltd.
P.O. Box 10460, Riyadh 11433
Fax. (01) 463-1143
Mob. 050-525-4996
Email: ashrafzia76@hotmail.com
B.Sc. (ME) UETL 92

MOHAMMAD FAHEEM WAJID
Construction Div. Manager
Horizon Contracting & Trading
P.O. Box 2124, Dhahran 31311
Tel. (03) 340-8881/2 (Off)
(03) 364-2575 (Res)
Fax. (03) 340-8883
Mob. 050-685-0252
Email: fahimwajid@yahoo.com
B.Sc (ME) UETL 97

MOHAMMAD FAZLUL AMIN
Mechnical Engineer
Saudi Consulting Services
P.O. Box 2341, Riyadh 11451
Tel. (01) 245-3681 x 9335 /245-3669 (Off)
(01) 405-6203 (Res)
B.E (M) NED 78
FIE, No. M7088

MOHAMMAD FEROZE ALAM
Mechanical/Piping Engineer - I
Saudi Consolidated Engineering Co. (SCEC)
P.O. Box 1713, Al-Khobar 31952
Tel. (03) 894-6816 x 372 (Off)
Fax. (03) 894-2341
Mob. 053-100-5715
Email: falam55@yahoo.com
B.E (M) NED 84

MOHAMMAD HUSSAIN KASHIF
Sales Engineer
Arabian Airconditioning (Carrier)
P.O. Box 377, Al-Khobar 31952
Tel. (03) 857-7710 (Off)
Fax. (03) 857-8834
Mob. 050-223-4313
Email: mohd.kashif@carriersaudi.com
B.E (M) NED 95, M.S PNEC 98

Mechanical Engineers

MOHAMMAD ISHAQUE QAZI
Mechanical Engineer
Int'l Airports Projects, KKIA
P.O. Box 12531, Riyadh 11483
Tel. (01) 221-2067 (Off)
(01) 220-2558 (Res)
B.Sc (ME) GCET 62

MOHAMMAD ISRARUL HAQ
Senior Engineer
SEC-ERB
OED/MED Room 2-210 W SEC-ERB P.O.
Tel. (03) 858-6529 (Off)
(03) 814-0807 (Res)
Fax. (03) 858-5465
Mob. 056-001-5939
Email: israr6529@yahoo.com
B.Sc (ME) UETL 78, MSc. KFUPM 84

MOHAMMAD JAMSHAID MEER
Sr. Operations Engineer
Saudi Aramco
P.O. Box 13761, Dhahran
Tel. (03) 874-1343 (Off)
(03) 878-5308 (Res)
Fax. (03) 874-1331
Mob. 050-682-5198
Email: mohammad.meer@aramco.com
B.Sc (ME) UETL 80
MIE, No. M11804

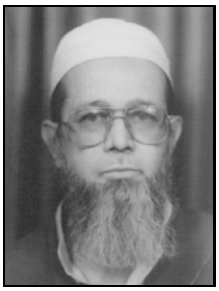
MOHAMMAD MAHMOOD ALAM
Mechanical Engineer
Zamil & Turbag Consulting Engineers
P.O. Box 30594, Yanbu
Tel. (04) 392-5316 (Off)
Fax. (04) 392-5171
Email: masoodul@yahoo.com
AMIE IEP 76
MIE, No. M5944

MOHAMMAD PARVEZ MALIK
Divisional Manager Service-CSA
Carrier Saudi Arabia
P.O. Box 377, Al-Khobar-31952
Tel. (03) 857-7710 x 222 (Off)
Fax. (03) 857-7710 ext223
Mob. 050-552-5273
Email: parvez.malik@carriersaudi.com
B.Sc (ME) UOP 78
MIE, No. M2869

MOHAMMAD SAEED AKHTAR
Manager Contracts & Procurment
Imad Company
P.O. Box 677, Al-Khobar 31952
Tel. (03) 887-3868 x 202 (Off)
(03) 881-2037 ext.203 (Res)
Fax. (03) 887-3872
Email: saieedakhtar@yahoo.com
B.Sc (ME) UETL 74, M.Sc. AIT 77

MOHAMMAD SAGHIR
Executive Manager
Alqan Contracting Est.
P.O. Box 221314, Riyadh
Tel. (01) 463-4451 (Off)
(01) 402-9386 (Res)
Fax. (01) 465-1174
Mob. 055-438-7174
Email: saghir59@hotmail.com
B.Sc (M) UC 87, M.Sc Brunel U 00

MOHAMMAD SHEHBAZ KHAN
Procurement Engineer
Nesma Emcor Co. Ltd.
P.O. Box 1498, Al-Khobar 31952
Tel. (03) 897-1050 x 272 (Off)
(03) 859-2437 (Res)
Fax. (03) 897-1050 x 285
B.E (M) NED 96



MOHAMMAD SULAIMAN LALA
Mechancial Engineer
Saline Water Conversion Corporation
P.O. Box 5968, Riyadh 11432
Tel. (01) 463-1111 x 2111 (Off)
(01) 474-7048 (Res)
Fax. (01) 462-1015
Email: swcc@kfshhub.kfshrc.edu.sa
B.E (M) NED 71

MOHAMMAD TARIQ
Mechanical Engineer
Dar Al-Majd Consulting Engineers
P.O. Box 60212, Riyadh 11545
Tel. (01) 464-9688 (Off)
(01) 476-9014 (Res)
B.Sc (ME) MMU 80

MOHAMMAD TARIQ FAQUIH
Operation Engineer
Saudi Electric Company (CRB)
Power Plant No 9, P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 1720 (Off)
(01) 486-1228 (Res)
Mob. 050-717-2683
B.E (M) NED 76

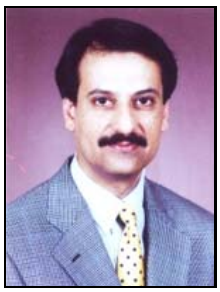
MOHAMMAD YAQUB
Lecturer
KFUPM
KFUPM Box 767, Dhahran 31261
Tel. (03) 860-2520 (Off)
(03) 860-5429 (Res)
Fax. (03) 860-2949
Mob. 050 906-0018
Email: Myra@frump.eddo.as
B.E (M) 84, M.S KFUPM 90
MIE, No. M997/K332

Mechanical Engineers

MOHAMMAD YOUNAS
Lecturer
KFUPM
P.O. Box 196, Dhahran 31261
Tel. (03) 860-3049 (Off)
(03) 860-5299 (Res)
Fax. (03) 860-2949
Email: myounasa@kfupm.edu.sa
B.Sc (ME) UETL 78, M.S KFUPM 84
MIE

MOHAMMAD ZAHID SOHAIL
Regional Sales Manager
Arabian Auto Agency
P.O. Box 2111, DAMMAM-31451
Tel. (03) 8576024 (Off)
(03) 8141195 (Res)
Fax. (03) 857-9220
Mob. 050-515-2604
Email: mzsohail@yahoo.com
B.Sc (ME) UETL 78
MIE, No. M9876/L1774

MUHAMMAD TARIQ
Sr. Reliability Engr.
Petrokemya
P.O. Box 10002, Jubail
Tel. (03) 357-7260 (Off)
(03) 346-9715 (Res)
Fax. (03) 358-4480
Mob. 050-218-871
Email: tariqm@petrokemya.sabic.com
B.Sc. (ME) UETL 85



NAJIB REHMAN
Head Mechancial Dept.
Zuhair Fayez Partnership
P.O. Box 5445, Jeddah 21422
Tel. (02) 612-9999 x 9433 (Off)
(02) 617-3056 (Res)
Fax. (02) 612-9955
Mob. 050-469-4257
Email: najibrehman@yahoo.com
B.E (M) NED 80
MIE, No. M12689/SA63

NAVEED ASLAM
Operations Manager
Zamil Steel
P.O. Box 877, Dammam 31421
Tel. (03) 847-1840 x 207 (Off)
(03) 869-1622 (Res)
Fax. (03) 847-1982
Mob. 050-844-0830
Email: naveedaslam@bcoms.com
B.Sc. (ME) UETL 91

NEAZ AHMED
Engineer-II
Research Institute, KFUPM
KFUPM Box 573, Dhahran 31261
Tel. (03) 860-3082 (Off)
Fax. (03) 860-3989
B.E (M) NED 84, M.S (M) KFUPM 93
MIE

MOHAMMAD ZAFAR SAGHIR
Senior Engineer
Saudi Electric Company (SEC-COA)
P.O. Box 57, Riyadh 11411
Tel. (01) 403-2222 x 18026 (Off)
(01) 466-0132 (Res)
Fax. (01) 408-6307
Mob. 050-925-2649
Email: zafar_saghir@hotmail.com
B.E. (ME) MUET 80

MOHIUDDIN AHMED
Lecturer
KFUPM
P.O. Box 102, Dhahran 31261
Tel. (03) 860-3779 (Off)
(03) 860-5907 (Res)
Fax. (03) 860-2115
Email: mohiudin@kfupm.edu.sa
B.Sc (ME) UETL 80, M.E KFUPM 84

NAFIS-UL-HASAN
Section Head, Plan. & Project
Saudi Electric Company (CRB) PP7
P.O. Box 57, Riyadh 11411
Tel. (01) 498-0020 x 7013 (Off)
(01) 446-7913 (Res)
Fax. (01) 498-0028
B.E (M) NED 74

NASIM R.M INAMULLAH
Unit Planning Engineer
Saudi Electric Company (CRB)
P.O. Box 57, Riyadh 11411
Tel. (01) 245-3681 x 9753 (Off)
(01) 454-4923 (Res)
Email: flame8_2000@yahoo.com
B.Sc (ME) EPUET 69
MIE

NAVEED IQBAL QURESHI
Mechanical Engineer
Ministry of Defense and Aviation
P.O. Box 58303, Riyadh 11594
Tel. (01) 477-7009 x 27213 (Off)
(01) 405-9327 (Res)
B.Sc (ME) UETL 84

NISAR AHMAD ATTA
Mehanical Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1295 (Off)
(07) 236-1244 (Res)
Fax. (07) 227-1175
B.Sc.(ME) UET 78, M.Sc.(ME) 98

Mechanical Engineers

PERVAIZ AKBAR
MANAGER PLANT SERVICES
Olayan Descon
P.O. Box 10108, Jubail 31961
Tel. (03) 341-6430 / 341-7024 x2209 (Off)
(03) 346-0552 (Res)
Fax. (03) 340-7029
Mob. 050-490-0143
Email: pakbar@olayandescon.com
B.Sc (ME) UETL, 75

RAFIQ AHMED LAGRIAL
Mechanical Engineer
Ground Engineering Contractors
P.O. Box 2870, Al-Khobar 31952
Tel. (03) 898-2240 (Off)
Fax. (03) 894-8378
Mob. 055-844-4375
Email: gec@zajil.net
B.E. (Mech) NED 94

RAJA RIZWAN IMTIAZ
Sr. Stationary Equip Engr.
Petrokemya
P.O. Box 10002, Jubail
Tel. (03) 357-7192 (Off)
(03) 346-7417 (Res)
Fax. (03) 358-4480
Mob. 050-393-4186
Email: imtiazrr@petrokemya.sabic.com
B.Sc. (ME) NWFP UET 88

REHAN NOOR KHAN
King Faisal University
Tel. (03) 896-6666 x 1045 (Off)
(03) 858-1820 (Res)
Fax. (03) 896-6695
Mob. 050-499-8628
B.SC (ME) UETL 78, M.S KFUPM 82

S. ABID HUSSAIN
Product & System Supp. Manager
Arabian Airconditioning Co. (Carrier)
P.O. Box 690, Riyadh 31932
Tel. (01) 491-1333 x 320 (Off)
(01) 445-4824 (Res)
Fax. (01) 491-5325
Email: abid.hussain@carriersaudi.com
B.E (M) NED 89

SAEED RASHID SHEIKH
Manager Engineer Services
Turbine Technologies
Tel. (01) 476-2539 (Off)
(01) 403-2377 (Res)
Mob. 050-412-0374
B.Sc (ME) GCET 56

SAIF UR REHMAN
Senior Sales Engineer
Arabian Air Conditioning Co. (Carrier)
P.O. Box 9784, Riyadh 11423
Tel. (01) 491-1333 x 342 (Off)
Fax. (01) 491-6758
Email: saif.rehman@carriersaudi.com
B.E (M) NED 90, MBA (Mar) PUK 97
MIE

SAIFULLAH SALEEM
Marketing & Sales Manager
MAQ Trading & Contracting
P.O. Box 221481, Riyadh 11311
Tel. (01) 204-6279 (Off)
(01) 402-6838 (Res)
Fax. (01) 276-5801
Mob. 050-344-4853
Email: faastintl@yahoo.com
B.Sc (ME) UETL 91
MIE, No. M12258

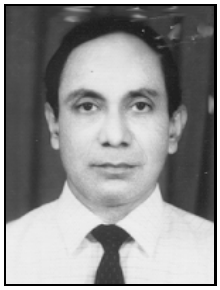
SAIF-UR-RAHMAN, DR
Research Engineer
King Fahd University of Petroleum and
P.O. Box 1047, KFUPM, Dhahran 31261
Tel. (03) 860-6688 (Off)
(03) 860-5688 (Res)
Fax. (03) 860-3685
Email: surahman@kfupm.edu.sa
B.SC (ME) 78, M.Sc. UTA 89, Ph.D UTA 96

SAJID GUL
Technical Manager
Siemens Ltd
P.O. Box - 719, Al-Khobar - 31952
Tel. (03) 865-9624 (Off)
Fax. (03) 865-9661
Mob. 055-822-7702
Email: sajid.gul@siemens.com
B.Sc. (ME) UETL 96

SAMI UDDIN CHUGHTAI
Project Manager
Gulf Consolidated Contractor Co.Ltd
Gulf Consolidated Contractor Co.Ltd
Tel. (03) 817-3000 (Off)
(03) 865-6896 (Res)
Fax. (03) 817-3300
Mob. 050-587-4716
Email: samipk003@yahoo.com
B.Sc (ME) UETL 91
MIE, No. M13531/L3863

SARFRAZ AHMAD MALIK
Maint. Trg. Coordinator
PETROKEMYA
P.O. Box 10002, Jubail 31961
Tel. (03) 357-7236 (Off)
(03) 348-1722 (Res)
Fax. (03) 358-4480
B.Sc (M) UETL 79

Mechanical Engineers



SHABBIR AHMED SIDDIQUI
Senior Mechanical Engineer
Saudconsult
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 (Off)
(01) 473-6026 (Res)
Mob. 050-923-5447
Email: shabbir_ahmed74@hotmail.com
B.E (M) NED 75
MIE

SHAHID MASOOD
Mechanical Designer
Al-Hugayet Est
c/o Aramco, So. Area Design Service Dept.,
Tel. (03) 572-0059 (Off)
Fax. (03) 572-1426
Email: shahid_masood@hotmail.com
B.Sc (ME) UETL 94

SHAKOOR ALAM
Manager Mech Section
Ground Engineering Contractors
P.O. Box 2870, Al-Khobar 31952
Tel. (03) 898-2240 (Off)
Fax. (03) 894-8378
Mob. 050-859-0765
Email: gec@zajil.net
B.Sc. (ME) UETL 89

SHAMEEM AHMAD
Sr. Shift Charge Engineer
Saline Water Conversion Corporation
P.O. Box 8068, Jubail 31951
Tel. (03) 343-0333 x 31002 (Off)
(03) 343-0333 x 33644 (Res)
Fax. (03) 343-1737
Email: shamim02@hotmail.com
B.E (M) NED 77

SHAMIM AHMED
Manager, Fab. & Projects
Olayan Descon
P.O. Box 10108, Jubail 31961
Tel. (03) 341-0671 (Off)
(03) 346-0216 (Res)
Fax. (03) 341-0950
B.Sc (ME) UETL, 70

SHAMIM UDDIN
Chief Mechanical Engineer
Rashid Engineering
P.O. Box 4354, Riyadh 11491
Tel. (01) 464-1188 x 226 (Off)
Mob. 050-796-0173
Email: shamim_uddin@yahoo.com
B.E (M) NED 72

SHAMS-UD-DIN AHMED
Sr. Project Engineer
Sabic, Engineering & Project Management
P.O. Box 11425, Jubail 31961
Tel. (03) 340-1634 (Off)
(03) 347 5085 (Res)
Fax. (03) 341-2817
Mob. 050-808-8329
Email: shamsuddina@sabic.com
B.E (ME) NWFPUET 77

SHAMS-UR-REHMAN
Technical Manager
Al-Joraid Trad. Co.
P.O. Box 86658 Dammam 31452
Tel. (03) 837-3299 (Off)
Fax. (03) 837-3807
Mob. 050-246-1646
Email: engrshamss@@hotmail.com
B.Sc (ME) NWFPUET 99

SHARFUDDIN
Senior Shift Charge Engineer
Saline Water Conversion Corporation
P.O. Box 8050, Al-Jubail 31951
Tel. (03) 343-0333 x 31002 (Off)
(03) 343-0333 x 32246 (Res)
Fax. (03) 343-0333 x 32246
B.E (ME) NED 76.

SHAUKAT PERVAIZ
Division Manager Mech.
Dunya Establishment.
P.O. Box 2483, Riyadh 11451
Tel. (01) 478-4401 (Off)
(01) 406-7210 (Res)
Fax. (01) 478-8744
Email: shaukat36@hotmail.com
B.Sc (ME) UETL 89
MIE, No. M7216

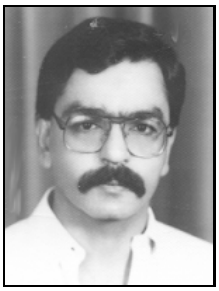
SHEIKH MUHAMMAD IRSHAD SHAMI
Project Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha,
Tel. (07) 231-9105 x 1124 (Off)
(07) 222-2838 (Res)
Fax. (07) 227-1020
Mob. 050-579-4384
BE (M) UET 91

SHIEKH NISAR MUHAMMAD
Project Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1306 (Off)
(07) 223-3200 (Res)
Mob. 050-702-8387
Email: snisar50@hotmail.com
B.E. (M) NED 75

Mechanical Engineers

SIRAJ UL HUDA SIDDIQUI
Plumbing / Sanitary Eng.
Rashid Engineering
P.O. Box 4354, Riyadh 11491
Tel. (01) 464-1188 x 203 (Off)
(01) 477-5927 (Res)
Fax. (01) 465-6245
Mob. 055-707-9214
Email: siraj@rashidengineering.com
B.E (M) NED 75

SYED ABDUR REHMAN
Divisional Manager
Carrier Saudi Arabia
P.O. Box. 9784, Riyadh
Tel. (01) 491-1333 x 431 (Off)
Mob. 050-366-7858
Email: rehman_52@hotmail.com
B.E (ME) NED 75



SYED AHMED MAHMOOD
Senior Mechanical Engineer
Arabian BEMCO
Jeddah
Tel. (02) 640-0004 x 378 (Off)
B.E (M) NED 75

SYED AHMED SALMAN
Sales & Marketing Engineer
ARAB EQUIPMENT EST.
P.O. Box 1660, Dammam 31441
Tel. (03) 857-3559 x 116 (Off)
(03) 865-3784 (Res)
Mob. 050-481-9371
Email: SYEDAHMEDSALMAN@YAHOO.COM
B.E. (ME) NED 02

SYED ALI ABID
Sales Engineer
Arabian Air Conditioning Co.
P.O. Box 9784, Riyadh 11423
Tel. (01) 491-1333 x 303 (Off)
Fax. (01) 491-6758
Mob. 050-147-7851
Email: ali.abid@carriersaudi.com
B.E. (ME) BUET Khuzdar 98

SYED ANWAR ALI
Sr. Planning & Prog. Analyst
Saudi Electric Company (ERB)
PTD Room 2-305W, P.O. Box 5190,
Tel. (03) 857-2300 x 84951 (Off)
(03) 843-1335 (Res)
Fax. (03) 858-5211
Mob. 050-171-3620
Email: anwar193@hotmail.com
B.E (M) NED 78, MBA IBA 84, MSIE MiSU 90
AMIE, No. A-2782

SYED ASLAM ALI
Saudi Consolidated Engineering Co.
P.O. Box 1713, Al-Khobar 31952
Tel. (03) 894-6816 x 259 (Off)
Fax. (03) 894-2341
Mob. 056-946-9716
B.E (M) NED 92

SYED KAFIL AHMED HASHMI
Superintendent Transportation
Saudi Cement Com.
P.O. Box 3394, Dammam 31471
Tel. (03) 566-0600 x 525 (Off)
(03) 566-0348 (Res)
Fax. (03) 566-1992
Mob. 050-001-6762
Email: kafil_hashmi@hotmail.com
B.E (ME), NED 74

SYED KHALID UMER
PROJECT DIRECTOR
ALMARASIM GATE CONT&TRAD
P.O. Box 16558, Riyadh 11471
Tel. (01) 206-6909 (Off)
(01) 461-0482 (Res)
Fax. (01) 206-6908
Mob. 050-310-6273
Email: khalidumer2002@yahoo.com
B.E (M) NED 76
MIE, No. M7176

SYED MANZAR HASNAIN
Senior Mechanical Engineer
Dar Al-Majd Consulting Engineers
P.O. Box 60212, Riyadh 11545
Tel. (01) 464-9688 (Off)
(01) 492-7315 (Res)
Fax. (01) 462-1727
Mob. 050-245-7193
B.E (ME) NED 78

SYED MASOODUL HASSAN
Generation Specialist
SEC (EOA), GTSD, Quality & Performance
P.O. Box 5190, Dammam 31422
Tel. (03) 857-2300 x 84980 (Off)
(03) 897-5716 (Res)
Fax. (03) 858-5465
Mob. 050-727-6783
Email: masoodul@yahoo.com
B.E (M) NED 71, M.Sc (Nuc) QAU 74
MIE, No. M6196

SYED MOHAMMAD ZUBAIR
Professor, ME Dept.
KFUPM
P.O. Box 1474, Dhahran 31261
Tel. (03) 860-3135 (Off)
(03) 860-5337 (Res)
Fax. (03) 860-2949
Mob. 055-760-0382
Email: smzubair@kfupm.edu.sa
B.Sc (ME) UETL 78, M.E KFUPM 80, Ph.D GT

Mechanical Engineers

SYED MOHTASHIM NIZAM
Principal Engineer
Saudi Consulting Services
P.O. Box 1293, Dammam 31431
Tel. (03) 895-5004 (Off)
Fax. (03) 895-1722
B.Sc (ME) UETL 76

SYED NASIR UDDIN
Design Engineer
Mitsubishi Electric Saudi Ltd.
P.O. Box 14166, Jeddah 21424
Tel. (02) 651-9998 x 235 (Off)
Fax. (02) 650-3519
Email: syednasir90@hotmail.com
B.E (M) MUET 95

SYED SAFDAR RAZA NAQVI
MESC Engineer (Mechanical)
Saline Water Conv. Corp. (SWCC)
P.O. Box 60889, Riyadh 11555
Tel. (01) 463-1111 x 5182 (Off)
(01) 402-1388 (Res)
Fax. (01) 465-0852
Mob. 050-889-149
Email: swccnaqvi@hotmail.com
B.E (M) NED 83

SYED SAJID HUSSAIN
Mechanical Engineer
Saudi Oger
P.O. Box 1938, Riyadh 11441
Tel. (01) 409-3709 (Res)
Mob. 056-742-9947
B.E (M) NED 85
MIE

SYED WALIULLAH HUSAINI
Materials Engineer (Proc.)
Saudi Binladin Group - IPP
P.O. Box 3143, Jeddah 21471
Tel. (02) 667-0092 x 336 (Off)
(02) 670-2748 (Res)
Fax. (02) 660-9825
Mob. 056-352-2624
Email: syed@bemco-ipp.com
B.E (M) NED 72

SYED ZAFAR AHMAD
METCAL Specialist Advisor,RSAF
BAE Systems
P.O. Box 1732, Riyadh 11441
Tel. (01) 476-9777 x 42310 (Off)
(01) 462-1686 (Res)
Fax. (01) 419-2738
Mob. 050-714-9698
Email: syedzafar@awalnet.net.sa
B.E (M) NED 76, M.S KFUPM 82
FIE, No. M12462/SA56

SYED ZIKRUR REHMAN
Research Assistant
King Saud University
P.O. Box 800, Riyadh 11421
Tel. (01) 467-6966 (Off)
(01) 460-8299 (Res)
Fax. (01) 467-6225
Mob. 050-840-1153
Email: szrehman@ksu.edu.sa
B.E (M) NED 83, M.E UOD 88

TAHIR ILYAS SHEIKH
Mech. Engr. (Project)
Grain Silos & Flour Mills Organization
P.O. Box: 3402, Riyadh 11471
Tel. (01) 210-3333 x 5511 (Off)
(01) 474-2254 (Res)
Mob. 056-242-3468
Email: tisheikh2002@yahoo.com
B.E (ME) NED 78
MIE

TAHIR RASHID KHAN
Mechanical Enginner
Eastern Petrochemical Co.
P.O. Box 10035, Jubail 31961
Tel. (03) 348-2440 (Off)
(03) 346-0523 (Res)
Fax. (03) 348-1680
B.Sc (ME) UETL 78

TARIQ BIN ZAFAR
General Manager
M.A. Al-Azzaz Est.
P.O. Box 31172, Alkhobar 31952
Tel. (03) 859-0484 (Off)
(03) 859-4775 (Res)
Fax. (03) 859-0486
Mob. 050-582-4538
Email: maaz@arabtec.com
B.E (ME), NED. 76
MIE, No. M 11551/SA39

TARIQ JAVED
Branch Manager
Gulf Lubricants
P.O. Box 187, Riyadh 11332
Tel. (01) 244-1245 (Off)
Fax. (01) 244-1248
Mob. 050-100-4144
Email: tariqjaved15@hotmail.com
B.Sc. (ME) UETTaxila 03

USMAN AHMAD
Production Manager
M/S Al-Shahrani Factory/MOTS
P.O. Box 8620, Riyadh 11632
Tel. (01) 265-3701 (Off)
(01) 409-1833 (Res)
Fax. (01) 265-3704
Mob. 056-272-6689
Email: usman@mots.com.sa
B.Sc. (ME) UETL 07

Mechanical Engineers

WAQAR AHMAD
Principal Engineer
Nespak / Saudconsult
P.O. Box 50344, Riyadh 11523
Tel. (01) 403-2222 x 29337 (Off)
(01) 463-2480 (Res)
Fax. (01) 462-6769
Mob. 050-424-3294
Email: qaziwaqar54@yahoo.com
B.Sc (ME) UETL 78

YASIR MAZHAR
Sr. Executive Engineer
S&A Abahsain Co. Ltd.
P.O. Box 11766, Jubail
Tel. (03) 341-5845 (Off)
(03) 362-6501 (Res)
Fax. (03) 341-6113
Mob. 050-814-9910
Email: yasir_mazhar@yahoo.com
B.E. (ME) NED 94

ZAFAR AHMED TALPUR
Vice president
Al-Hamrani - Fuchs Petroleum Ltd.
P.O. Box 7103, Jeddah 21462
Tel. (02) 691-6240 (Off)
(02) 683-2459 (Res)
Fax. (02) 691-5731
Mob. 050-560-064
Email: ztalpur@fuchs.com.sa
B.Sc (ME) UETL 66

ZAFARULLAH KHAN DR.
Associate Professor
KFUPM
KFUPM Box #347, Dhahran
Tel. (03) 860-2693 (Off)
(03) 860-5360 (Res)
Fax. (03) 860-2949
Email: zukhan@kfupm.edu.sa
B.E (M) NCET 73, M.S UOI 78, Ph.D UOI 85
MIE

ZAHEER UDDIN AHMAD
Director
Saudi Plastic Factory
P.O. Box 759, Riyadh 11421
Tel. (01) 498-2807 x 555/ 498-3055 (Off)
(01) 419-1843 (Res)
Fax. (01) 498-3731
Mob. 050-449-0283
Email: spf1@awalnet.net.sa
B.Sc (ME) UETL 76

ZIA-UR-REHMAN
Sr. Maintenance Specialist
Petrokemya
P.O. Box 10002, Juabil 31961
Tel. (03) 357-7380 (Off)
(03) 362-4113 (Res)
Fax. (03) 358-4480
Mob. 050-490-2948
Email: zia-ur-rehman@petrokemya.sabic.com
B.E. (ME) NED 81

ZUBAIR AKHTAR
Senior Mechanical Engineer
SWCC
P.O. Box 5968, Riyadh 11432
Tel. (01) 463-1111 x 2805 (Off)
(01) 402-5825 (Res)
Fax. (01) 462-6511
Mob. 050-620-5840
Email: zakhtar54@hotmail.com
B.E (M) NED 76

ZULFIQAR AHMED KHAN
Country Sales Manager
SASCOM
P.O. Box 2700, Dammam 31461
Tel. (01) 686-1119 ext 434 (Off)
(01) 8681236 (Res)
Mob. 050-490-8315
Email: szak_khan@hotmail.com
B.Sc (ME) UETL 91, MBA Preston U 98

Metallurgical Engineers

ABDUL RAZZAQ
Assistant Manager
Al-Tuwarqi National Steel Dammam
Industrial Area 2
Tel. (03) 812-2966 (Off)
Fax. (03) 812-3923
Mob. 050-492-7146
Email: abdul.razzak@altuwarqi.com.sa
B.Sc.(Met E) UETL 88

AMIR RASOOL
Assistant Manager (Production)
Dr. Hilal Tuwairqi
P.O. Box 7600, Dammam 31472
Tel. (03) 812-2966 (Off)
(03) 867-7190 (Res)
Fax. (03) 812-2991
Mob. 050-139-6271
Email: amir.rasool@altuwairqi.com.sa
B.Sc. (Met E) UETL 92

ATEEQ UR REHMAN KAILANI
Executive Manager
Paradise Import Export Company
P.O. Box 220702, Riyadh 11311
Tel. (01) 403-6269 (Off)
(01) 403-6269 (Res)
Fax. (01) 293-4446
Mob. 050-416-4819
Email: kailani@hotmail.com
B.Sc (Met.) UETL 86

AZIZ ZARULLAH KHAN
Inspection Engineer
Arab Inspection Company
P.O. Box 3306 Dammam 31471
Tel. (03) 830-2396 (Off)
(03) 893-7312 (Res)
Fax. (03) 833-5180
Mob. 056-738-1553
B.E (Met.) NED 78

BASIT HABIB
Shift Superintendent
Hilal Al-Tuwairqi
P.O. Box 7922, Dammam 31472
Tel. (03) 812-2966 x 511 (Off)
(03) 867-8749 (Res)
Fax. (03) 812-2991
Mob. 050-139-6272
Email: basit.habib@NSIF.com.sa
B.E. (Met E) UETL 99

FAKHRUDDIN A. HABIBY
Mat & Collision Engr.
Petrokemya
P.O. Box 10002, Jubail 31961
Tel. (03) 357-7253 (Off)
(03) 347-2714 (Res)
Fax. (03) 358-4480
Mob. 050-396-8390
Email: habibyfa@petrokemya.sabic.com
BE (Mett) NED 78, MS (Mat) UI 83, PhD

FAZAL-UR-REHMAN AWAN
Senior Researcher
Sabic Research & Technology
P.O. Box 11669, Jubail 31961
Tel. (03) 359-9230 (Off)
Fax. (03) 359 9212
Mob. 050-595-4301
Email: awanfm@sabic.com
B.E (Met.) NED 83, Ph.D (Met.) IC UK 94,

MOHAMMAD AYOUB WALI
Managing Director
Al-Joaib Intl. Corporation
P.O. Box 9437, Dammam 31413
Tel. (03) 817-5133 (Off)
(03) 864-5036 (Res)
Fax. (03) 817-5108
Mob. 050-585-0091
B.E (Met) KU 76

SYED NIAZ AHSAN
Sr. Researcher, Metals Tech.
SABIC
P.O. Box 11669, Al-Jubail 31961
Tel. (03) 359-9224 (Off)
(03) 346-1708 (Res)
Fax. (03) 359-9212
Mob. 050-485-0479
Email: ahsansn@sabic.com
Ph.D (Met.) SU 82

TAJAMMAL HUSSAIN
Assistant Manager (Shift)
National Steel Co.
P.O. Box 7922, Dammam 31472
Tel. (03) 812-2966 (Off)
Fax. (03) 812-2991
Mob. 055-311-4285
Email: tajammal.hussain@altuwairqi.com.sa
B.Sc. (Met E) PU 94

TARIQ AHMED SHEIKH
Metallurgical Engineer
Saudi Electric Company SEC-SOA
P.O. Box 616, Abha
Tel. (07) 227-1111 x 1301 (Off)
(07) 223-6326 (Res)
Fax. (07) 227-1175
Mob. 050-891-3478
Email: tariq52a@hotmail.com
B.Sc. (Met) UET 84, M.Sc. (Met) USD USA 92

WAQAR USMAN MIAN
Copr. Business Dev. Manager
Al-Tuwairqi Group
P.O. Box 2705, Dammam 31461
Tel. (03) 857-9922 x 393 (Off)
Fax. (03) 857-9014
Mob. 050-610-6240
Email: waqar.mian@altuwaiqi.com.sa
B.Sc (Met) UETL, M.Sc (Met) UETL 85

Miscellaneous

ABDUL AZIZ SAQIB
Sr. Staff Telecom. Advisor
Royal Saudi Air Force
P.O. Box 59742, Riyadh 11535
Tel. (01) 476-9777 x 40556 (Off)
(01) 460-4776 (Res)
Fax. (01) 476-9777 x 40451
Mob. 050-228-7083
Email: abdulaziz_saqib@hotmail.com
B.E (Aero) NED 77, M.A.(Economics) KU PK
MIE, No. M5757

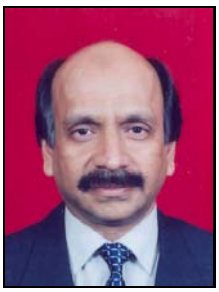
AZIZ ARSHAD
Reserach Engineer
KFUPM
P.O. Box 403, Dhahran 31261
Tel. (03) 860-2761 (Off)
(03) 860-5356 (Res)
Fax. (03) 860-3685
Mob. 050-787-9745
Email: aarshad@kfupm.edu.sa
B.Sc (Pet). UETL. 78, M.E. (Pet.) UNSW,
MIE

IFTIKHAR NADEEM
Advisor, Information Tech.
KFUPM
P.O. Box 531, Dhahran 31261
Tel. (03) 860-3893 (Off)
(03) 860-5515 (Res)
Fax. (03) 860-1801
Mob. 050-588-0953
Email: ifti@kfupm.edu.sa
M.Sc. (Sys E) KFUPM 92

KAFEEL AMEEN KHAWAJA, DR.
Production Engineer
Turky Trading & Contracting Ltd.
P.O. Box 31269, Al-Khobar 31952
Tel. (03) 864-6593 (Off)
Mob. 050-588-0792
Email: kafeel.khawaja@talk21.com
BEng (Hon) KCL 97, M.Sc KCL 98, PhD 05

MAQBOOL HUSSAIN
Environmental Engineer
Saudi Consulting Services
P.O. Box 2341, Riyadh 11451
Tel. (01) 465-9975 x 249 (Off)
(01) 419-8365 (Res)
Mob. 050-918-0704
Email: maqboolsa@yahoo.com
M.Sc (Env E) MSU98, M.Sc (Chem) QAU 92

MOHAMMAD ASLAM BROHI
Junior Safety Engineer
AETCON
P.O. Box 250974 Riyadh 11391
Tel. (01) 889-1609 (Off)
Mob. 050-685-3926
B.E (Ind) MUET 93



MOHAMMED ZIAUL ISLAM
Production Specialist
National Industrial Gases Co SABIC
P.O. Box 10110, Jubail 31961
Tel. (03) 357-5726 (Off)
Mob. 050-595-3058
Email: islammz@gas.sabic.com
B.Sc. (Ind. Eng) MEU 77

SHAHABUDDIN
Mining Engineer
Saudi White Cement Co.
P.O. Box 17775, Riyadh 11494
Tel. (01) 523-5529 (Off)
(01) 523-5529 x 313 (Res)
Fax. (01) 523-5249
Mob. 050-184-5338
B.Sc (Min) UETL 76

SHARFUDDIN S. MALIK
Sr. Landscape Engineer
Saudi Consulting Services
P.O. Box 2341, Riyadh 11451
Tel. (01) 484-2093 (Off)
(01) 406-6919 (Res)
Fax. (01) 486-0781
Mob. 050-423-0785
Email: sharf950@yahoo.com
B.Sc (Agr) Hons. POP 71, M.Sc (Agr) Hons.

TARIQ NAZIR SHEIKH
Branch Manager
Ahmad Hamad Al-Gosaibi
P.O. Box 12, Jubail 31951
Tel. (03) 362-1064 (Off)
Fax. (03) 361-2816
Mob. 050-585-6660
Email: jubail@gacworld.com
B.Sc. (Ind. Eng.) SU 75

TAZIM HUSSAIN KAZMI
Instructor
General Authority of Civil Aviation (GACA)
P.O. Box: 15441, Jeddah 21444
Tel. (02) 671-7717 x 529 (Off)
(02) 616-1153 (Res)
Mob. 050-952-1763
Email: tazimkazmi@yahoo.com
B.E. (Avionics) PAF KU 71, MBA USA 97
MIE, No. M-8987-I/277

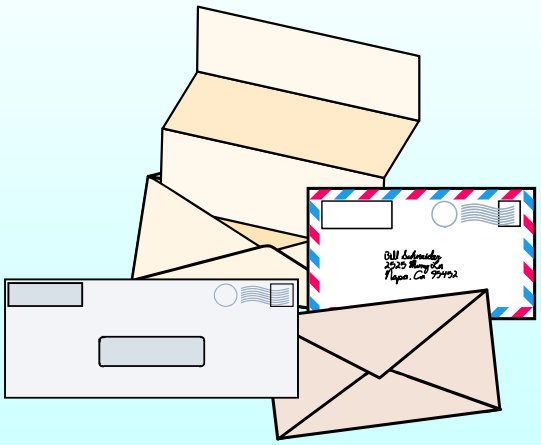
ACRONYM AND ABBREVIATIONS

AE	Associate Engineer
AEC	Ahsanullah Engineering College, Dacca
Aero	Aeronautical Engineering
Agr	Agricultural
AIT	Asian Institute of Technology, Bangkok, Thailand
AMU	Aligarh Muslim University, India
AUB	Astonton University, Birmingham
AUUP	Allahabad University, UP, India
BCE	Bihar College of Engineering
BU	Baluchistan University, Pakistan
BUE	Birmingham University, England
CBA	College of Business Administration, Lahore
CE	Civil Engineering
CEI	Council of Engineering Institution, UK
CET	College of Engineering, Taxila, Pakistan
Chem	Chemical Engineering
CMSU	Central Missouri State University, USA
Comp	Computer
CPU	California Pacific University, USA
CSU	California State University, USA
DCET	Dawood College of Engineering & Technology, Karachi, Pakistan
DIT	Detroit Institute of Technology, USA
DU	Duke University, USA
DUP	Drexel University, Philadelphia, USA
E	Electrical
Ecs	Electronics
Env	Environmental
EE	Electrical Engineering
EPUET	East Pakistan University of Engineering & Technology, Dacca
ET	ENSAE Toulouse, France
GCTK	Govt. College of Technology, Karachi
GIK	G. I. K. Institute of Engineering and Technology, Topi, Pakistan
GPIS	Govt. Polytechnic Institute, Sialkot, Pakistan
GT	Georgia Tech, USA
GWU	George Washington University, USA
HP	Huddersfield Polytechnic, UK
HWU	Heroit Watt University Edinburg, UK
IBA	Institute of Business Administration, Karachi
ICES	Institute of Civil Engineering Surveyors, UK
ICUL	Imperial College University of London, UK
IEEL	Institution of Electrical Engineers London, UK
IEP	Institution of Engineers Pakistan Exam Section A&B
IIT	Illinois Institute of Technology, Chicago, USA
Ind	Industrial
IQA	Institution of Quality Assurance, UK
IU	International University
KCL	King's College London, UK
KFUPM	King Fahad University of Petroleum & Minerals, Dhahran, Saudi Arabia
KFUPM-RI	King Fahad University of Petroleum & Minerals-Research Institute
KU	Karachi University, Pakistan
KWU	Kennedy Western University, USA
LP	Liverpool Polytechnic
LU	Lamar University, Texas, USA
M.E.	Master of Engineering
M.S.	Master of Science
ME	Mechanical Engineering
MEH	Mehran Engineering University, Jamshoro
Met	Metallurgical Engineering
METU	Middle East Technical University, Ankara, Turkey
Min	Mining
MiSU	Mississippi State University, USA
MMU	Manchester Metropolitan University, UK
MOPTT	Ministry of Post, Telegraph and Telephone, Saudi Arabia
MSU	Michigan State University, USA
MTU	Michigan Technology University, USA
MUET	Mehran University of Engineering & Technology, Jamshoro
NCA	National College of Arts, Lahore
NCET	National College of Engg. & Technology, Karachi, Pakistan
NED	NED College/University of Engineering & Technology, Karachi
NEU	Near East University
NU	Northrop University, USA
Nuc	Nuclear Engineering
NWFPUET	North West Frontier Province Uni. of Engg. & Tech., Peshawar, Pakistan
Off.	Office
OSU	Ohio State University
OU	Osmania University, Hyderabad
OUM	Oakland University, Michigan, USA
PAFCAE	Pakistan Air Force College of Aeronautical Engineering, Karachi
PCET	Punjab College of Engineering & Technology, Lahore
PCOA	Pakistan College of Aeronautical Engineering
PE	Petroleum Engineering
Pet	Petroleum
PGC	Post Graduate Course
PGD	Post Graduate Diploma
PIBR	Polytechnic Institute Bucharest, Rumania
PINSTC	Pakistan Institute of Science & Technology, Islamabad
PNEC	Pakistan Navy Engineering College
PSU	Penn. State University, USA
PU	Punjab University, Lahore
PUI	Purdue University, West Lafayette, Indiana, USA
PUK	Preston University, Karachi, Pakistan
QAU	Quaid-e-Azam University Islamabad
Res.	Residence

RU	Ranchi University, India
RUH	Rice University Huston, USA
S	Systems
SGW	Sir George Williams, Canada
SIU	Southern Illinois University, USA
Sr.	Senior
SSUET	Sir Syed University of Engineering and Technology, Karachi, Pakistan
SU	Sind University, Jamshoro, Pakistan
SUC	Stanford University, California, USA
TSC	Telecom. Staff College, Haripur, Pakistan
TUB	Technical University, Berlin, Germany
U	University
UB	University of Bahrain
UD	University of Detroit, Michigan, USA
UDE	University of Durham, England
UETL	University of Engineering and Technology, Lahore, Pakistan
UL	University of Leeds, UK
UM	University of Michigan, Ann Arber, USA
UNSW	University of New South Wales, Australia
UOB	University of Bradford, UK
UOBE	University of Birmingham, UK
UOC	University of California, USA
UOD	University of Detroit, Michigan, USA
UOF	University of Florida, USA
UOG	University of Glasgow, UK
UOI	University of Illinois, Urbana, USA
UOL	University of London
UOM	University of Manchester, UK
UOM	University of Minisotta, USA
UON	University of Nottingham, UK
UOP	University of Peshawar, Pakistan
UOS	University of Salford, UK
UOT	University of Engineering and Technology, Taxila
UOW	University of Waterloo, Canada
UPM	University of Petroleum & Minerals, Dhahran, Saudi Arabia
US	University of Southampton, UK
USC	University of Southern California, Los Angeles, USA
UTA	University of Texas, Austin, USA
UTC	University of Toronto, Canada
UW	University of Windsor, Ontario, Canada
WSU	Washington State University, USA
WU	Winconsin University, USA
x	Extension

COMMENTS AND SUGGESTIONS

We welcome your comments and suggestions to improve the quality of contents and layout of this Journal. Please post your comments and suggestions on our website http://www.iepsac.org or send it to the following address:



CHAIRMAN
IEP Saudi Arabian Center
P.O.Box 50344, Riyadh 11523

ALPHABETICAL INDEX

NAME	DISCIPLINE	PHONE (OFFICE)
ABDUL ALI SIDDIQUI	Chemical	(01) 285-1867
ABDUL AZIZ SAQIB	Miscellaneou	(01) 476-9777 x 40556
ABDUL BASIT AMJAD	Civil	(03) 330-6666 x 75120
ABDUL GHAFOOR	Electrical	(01) 578-0337
ABDUL GHAFOOR KHAN	Electrical	(01) 464-1188
ABDUL HAFEEZ ANJUM	Electrical	(03) 362-1824 x 76580
ABDUL HAFEEZ MUGHAL	Electrical	(01) 476-7407 x 2257
ABDUL HANNAN	Electrical	(01) 495-5332 x 124
ABDUL JALAL	Electrical	(01) 402-6809
ABDUL MAJEED KALAIR	Electrical	(03) 895-5004 x 1610
ABDUL MAJID KHAN	Electrical	(03) 864-9612
ABDUL MATEEN AZMI	Mechanical	(03) 857-4082
ABDUL MUQEET	Electronics	(01) 403-2222 x 86856
ABDUL QADIR AKBANI	Mechanical	(03) 857-4150
ABDUL QAYYUM	Electrical	(01) 462-2011 / 465-661
ABDUL QAYYUM QURESHI	Electrical	(03) 889-8748
ABDUL QUDDUS	Mechanical	(03) 860-3533
ABDUL QUDDUS M. IBRAHIM	Mechanical	(01) 464-3333 x 4803
ABDUL RAHMAN LALDIN	Electrical	(01) 461-9274
ABDUL RAUF	Electrical	(01) 478-5448
ABDUL RAZZAQ	Metallurgy	(03) 812-2966
ABDUL REHMAN RATHORE	Chemical	(01) 477-9111 x 322
ABDUL SATTAR	Electrical	(01) 239-7320
ABDUL WAHEED	Mechanical	(03) 858-6649 x 86649
ABDUL WAHEED KHAN	Civil	(01) 477-7222 x 168
ABDUL WAHEED MIR	Electrical	(01) 403-2222 x 14546
ABDUR RASHID HAQ	Civil	
ABDUR RASHID SHAD	Civil	(04) 622-4874
ABID WASEEM ASLAM	Civil	(01) 476-8118
ADIL BIN RAUF	Mechanical	(03) 357-7691
AFAQ HUSSAIN SIDDIQI	Civil	(01) 403-7878 x 430
AFTAB AHMAD MALIK	Mechanical	(03) 801-2806
AFTAB AHMED	Civil	(02) 667-0500 x 117
AFTAB ALAM	Civil	(02) 542-6421
AFZAAL SHAIQ QADRI	Chemical	(01) 523-1489
AGHA ZIA-UL-HASSAH	Mechanical	(01) 465-4235 x 105
AHMAD NADEEM KHAWAJA	Electrical	(03) 847-3020
AHMAD SOHAIL SIDDIQUI	Electrical	(01) 452-8896
AHMAD WARAICH	Civil	(01) 454-9191 x 245/267
AHMAD ZAHEER TAHIR	Electrical	(03) 882-4603 x 204
AHMED FARRAKH MANZOOR	Electrical	(03) 882-6506 Ext. 4245
AHSAN AHMED RANA	Electronics	(01) 452-7376
AHSAN ALI LOONA	Mechanical	(01) 476-8686 x 108
AHTSHAM AHMED	Mechanical	(02) 550-6273 x 330
AJAZ AHMAD QUDDUSI	Electrical	(03) 882-9394 x 322
AKHTAR HAYAT	Electrical	(03) 882-9546 x 222
AKHTAR JAWAID NIAZI	Civil	(03) 882-2299
AKIF ALI	Electrical	(01) 477-7947 Ext 181
ALI AKBAR	Electrical	(01) 465-6150
ALTAF HUSSAIN KHAN	Electrical	(01) 465-9975 x 206
AMANULLAH TURK	Mechanical	(03) 847-7801 x 242
AMIR BIN RAUF	Mechanical	(03) 357-7276
AMIR RASOOL	Metallurgy	(03) 812-2966
AMJAD IQBAL	Electronics	(0) 358-7000 x 1349
AMJAD RASHEED	Electrical	(01) 275-5999 x 815
ANIS AL-HASAN	Civil	(02) 667-6612
ANIS UR REHMAN KHAN	Civil	(03) 864-2642
ANWAR KHALIL SHEIKH DR.	Mechanical	(03) 860-2575
ANWAR NAZAR ALI JIWANI	Electrical	(01) 465-2260 / 463-341
ANWAR RAZA KHAN	Mechanical	(03) 340-3263 Ext.121
ANWAR UL HAQ	Civil	(01) 485-4644
AQIL NASIR MIRZA	Electrical	(03) 357-7603
ARIF ISLAM BUTT	Electronics	(02) 651-9998 x 240
ARSHAD ALI	Electrical	(07) 227-1111 x 1328
ARSHAD ALI AMJAD, DR.	Civil	
ARSHAD HUSSAIN	Electronics	(01) 493-6622 x 260
ARSHAD M. CHOHAN	Architecture	(02) 675-7253
ARSLAN AHMED	Mechanical	(01) 245-3681 x 9765
ASAD NAVEED	Electrical	(03) 860-4069
ASADULLAH ABDUL GHANI	Electrical	(01) 265-3030 x 1423
ASHFAQ MOHAMMAD QURESHI	Architecture	(01) 464-1188 x 207
ASIF ABBAS ZAIDI	Mechanical	
ASIF KAMAL	Electronics	(03) 357-7387
ASIF MAJEED	Electrical	(01) 403-2222 x 29310
ASIF MAQSOOD SHEIKH	Mechanical	(01) 477-5192x 265
ASIF RASUL	Electrical	(01) 435-5125 x 1868
ASIF ZAFAR	Mechanical	
ASRAR HUSSAIN	Electrical	(01) 206-0000 x 3681
ASRAR KHAN GHORI	Civil	(01) 465-8665 x 258
ASRAR M AHMED	Civil	(02) 542-6421
ASRARUL HAQ SHEIKH	Electrical	(03) 860-1182
ATEEQ UR REHMAN KAILANI	Metallurgy	(01) 403-6269
ATHAR ALIM KHAN	Mechanical	(01) 488-2226 x 23
ATHER JAMIL DAR	Electrical	(01) 452-8847

NAME	DISCIPLINE	PHONE (OFFICE)
ATIF ALI KHAN	Electronics	(03) 341-8500 x 210
ATIF USMAN	Civil	(01) 464-3361
AZHAR I. KHAN	Electrical	(02) 665-8420
AZIMUDDIN QURESHI	Electrical	(02) 653-1765 x 233
AZIZ ARSHAD	Miscellaneou	(03) 860-2761
AZIZ ZARULLAH KHAN	Metallurgy	(03) 830-2396
AZMAT MUJTUBA	Mechanical	(03) 812-1143
BABAR SULTAN	Civil	(03) 889-1576 x 14
BADAR UZ ZAMAN	Mechanical	(03) 357-5757
BASHARAT AHMED QURESHI	Electrical	(01) 476-2841 x 208
BASHIR AHMAD MALIK	Electrical	(01) 452-1764
BASIT HABIB	Metallurgy	(03) 812-2966 x 511
BAZURJ MEHR KHAN	Electrical	(01) 442-2000 x 360
BILAL AKHTAR	Electrical	(03) 882-5669 x 244
CHAUDHARY GULRAIZ SAEED	Civil	(01) 211-0087
CHAUDHARY M. SHARIF RIFAT	Electrical	(01) 464-3333 x 14354
CHAUDHARY MOHAMMAD	Electrical	(01) 477-9111 x 155
CHAUDHARY SARFARAZ	Electrical	(03) 860-2134
DEEDAR ALI	Electronics	(01) 452-9187
DIWAN Y. DAWOOD	Electrical	(03) 673-2833
DR. AZIZ UR-REHMAN MALIK	Electrical	(01) 403-22222 x 23543
EBRAR AHMED SHAMS	Civil	(03) 586-2144
EHSANUL HAQUE	Electrical	(01) 465-9975 x 292
EHSAN-UL-HAQUE	Electrical	(01) 246-2776 x 36
ENAYATULLAH KHAN SHERWANI	Electrical	(01) 442-2000 x 312
FAHAD KARIM KHAN	Electrical	(03) 857-2537
FAHEEM ELAHI ANSARI	Chemical	(02) 686-4288
FAISAL JAN MOHAMMAD	Electrical	(03) 882-5669 x 262
FAISAL MALIK	Mechanical	(01) 491-1333 x 385
FAKHRUDDIN A. HABIBY	Metallurgy	(03) 357-7253
FAQIR HUSSAIN	Civil	(03) 812-2966x 450
FAREED AHMED	Mechanical	(01) 491-1333
FAREED AHMED MEMON	Electrical	(07) 227-1111 x 1493
FAREEDUDDIN AHMED	Electronics	(03) 860-2884
FARHAT ALI BURNEY, DR	Mechanical	(02) 695-2251
FAROOQ AHMED BHATTI	Architecture	(03) 895-5004 x 1510
FAROOQ AHMED KHANANI	Electrical	(01) 498-3844
FAROOQ HAMEED	Mechanical	(03) 357-7332
FAROOQ SALEEM IKRAM	Chemical	(03) 340-6663
FASIH AHMED	Civil	(01) 482-3380
FASIH-UZ-ZAMAN KHAN	Mechanical	(01) 476-3030 x 295
FATEH KHAN	Electrical	(01) 241-2228 x 4126
FAYYAZ AHMED KHAN	Mechanical	(01) 476-3030 x 283
FAYYAZ MUDDASSIR MUBEEN	Mechanical	(07) 341-1600 x 141
FAZAL-UR-REHMAN AWAN	Metallurgy	(03) 359-9230
FAZLE RAFEY	Electrical	(01) 265-3030 x 1658
FURQAN ALI SIDDIQUI	Electronics	(03) 858-5955
GHAZANFAR ALI IQBAL	Electrical	(01) 408-7805
GHUFRAN AHMED	Electrical	(03) 882-5669 x 240
GHULAM ABBAS	Electrical	(01) 405-5143
GHULAM HUSSAIN KHAN	Mechanical	(01) 467-6841
GHULAM RASUL MERCHANT	Electrical	(02) 271-8581
GHULAM SAFDAR	Civil	(01) 226-3727
GHULAM SARWAR	Mechanical	(01) 464-1188
HABIBULLAH TALPUR	Mechanical	(01) 241-4364 x 4220
HAFEEZ-UR-REHMAN	Electronics	(01) 206-0000
HAFIZ KHADIM HUSSAIN	Civil	(01) 477-3115 x 5244
HAFIZ MUHAMMAD WASEEM	Mechanical	(02) 651-9998 x 233
HAMID ALI	Electrical	(03) 586-8600 x 2627
HAMID ALI KHAN	Civil	(01) 454-9191 x 239
HAMID MAHMOOD SHAH	Mechanical	(03) 812-2212 x 260
HAMID MOHSIN	Electrical	(01) 479-3000
HAMIDUR RAHMAN ADNAN	Electrical	(01) 478-0320
HAROON RASHID RAJA	Electrical	(02) 697-7723
HAROON SALEEM QAZI	Mechanical	(03) 857-4401
HASSAN SIDDIQUI	Electrical	(01) 291-2877 x 243
HUMAYUN AKHTAR	Electrical	(01) 443-1570
HUSAIN AHMED	Electrical	(03) 341-2444 x 77592
IFTIKHAR AHMAD QAZI	Chemical	(01) 285-1889
IFTIKHAR AHMED CHEEMA	Electrical	(01) 404-0910
IFTIKHAR AHMED HAJI	Electronics	(01) 452-8184
IFTIKHAR NADEEM	Miscellaneou	(03) 860-3893
IJAZ AHMAD KHAN	Civil	(01) 465-9975 x 115
IJAZ HUSSAIN	Electrical	(01) 472-4473
IKRAM HUSSAIN	Chemical	(03) 860-3085
IMRAN ASHRAF	Electronics	(01) 560-313031
IMRAN IDREES MEMON	Electrical	(01) 265-3030 x 1592
IMRAN SULTAN	Mechanical	(03) 857-7710
IMTIAZ AHMAD	Chemical	(03) 358-5002 x200
IMTIAZ AHMED	Civil	(01) 295-3015
IMTIAZ AHMED DURRANI	Civil	(02) 671-5621
INAM KHAN	Electrical	(03) 842-2442
INAM MUHAMMAD	Mechanical	(03) 860-2520
INAYAT ULLAH MEMON	Electrical	(03) 678-8288 x 1071

ALPHABETICAL INDEX

NAME	DISCIPLINE	PHONE (OFFICE)
IQBAL AHMED	Electrical	(01) 478-2027 x 35
IQBAL AHMED SIDDIQUI	Electronics	(01) 479-5802
IQBAL HUSSAIN	Civil	(01) 478-1444 / 477-830
IQBAL ISMAIL KHURRAM	Electrical	(01) 239-7497
IRFAN AHMAD CHISHTI	Civil	(03) 859-8503
IRFAN ALI KHAN	Mechanical	(01) 474-5296
IRFAN BROHI	Mechanical	(03) 857-3559
IRFANUDDIN AHMED	Electronics	(02) 660-7860x 249
IRSHAD AHMED CHAUDHRY	Mechanical	(07) 227-1111 x 1615
IRSHAD NABI	Civil	(01) 465-6975
ISLAM AHMAD ASIF	Electrical	(03) 889-1609 x 12
ISLAM MUSHEER KHAN	Mechanical	(03) 854-2058
ISMET AMIN KHAWAJA	Civil	(03) 864-6593
ISRAR UL HAQ	Electrical	(01) 246-6500 x 235
ITLAQUE AHMED KHAN	Mechanical	(03) 340-9667
JALEEL HASAN	Electrical	(01) 225-0428
JAMIL A. WARSI	Mechanical	(01) 463-3330
JAMSHED AHMED	Electrical	(03) 835-3234 x 600
JAVAID HAMEED	Electrical	(03) 858-6350
JAVAID IQBAL	Civil	
JAVED IQBAL	Civil	(03) 865-6982
JAVED M. AHSANI	Electronics	(01) 460-0590
JAVED SAFDAR	Electrical	(03) 858-6747
JAVED SHAMIM	Electrical	(01) 452-7928
JAWAID INAM	Electrical	(03) 864-8371
JAWAID IQBAL	Mechanical	(02) 654-5683 / 692-042
JAWED IQBAL	Civil	(01) 419-1818
JUNAID AHMAD HASHMI	Electrical	(01) 401-4806
KAFEEL AMEEN KHAWAJA, DR.	Miscellaneou	(03) 864-6593
KAMRAN ASIF ASLAM	Electronics	(01) 473-1300 x 107
KARAMAT ULLAH	Electrical	(02) 608-5833
KASHIF ZIA	Mechanical	(03) 811-7001
KAUSER MAHMOOD BUTT	Electrical	(01) 403-2222 x 23196
KAZIM HUSSAIN RIZVI	Chemical	(03) 359-9297
KHALID ALI	Mechanical	(07) 227-1111 x 1358
KHALID HUSSAIN	Civil	(03) 867-1708
KHALID IQBAL WARRAICH	Architecture	(01) 240-6483
KHALID LATIF	Mechanical	(03) 357-7609
KHALID MAHMOOD DR.	Civil	(02) 695-2250
KHALID MAHMOOD MALIK	Civil	(01) 476-3030
KHALID MASOOD BARLAS	Mechanical	(01) 476-6500
KHALID NADEEM	Electronics	(02) 650-4744 x 478
KHALIL AHMED	Computer	(01) 499-6666 x 2907
KHALIL UR REHMAN SHAH	Mechanical	(01) 442-7686
KHAWAR IQBAL KHAN	Mechanical	(02) 531-7420
KHIZAR JUNAID USMANI	Electrical	(01) 265-3030 x 1562
KHURAM RAZZAK MOHIB	Civil	(03) 898-2240
KHURRAM KARAMAT	Civil	(01) 465-9975 x 107
KHURRAM SHAHID QURESHI	Computer	(01) 478-1212 x 227
KIRMANI SYED MUBASHIR	Civil	(01) 465-3127
KUNWAR MUHAMMAD IDRIS	Electrical	(02) 672-9913
LAIQUE HAIDER	Civil	(03) 862-5481
LIAQAT ALI KHAN	Electrical	(03) 586-8600 x 62739
LIAQAT ALI SAHI	Mechanical	(03) 873-8959
M. ASHRAF KHAN	Electrical	(01) 265-1515 x 626
M. FARAZ UDDIN QURESHI	Electronics	(01) 281-9637
M. FEROZE SAYEED	Mechanical	(03) 834-4500 x 603
M. IMRAN ASGHAR	Mechanical	(03) 3575709
M. IRSHAD A. USMANI	Electrical	(03) 843-1874
M. JAVED AKHTAR	Electrical	(03) 845-0000
M. JAVED IQBAL	Electrical	(03) 889-1609 x 19
M. SHABBIR SHEKHANI	Electrical	(03) 882-9430
M. WAHEED CHUGHTAI	Civil	(01) 239-7619
M.J.K. ZARRAR SHARIF	Mechanical	(01) 435-8422 x 1686
MAHMOOD BUTT	Mechanical	(03) 03-572-0849
MAHMOOD SARWAR MALIK	Electrical	(01) 464-3333 x 14573
MAHMOOD USMAN	Electrical	
MAJID LATIF	Electronics	(01) 476-3777 x 141
MAJOR WAHID AHMED BHUTTA	Civil	(01) 260-0087
MALIK HUMAYOON IQBAL	Civil	(01) 478-9000 x 4635
MALIK ZUBAIR	Electronics	(03) 887-0188 x 253
MANSOOR JAMIL	Electronics	(03) 358-5002
MAQBOOL AHMED BHATTI	Mechanical	(01) 419-6425
MAQBOOL HUSSAIN	Miscellaneou	(01) 465-9975 x 249
MAQBUL AHMED	Mechanical	
MAQSOOD AHMED ZAFAR	Electrical	(01) 403-2222 x 14875
MAQSOOD ALAM	Electrical	(01) 265-0515
MAQSOOD HAMID	Chemical	(03) 357-7220
MAQSOOD HUSSAIN TARIQ	Electrical	(02) 667-0500
MAROOF AHMED JAFFERI	Mechanical	(03) 858-0511 x 216
MASOOD ELAHI	Mechanical	(01) 251-3559 / 251-346
MASOOD HAMID	Electrical	(02) 697-2620 / 697-695
MASOOD SAID	Mechanical	(02) 663-5666
MASOOR AHSAN SIDDIQUI	Electrical	(02) 686-4855
MASROOR AKBAR RAMZI	Electrical	(01) 403-2222 x 18593
MASUD KHAN	Electrical	
MASUD UL HASAN	Electrical	(03) 860-3880
MAZHAR NAWAZ KHAN	Electrical	(03) 358-3072 x 113
MAZHAR NOOR	Electrical	(01) 206-0000 x 3326
MIAN ABDUL REHMAN SARWAR	Mechanical	(03) 812-2966 x 611
MIAN FAHEEM-UL-GHANI	Electronics	
MIAN MUHAMMAD ISRAIL	Electrical	(03) 857-8900 x 87068
MIAN SHAMIM AHMAD	Mechanical	(01) 464-1188 / 254-088
MIR MAJID TAUSEEF	Electrical	(01) 464-3333 x 14443
MIR SARFARAZ ALI KHAN	Civil	(03) 895-5004 x 465
MIR ZAMAN KHAN	Mechanical	(02) 612-9999
MIRZA AHTESHAM UD DIN	Civil	(02) 667-2082
MOBASHIR AHMED SHEIKH, DR	Electrical	(02) 663-4442
MOHAMMAD ABBAS ANSARI	Mechanical	(03) 341-0109 x 3517
MOHAMMAD ABDUL HALIM	Electrical	(03) 832-4400 x 148
MOHAMMAD ABDUL KHALID	Civil	(03) 858-6629
MOHAMMAD ABDUL RAUF	Civil	(01) 465-9975
MOHAMMAD ABDULLAH	Electrical	(03) 845-0000 x 150
MOHAMMAD ABRAR SHAMI	Electrical	(07) 227-1111 x 1328
MOHAMMAD ADIL	Civil	(03) 847-1500 x 1502
MOHAMMAD ADNAN KHAN	Electrical	(03) 859-5912
MOHAMMAD AFTAB ALAM KHAN	Electrical	(01) 495-1300 x 322
MOHAMMAD AFZAL	Electrical	(03) 857-2300 x 84894
MOHAMMAD AFZAL	Civil	(03) 341-3096
MOHAMMAD AFZAL NADEEM	Electrical	(03) 858-5909
MOHAMMAD AJMAL KHAN	Electrical	(01) 477-6777 x 1553
MOHAMMAD AKHTAR	Electrical	(03) 858-6516
MOHAMMAD AKRAM	Electrical	(01) 476-9777 x 42550
MOHAMMAD AKRAM ARAIN	Electrical	(03) 341-4276
MOHAMMAD ALIUDDIN	Civil	(03) 766-0055 x 4079
MOHAMMAD AMIN	Electrical	(03) 534-2774 x 105
MOHAMMAD AMIN UDDIN AHMED	Electrical	(03) 833-7110
MOHAMMAD ANWAR	Civil	(02) 631-2280 x 514
MOHAMMAD ANWAR DAWOOD	Mechanical	(01) 477-6777 x 1371
MOHAMMAD ANWAR HAYAT	Civil	(03) 883-2377
MOHAMMAD ARSHAD	Mechanical	(01) 464-3500 x 450
MOHAMMAD ARSHED	Electrical	(01) 403-2222 x 23397
MOHAMMAD ARSHED JAVAID	Mechanical	(07) 227-1111 x 1358
MOHAMMAD ASGHAR MUGHAL	Mechanical	(03) 357-7084
MOHAMMAD ASHFAQ	Electrical	(01) 265-0515 / 406-666
MOHAMMAD ASHRAF	Electrical	(02) 650-3507
MOHAMMAD ASHRAF RABBANI	Electrical	(01) 467-6692
MOHAMMAD ASHRAF ZIA	Mechanical	
MOHAMMAD ASIF	Electrical	(01) 403-6670 x 125
MOHAMMAD ASIM SIDDIQUI	Electrical	
MOHAMMAD ASLAM	Electrical	(01) 291-2000 x 415
MOHAMMAD ASLAM	Electrical	(01) 464-1498
MOHAMMAD ASLAM BROHI	Miscellaneou	(01) 889-1609
MOHAMMAD ASLAM IQBAL	Electrical	(03) 895-5004 x 425
MOHAMMAD ATIQULLAH	Electrical	(03) 894-6816
MOHAMMAD AWAIS	Electrical	(03) 363-1824 x 76585
MOHAMMAD AYAZ QUTUB	Electrical	(01) 408-6630
MOHAMMAD AYOUB WALI	Metallurgy	(03) 817-5133
MOHAMMAD AZAM	Electrical	
MOHAMMAD AZAM	Electrical	(02) 574-9045 x 404
MOHAMMAD FAHEEM	Civil	(03) 812-2967 x 239
MOHAMMAD FAHEEM WAJID	Mechanical	(03) 340-8881/2
MOHAMMAD FAHIM UDDIN	Civil	
MOHAMMAD FAROOK KHAN	Electrical	(03) 882-6506 Ext. 4228
MOHAMMAD FAWAD KARBARI	Civil	(01) 464-9835 / 462-395
MOHAMMAD FAWAD RABBANI	Electronics	(01) 279-1029
MOHAMMAD FAZLUL AMIN	Mechanical	(01) 245-3681 x 9335 /2
MOHAMMAD FEROZE ALAM	Mechanical	(03) 894-6816 x 372
MOHAMMAD HAFEEZ-UR-	Electrical	(03) 341-4223
MOHAMMAD HANIF	Electronics	(01) 265-3030 x 1371
MOHAMMAD HASAN	Civil	(03) 891-2838
MOHAMMAD HASEEB NAZ	Computer	(01) 230-3111 x 2003
MOHAMMAD HASSAN SHEIKH	Electrical	(02) 542-2836
MOHAMMAD HUSSAIN	Electrical	(01) 458-2222 x 3502
MOHAMMAD HUSSAIN KASHIF	Mechanical	(03) 857-7710
MOHAMMAD IBRAHIM	Civil	(01) 478-9000
MOHAMMAD IDREES FAROOQI	Electrical	(03) 231-2222 x 3742
MOHAMMAD IDREES QURESHI	Electrical	(01) 403-2222 x 23243
MOHAMMAD IFTEKHAR-UD-DIN	Civil	(07) 722-1477
MOHAMMAD ILYAS	Electrical	(02) 671-4774
MOHAMMAD ILYAS	Electrical	(01) 452-7664
MOHAMMAD IMAMUDDIN	Electronics	(03) 857-2595
MOHAMMAD IMRAN	Electrical	(03) 899-1930
MOHAMMAD IMTAR	Electrical	(03) 857-7000
MOHAMMAD IQBAL GHADAI	Electrical	(02) 684-1693
MOHAMMAD IQBAL QURESHI DR.	Electrical	(01) 467-6963
MOHAMMAD IQBAL TAREEN	Electronics	(01) 467-6069
MOHAMMAD IQBAL YOUSAF	Electrical	(01) 452-9362

ALPHABETICAL INDEX

NAME	DISCIPLINE	PHONE (OFFICE)
MOHAMMAD IRFAN	Electronics	(07) 227-1111 x 1128
MOHAMMAD IRFAN AHMAD	Electronics	(02) 056-0313408
MOHAMMAD ISHAQUE QAZI	Mechanical	(01) 221-2067
MOHAMMAD ISHTIAQ ASLAM	Electrical	(03) 341-7493
MOHAMMAD ISRARUL HAQ	Mechanical	(03) 858-6529
MOHAMMAD JAFAR KHAN	Civil	(03) 897-1050
MOHAMMAD JAMSHAID MEER	Mechanical	(03) 874-1343
MOHAMMAD JASIM AKHTAR	Civil	(01) 252-0088 x 4559
MOHAMMAD JAVAID SIDDIQUI	Electrical	(01) 468-3031
MOHAMMAD JAWAID IQBAL	Electrical	(02) 682-7337
MOHAMMAD KALIMUR REHMAN,	Civil	(03) 860-1129
MOHAMMAD KASHIF SAIR	Electrical	(03) 857-9922
MOHAMMAD KASSIM HUSSAIN	Electrical	(01) 265-3030 x 1337
MOHAMMAD KHALID AHMAD	Electrical	(02) 627-1400
MOHAMMAD KHALID BHATTI	Electrical	(03) 895-5004 x 322
MOHAMMAD KHALID SYED	Electronics	(03) 857-9922 x 408
MOHAMMAD KHURSHID	Civil	(01) 464-9688
MOHAMMAD MAHFOOZ ALAM	Civil	(01) 462-7799
MOHAMMAD MAHMOOD ALAM	Mechanical	(04) 392-5316
MOHAMMAD MAHMUD	Electrical	(01) 278-9247
MOHAMMAD MAHTAB ALAM	Electrical	(02) 684-2691
MOHAMMAD MANSHA VIRK	Electrical	(01) 2312222 x13733
MOHAMMAD MANSOUR AZAM	Architecture	(01) 465-9975-703
MOHAMMAD MAROOF-UZ-ZAMAN	Electrical	(02) 697-7723
MOHAMMAD MASOOD ANJUM	Civil	(01) 454-9191 x 214
MOHAMMAD MOAZAM KHAL	Civil	(01) 464-1611
MOHAMMAD MUSHTAQUE	Electrical	(01) 426-0018 x 8231
MOHAMMAD MUSLIM KHAN	Electrical	(01) 454-8121
MOHAMMAD NADEEM IQBAL	Electrical	(01) 265-1515 x 517
MOHAMMAD NAEEM HASSAN	Electrical	(03) 857-2300 x 84561
MOHAMMAD NASIM	Electrical	(01) 403-2222 x 10208
MOHAMMAD NAVEED ARSHAD	Electrical	(03) 361-3407
MOHAMMAD NISAR ASAAD	Electronics	(03) 343-0333 x 30713
MOHAMMAD NOOR ALAM	Electrical	(01) 401-5555 x 1364
MOHAMMAD PARVEZ MALIK	Mechanical	(03) 857-7710 x 222
MOHAMMAD RAFIQUE MOGHAL	Electrical	
MOHAMMAD RASHAD BHATTI	Electrical	(01) 478-9000 x 3761
MOHAMMAD RASHID	Civil	(03) 592-4445
MOHAMMAD RASHID QAZI	Electrical	(03) 362-1824 x 76597
MOHAMMAD RIAZ	Electrical	(01) 230-3111
MOHAMMAD SADIQ KHAN	Electrical	(01) 403-2222 x 223
MOHAMMAD SAEED AKHTAR	Mechanical	(03) 887-3868 x 202
MOHAMMAD SAEED IQBAL	Electrical	(03) 899-7629
MOHAMMAD SAFDAR	Electrical	(03) 858-7536 x 3303
MOHAMMAD SAGHIR	Mechanical	(01) 463-4451
MOHAMMAD SAJID MUSHTAQUE	Electrical	(01) 403-2229 x 18355
MOHAMMAD SAJJAD HUSSAIN	Civil	(03) 887-9525 x 1536
MOHAMMAD SALEEM	Electrical	
MOHAMMAD SALEEM	Civil	(03) 860-2691
MOHAMMAD SALEEM	Electrical	(03) 847-3020 x 232
MOHAMMAD SARDAR KHAN	Electrical	(01) 452-7493
MOHAMMAD SHAFIQ	Electrical	(01) 464-9811 x 430
MOHAMMAD SHAFIQ MAITLA	Civil	(01) 464-5142
MOHAMMAD SHAKIL HARIS	Chemical	(03) 847-2466 x 152
MOHAMMAD SHAUKAT ALI	Electrical	(07) 227-1111 x 1410
MOHAMMAD SHEHBAZ KHAN	Mechanical	(03) 897-1050 x 272
MOHAMMAD SHER UMAR KHAN	Electrical	(03) 857-7738 x 242
MOHAMMAD SULAIMAN LALA	Mechanical	(01) 463-1111 x 2111
MOHAMMAD TAHIR JAMIL	Civil	(03) 833-2266
MOHAMMAD TAHIR SALEEM	Civil	(0) 477-8556
MOHAMMAD TARIQ	Mechanical	(01) 464-9688
MOHAMMAD TARIQ BARLAS	Chemical	(03) 857-9922
MOHAMMAD TARIQ FAQUIH	Mechanical	(01) 403-2222 x 1720
MOHAMMAD TARIQ SHAFI	Electrical	(03) 857-9922
MOHAMMAD TAUSIF	Electrical	(01) 403-2222 x 21157
MOHAMMAD TAYYIB WARAICH	Civil	(01) 454-9191 x. 256
MOHAMMAD TOUSEEF ASLAM	Electrical	(03) 577-1405
MOHAMMAD WASEEM	Architecture	(01) 252-0088 x 4563
MOHAMMAD YAHYA KHAN	Civil	(01) 454-9191 x 292
MOHAMMAD YAQUB	Mechanical	(03) 860-2520
MOHAMMAD YOUNAS	Mechanical	(03) 860-3049
MOHAMMAD YOUNAS	Chemical	(01) 285-1878
MOHAMMAD YOUNAS TAHIR	Chemical	(03) 357-2327
MOHAMMAD YOUSUF	Civil	
MOHAMMAD ZAFAR	Chemical	(03) 898-4045x 252
MOHAMMAD ZAFAR HUSSAIN	Chemical	(01) 265-0980
MOHAMMAD ZAFAR SAGHIR	Mechanical	(01) 403-2222 x 18026
MOHAMMAD ZAFAR ULLAH	Electrical	(01) 441-5958
MOHAMMAD ZAHID SOHAIL	Mechanical	(03) 8576024
MOHAMMAD ZAMURRAD	Electronics	(01) 452-5161
MOHAMMED AHSAN KHAN	Computer	(01) 462-5766
MOHAMMED ANEEQ KASHAN	Computer	(01) 206-0000 x 3277
MOHAMMED MAHMOOD	Electrical	(03) 892-2300 x 2503
MOHAMMED RASHID SARWAR	Electrical	(02) 663-7854
MOHAMMED SALEEM BUKHARI	Architecture	
MOHAMMED ZIAUL ISLAM	Miscellaneou	(03) 357-5726
MOHIUDDIN AHMED	Mechanical	(03) 860-3779
MOHSIN TANVIR MALIK	Electrical	(02) 672-5405
MUBEEN UDDIN AHMED	Civil	(03) 576-0650 x. 195
MUHAMMAD ILYAS MUGHAL	Electronics	(03) 357-7601
MUHAMMAD JAVAID AGHA	Chemical	(03) 358-7124
MUHAMMAD NASIR SHAHAB	Chemical	
MUHAMMAD TARIQ	Mechanical	(03) 357-7260
MUJAHID AHMAD	Electrical	(01) 273-5050
MUKESH KUMAR	Electrical	(03) 899-5605 / 898-007
MUKHTAR AHMAD FAZAL KARIM	Electrical	(01) 403-2222 x 23222
MUNAWAR A. SAUDAGAR, DR.	Chemical	(01) 265-3333 x 5545
MUNEEB AHMAD DAR	Electrical	(07) 227-1111 x 1106
MUNEEB ASLAM KHAN	Civil	(03) 898-2240
MUNEER AHMED RANA	Civil	(01) 460-7667
MUNIR AHMAD	Civil	(01) 403-1103
MUNIR AHMAD HASRAT	Electrical	(01) 411-2222 x 3324
MUNIR AHMED	Civil	(01) 490-0116
MUNIR AHMED	Electrical	(01) 265-3030 x 1330
MUNIR AHMED JAVID	Civil	(03) 889-1609
MUSHARRAF ALI KHAN	Electrical	(01) 265-0255 x 15
MUSHIR AHMED SIDDIQUI	Electrical	(01) 481-6666 x 318
MUSHTAQ AHMED AZAD	Electrical	(01) 403-2222x 18587
MUSHTAQ AHMED CHEEMA	Electronics	(01) 403-2222 x 10346
MUSHTAQ AHMED M. BHUTTO	Electrical	(07) 231-9177
MUSHTAQ AHMED SOOMRO	Electrical	(01) 403-2222 x 23203
MUSHTAQ AHMED WASSAN	Civil	(02) 612-9999 x 9480
MUSTAFA IQBAL NASIM	Civil	(01) 401-2550 x 617
MUSTAFA NOEED AHMED	Civil	(03) 842-2442
MUZAFFAR UL HASSAN	Electrical	(01) 408-6345
NABEEL AHMAD SIDDIQUE	Electronics	(01) 230-3111 x 9245
NABEEL PERVAIZ MALIK	Chemical	(03) 361-0115
NADEEM ARSHAD SHEIKH	Civil	(01) 465-9975 x 213
NAEEM AKHTAR	Civil	(03) 860-2691
NAEEM UD DIN	Electrical	(01) 241-3236 x 4165
NAEEM ULLAH SHEIKH	Electrical	(01) 265-1573 x 240
NAFIS-UL-HASAN	Mechanical	(01) 498-0020 x 7013
NAJIB REHMAN	Mechanical	(02) 612-9999 x 9433
NASIM R.M INAMULLAH	Mechanical	(01) 245-3681 x 9753
NAVEED AHMAD, PMP	Electrical	(01) 265-3030 x 1534
NAVEED AKHTAR	Electrical	(01) 464-9390
NAVEED ASLAM	Mechanical	(03) 847-1840 x 207
NAVEED IQBAL QURESHI	Mechanical	(01) 477-7009 x 27213
NAVEED ULLAH	Civil	(03) 859-4015
NAYER AZAM	Electronics	(01) 416-2222 x 440
NAZAR HUSSAIN MALIK, DR.	Electrical	(01) 467-6783
NEAZ AHMED	Mechanical	(03) 860-3082
NISAR AHMAD ATTA	Mechanical	(07) 227-1111 x 1295
NISAR AHMAD PIRACHA	Electrical	(03) 857-9922
NISAR BALOCH	Electrical	(01) 291-2877 x 24
NOMAN BIN NASIR	Electrical	(03) 859-5912
NOOR MOHAMMAD KHAN	Electrical	(01) 464-3333 x 14851
NOOR ULLAH KHALID	Architecture	(01) 461-6087 x 166
NUSRAT PERVEZ	Electronics	(01) 463-1277 x 401/404
OBAIDULLAH SIDDIQI	Civil	(01) 476-3030 x 289
OMER FAROOQ SALAM	Chemical	
PARVEZ A. NAUSHAHI	Civil	(03) 898-2240
PERVAIZ AKBAR	Mechanical	(03) 341-6430 / 341-702
PERVAIZ IQBAL QURESHI	Civil	(01) 465-6150
QAIM MAHDI	Electrical	(01) 265-1515 x 316
QAIYYUM HASHMI	Civil	(03) 897-1050 x 788
QAIYYUM HASHMI	Civil	(01) 477-3115 x 5361
QAMAR UL ISLAM	Computer	(01) 478-3603 x 263
QAMARUL HAQUE SIDDIQUI	Electrical	(02) 669-5851 x 242
QAZI SALEEM AHMED	Electrical	(02) 673-6033 x 251
RAFIQ AHMED	Electrical	(01) 465-6975
RAFIQ AHMED LAGRIAL	Mechanical	(03) 898-2240
RAIS MIRZA	Civil	
RAJA RIZWAN IMTIAZ	Mechanical	(03) 357-7192
RAJA SHAHID SALEEM	Civil	(03) 833-3997
RANA MUHAMMAD ASIF JAMIL	Chemical	
RANA SARFRAZ AHMED	Electrical	(01) 452-8905
RAO ABDUL RAQEEB KHAN	Electrical	(01) 452-6964
RASHEED A. BHUTTO	Electrical	(07) 231-9197
RAZA HUSAIN	Electrical	(01) 465-9975 x 205
RAZAUR RAHMAN	Electrical	(01) 265-1515 x 255
REHAN NOOR KHAN	Mechanical	(03) 896-6666 x 1045
RIAZ HUSSAIN	Electronics	(01) 452-8712
RIZWAN AHMAD	Electrical	(03) 834-1730
RIZWAN AHMED BHATTI	Civil	(03) 897-1050 x 159
RIZWAN UL HAQ FAISAL	Electrical	(03) 857-9922 x 227
RUKHSUDDIN SHAIKH	Architecture	(01) 408-9051
S. ABID HUSSAIN	Mechanical	(01) 491-1333 x 320

ALPHABETICAL INDEX

NAME	DISCIPLINE	PHONE (OFFICE)
S. AFZAL HASAN KAZMI	Electrical	(01) 465-2511 x 14
S. AIJAZ HAIDER	Electrical	(02) 661-8957
SADAR DIN	Civil	(01) 465-9975 x 203
SAEED RASHID SHEIKH	Mechanical	(01) 476-2539
SAFDAR IQBAL AWAN	Electrical	(01) 464-3333 x 14386
SAGHIR AHMED	Electrical	(03) 343-0333 x 39204
SAIF UR REHMAN	Mechanical	(01) 491-1333 x 342
SAIFULLAH SALEEM	Mechanical	(01) 204-6279
SAIF-UR-RAHMAN, DR	Mechanical	(03) 860-6688
SAJID GUL	Mechanical	(03) 865-9624
SAJJAD AHMAD SAJID	Electrical	(02) 665-8420 x 2047
SALEEM AHMAD	Electrical	(03) 586-8600 x 62679
SALEEM BAIG MIRZA	Civil	(01) 477-8384
SALIS USMAN	Electrical	(01) 403-2222 x18385
SALMAN M. KHAN	Civil	(03) 874-6859
SALMAN MEHMOOD	Electronics	(03) 865-5422
SALMAN MUSTAFA	Electrical	(03) 566-2072
SAMI UDDIN CHUGHTAI	Mechanical	(03) 817-3000
SAQIB SHAH	Electrical	(01) 464-1188 x 292
SARFRAZ AHMAD MALIK	Mechanical	(03) 357-7236
SARFRAZ MAHMOOD	Electrical	(01) 452-8519
SARMAD RIZWAN AHMAD	Chemical	
SHABBIR A. KHOKHAR	Civil	(01) 477-4002 x 248
SHABBIR AHMED SIDDIQUI	Mechanical	(01) 465-9975
SHAH NAWAZ KHAN	Electrical	(07) 227-1111 x 1740
SHAH ZAMAN PANHWAR	Electrical	(02) 660-3672
SHAHABUDDIN	Miscellaneou	(01) 523-5529
SHAHID AKHTAR BUTT	Electrical	(03) 357-7320
SHAHID ANWAR	Civil	(01) 249-9270
SHAHID MASOOD	Mechanical	(03) 572-0059
SHAHID ZUBAIR	Electrical	(01) 265-1515 x 507
SHAHIDMAHMOOD ALVI	Electrical	
SHAHZAD ALI BAIG	Electrical	(03) 882-9394
SHAHZAD HABIB GILL	Electrical	(03) 857-2300 x 84812
SHAIKH ASRAR AHMED	Electronics	(01) 473-8995 / 473-899(
SHAIKH MOHAMMAD ASHRAF	Civil	(01) 472-4338
SHAKEEL AHMAD	Electrical	(01) 402-0227
SHAKIL AHMAD	Electrical	(03) 386-1750 x 114
SHAKIL OMAR	Electrical	(03) 882-9546
SHAKOOR ALAM	Mechanical	(03) 898-2240
SHAMEEM AHMAD	Mechanical	(03) 343-0333 x 31002
SHAMIM AHMED	Mechanical	(03) 341-0671
SHAMIM ALAM KHAN	Electrical	(01) 403-1128
SHAMIM UDDIN	Mechanical	(01) 464-1188 x 226
SHAMS-UD-DIN AHMED	Mechanical	(03) 340-1634
SHAMS-UR-REHMAN	Mechanical	(03) 837-3299
SHARFUDDIN	Mechanical	(03) 343-0333 x 31002
SHARFUDDIN S. MALIK	Miscellaneou	(01) 484-2093
SHAUKAT ALI	Electrical	(03) 860-4252
SHAUKAT PERVAIZ	Mechanical	(01) 478-4401
SHEHZAD AHMED	Electrical	(03) 397-4005
SHEIKH AKHTAR HUSAIN	Civil	(01) 465-9975 x 240
SHEIKH KHALIL AHMED	Civil	(01) 454-9191 x 225
SHEIKH MAHMOOD AHMED	Electrical	(03) 373-0308 x 72634
SHEIKH MUHAMMAD IRSHAD	Mechanical	(07) 231-9105 x 1124
SHIEKH NISAR MUHAMMAD	Mechanical	(07) 227-1111 x 1306
SHOAIB AHMAD	Electrical	(03) 897-6283
SIKANDER H. BHATTI	Electrical	(01) 478-2027 x 25/ 479-
SIRAJ UL HUDA SIDDIQUI	Mechanical	(01) 464-1188 x 203
SULTAN ALI MANZOOR	Electrical	(03) 858-7075 x 37
SYED ABDUR REHMAN	Mechanical	(01) 491-1333 x 431
SYED ABUL HASAN JAFRI	Electrical	(02) 665 4616
SYED ADNAN ALI	Electronics	(01) 462-9095 x 5313
SYED ADNAN MOID	Electrical	(01) 462-5858 x 248
SYED AFZAL HUSAIN	Electrical	(01) 465-4406
SYED AHMED MAHMOOD	Mechanical	(02) 640-0004 x 378
SYED AHMED SALMAN	Mechanical	(03) 857-3559 x 116
SYED ALI ABID	Mechanical	(01) 491-1333 x 303
SYED AMIR UR REHMAN	Electrical	(03) 835-8875
SYED ANWAR ALI	Mechanical	(03) 857-2300 x 84951
SYED ASHFAQUE MAZHAR	Electronics	(02) 671-7285
SYED ASLAM ALI	Mechanical	(03) 894-6816 x 259
SYED AZHAR MOIN	Chemical	(03) 341-9065
SYED FAIZ AHMAD	Civil	(01) 477-3115 x 3845
SYED FARASAT ABBAS	Electrical	(03) 857-9922x 413
SYED FASEEH-UDIN	Chemical	(03) 898-4045 x 221
SYED GHULAM MUSTAFA SHAH	Civil	(01) 454-9191
SYED HUSSAIN HAIDER	Electrical	(03) 882-8518 x 2213
SYED IBNE MOHAMMAD NAQVI	Civil	(03) 340-1249
SYED IFTIKHAR AHMED	Electronics	(03) 574-4115
SYED IQBAL ALAM	Computer	(01) 476-3777 x 367
SYED KAFIL AHMED HASHMI	Mechanical	(03) 566-0600 x 525
SYED KHALID UMER	Mechanical	(01) 206-6909
SYED KHAWAJA NEHAL UDDIN	Electronics	(01) 495-1300 x 228
SYED KHURSIED ABBAS	Electronics	(04) 325-8716
SYED MANZAR HASNAIN	Mechanical	(01) 464-9688
SYED MASOODUL HASSAN	Mechanical	(03) 857-2300 x 84980
SYED MISBAH UL ISLAM SABRI	Electrical	(03) 897-1717
SYED MOHAMMAD ALI	Civil	(03) 833-3997
SYED MOHAMMAD ASHFAQ	Chemical	(03) 358-5002 x 409
SYED MOHAMMAD NASEEM	Electrical	(01) 464-9688
SYED MOHAMMAD ZUBAIR	Mechanical	(03) 860-3135
SYED MOHTASHIM NIZAM	Mechanical	(03) 895-5004
SYED MUBASHIR UL HAQUE	Electrical	(01) 474-0555 x 191
SYED MURSHID PERVEZ	Electrical	(01) 406-9200 x 278
SYED NADEEM ALI	Chemical	(03) 357-7655
SYED NAEEM ALI	Architecture	(02) 654-7171
SYED NASIR UDDIN	Mechanical	(02) 651-9998 x 235
SYED NAVED HAIDER	Electrical	(03) 882-5669 x 223
SYED NAZEEF AKHTER	Electronics	(01) 454-9191 x 275
SYED NIAZ AHSAN	Metallurgy	(03) 359-9224
SYED RAHEEL AZAM	Electrical	(03) 864-1012
SYED SAFDAR RAZA NAQVI	Mechanical	(01) 463-1111 x 5182
SYED SAJID HUSSAIN	Mechanical	
SYED SALIMULLAH	Electronics	(01) 419-1394
SYED SALMAN SHAFIQ	Computer	(01) 452-6275
SYED SAMIUDDIN AHMED	Civil	(03) 895-5004 x 242
SYED SHABBIR AHMED	Electrical	(01) 403-2222 x 29716
SYED SHAHERYAR A SHAH	Electrical	(01) 401-2550 x 608
SYED SHAKEEL AHMED	Electronics	
SYED SHAMSUL HAQ	Electrical	(01) 477-7950
SYED SHUJAAT KHURSHED	Electrical	(01) 402-6809 x 304
SYED TARIQ MUHAMMAD	Electrical	(03) 898-4045 x 406
SYED TASNEEM HUSAIN	Electrical	(01) 265-1689 x 1482
SYED TOUSEEF AHMAD RIZVI	Electrical	(02) 662-8049
SYED UMER MOIZ	Electrical	(01) 467-2759
SYED WAJID HUSSAIN	Electrical	(03) 858-4855 x 307
SYED WALIULLAH HUSAINI	Mechanical	(02) 667-0092 x 336
SYED WASI IMAM	Civil	(03) 895-5004 x 239
SYED WIQAR FAKHRI	Electrical	(03) 673-5071
SYED ZAFAR AHMAD	Mechanical	(01) 476-9777 x 42310
SYED ZAFAR WAHAB	Electrical	(03) 586-8600 x 62864
SYED ZAHID HASSAN RIZVI	Electrical	(01) 403-2222 x 18448
SYED ZAHIR-UL-HUSNAIN SHAH	Civil	(03) 820-4309
SYED ZIKRUR REHMAN	Mechanical	(01) 467-6966
TAHIR ILYAS SHEIKH	Mechanical	(01) 210-3333 x 5511
TAHIR J. BAIG	Chemical	(03) 357-7399
TAHIR RASHID KHAN	Mechanical	(03) 348-2440
TAHIR S. MIRZA	Electrical	(03) 858-6201
TAJAMMAL HUSSAIN	Metallurgy	(03) 812-2966
TANWEER AHMED	Electrical	(01) 265-0850
TANWEER EJAZ NAWAZ	Electrical	(03) 858-6725
TANWEER NAWAZ MALIK	Electrical	(01) 275-5999 x 4702
TARIQ AHMED SHEIKH	Metallurgy	(07) 227-1111 x 1301
TARIQ ALI KHAN	Chemical	(03) 847-4050
TARIQ AZIZ BHUTTA	Civil	(03) 847-3556
TARIQ BIN ZAFAR	Mechanical	(03) 859-0484
TARIQ JAVED	Mechanical	(01) 244-1245
TARIQ MAHMOOD	Chemical	(01) 498-4000 x 1888
TARIQ MUMTAZ SOOMRO	Electrical	(01) 293-3617 / 464-308
TARIQ MUSHTAQ	Electrical	(03) 858-5471
TARIQ NAZIR SHEIKH	Miscellaneou	(03) 362-1064
TASADDUQ HUSSAIN GILANI	Electronics	(01) 206-0000 x 3334
TASNEEM AHMED	Electronics	(03) 858-7505 / 858-759
TAZIM HUSSAIN KAZMI	Miscellaneou	(02) 671-7717 x 529
USMAN AHMAD	Mechanical	(01) 265-3701
WAHEED AKHTER	Electronics	(01) 464-9811 x 430
WAJAHAT HUSSAIN SIDDIQUI	Electrical	(02) 640-0004 x 265
WAQAR AHMAD	Mechanical	(01) 403-2222 x 29337
WAQAR USMAN MIAN	Metallurgy	(03) 857-9922 x 393
WASIM NOOR MALIK	Civil	(01) 454-9191 x 309
WAZIR ULLAH KHAN	Electrical	(03) 889-1609
YASER MUSHTAQ, PMP	Electrical	(01) 265-2112 x 1516
YASIN KHAN, DR.	Electrical	(01) 467-9813
YASIR MAZHAR	Mechanical	(03) 341-5845
ZAFAR AHMED TALPUR	Mechanical	(02) 691-6240
ZAFAR IQBAL, PMP	Electrical	(01) 478-2027
ZAFARULLAH KHAN DR.	Mechanical	(03) 860-2693
ZAHEER UDDIN AHMAD	Mechanical	(01) 498-2807 x 555/ 49
ZAHID KHAN	Electronics	(07) 227-1111 x 1410
ZAHOOR ALI KHAN	Computer	(01) 435-5010 x 731
ZAINULABDIN PATHAN	Civil	(01) 403-2222 x 29758
ZAKIR RAZA	Electrical	(01) 477-7000
ZIA-UR-REHMAN	Mechanical	(03) 357-7380
ZUBAIR AHMED	Electrical	(01) 465-6975
ZUBAIR AKHTAR	Mechanical	(01) 463-1111 x 2805
ZULFIQAR AHMED BHATTY	Electrical	(01) 477-1122 x 258
ZULFIQAR AHMED KHAN	Mechanical	(01) 686-1119 ext 434

DIRECTORY OF PAKISTANI ENGINEERS
IN THE KINGDOM OF BAHRAIN

ADIL AHMED KHAN
Network Engineer
Ebrahim AI-Kadhem Trading Establishment
P.O. Box 10677, Manama, Kingdom of Bahrain
Tel. 17277980 (Off)
Mobile 39269970
Email: ekte@batelco.com.bh

AFTAB AHMED
Construction Manager (Elec.& Instr.)
Ahmed Mansoor AI-Aali Co.
P.O. Box 778, Manama, Kingdom of Bahrain
Tel. 17250521 (Off)
Mobile 39402955
Fax. 17262323
Email: aftaba786@hotmaiLcom

AHSAN NASEER
Flight Safety Engineer, Gulf Air
Flat No. 14, Building No. 1712, Road No. 2427
Manama 324, Kingdom of Bahrain
Tel. 17338466 (Off)
Mobile 39804916
Fax. 17336219
Email: piaahsan@yahoo.com

AJAZ RASHID
Demnstrator
University of Bahrain
House No 1975, Road 350, Block 203, Muharraq,
Kingdom of Bahrain
Tel. 17449999/611 (Res)
Mobile 39473730
Email: ajaz@eng.uob.bh

AMIR YAKUB MIAN
Senior Mechanical Engineer
W.S. Atkins & Partners Overseas
P.O. Box: 5668, Manama, Kingdom of Bahrain
Mobile 36554475
Email: amirmian@atkinsglobal.com

AMJAD NADEEM
Engineering Manager
Bahrain Electric Works
P.O. Box 571, Manama, Kingdom of Bahrain
Tel. 17252432 (Off)
Mobile 39470622
Fax. 17272472
Email: bew@batelco.com.bh

ANWER QAMER, PMP *(Member)*
Civil & Structural Engineer
The Bahrain Petroleum Company (BAPCO)
P.O. Box 25555, Awali, Kingdom of Bahrain
Tel. 17755826 (Off)
Mobile 36312165
Fax. 17755552
Email: anwer_qamer_mohd@bapco.net

ARIF SADIQ
Managing Director
Arif Sadiq Design Consultants
P.O. Box 11614, Manama,
Kingdom of Bahrain
Tel. 17274606 (Off)
Mobile 39608999
Fax. 17234244

FAISEL SIDDIQUE RANA
Senior Civil Engineer
A.C.E AI-Moayed Consulting Engineers
P.O. Box 844, Manama, Kingdom of Bahrain
Tel. 17874445 (Off)
Mobile 39836538
Fax. 17789856
Email: sportsman77@hotmaiLcom

GHAZALA TASNEEM
Civil Engineer
Flat 22, Building 990, Road 1813
Block 318, Hoora, Kingdom of Bahrain
Tel. 17293908 (Res)
Email: afreentas@hotmail.com

GHULAM MOHYUDDIN KHAN
Senior Inspection Engineer
Gulf Petrochemical Industries Company
P.O. Box 26730, Manama, Kingdom of Bahrain
Tel. 17733370 (Off)
Mobile 39816531
Fax. 17731047
Email: mohyuddn@batelco.com.bh

GHULAM NABI CHAUDHARY
SR. Civil &QA/QE Engineer
Tilke & Partners W.L.L.
P.O. Box 21557, Manama, Kingdom of Bahrain
Tel. 17540028 (Off)
Mobile 39415965
Fax. 17530861
Email: gmdkhan@gmaiLcom

GUL HAMEED KHALIL
Assistant Resident Engineer
Hyder Consulting M.E. Ltd.
P.O. Box 26073
Tel. 17564755
Mobile 3672786
Email: ghkl@hotmail.com

IFTIKHAR SADDEEQ CHAUDHARY *(Member)*
Manager Quality Assurance
Bahrain Alloys Manufacturing Co.
P.O. Box 5343, Manama, Kingdom of Bahrain
Tel. 17830011 (Off)
Tel. 17295898 (Res)
Fax. 17830060
Email: iftikhar@bamco.com.bh

IHSAN UL HAAQUE
Superintendent Special Projects
Bahrain Petroleum Company
P.O. Box 25053, Awali, Kingdom of Bahrain
Tel: 17753337
Mobile 39456085
Fax. 17 753202
Email: ihsan@bapco.net

IJAZ AHMAD RANA
Head Construction TC & DLO
Sanitary Engineering, Planning & Project Directorate
Ministry of Works & Housing
P.o. Box: 5, Manama, Kingdom of Bahrain
Tel. 17875354 (Off)
Mobile 39208539
Email: iarana@batelco.com.bh

IJAZ ASHRAF
Coordinator Env. Management System Development
Bahrain Petroleum Company
P.O. Box 25153, AwaF, Kingdom of Bahrain
Tel. 17755830 (Off)
Mobile 386626083
Fax. 17755552
Email: ijaz_ashraf@bapco.net

IMTIAZ AHMED SYED
Branch Manager
Keller Grundbau GmbH.
P.O. Box 5452, Manama, Kingdom of Bahrain
Tel. 17226905 (Off)
Mobile 39656135
Fax. 17224733
Email: imtiaz1@batelco.com.bh

JAVED ZIA MALIK
Assistant Resident Engineer
Hyder Consulting Middle East Ltd.
P.O. Box 26073,Kingdom of Bahrain
Tel. 17564755
Mobile 36767457
Email: zia2javed@yahoo.com

JAVAID AKRAM
Head of Engineering Group,
Building Maintenance Directorate,
Ministry of Works & Housing
P.O. Box 10140, Manama, Kingdom of Bahrain
Tel. 17349011 (Off)
Mobile 39664851
Email: jave13@batelco.com.bh

MAHMOOD SHAFQAT UPPAL
Lecturer
University of Bahrain
P.O. Box 32038, Manama, Kingdom of Bahrain
Tel. 17876941 (Off)
Mobile 36629620
Email: shafqatv@yahoo.com

MOHAMMAD AFZAL BEG
Senior Technician
Watson Khunji
Manama, Kingdom of Bahrain
Tel. 17280103 (Off)
Mobile 39552267
Fax. 17233006
Email: m_afzal42@batelco.com.bh

MOHAMMAD ARIF RASHEED
Q.A. Manager
Bureau Veritas Bahrain
P.O. Box: 45, Manama, Kingdom of Bahrain
Tel. 17877574
Mobile 39095732
Email: arifr20@yahoo.com

MOHAMMAD AYAZ BEG
Senior Resident Engineer
Hyder Consulting Middle East Ltd.
P.O. Box 26073, Kingdom of Bahrain
Mobile 36066775
Email: moayazb@gmail.com

MOHAMMAD BABAR OMAR
Managing Director
CRYSTAL DROP (THE WATER MASTERS)
P.O. Box 26817, Manama, Kingdom of Bahrain
Tel. 17737551 (Off)
Mobile 39422077
Fax. 17737552
Email: babar@crystaldrops.com

MOHAMMAD IQBAL
Managing Director
Cellmec
P.O. Box 26252, Manama, Kingdom of Bahrain
Tel. 17732111 (Off)
Mobile 39696896
Fax. 17730860
Email: iqcelmec@batelco.com.bh

MOHAMMAD MASROOR ANWER *(General Secretary)*
Head, Damage Prevention Section
Authority Electricity & Water
Kingdom of Bahrain
Tel. 17389901 (Off)
Mobile 36052976
Email: mmanwer@batelco.com.bh

MOHAMMAD RIAZ MUSTAFA
System Supprot Engineer
Bahrain Petroleum Company
P.O. Box 25088, Awali, Kindom of Bahrain.
Tel. 17752905 (Off)
Mobile 39227023
Fax. 17755552
Email: mrmustafa@batelco.com.bh

MOHAMMAD SHAFI ALAM
Planning & Design Engineer
Water Distribution Directorate
Ministry of Electricity &Water
P.G.Box 833, Manama, Kingdom of Bahrain
Tel. 17814247 (Off)
Mobile 39678366
Email: mshafialam@hotmail.com

MOHAMMAD SHUJA UL ISLAM
Planning Engineer
Aluminium Bahrain (ALBA)
P.O. Box 570, Manama, Kingdom of Bahrain
Tel. 17834610 (Off)
Mobile 39647428
Fax. 17830459
Email: mshuja@alba.com.bh

MOHAMMAD TAJ KHAN
Property Manager
Y.B.A.Kanoo
P.O. Box 45, Manama, Kingdom of Bahrain
Tel. 17220753 (Off)
Mobile 39454325
Fax. 17727120
Email: mtk786@batelco.com.bh

MOTEEN AHMAD BUTT
Project Engineer
Skyline Trading Corporation W.L.L.
P.O. Box 3207, Manama, Kingdom of Bahrain
Tel. 17598009 (Off)
Mobile 36065004
Fax. 17598338
Email: moteen786@hotmail.com

MUHAMMAD HAMOOD ALAM
Technical Training Instructor, Gulf Air
Flat No. 11, Building No. 69, Road 2003
Hoora 320, Manama, Kingdom of Bahrain
Tel. 17338075 (Off)
Mobile 39880267
Fax. 17338234
Email: muhammad.alam@gulfairco.com

NASIR ALI KHAN
Design Manager, Design & Engineering Dept.
SyedJunaid Alam W.L.L.
Flat No. 12, Building No. 830 Road No. 4215
Block 342, Juffair
Tel. 17737007 (Off)
Mobile 39982982 Fax. 17735333
Email: nasirasma@yahoo.com

NASIR RASHID TOOSY *(Treasurer)*
Managing Direcor White World Contracting
P.O. Box 24511, Bldg. 54, Rd. 503 Block 205 Muharraq
Tel. 17323791 (Off)
Tel. 17716049 (Res)
Mobile 39674415
Fax. 17323790
Email: toosynr@hotmail.com

QAMAR UL HASSAN *(Vice Chairman)*
Project Manager
Gulf House Engineering
Manama, Kingdom of Bahrain
Tel. 17720203 (Off)
Mobile 39431815
Fax. 17720203
Email: qamarh63@gmail.com

QAZI MAHMOOD ALAM
Senior Design Engineer
Ministry of Works & Housing
P.O. Box 15802, Manama, Kingdom of Bahrain
Tel. 17528270 (Off)
Mobile 39272540
Fax. 17533836
Email: qazi@bahrain.gov.bh

REHAN AHMED *(Chairman)*
Senior Environmental Specialist
Public Commission for the Protection of
Marine Resources, Environment & Wildlife
P.O. Box 32657, Isa Town, Kingdom of Bahrain
Tel. 17875173 (Off)
Mobile 39275066
Email: rehan900@gmail.com

RIAZ AHMED
Senior Resident Engineer
W.S. Atkins & Partners Overseas
P.O. Box: 5668, Manama, Kingdom of Bahrain
Mobile 36066919,
Email: ariaiz50@yahoo.com

RIZWAN MUMTAZ
General Manager
Amwaj Gateway Development Co.
P.O. Box 21557, Manama, Kingdom of Bahrain
Tel. 17516555 (Off)
Tel. 17770629 (Res)
Mobile 39687190 Fax. 17530861
Email: rmumtaz@batelco.com.bh.

SAIMA SAJJAD HASHMI
Student (University of Bahrain)
P.O. Box 5030, Manama, Kingdom of Bahrain
Tel. 17276380 (Res)
Mobile 39060446
Fax. 17535035
Email: saimahashmi84@yahoo.com

SALEEM JAVED
Sr. Electrical Engineer
Tike & Partners W.L.L.
P.O. Box 18129, Manama, Kingdom of Bahrain
Tel. 17594673 (Off)
Mobile 39094139
Fax. 17595692
Email: sjmsl962@yahoo.com

SHAMSUL HAQUE ALVI
Professor, Department of
Civil Engineering University of Bahrain
P.O. Box 32038, Manama, Kingdom of Bahrain
Tel. 17782134 (Off)
Mobile 39441435
Fax. 17411109
Email: shalvi43@hotmail.com

SHARFUDDIN AHMAD
Medical Equipemnt Engineer
Ministry of Interior
P.O. Box 13, Manama, Kingdom of Bahrain
Tel. 17230700 (Off)
Fax. 17275143
Email: sharfuddinahmad@hotmail.com

SUZAN AL AJJAWI
Senior Environmental Specialist
Public Commission for the Protection of
Marine Resources, Environment & Wildlife
P.o. Box: 32657, Isa Town, Kingdom of Bahrain
Tel. 17875140 (Off)
Email: suzana@env.gov.bh

SYED AYAZ ANWAR
Marine Surveyor
Lloyd's Register of Shipping
P.O. Box 464, Manama, Kingdom of Bahrain
Tel. : 17223368
Mobile 39975585
Fax. 17224776 .
Email: ayaz.anwar@lv.org

TARIQ MALIK
Systems Consultant
General Engineering & Management (GEMAC)
P.O. Box 11789, Manama, Kingdom of Bahrain
Tel. 17729958 (Off)
Mobile 39462532
Fax. 17729958
Email: tariqm@batelco.com.bh

TASNEEM AKHTAR SIDDIQUI
Control Engineer
Min. of Electricity & Water
Flat No. 22, Building No. 990, Road: 1813
Hoora Block 318, Kingdom of Bahrain
Tel. 17726672
Mobile 39710983
Email: tasneemsiddiqui66@hotmail.com

TOOBA TOOSY
Quantity Surveyor
Quantity Surveying & M.T. Directorate,
Ministry of Works & Housing
P.O. Box 5, Manama, Kingdom of Bahrain
Tel. 17545759 (Off)
Mobile 39667834 Fax. 17532678
Email: toobatoosy@yahoo.com

UBEDULLAH RUK *(Joint Secretary)*
Project Engineer
Mohammed Salauddin Consulting
Engineering Bureo (MSCEB)
P.O. Box 111, Manama, Kingdom of Bahrain
Tel. 17216777 (Off)
Mobile 39740945
Email: ubaidruk75@hotmail.com

UNAIZA QAMAR, MRS.
Structural Engineer
Ministry of Housing
Manama, Kingdom of Bahrain
Mobile 39078495
Email: unaiza@moh.gov.bh

WASEEM AKHTAR ALI
Resident Engineer
Arif Sadiq Design Consultants S.P.C.
P.O. Box 11614
Manama, Kingdom of Bahrain
Mobile 39740178
Email: waseembahrain@gmail.com

ZIA ULLAH ALVI
Manager Projects
Bahrain Fibre Glass International
Mina Salman Industrial Area
P.O. Box: 26197, Kingdom of Bahrain
Tel. 17727063 (Off)
Fax. 17727615
Email: ziaebfginternational.com

ZULFIQAR HAIDER *(Publication Secretary)*
Manager
Building & Facility Bureau Veritas Bahrain
P.o. Box: 45 Manama, Kingdom of Bahrain
Tel. 17877574
Mobile 39792227
Fax. 17877576
Email: zulfiqar.haider@ae.bureauveritas.com

IEP-BC LOCAL COUNCIL MEMBERS

REHAN AHMED
Chairman

UBEDULLAH RUK
Joint Secretary

ANWER QAMER
Member

QAMAR UL HASSAN
Vice Chairman

NASIR RASHID TOOSY
Treasurer

IFTIKHAR SADDEQ CHAUDHARY
Member

MOHAMMAD MASROOR ANWER
General Secretary

ZULFIQAR HAIDER
Publication Secretary & Training

ADVERTISERS INDEX

IEP-SAC STANDING COMMITTEES

Regional Coordination Committee

- Engr. Masood A. Khan (Convenor)
- Engr. Jaleel Hasan (Co-Convenor)
- Engr. Rizwan Ahmed (East Region)
- Engr. Masood Hamid (West Region)

Awards and Scholarships Committee

- Engr. Abdur Rashid Shad (Convenor)
- Engr. Obaidullah Siddiqui (Co-Convenor)
- Engr. Dr. Nazar Hussain Malik
- Engr. Sheikh Akhtar Hussain
- Engr. Syed Mubashir Kirmani

Finance Committee

- Engr. Jaleel Hassan (Convenor)
- Engr. Abdul Waheed Mir (Co-Convenor)
- Engr. Abdur Rashid Shad
- Engr. Masood A. Khan

Media Co-ordination Committee

- Engr. Saifullah Saleem (Convenor)
- Engr. Syed Faiz Ahmed (Co-Convenor)
- Engr. Shaikh Asrar Ahmed

Membership Committee

- Engr. Obaidullah Siddiqui (Convenor)
- Engr. Syed Zafar Ahmed (Co-Convenor)
- Engr. Saifullah Saleem

Reception and Facilitation Committee

- Engr. Sheikh Akhtar Hussain (Convenor)
- Engr. Abdul Wahid Mir (Co-Convenor)
- Engr. Naveed Ahmed
- Engr. Riaz Ahmed
- Engr. Wasim Noor Malik

Printing and Publications Committee

- Engr. Khalil Ahmed (Convenor)
- Engr. Naveed Ahmed (Co-Convenor)
- Engr. Obaidullah Siddiqui
- Engr. Shaikh Asrar Ahmed
- Engr. Syed Faiz Ahmed
- Engr. Syed Salman Shafiq

Social Activities Committee

- Engr. Shaikh Asrar Ahmed (Convenor)
- Engr. Saifullah Saleem (Co-Convenor)
- Engr. Kauser M. Butt
- Engr. Khalil Ahmed
- Engr. Riaz Ahmed
- Engr. Syed Faiz Ahmed
- Engr. Syed Mubashir Kirmani
- Engr. Wasim Noor Malik

Sponsorship Arrangements Committee

- Engr. Jaleel Hassan (Convenor)
- Engr. Syed Mubashir Kirmani (Co-Convenor)
- Engr. Aleem uddin
- Engr. Rizwan Ahmed
- Engr. Skindar Bhatti
- Engr. Syed Salman Shafiq

Technical Presentations Committee

- Engr..Syed Mubashir Kirmani (Convenor)
- Engr. Jaleel Hasan (Co-Convenor)
- Engr. Khalil Ahmed
- Engr. Obaidullah Siddiqui
- Engr. Syed Zafar Ahmed

Venue Arrangement & Catering Committee

- Engr. Kauser M. Butt (Convenor)
- Engr. Abdul Waheed Mir (Co-Convenor)
- Engr. Saifullah Saleem
- Engr. Shaikh Asrar Ahmed

IEP-SAC STANDING COMMITTEES
EASTERN PROVINCE

Finance Committee

- Engr. Pervez Naushahi (Convenor)
- Engr. Aziz Arshad (Co-Convenor)
- Engr. Mohammad Azam Randhawa

Membership Committee

- Engr. Samiuddin Chughtai (Convenor)
- Engr Italaq Ahmed Khan (Co-Convenor)
- Engr. Javed Iqbal
- Engr. Abdul Qadir Aqbani
- Engr. Khalid Hussain
- Engr. Asif Kamal

Reception Committee

- Engr. Mustafa Noeed A. Kamran (Convenor)
- Engr. Tanweer Ejaz (Co-Convenor)
- Engr. Italaq Ahmad
- Engr. Khalid Hussain
- Engr. Tariq Aziz Bhutta
- Engr. Akhtar Javaid Niazi
- Engr. Samiuddin Chughtai
- Engr. Syed Zahir ul Husnain
- Engr. Asad Zubairi
- Engr. Javed Iqbal

Media Co-ordination Committee

- Engr. Javed Iqbal (Convenor)
- Engr. Amamullah Turk (Co-Convenor)
- Engr. Misbah ul Islam

Sponsorship Arrangements Committee

- Engr. Abdul Qadir Aqbani (Convenor)
- Engr. Ismet Amin Khawaja (Co-Convenor)
- Engr. Tariq Bin Zafar
- Engr. Mohammad Azam Randhawa
- Engr. Rizwan Ahmed
- Engr. Akhtar Javaid Niazi

Technical Seminars Committee

- Engr. Asrar ul-Haq Sheikh, Dr. (Convenor)
- Engr. Tariq Aziz Bhutta (Co-Convenor)
- Engr. Aziz Arshad
- Engr. Awar Khalil Sheikh, Dr.
- Engr. Syed Zahir ul Husnain
- Engr. Misbah ul Islam
- Engr. Asif Kamal

DIRECTORY OF PAKISTANI ENGINEERS IN THE KINGDOM OF SAUDI ARABIA

NEW ENTRIES AND CHANGES

If your name is not included in the Directory of Pakistani Engineers in the Kingdom of Saudi Arabia and you want it to be included in the next edition, then please fill in the registration form and mail it to IEP-SAC together with two color photographs. If your name is already included but you like to have changes/corrections in the next edition of the directory, please fill-in your name, branch, and the changes/corrections on the directory form and write down the page number of your entry in the directory on top of the form and mail it to IEP-SAC.

IEP-SAC LOCAL COUNCIL – WESTERN PROVINCE

Engr. A. Aleem Khan
E/M Manager
SBG -PBAD
Ph (Off) 02-640-0004 Ext. 268
Mobile 050-768-3556
Email: alimkhan@pbad.sbg.com.sa
Chairman

Engr. Masroor Elahi Khan
Manager Low Current
SBG - PBAD
Ph (Off) 02-640-0004 Ext. 261
Mobile 056-734-2436
Email: masroor@pbad.sbg.com.sa
Secretary

Engr. Abu Farhan Siddiqui
Head of Mechanical
SBG - PBAD
Ph (Off) 02-640-0004 Ext.272
Mobile 050-770-4326
Email: farhan@pbad.sbg.com.sa
Member

Engr. Humayun Hussain Taqi
Sales Manager
Arab Engineers
Ph (Off) 02-675-9774
Mobile 056-465-8630
Email: hhtael@hotmail.com
Member

Engr. Liaqat Ali
General Manager
ASAS Contracting
Ph (Off) 02-671-5202
Mobile 050-551-8766
Email: asas@asasksa.com
Member

Engr. Nafees Ahmed Khan
Projects Control Manage
Al-Swedy
Ph (Off) 02-640-0004
Mobile 050-459-5408
Email: Nafis_khan@yahoo.com
Member

Engr. Omer Idrees
President
Atwar al Handasia Est.
Ph (Off) 02-670-1982
Mobile 055-655-0895
Email: omer.idrees@gmail.com
Member

Engr. Qamar-ul-Haq Siddiqui
Sr. Electrical Engineer
Arabian BEMCO
Ph (Off) 02-669-5851 Ext.242
Mobile 056-423-6160
Email: qamarul@bemco-ipp.com
Member

Engr. Syed Waliullah Hussaini
Procurement Specialist
Arabian BEMCO
Ph (Off) 02-667-0092 Ext. 336
Mobile 056-352-2624
Email: syed@bemco-ipp.com
Member

Engr. Touqeer Ahmad Khan
E/M Manager
Alnahdi Est.
Ph (Off) 02-673-0182
Mobile 050-665-2386
Email: toqeerk@yahoo.com
Member

IEP-SAC LOCAL COUNCIL – WESTERN PROVINCE

Engr. Maqsood Tariq
Electrical Manager
Saud Consult
Ph (Off) 02-667-0500
Email:
maqsoodtariq@saudconsult.com
Member

Engr. Masood Hamid
General Manager
NPCC
Ph (Off) 02-697-2620
Mobile 050-568-0706
Email: masoodhamid@yahoo.com
Member

Engr. Mian Mohammed Rafi
General Manager
ASAS Contracting
Ph (Off) 02-673-6175
Mobile 050-362-2586
Email: mianmrafi@hotmail.com
Member

Engr. Mohammed Javaid Iqbal
Sales Manager
ADWAN
Ph (Off) 02-280-3310
Mobile 050-512-4352
Email: javaid@adwanmarketing.com
Member

Engr. Naseer Ahmed Khan
Head of Mechanical
SAUDI DIYAR
Ph (Off) 02-699-9888 Ext.3300
Mobile 050-265-2267
Email: nkhan@diyar.com
Member

Engr. Riaz Ahmed
General Manager
Saudi TKT
Ph (Off) 02-660-6624
Mobile 050-565-9606
Email: info1@sauditkt.com
Member

Engr. S. Ehsanul Haq
Senior Sales Engineer
SCHNEIDER
Ph (Off) 02-697-6680
Mobile 050-527-6237
Email: ehsanuI-haque.syed@sa.schneider-electric.com
Member

Engr. Tasneem Ahmed
Regional Sales Manager (West)
Honeywell Building Solutions
Ph (Off) 02-665-4616
Mobile 056-791-9221
Email: tasneem.contact@yahoo.com
Member

Engr. Zafar-ul-Islam
Manager
TRANE
Ph (Off) 02-691-3412 Ext. 255
Mobile 050-437-4387
Email: zafrul.islam@gmail.com
Member

THE INSTITUTION OF ENGINEERS PAKISTAN
SAUDI ARABIAN CENTRE

نقابة المهندسين الباكستانين - مركز المملكة العربية السعودية

www.iep-sa.org

DIRECTORY REGISTRATION FORM

Please cross (X) the applicable:

☐ New Entry ☐ Data already sent is correct ☐ Amendment (*Please write only Name, Branch, and Amendment*)

Name _____

Branch (e.g. Civil, Electrical etc.) _____

Are you a member of IEP? ☐ Yes ☐ No

If the answer to the above question is "Yes" then please fill up the following:

a. Grade (Fellow, Member etc.) _____

b. Membership No. _____ c. Year _____

d. Centre that granted membership _____

TWO PHOTOGRAPHS 1.75" X 2.25"

(PASTE 1, STAPLE 1)

Qualifications (Please begin with Engineering Degree and list up to the highest qualification)

Degree	Institution	Year

Present Designation _____

Present Employer _____

Present Address _____

_____

Telephone Office _____ Residence _____

Fax _____ Mobile _____

Email 1 _____ Email 2 _____

Permanent contact in Pakistan or elsewhere (with country, area and postal code)

Telephone Residence _____ Fax _____

City _____ Country _____

Please register my particulars in the next edition of *IEP-SAC Directory of Pakistani Engineers in Saudi Arabia*.

SIGNATURE _____ DATE _____

Please mail the completed form to:
IEP-SAC, P.O.Box 50344, Riyadh 11523, Saudi Arabia.

Apr 2006

AL - TUWAIRQI GROUP

WORKING FOR BETTER TOMMOROW

AL-TUWAIRQI GROUP OF COMPANIES

Cognizant planning, well defined objectives and like thinking minds can build a future that everybody desires. Growing companies like Al-Tuwairqi Group, reinvent themselves by utilizing their financial strength and credibility to stay ahead of competition. Quality, commitment and customer satisfaction are the criterion of mammoth success of Al-Tuwairqi Group and recent ranking had placed the group at 26th position among the top hundred companies in the Kingdom of Saudi Arabia.

COMPANIES

- NATIONAL STEEL COMPANY LTD
- AL-ITTEFAQ STEEL PRODUCTS COMPANY
- AL-FAISAL STEEL PRODUCTS COMPANY
- DIRECT REDUCTION IRON COMPANY
- ALITUWAIRQI STEEL MILL (Pakistan)
- THAMESTEEL LTD
- THE INTERNATIONAL ELECTRICAL PRODUCTS COMPANY.

HEAD OFFICE

P.O.Box: 2705, Dammam31461 Kingdom of Saudi Arabia
Tel: +966- 3-857 9922 - 857 6622 - Fax: +966-3-857 9014

www.altuwairqi.com.sa - E-mail: group@altuwairqi.com.sa

شركة اميانتيت العربية السعودية

Saudi Arabian Amiantit Co.

(شركة مساهمة سعودية)

(A Saudi Joint Stock Co.)

AMIANTIT GROUP OF COMPANIES

THE LARGEST PIPES MANUFACTURER GROUP IN THE WORLD

FIBERGLASS فيبرغلاس

Fiberglass Reinforced Polyester or Vinylester Resin Pipes and Fittings for underground and above ground Application from 80 mm to 3700 mm Dia. for pressure & Drainage Systems.
Fiberglass Inspection Chambers and Manholes. Fiberglass Fuel/Water Storage Tanks from 250 to 48,000 U.S. Gallons (UL) Listed.

SADIP

Saudi Arabian Ductile Iron Pipes company ltd. (SADIP)

Ductile Iron Pipe Dia. From 100 to 600 mm.

Ameron
Ameron Saudi Arabia, Ltd.

Ameron Saudi Arabia, Ltd.

Pre-Tensioned concrete cylinder Pipes & Fittings from 300 mm to 1500 mm Dia for Water Supply & Drainage System.
Pre-stressed Concrete cylinder Pipes & Fittings from 1400 mm to 4000 mm Dia. for Water Supply & Drainage Systems.
Cement Mortar Lining of Steel Pipes & Fittings from 3" to 72".

شركة بوند سراند المحدودة
BONDSTRAND, LTD.

Fiberglass Reinforced Polyester or Vinylester Resin Pipes and Fittings from 25 mm to 1000 mm Dia. for Pressure & Drainage Systems for Both Underground & Aboveground Application.

SA ساكوب

Reinforced Concrete Pipes from 300 mm to 2500 mm Dia. for Storm Drainage System.
Reinforced Concrete Pipes PVC "T" Lock Inside Liner from 600 mm to 2500 mm Dia. for Foul Sewer Systems.
Reinforced Concrete Jacking Pipe Thrust Boring R. V. Manholes.

AMIANTIT RUBBER IND LTD

Rubber Rings for all types of Pipes and Fittings. Rubber sheets.
Cable Duct Sealing Units.

ARABIAN FIBERGLASS INSULATION

J. V. Of Saudi Amiantit & Owens Corning

AFICO Fiberglass Insulation for central air-conditioning buildings, and industrial piping

ISO 9001 - 9002 CERTIFIED

THE BEST CHOICE FOR DESALTING PLANTS PIPING SYSTEM

FOR INFORMATION, PLEASE CONTACT THE FOLLOWING OFFICES

Dammam	P.O. Box 589	- Dammam 31421	☎ 857-1160	- Fax (03) 857-1156
Riyad	P.O. Box 1029	- Dammam 11431	☎ 465 8665	- Fax (01) 463-1389
Jeddah	P.O. Box 2140	- Dammam 21451	☎ 651-5988	- Fax (02) 651-6149
Export	P.O. Box 589	- Dammam 31421	☎ 857-1160	- Fax (03) 857-8824

E-mail:amiantit@anet.net.sa / web page www.anet.sa/amiantit

شارع الستين، منفوحة، الرياض، المملكة العربية السعودية
60th Str. Manfoha, Al-Riyadh, Kingdom of Saudi Arabia
تلفون و فاكس:٤٥٨٥٥٨٩ Tel. & Fax:4585589

مطابع ركن الثقافة