

ENGINEERING
REVIEW

Founded by:
Najam ul Hasan

Engineers' trusted voice for 50 years and beyond

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50

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The First Fifty Years Were Just the Beginning

By Manzoor Shaikh

Fifty years ago, the idea of launching a publication dedicated exclusively to engineering in Pakistan seemed both ambitious and unconventional. The country was still developing its industrial base. Engineering universities were few in number, technical education infrastructure was limited, and the engineering profession had yet to emerge as a major force in national development. Even the Pakistan Engineering

industries, consultants, contractors, educational institutions, and public sector organizations. The publication would sustain itself through advertisements from companies that benefited from the visibility, networking, and information exchange the magazine provided.

The idea proved to be a remarkable success.

Companies found a platform to showcase their products and services, engineers

voice of engineers across Pakistan.

Of Engineering Review's fifty-year journey, the first thirty-seven years were led by its founder, Najmul Hasan. Following his passing, his son, Mohammad Salahuddin, assumed responsibility for carrying forward the legacy. Together, these two eras—37 years under the founder and 13 years under his successor—tell a story of resilience, adaptation, and unwavering commitment.

periodicals disappeared from the market, Engineering Review survived through the dedication and sacrifices of its team and the continued support of its advertisers and the engineering industry.

Today, as the world confronts new geopolitical challenges, including the Middle East crisis and disruptions in global supply chains, the publication remains steadfast in its mission.

Three years after the passing of Najmul Hasan,

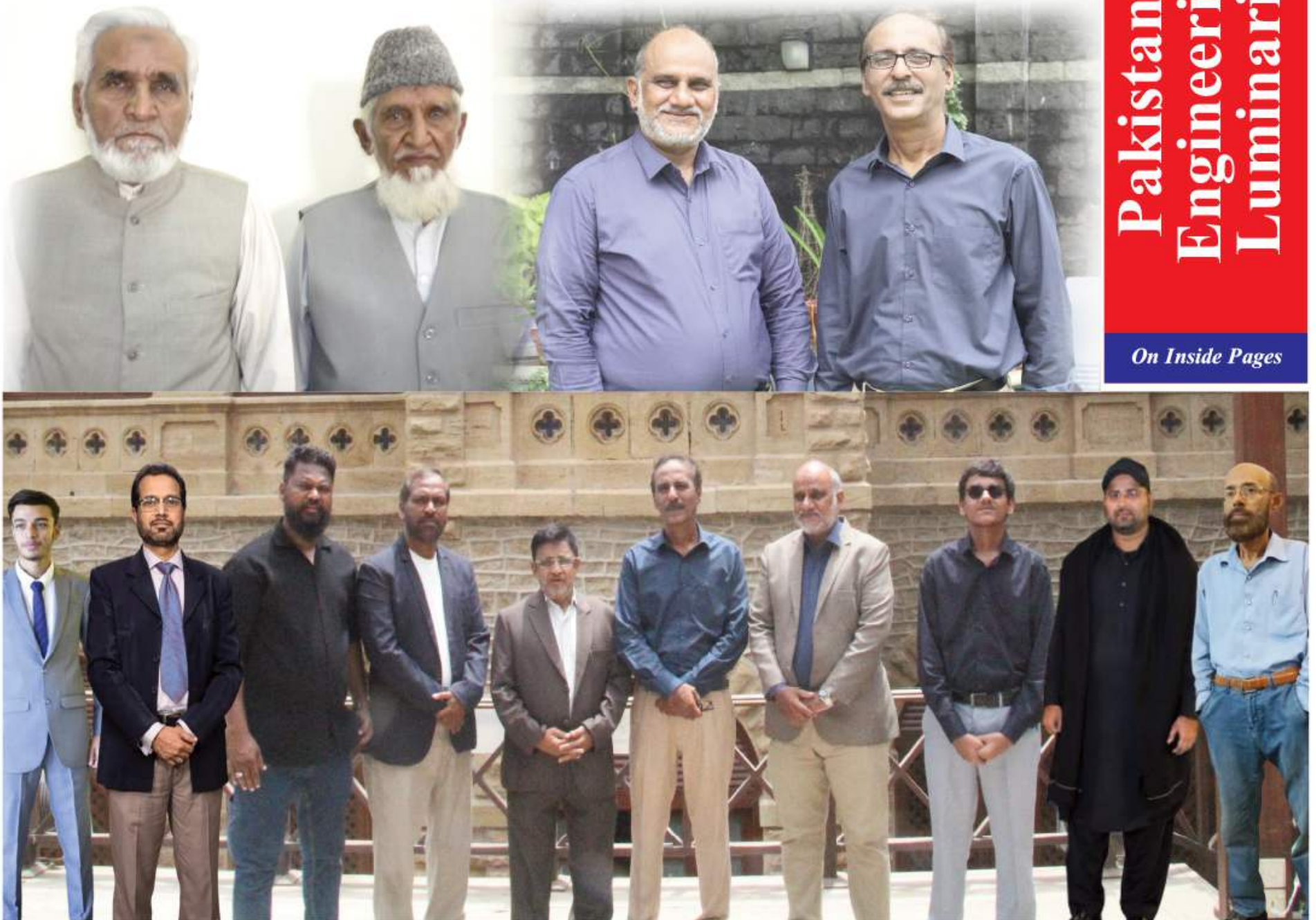
ternity nationwide.

Engr. Manzoor Shaikh brought with him decades of experience in English, Urdu, and Sindhi journalism, including work in print media and current affairs television, particularly with leading Sindhi channel KTN. His appointment proved to be a timely and strategic decision.

By then, the world had changed dramatically.

Media was undergoing a digital revolution. Engineering itself was evolving

channel, followed by a comprehensive social media presence across Facebook, LinkedIn, and Instagram. Simultaneously, the magazine introduced its dynamic website, EngineeringReview.com.pk, which is updated daily and



**Pakistan's
Engineering
Luminaries**

On Inside Pages

Council (PEC), the country's premier engineering regulatory body, had not yet come into existence. The only notable institution serving the engineering community at the time was the Institution of Engineers Pakistan.

It was in this environment that the late Najmul Hasan envisioned Engineering Review in October 1975—a publication that would become the voice of Pakistan's engineering fraternity for generations to come.

His vision was simple yet revolutionary. Engineering Review would be distributed free of cost to engineers,

gained access to industry developments, and public sector organizations could share their achievements with the broader engineering community. In a short span of time, Engineering Review established itself as a bridge connecting industry, academia, policymakers, and professionals.

Its uniqueness lay not only in its business model but also in its editorial focus. Unlike mainstream media, which covered a broad range of subjects, Engineering Review concentrated exclusively on engineering. Soon, it became the representative

Pakistan itself underwent significant political, economic, and industrial transformations during these five decades. Karachi, the country's largest industrial and economic hub, experienced periods of instability, uncertainty, and disruption. Yet, Engineering Review continued to publish uninterrupted.

Perhaps the greatest test came during the COVID-19 pandemic.

At a time when businesses shut down and many publications around the world ceased operations, Engineering Review persevered. While several magazines and

Engr. Manzoor Shaikh joined Engineering Review as Editor. At the time, veteran editor Riaz-ul-Hasan—whose contributions had helped establish the publication's editorial credibility—was no longer able to actively perform his duties due to health challenges.

Riaz-ul-Hasan's influence on Engineering Review cannot be overstated. Through his principled journalism, exclusive stories, and insightful coverage of Pakistan's engineering sectors, he helped create a strong editorial foundation that earned the respect of the engineering fra-

beyond traditional disciplines, influencing government policies, economic development, climate initiatives, and emerging technologies. Universities were producing engineers in new fields, while artificial intelligence, automation, and digital transformation were redefining industries.

Recognizing these shifts, Mohammad Salahuddin and Engr. Manzoor Shaikh made a conscious decision to modernize Engineering Review.

The publication entered the digital age.

Engineering Review launched its first YouTube

has become an important source of engineering and industrial news in Pakistan.

Today, Engineering Review stands as one of Pakistan's pioneering engineering publications in the digital space.

Its reach has expanded several times over compared to the print-only era. Digital platforms have not replaced the magazine's print edition; instead, they have strengthened and sustained it. The publication's online footprint is visible to anyone interested in Pakistan's engineering

Contd on page 2

The First Fifty Years Were Just the Beginning

Contd from page 1

landscape.

Engineering Review's institutional strength is evident in another remarkable fact. Over the past fifty years, many individuals who worked with the publication went on to establish their own magazines and media ventures. Some even predicted that Engineering Review would eventually cease publication.

It never did.

Not a single issue has been missed in half a century.

This continuity reflects not only the strength of the institution but also the values upon which it was built—professionalism, credibility, and service to the engineering community.

Equally important has been the publication's editorial

philosophy.

Engineering Review's team focuses on news, analysis, discussions, and debates that shape engineering policy

research, final-year projects, engineering institutions, and the achievements of Pakistani engineers and entrepreneurs around the world.

Review is more than a magazine. It is an archive of Pakistan's engineering history and a platform documenting the country's industrial evolution.

to transform itself into an international platform covering engineering, science, technology, climate change, and emerging innovations from around

The medium may have changed—from print pages to digital platforms—but the purpose remains unchanged.

As Engineering Review celebrates fifty years of uninterrupted publication, it does so with gratitude to its readers, advertisers, contributors, partners, and the engineering fraternity that has supported it every step of the way.

The journey that began in 1975 is far from over.

With the trust of the engineering community and the support of its partners, Engineering Review now looks toward the future with confidence—ready to take Pakistan's engineering story to every corner

of the world. ■

With inputs from
Mohammad Salahuddin.



and industrial development in Pakistan. Its coverage extends to engineering exhibitions, industrial projects, university

Few publications can claim such breadth within a specialized domain. Today, Engineering

As it enters its next chapter, Engineering Review has set its sights beyond Pakistan's borders. The publication aims

the world.

The mission remains the same: to inform, inspire, and connect.

neering story to every corner

of the world. ■

With inputs from
Mohammad Salahuddin.

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Sajid Ali Abbasi is the Founder & Group CEO of Times Group Private Limited, an integrated engineering, management, construction, and development company specializing in the construction and development of buildings and infrastructure.

He holds a Bachelor of Engineering (Civil) and a Master of Engineering Management in Construction Management from NED University of Engineering & Technology.

As an engineer, entrepreneur, and institution builder, he advocates engineering-led national development through innovation, technology, governance, sustainable infrastructure, and long-term capability building. His work focuses on strengthening engineering excellence, institutional capacity, and resilient infrastructure to support Pakistan's long-term economic growth and competitiveness.

ER: In the aftermath of the Middle East war, What would you suggest to policy-makers?

SAA: Recent global events have reaffirmed that engineering capability is a strategic national asset. Countries that possess strong engineering, manufacturing, and industrial capabilities are better equipped to withstand geopolitical uncertainty and economic disruption.

Pakistan should prioritize engineering-led development across energy, water resources, transportation, industrial manufacturing, construction materials, digital infrastructure, heavy engineering, and engineering research. Greater emphasis should also be placed on local manufacturing, technology transfer, research and development, and engineering innovation.

Engineering should no longer be viewed merely as a technical profession. It should be recognized as a strategic driver of economic resilience,

national competitiveness, technological independence, and long-term prosperity.

ER: Where did you receive your education, and what is the best memory you would like to share?

SAA: I completed my

Bachelor of Engineering (Civil) in 2006 and my Master of Engineering Management in Construction Management in 2013 from NED University of Engineering & Technology.

The most valuable memory is the collaborative learning environment that strengthened discipline, analytical thinking, teamwork, and problem-solving. NED not only provided technical knowledge but also



instilled the mindset of continuous learning, professional integrity, and lifelong improvement, principles that

coordination, conventional project management, and fragmented information systems.

Today, the profession is

Engineering Capability is a Strategic National Asset: Sajid Ali Abbasi Engineering Must Be the Foundation of Pakistan's Long-Term Prosperity

continue to guide my professional journey.

ER: What kind of engineering and industrial environment did you encounter after

being transformed through Building Information Modeling (BIM), Enterprise Resource Planning (ERP), artificial intelligence, digital

gies, and practical project exposure. Likewise, industry should actively mentor students, support research initiatives, provide structured training

opportunities, and continuously

share practical knowledge with educational institutions.

Such collaboration will produce engineers who are technically competent, industry-ready, innovative, and

engineering, data analytics, automation, and advanced project controls.

However, technology alone is not enough. Future competitiveness will depend

completing your education, and what changes do you observe today?

SAA: When I entered the profession, engineering projects relied heavily on manual

Engineering Review has served as an important platform for knowledge sharing, professional dialogue, and recognition of engineering achievements in Pakistan.

capable of solving real-world engineering challenges from the beginning of their professional careers.

ER: What is your opinion about Engineering Review?

SAA: As engineering continues to evolve through digital transformation, sustainability, artificial intelligence, and advanced technologies, publications such as Engineering Review play an increasingly important role in promoting innovation, encouraging informed discussion, sharing best practices, and inspiring future generations of engineers to contribute towards Pakistan's development. ■

Times Group Brief Introduction

Times Group Private Limited is an integrated engineering, management, construction, and development company specializing in the construction and development of buildings and infrastructure.

The company delivers end-to-end solutions across the project lifecycle, integrating engineering, project management, construction, sustainability, and technology to execute complex projects with efficiency, quality, and long-term value. Through disciplined execution, innovation, and engineering excellence, Times Group contributes to the development of resilient infrastructure that supports economic growth and national progress.

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THE INTERVIEW

Engineering Review: We would like our young viewers and engineering students to hear your story. When you were a young university graduate with dreams in your eyes, how did your journey begin? Most students imagine that after graduation they will get a good job, a car, a respectable office, and a comfortable life. But the reality is often a long struggle. How was it for you?

Engr. Wasim Nazir: That is a difficult question to answer in a few minutes because it is a journey of more than fifty years. I graduated from UET around fifty-two years ago when I was about twenty or twenty-one years old.

Like every young graduate, I also had the same dreams. I imagined that after graduation I would get a good position, a car, a nice office, and become an important officer. Those dreams were not different from anyone else's.

But when I started working, I quickly realized that the world we imagined was not the final reality. Dreams alone do not bring success. To improve yourself, your skills, and your future, you need hard work, passion, planning, and consistency. Without these, you cannot move forward.

ER: What became the foundation of your career?

WN: I decided that whatever work I would do, I would do it with excellence. Many people talk about excellence, but I made it a habit.

I want young engineers to understand this: if excellence becomes your habit, then they too can achieve what I achieved.

Throughout my career I remained a professional.

I never got distracted. I was not involved in politics. Even when I later entered a policy-making role, it was because of my professional credibility, not political connections.

ER: You worked in government service, construction, and consulting. What did those experiences teach you?

WN: I have worked in government service. I established a construction company. I suffered losses as well. But I remained focused.

If you ask me the secret of my journey, it is this:

- Make excellence a habit.
- Remain focused.
- Think big.
- Keep moving forward.

That is exactly what I did.

ER: At what stage did you decide to pursue higher education abroad?

WN: I realized that I had to continue developing myself. So I went abroad and completed two master's degrees — one in engineering and another in management.

After that I felt that consulting would be the most suitable field for me. I liked the idea of a professional, white-collar con-



Five Decades of Excellence: The Journey of Engr. Wasim Nazir

Engr. Wasim Nazir reflects on five decades of professional excellence, leadership, and lifelong learning, sharing the principles that took him from a young engineering graduate to an internationally recognized engineering leader.

sulting practice.

I started my consulting business in

ment?

WN: When I joined the organiza-

Whether that happens completely is in Allah's hands, but my intention is clear.

I believe that if we remain relevant, competitive, and committed to excellence, we can shape the future of engineering in Pakistan.

ER: You were recently elected to an important Commonwealth engineering body. Could you tell us about that?

WN: Yes. In the recent elections of the Commonwealth Engineering Council, I was elected as the first Executive Director member representing Asia after a competitive process.

This shows that if you want to claim your rightful place internationally, you

must demonstrate your capabilities through work, not merely through titles.

ER: Finally, if you had to summarize your entire journey in one message for young engineers, what would it be?

WN: Do not chase positions. Chase excellence.

Stay focused, keep learning, think beyond immediate limitations, and continue your journey with discipline and integrity. If you do that consistently, success will eventually follow. ■



1989, and today it has been running for almost 35 years.

tion, there were about 1,200 employees, and I was the only Pakistani.

The individuals who planted the seed of Engineering Review built it on the foundations of professionalism and integrity. Throughout its long history, I have never seen the magazine publish planted or biased news. Even during challenging periods such as the COVID-19 pandemic, Engineering Review remained steadfast and continued serving the engineering community. I am confident that its dedicated team will take the magazine to even greater heights in the years ahead.

ER: How did you establish yourself in an international environ-

Today that organization has around 16,000 employees, and I was among





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PEC extends its warmest congratulations to Engineering Review on celebrating 50 years of success.

Dr. Saleem Raza Samo: The change has been extraordinary. In fact, I would say that the term "engineering revolution" is no longer sufficient—it is a complete transformation.

When I entered engineering in the early 1980s, almost everything was manual. Engineers spent hours performing calculations, consulting textbooks, and preparing drawings by hand. Access to knowledge was limited, and obtaining technical information often took days or weeks.

Today, engineers carry more computing power in their smartphones than entire organizations possessed decades ago. Artificial intelligence, advanced simulations, cloud computing, and digital collaboration have fundamentally changed the way engineers work.

However, despite all these advancements, the essence of engineering remains unchanged. Engineering is still about solving problems. Technology may evolve, but engineers will always be required to think critically, act ethically, and create solutions that improve people's lives.

THE INTERVIEW

ER:
Take us back to your student days. What inspired you to become an engineer?

SRS: My interest in engineering began long before university.

I completed my Higher Secondary Certificate in 1980. During those days, a highly respected mathematics teacher in Nawabshah, Sir Vasdev, regularly advised students regarding their career choices. After assessing my academic performance, he told me I had the potential to become either a doctor or an engineer.

My elder brother was a doctor, so medicine was naturally an attractive option. However, another individual left a lasting impression on me.

A mechanical engineer used to visit Nawabshah regularly to work on industrial machinery. I still remember him clearly. He wore a blue engineering apron, confidently inspected equipment, and always seemed to have practical solutions to complex problems.

Watching him convinced me that engineering was a profession where knowledge met action.

Although I was offered admission in both Electrical and Mechanical Engineering, I chose Mechanical Engineering because I wanted to work with machines and industrial systems. I wanted to become a practical engineer.

Looking back, it was undoubtedly one of the best decisions of my life.

ER: What happened after graduation?

SRS: I graduated as a gold medalist and secured a top position in my class.

Soon after graduation, the university offered me a position as a lecturer. At the same time, I appeared for recruitment at Pakistan Ordnance Factories. The competition was intense, with hundreds of candidates applying.

By the grace of Allah, I was selected on merit, and Major General Talat Masood personally handed me my appointment letter immediately after the interview. For a young engineer, it was a proud moment.



Slide Rules to Artificial Intelligence: Dr. Saleem Samo on Transforming Engineering Education

QUEST Vice Chancellor reflects on four decades of engineering education, his journey from gold medalist to university leader, the transformation of QUEST, and why the future of Pakistan depends on engineers who can combine strong fundamentals with artificial intelligence, innovation, and leadership.

However, life had other plans.

My family suffered the tragic loss of my sister, and I returned to Nawabshah. The university once again encouraged me to join the faculty, and what initially appeared to be a temporary decision eventually became my life's work.

Since 1987, I have remained associated with the university system—as a teacher, researcher, administrator, and now Vice Chancellor.

When I look back, I realize that challenges often redirect us toward opportunities we never anticipated.

ER: What became your focus as a teacher?

SRS: Very early in my career, I noticed something important. Students from smaller cities possessed tremendous talent but often

lacked confidence. Technical knowledge alone is not enough. Engineers must be able to communicate, present ideas, and lead teams.

For that reason, I made classroom presentations compulsory. Every student had to stand before the class and explain a technical topic.

Initially, students were uncomfortable, but over time they developed confidence. Even today, many former students tell me that those presentations became one of the most valuable experiences of their careers.

I have always believed that education is not merely about producing graduates—it is about producing capable, confident, and responsible citizens.

ER: You became Vice Chancellor in 2018. What challenges did you inherit at QUEST?

SRS: There were several operational challenges. Student concerns regarding hostel facilities, electricity, and basic services required immediate attention. We focused on improving sanitation, installing RO water plants, and ensuring uninterrupted electricity during study hours.

Fortunately, we succeeded in addressing many of these issues. Since then, not a single university examination has been disrupted because of such problems.

At the same time, we focused on financial sustainability. We expanded solarization across the campus, which now covers approximately 60 to 70 percent of our energy requirements. We digitized processes and reduced unnecessary expenditures.

As a result, QUEST has become one of the few public-sector universities in Sindh operating with a surplus budget.

ER: QUEST has recently achieved important rankings. How significant are these achievements?

SRS: They are significant because they demonstrate what is possible when an institution works collectively. For the first time in its history, QUEST entered the Times Higher Education Rankings. More importantly, in the Sustainable Development Goal (SDG) category for Quality Education, QUEST emerged as the top-ranked engineering university in Sindh and among Pakistan's leading institutions in that category.

These achievements belong to our faculty, students, officers, and staff. They also demonstrate that institutions outside major metropolitan cities can compete successfully at the national and international levels.

ER: What reforms have you introduced to modernize the university?

SRS: Digital transformation has been one of our major priorities. Previously, admissions could take sev-

eral weeks. Today, students can complete the process within a single day. Test scores are generated immediately, documents are verified electronically, and admission letters are issued promptly.

We have also established an RFID-enabled library, introduced new academic programs, expanded postgraduate education, and strengthened our research infrastructure.

When I assumed office in 2018, the university offered only a limited number of disciplines. Today, QUEST has 25 undergraduate departments and 35 postgraduate programs, including master's and doctoral degrees recognized by the Higher Education Commission.

We introduced emerging disciplines such as Artificial Intelligence, Data Science, Cyber Security, Software Engineering, and Computer Science because universities must prepare students for the future rather than the past.

ER: Many people fear that artificial intelligence will replace jobs. What is your perspective?

SRS: I view AI as an enabler rather than a threat.

History shows that every technological advancement creates new opportunities. During the Covid-19 pandemic, entirely new industries emerged. Similarly, artificial intelligence will create opportunities that we cannot fully imagine today.

AI will not replace engineers; it will enhance their capabilities. Engineers who understand AI will have a significant advantage over those who ignore it.

That is why universities must ensure students possess strong engineering fundamentals while also becoming comfortable with emerging technologies.

The future belongs to engineers who can combine technical expertise, creativity, and digital skills.

ER: Finally, what role do you believe Engineering Review plays in Pakistan's engineering community?

SRS: Completing fifty years of continuous publication is an extraordinary achievement.

Engineering Review has consistently connected academia, industry, and professional institutions. Through its publications, seminars, and

digital platforms, it has helped engineers remain informed about technological developments and industry trends.

In many ways, publications like Engineering Review serve as bridges between universities and industry. They create awareness, encourage dialogue, and inspire collaboration.

Pakistan has immense engineering talent. If our universities, industries, policymakers, and professional platforms work together, I have no doubt that Pakistan can emerge as a regional leader in technology and innovation.

The future of engineering will not be defined solely by artificial intelligence or advanced machines. It will be defined by institutions that produce confident graduates, encourage innovation, and prepare engineers to solve the challenges of tomorrow.

And that, ultimately, is the responsibility of every engineering university in Pakistan. ■

Engineering Review has consistently connected academia, industry, and professional institutions. Through its publications, seminars, and digital platforms, it has helped engineers remain informed about technological developments and industry trends.

ER: After completing your engineering education, did you immediately start working in engineering?

SB: I enrolled at NED University of Engineering & Technology in 1978 and graduated in 1983. During university, I served as Secretary of the Students' Union, which gave me the opportunity to work closely with professors, consultants, and contractors during the university's expansion projects. Those experiences introduced me to large-scale civil engineering long before graduation. I also developed a connection with Engineering Review, contributing news and interacting with senior engineers.

ER: What was your first professional assignment?

SB: On the day of my final viva, one of my professors, who was also Chief Engineer at Hyderi Construction Company, sent me to the Dera Ghazi Khan Cement Plant, then one of Pakistan's largest industrial projects.

That project became my real engineering classroom. Young graduate engineers worked alongside highly experienced professionals, learning

practical construction, foundations, silos, preheater towers, batching plants, conveyor systems, and overall project execution. It was an invaluable beginning.

ER: What came next?

SB: I later joined a community development initiative associated with the Orangi Pilot Project, where we worked on sanitation, sewerage, roads, and master planning in low-income communities. Working with residents, government representatives, and international experts taught me that engineering is as much about people and communication as it is about technical design.

ER: You spent many years at K-Electric. Tell us about that



a fellowship from the Government of the Netherlands, which broadened my technical perspective.

ER: What was your most challenging project?

SB: One major challenge was securing a reliable raw water supply for the Bin Qasim Thermal Power Plant. Without water, steam generation and electricity production would stop. We successfully developed an alternative supply arrangement with Pakistan Steel Mills, creating a system that remains vital to the plant's operations.

I also worked with leading international consultants from Germany, Japan, and the United States, gaining valuable exposure to global standards in

SB: After serving as the first General Manager Engineering of the Pakistan Real Estate Investment and Management Company, I took early retirement from K-Electric at the age of 50 and joined Saida Pakistan.

Since 2010, I have been working in the oil and gas exploration sector, developing airstrips, access roads, and field infrastructure for companies including BHP, Eni, OMV, and Pakistan Petroleum Limited.

ER: What advice would you give young engineers?

SB: A job is only the starting point. The greatest opportunities often come through innovation, entrepreneurship, and business development. Engineering equips you with problem-solving skills, but success depends on how you apply them.

The profession has changed dramatically, especially in technology and Health, Safety, and Environment (HSE). Today, safety is an essential part of engineering practice. Throughout my career, I have learned that engineering is not only about drawings and construction—it is about continuous learning, teamwork, adapting to change, and having the confidence to step beyond your comfort zone. ■

From Student Politics to Mega Projects: An Engineer's Journey Through Pakistan's Infrastructure Growth

Engr. Sohail Bashir reflects on his education at NED University, his first assignment at the Dera Ghazi Khan Cement Plant, decades at K-Electric, international exposure, and the evolution of engineering, safety, and business in Pakistan.

experience.

Engineer: I joined Karachi

remained there for 25 years. I worked on grid stations, trans-

neer and later heading procure-

project management and infrastructure development.

"I have been associated with Engineering Review since my student days. I first met Najam Sahib in 1981, and I have remained connected with the publication ever since."

Electric Supply Corporation (now K-Electric) in 1984 and

mission systems, and the Bin Qasim Thermal Power Plant before becoming Project Engi-

During this period, I also completed a master's degree in hydraulic engineering through

ER: Why did you later move into the private sector?



The Institution of Engineers Pakistan KARACHI CENTRE

"Quaid-e-Azam Muhammad Ali Jinnah"

Message on the occasion of Foundation Stone Laying Ceremony of the Institute of Engineers Pakistan, Headquarters at Dacca on 30th May, 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"

VISION

Our vision is to promote and advance the science, practice and business of Engineering in all branches throughout Pakistan and promote efficiency in the Engineering practices.

MISSION

- Lay down the professional code of ethics and to make it mandatory for its members in their professional conduct.
- Regulate the professional activities and assist in maintaining high standard in the general conduct of its members.
- Foster co-ordination with similar institutions in other countries and educational institutions in Pakistan and abroad for mutual benefits.
- To disseminate information and knowledge among Engineers through lectures, conferences, seminars and publication of journal and papers.

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3. Federation of Engineering Institution of South & Central Asia (FEISCA)
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 - (ii) Photo Copy of B.E. Degree Certificate
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4. Submit these documents to **The Institution of Engineers Pakistan, Karachi Centre** 4th Floor, IEP Building, Opp. SIUT Trust Hospital (Former Hotel Regent Plaza), Shahrah-e-Faisal, Karachi. Tel: 32780233, 32781492 WhatsApp: 0311-2277721 E-mail: main@iepkarchi.com.pk Web: www.iepkarchi.com.pk



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THE INTERVIEW

Engineering Review: How do you view Pakistan's position following the recent Iran-US tensions, particularly from an engineering and economic perspective?

Engr. Jawed Salim Qureshi: The developments created both challenges and opportunities for Pakistan. Historically, Pakistan and Iran have never achieved the level of economic integration that neighboring countries should ideally enjoy.

During my visits to Iran, I was genuinely impressed by the country's industrial capabilities. Despite decades of sanctions, Iran succeeded in building substantial indigenous manufacturing capacity. It has invested heavily in local production, infrastructure, and industrial self-reliance.

That experience reinforced an important lesson: countries that invest in engineering and manufacturing ultimately become more resilient.

The regional tensions also altered perceptions. Iranian business communities began looking toward Pakistan as a potential partner for technology transfer, agriculture, engineering products, and industrial collaboration. There was considerable interest in joint ventures and manufacturing partnerships.

However, opportunities alone are not enough. The real challenge lies in our ability to capitalize on them.

ER: What prevented Pakistan from fully benefiting from those opportunities?

JSQ: The biggest challenge has never been demand; it has been connectivity and coordination.

Trade requires efficient logistics, reliable transportation, and internal stability. Border infrastructure, transit arrangements, and administrative bottlenecks continue to limit trade potential.

Pakistan possesses significant export potential in engineering products, agricultural machinery, rice, and industrial goods. But unless we create an environment that supports commerce and investment, these opportunities will remain unrealized.

Ultimately, economic growth is not merely a function of geography. It depends on governance, planning, and institutions.

ER: Let us go back to your student days. What inspired you to pursue engineering?

JSQ: My engineering journey began in the early 1970s, but alongside academics, I developed a strong interest in leadership and public service.

At that time, university politics was highly competitive. Becoming the first opposition president of the student union at UET Lahore was not easy, but it taught me valuable lessons about leadership and responsibility.

Our focus was simple: solve problems.

We worked to expand transportation facilities, improve hostel conditions, provide hot water during winters, distribute course material in advance, and encourage extracurricular activities. Those experiences taught me that leadership is not about titles; it is about improving people's lives.



Engineering at the Center of National Progress: Insights from Engr. Jawed Salim Qureshi

Former Pakistan Engineering Council Chairman Engr. Jawed Salim Qureshi reflects on five decades of engineering transformation, lessons from regional developments, his journey from student leader to entrepreneur and regulator, and why Pakistan's future depends on giving engineers a greater role in policy, innovation, and economic planning.

For more than half a century, engineering has played a pivotal role in shaping Pakistan's infrastructure and economy. Yet, despite its contributions, the profession has rarely occupied a central place in national policymaking. Few individuals understand this reality better than Engr. Jawed Saleem Qureshi.

An engineer, entrepreneur, former Chairman of the Pakistan Engineering Council (PEC), and advocate for institutional reform, Qureshi has spent decades working across industry, business, and public service. His journey—from student leader at the University of Engineering and Technology (UET) Lahore to leading Pakistan's premier engineering regulator—offers valuable insights into the country's successes, shortcomings, and opportunities.

In this exclusive interview with Engineering Review on its 50th anniversary, Engr. Jawed Saleem Qureshi discusses Pakistan's engineering landscape, the economic opportunities that emerged following the Iran-US tensions, the need for stronger engineering institutions, and why artificial intelligence and innovation will define the next generation of engineers.

That philosophy has stayed with me throughout my career.

ER: After graduation, why did you choose entrepreneurship instead of remaining in government service?

JSQ: I began my professional career in the public sector, but I soon realized that I wanted greater independence and the ability to create something of my own.

Like many entrepreneurs, I started with limited resources.

A turning point came in the late 1980s and early 1990s through our engagement with Chinese partners. At a time when financing

Engineers frequently complained about delays, and there was a widespread perception that approvals required unnecessary intermediaries.

One of our priorities was digitization.

We introduced online systems, tracking mechanisms, and transparent timelines. We reduced paperwork and attempted to bring greater accountability into the process.

Institutional reform is never easy. It requires persistence and, most importantly, a willingness to challenge the status quo. While significant progress was made, much more remains to be done.

Engineering Review occupies an important place within Pakistan's engineering community. For fifty years, it has served as a bridge between academia, industry, policymakers, and practicing engineers. More importantly, it has provided space for diverse opinions and encouraged meaningful dialogue on issues that matter.

was difficult, they demonstrated trust and provided support. That relationship enabled us to expand from agricultural equipment into telecommunications, software, hardware, and information technology.

Over the years, our businesses diversified, but one lesson remained constant: success is built on relationships, credibility, and persistence.

ER: You later became Chairman of the Pakistan Engineering Council. What surprised you most after taking office?

JSQ: The condition of the system itself. Many processes were heavily manual. Documentation requirements were excessive, and inefficiencies had become normalized.

ER: What reforms do you believe are most urgently needed today?

JSQ: Three areas require immediate attention. First, Pakistan needs a proper engineering service structure within government. Engineers are responsible for implementing many of the country's most important projects, yet they remain underrepresented in decision-making positions.

Second, engineers must have a greater voice in policymaking. Around the world, countries that excel in technology and infrastructure place technical professionals in strategic roles.

Third, we need a national innovation ecosystem that connects universities, incuba-

tion centers, startups, investors, and industry. Innovation cannot flourish in isolation.

During my tenure, we also advocated for a Technology and Construction Bank to support engineering startups, contractors, and technology ventures. Unfortunately, many long-term initiatives lose momentum when leadership changes.

National development requires continuity.

ER: How is artificial intelligence changing engineering education?

JSQ: Artificial intelligence represents one of the most significant technological shifts of our time.

Traditional engineering education is no longer sufficient. Today's engineers must understand AI, automation, data analytics, and digital systems alongside their core disciplines.

Universities must continuously revise their curricula. The world is changing too rapidly for academic programs to remain static for decades.

Engineering graduates of the future will need to combine technical knowledge with adaptability. Those who embrace change will thrive; those who resist it may struggle to remain competitive.

Fortunately, Pakistani engineers have repeatedly demonstrated their ability to compete internationally. What they need is

access to modern tools, better institutions, and greater opportunities.

ER: What is your vision for Pakistan's engineering future?

JSQ: I remain optimistic.

Pakistan possesses extraordinary talent. Our engineers are working successfully across the

Middle East, Europe, North America, and Asia. Their achievements prove that capability has never been our problem.

Our challenge is institutional.

We must create an environment where engineers can innovate, entrepreneurs can invest confidently, and young graduates can build meaningful careers at home rather than seeking opportunities abroad.

Engineering should not merely implement policy—it should help shape it.

If we strengthen our institutions, invest in innovation, and empower technical professionals, Pakistan can emerge as a regional leader in engineering, manufacturing, and technology.

ER: Finally, how do you assess the role of Engineering Review?

JSQ: Engineering Review occupies an important place within Pakistan's engineering community.

For fifty years, it has served as a bridge between academia, industry, policymakers, and practicing engineers. More importantly, it has provided space for diverse opinions and encouraged meaningful dialogue on issues that matter.

I believe publications such as Engineering Review have a responsibility beyond reporting news. They must continue highlighting issues such as engineering service structures, professional representation, innovation, technology policy, and industrial development.

Nations progress when ideas are discussed openly and consistently. ■

Engineering Review: In the aftermath of the Middle East war, Pakistan's fault lines and weaknesses regarding self-sufficiency have become evident. What would you suggest to policymakers about which sectors of the economy especially engineering sectors should be revitalized?

Tahir Sultan: Pakistan's vulnerabilities exposed by the Middle East crisis are not temporary—they reflect long-standing structural weaknesses. Addressing them requires a shift toward self-reliance, industrial depth, and engineering-driven economic modernization. With decisive reforms, Pakistan can transform this moment of uncertainty into an opportunity for long-term resilience and growth. The following priority actions are recommended for policymakers:

1) Strengthen Internal Governance and Security

- Ensure fool-proof internal security to protect supply chains, industrial zones, and critical infrastructure.
- Eliminate corruption at all tiers, through digital governance, transparent procurement, and strict accountability mechanisms.

2) Education:

- Invest at-least 5% of the

GDB on education

- Improve primary and high school education on war footing

- University that are not performing should be closed down

3) Modernize & Accelerate Industrialization and Export-Led Growth

- Revitalize export-oriented industries under a true one-window operation and enabling rapid approvals for investors.

- Establish Special Engineering Zones (SEZs) focused on high-value manufacturing such as electri-

cal equipment, machinery,

automotive parts, and renewable-energy components.

4) Modernize Agriculture and Food-Export Systems

- Introduce modern aquaculture and seafood-processing

ing technologies to expand export volumes.

- Adopt post-harvest engineering, cold-chain logistics,

- Launch national pro-

grams for technical skills, vocational training, and engi-

and value-addition technologies for fruits and horticulture.

- Promote agri-machinery localization to reduce import bills and improve productivity.

5) Strengthen Technology, R&D, and Human Capital

- Establish engineering research centers in renewable energy, materials science, automation, and AI-driven manufacturing.

- Incentivize universities and industry to collaborate on product development and commercialization.

neering apprenticeships.

6) Iran – Pakistan Gas Pipe-Line

This project should be completed on war footing, as basic survey and engineering is ready for this project.

ER: Where did you receive your education, and what is the best memory you would like to share with our readers?

TS: Most of my formal education took place in Lahore, where I completed my undergraduate degree in Civil Engineering from UET Lahore. I later pursued my Master's degree at Wayne State University in Detroit, USA.

Although I value every stage of my academic journey, my time in Detroit remains the most memorable and transformative.

If one truly wants to understand what education means, how the art of learning shapes a person, and how knowledge should be applied in real life, then studying in the United States provides that clarity. The academic environment, the exposure, and the learning culture in the USA are unmatched.

ER: What kind of engineering and industrial

Contd on page 68

Building a Stronger Nation: Tahir Sultan on Engineering, Governance, and Economic Revival

Engineering Review plays a vital role in documenting the insights of experienced professionals and highlighting the challenges and opportunities within Pakistan's engineering sector. By bridging the gap between industry expertise and policymakers, the magazine has the potential to become an even more influential force in shaping the future of engineering and industrial development in Pakistan.

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THE INTERVIEW

Engineering Review: You graduated in Electronics Engineering from Dawood Engineering College. What was it like stepping into professional life after university?

Engr. Mukhtiar Ali Sheikh: I graduated in 1983, having joined Dawood Engineering College in 1978. Like most engineering students, I had ambitious dreams of contributing to the country through technology. I chose Electronics Engineering because a close relative had become a flight engineer with Pakistan International Airlines (PIA). At that time, it was a prestigious career that involved international travel, excellent benefits, and exciting opportunities. Inspired by his success, I hoped to follow the same path.

However, by the time I graduated, PIA had discontinued recruiting flight engineers. That taught me an important lesson—that careers do not always unfold as planned, and adaptability is essential.

ER: How did your professional career begin?

MAS: My first job was with the Airport Development Authority as an Assistant Director, where I worked for about five months. Soon after, I cleared the competitive examinations and interviews for Pakistan Customs and joined as a Technical Appraising Officer.

This was the first time Customs had recruited engineers for technical assessments.

Since Pakistan imports a wide range of machinery, industrial equipment, and software, engineers were needed to accurately classify, evaluate, and determine the value of these products. Our technical knowledge helped ensure proper customs valuation and prevent misclassification.

ER: How different was engineering during those years compared to today?

MAS: The difference is remarkable. During university, we studied from classic engineering textbooks that had been in use for decades. Once I entered Customs, I encountered advanced imported machinery and rapidly evolving industrial technologies, particularly in the textile sector.

Our engineering knowledge became invaluable in identifying sophisticated equipment. For example, we had to distinguish between humidifiers and air-conditioning systems, as different duty structures applied. Similarly, engineers could differentiate between industrial materials such as hot-rolled and cold-rolled steel sheets—differences that had significant implications for customs valuation.

Technology was advancing quickly, and engineers had to continuously update their knowledge to keep pace.

ER: Is there any memorable experience from your career that still stands out?

MAS: One incident has stayed with me throughout my career. While posted at the airport, a young doctor arrived carrying a personal computer. At that time, computers imported as engineering tools were exempt from customs duty, but computers brought by other professionals were generally not.

Initially, I questioned why a doctor would need a computer as a professional tool. She patiently explained that all her medical records, prescriptions, and patient information were stored digitally, and that computers had become essential to modern healthcare. After understanding her case, I recommended that she receive the same exemption because the computer was clearly an indispensable professional tool.

Looking back, that experience showed me how rapidly technology was expanding beyond engineering into every profession. Today, computers—and even smartphones—are essential tools for doctors, engineers,



Engineering, Public Service and Nation Building: The Journey of Engr. Mukhtiar Ali Sheikh

From the classrooms of Dawood Engineering College to leadership roles in public service, industry, and the Pakistan Engineering Council, Engr. Mukhtiar Ali Sheikh shares his insights on engineering, energy security, and national progress.

teachers, and professionals across every field.

ER: Technology has evolved tremendously since then. How do you view these changes?

MAS: We are now living in the era of artificial intelligence, where a smartphone has more computing power than the computers we once considered extraordinary. Technology has transformed every profession, and we must continue adapting to remain relevant.



vant.

Pakistan still has considerable ground to cover in adopting modern technologies. The world is moving forward at an incredible pace, and we must invest more seriously in technological advancement if we want to

What impresses me most is its consistency—even during the COVID-19 pandemic, when many publications suspended operations, Engineering Review continued publishing. The magazine has provided a valuable platform for discussing industry challenges, recognizing achievements, and encouraging constructive dialogue within the engineering profession.

I regularly read its digital edition and appreciate its balanced approach to covering

engineering affairs. It has made a meaningful contribution to the profession, and I sincerely commend the entire team for their dedication over the past five decades.

On Energy Security, Industrialization

"Completing 50 years is no ordinary accomplishment. Engineering Review has always written openly on important issues, including matters related to the Pakistan Engineering Council (PEC) and our own performance as engineers. We greatly appreciate its contributions."

remain competitive.

ER: Engineering Review has completed 50 years of publication. How do you evaluate its contribution to Pakistan's engineering community?

MAS: Reaching fifty years of continuous publication is a remarkable achievement in itself. Engineering Review has consistently highlighted engineering developments, professional issues, and the work of institutions such as the Pakistan Engineering Council.

and Self-Reliance

Reflecting on Pakistan's experience during the recent Middle East conflict, Engr. Mukhtiar Ali Sheikh emphasized that the country must draw important lessons regarding energy security and supply chain resilience.

"The biggest lesson for Pakistan is that engineering capability and industrialization are directly linked to national security," he said. "The recent crisis exposed our depend-

ence on imports and highlighted vulnerabilities in energy and supply chains."

Drawing on his experience in Pakistan Customs, particularly in the oil sector, he noted that Pakistan possesses sufficient infrastructure to store petroleum products for nearly a month but often maintains significantly lower reserves due to financial constraints.

He suggested that the government should allow international companies to utilize existing local bonded storage facilities rather than requiring them to build new infrastructure. According to him, such a policy could strengthen Pakistan's energy security while generating valuable foreign exchange earnings.

"Pakistan already has the storage capacity. We should leverage our existing infrastructure to benefit both local industry and the national economy," he explained.

Engr. Shaikh believes the second major lesson from recent global events is the urgent need for industrialization.

"Pakistan remains heavily dependent on imports. If we want sustainable economic growth, we must invest in local manufacturing, engineering, and value addition," he said, adding that affordable and reliable energy remains critical for industrial competitiveness.

Beyond public service, Engr. Shaikh has also ventured into industry. After retirement, he established a fruit and tomato pulp processing

facility in Khairpur, Sindh, after observing the country's dependence on imported processed food products.

Today, the plant supplies major corporations, including Nestlé, Unilever, and Shezan, while creating employment opportunities and supporting local farmers.

"I wanted to create a complete value chain—from farm to industry and eventually to the consumer," he said.

His experience attending international exhibitions in Saudi Arabia and Dubai further reinforced his belief in Pakistan's export potential, particularly for agricultural products.

"The demand for Pakistani mangoes is extraordinary. We have world-class products, but we need to invest more in processing, packaging, and exports," he observed.

To capitalize on these opportunities, Engr. Shaikh is now developing a significantly larger processing facility at Port Qasim, which he says will be among the largest of its kind in Asia.

He also highlighted the importance of agricultural clusters and closer collaboration between government, industry, and farmers. Citing examples from countries such as Nigeria, he noted that targeted support, modern farming practices, and access to financing can dramatically improve productivity.

"The government should identify specific regions for specific crops and provide incentives for industry to establish processing facilities nearby. Stronger integration between agriculture and industry will strengthen our economy and create jobs," he said.

Having served the engineering community through multiple terms at PEC, Engr. Shaikh remains optimistic about Pakistan's future.

"Pakistan has immense talent and tremendous potential. If we focus on industrialization, engineering, and self-reliance, we can transform challenges into opportunities," he concluded.

For Engr. Mukhtiar Ali Sheikh, the message is clear: engineering is not merely about building infrastructure—it is about building resilient institutions, stronger industries, and a more prosperous Pakistan. ■



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4. Ground Water Studies and Dewatering-Design and Construction.
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Engineering Review: You have witnessed over six decades of engineering. What was the profession like when you graduated, and how does it compare with today?

Engr. Farooq Mehboob: I graduated in 1965, and the biggest lesson from my career is that while technology changes, engineering fundamentals remain the same. Thermodynamics, fluid mechanics, heat transfer, and machine design are still based on the same principles. What has changed is the technology, the tools, and the way engineers work.

ER: What has been the biggest transformation?



to tools we could never have imagined.

ER: Do you see any risks?

FM: Yes. When we studied engineering, we first learned the underlying principles before applying technology. Today, many people rely on AI without understanding the fundamentals. That is a concern.

Another issue is the concentration of AI in the hands of governments and large corporations. If not managed responsibly, AI could widen economic inequality by replacing jobs. Looking further ahead, the development of Artificial General Intelligence and Artificial Super

APNS President Congratulates Engineering Review on Golden Jubilee



I, Syed Sarmad Ali, President, All Pakistan Newspaper Society, on behalf of the APNS, extend my heartfelt congratulations to Engineering Review on the remarkable milestone of complet-

Review, Mr. Najam ul Hasan. His vision, hard work and dedication was remarkable. He also played a very active role in APNS. I expect that Engineering Review team will carry forward his legacy. I commend everyone associated with Engineering Review for preserving this proud legacy and continuously adapting to the evolving

From Slide Rules to Artificial Intelligence — An Engineer's 60-Year Journey

Engr. Farooq Mehboob reflects on six decades of engineering, from manual calculations and slide rules to intelligent systems and artificial intelligence, while sharing timeless lessons on technology, leadership, and the enduring value of engineering fundamentals.

FM: Human history has experienced three major technological revolutions: the invention of the wheel, the Industrial Revolution, and today's integration of computers with machines. This combination

has produced automation, robotics, and artificial intelligence, transforming industries

tivity are extraordinary. Calculations that once took weeks can now be completed in

Intelligence raises important ethical and societal questions that humanity must address carefully.

ER: Tell us about your early career.

FM:

After graduating, I joined the distributor of Trane equipment as an Application Engineer. Two years later, I applied for the position of Chief Engineer at the Dhaka Intercontinental Hotel. Around 150 candidates appeared for the interview, but the interviewer, the late Khalid Bhatt, selected me immediately. I was only 20 years old.

I spent 12 years with Intercontinental Hotels and later became Regional Chief Engineer, overseeing operations across parts of the Middle East, Central Asia, and South Asia. The role exposed me to projects of international standards and interactions with leaders, diplomats, and executives from around the world.

ER: Why did you move into consulting?

FM: Consulting appealed to me because it allowed me to build something of my own. I founded my consultancy in 1981, starting from the garage of my home, with my late wife managing the accounts and correspondence. Today, more than four decades later, the firm continues to grow, and two of my sons have joined me as engineers while another has established a related business.

ER: How would you summarize your journey?

FM: I have seen engineering evolve from slide rules and manual calculations to intelligent systems powered by artificial intelligence. Yet the most important lesson remains unchanged: technology will continue to evolve, but engineers who master the fundamentals, embrace lifelong learning, and adapt to change will always remain valuable. ■

"I had the privilege of interacting with Najam Sahib and Riaz Sahib. Their credibility and professionalism were reflected in Engineering Review, which has remained a highly respected publication. I hold the magazine in great esteem."

and everyday life.

ER: What benefits has this transformation brought?

FM: The gains in produc-

hours, while AI enables reports and analyses to be prepared in a fraction of the time. Engineers today have access



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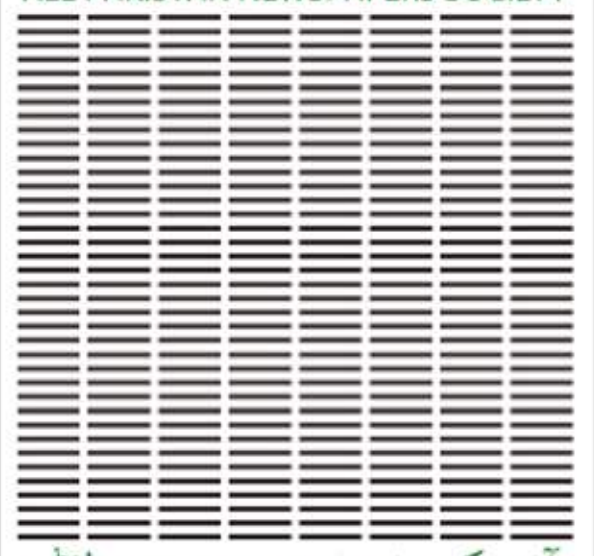
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ing 50 years of dedicated service to the engineering, industrial, and publishing sectors of Pakistan.

Reaching a golden jubilee is a testament to the publication's unwavering commitment to quality journalism, professional excellence, and its enduring contribution to promoting engineering and industrial sector of Pakistan. Over the past five decades, Engineering Review has earned the trust and respect of engineers, entrepreneurs, policymakers, academics, and industry professionals by consistently providing credible, informative, and insightful content.

On achieving this great milestone, I would like to remember and acknowledge the founder of Engineering

media landscape while upholding the highest standards of professional journalism.

I sincerely appreciate the invaluable role Engineering Review has played in highlighting technological innovation, engineering excellence, and the progress of Pakistan's industrial sector. I am confident that the publication will continue to inspire future generations and serve as a trusted voice for the engineering community for many years to come.

On this historic occasion, I extend my best wishes to the management, editorial team, and all those associated with Engineering Review. May the next fifty years bring even greater success, innovation, and service to the nation. ■

Engineering the Future with AI, Sustainability, and Quality

Burhani AQMS is using AI-enabled manufacturing, energy-efficient cold-forming technology, and internationally certified quality systems to strengthen Pakistan's industrial capabilities and compete in global export markets.

Engineering Review: Could you tell us about Burhani AQMS? When did you establish the company, and what was the engineering landscape like at that time? Today, we are in the age of AI and advanced technologies. What differences do you see between then and now?

Taher Eranpurwala: We conceived Burhani AQMS in 2021, and shortly afterward we imported our manufacturing machinery. We had already been working on the project for about a year before that. From the beginning, our focus was on adopting advanced manufacturing technologies.

At that time, there were mainly two manufacturing methods: cold forming and hot forming. Hot forming consumes a significant amount of electricity and also creates more pollution. Cold forming, on the other hand, was relatively new and involved a slightly higher production cost. However, it is much more environmentally friendly and uses considerably less energy. We believed that investing in this technology would benefit not only our business but also the environment.

Today, AI has transformed manufacturing. It is no longer limited to computers. The machines we use for cold forming now come with AI-enabled chips that do much more than reduce

we maintain complete traceability from raw material to the finished product.

Our production processes are comparable to those used in countries such as Germany and China, giving customers confidence that the products they receive meet the promised specifications. We also operate under an ISO 9001-certified quality management system, ensuring comprehensive documentation and quality control throughout our manufacturing process. ■



Engineering Review has been our partner in engagement for more than a decade, consistently providing valuable information on the engineering sector and issues that matter to us. It encompasses a broad cross-section of industry developments, making it an important platform for engineers and industrial stakeholders alike.

material waste. They monitor production efficiency, identify bottlenecks, and generate reports showing where improvements can be made. Previously, many of these tasks had to be performed manually, but now cameras and integrated data systems allow the machines to automate the process and optimize production.



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International Accreditation Forum (IAF).

ER: By adopting the latest technology while also focusing on environmental sustainability, you've created clear benefits for the local industry. Did you also plan to expand into export markets?

TE: Yes, exports have always been part of our vision. As I mentioned earlier, if the Government of Pakistan provides a more conducive business environment, our products have strong export potential. In fact, we have already exported a sample batch to the United States, where we received very positive feedback.

From day one, our goal has been to manufacture products that comply with international standards, particularly ASTM standards. We are very careful about sourcing our raw materials. Every batch comes with Material Test Certificates (MTCs), and

THE INTERVIEW

For many engineers, success is measured by promotions, titles, and years of service. For others, it is defined by the willingness to leave behind stability and build something of their own. Amjad belongs to the latter category.

Over the past two decades, he has witnessed Pakistan's engineering sector evolve from an era of hand-drawn air handling unit (AHU) sketches, psychrometric charts, and manual calculations to one increasingly influenced by automation, digital tools, and artificial intelligence. Beginning his career in the early 2000s, he spent nearly nineteen years with one of Pakistan's leading HVAC organizations, rising through the ranks to become General Manager and overseeing hundreds of projects across the country.

Yet, after building a successful corporate career, he made the difficult decision to step away from the security of a regular paycheck and venture into entrepreneurship. In 2019, he founded Welkin Solutions, a company that has since established itself as an important player in Pakistan's HVAC sector through its partnership with Sweden's Systemair.

His journey is also a reflection of the broader challenges facing Pakistan's engineering profession—bridging the gap between academia and industry, adapting to rapid technological change, and creating an environment where local manufacturing can thrive.

In this exclusive conversation with Engineering Review, Amjad speaks candidly about the realities of starting an engineering career, the sacrifices behind entrepreneurship, the opportunities and risks associated with artificial intelligence, and why he believes Pakistan's future ultimately depends on honesty, innovation, and a renewed commitment to manufacturing.

Engineering Review: We'd like to take you back to the beginning of your career. When did you complete your engineering degree, and what was it like entering professional life? Where did you start, and how did your journey unfold?

Amjad Iqbal: That's a very important question because it brings back many memories. I entered professional life around 2001. The reality is that the gap between university and the workplace was just as challenging then as it is today.

Even now, when I visit universities and speak with fresh graduates, I tell them to keep their expectations realistic. Many believe that once they graduate, they'll immediately have a prestigious office, a comfortable chair, air conditioning, and a team working under them. In reality, the early years are all about struggle and learning.

I also went through that phase. I completed a few internships before joining Sabro Air Conditioning, which was my first full-time job. We routinely worked 12 to 16 hours a day, but the learning opportunities were exceptional. Our managers were strict, and taking leave or arguing with seniors simply wasn't part of the workplace culture. Looking back, those demanding years gave me the practical experience that shaped my career.



Employee to Entrepreneur: Amjad Iqbal on Engineering, Business, and Future of Manufacturing in Pakistan

From the beginning, I specialized in the HVAC industry. Over time, I was promoted to General Manager within the group. At one stage, we were handling nearly 200 active projects simultaneously. Everything was done manually—we prepared AHU drawings by hand, selected chillers manually, and used psychrometric charts for engineering calculations. We didn't have today's

alone is not always the best long-term solution if you want to grow professionally and financially.

In my case, circumstances led me toward starting a business. Things did not work out with my previous employer, so I had a choice: look for another job or build something of my own. I chose the second option.



advanced software or digital tools, but that hands-on experience gave us a deep understanding of the engineering fundamentals.

I remained with Sabro Group for almost 19 years. Then, in 2019, I established my own company, Welkin Solutions. Soon afterward, we entered into an exclusive partnership with Systemair, a Swedish com-

pany, and since then we have been working together successfully across Pakistan.

ER: After spending 19 years in a stable job, what motivated you to leave your comfort zone and start your own business?

AI: It was certainly one of the most difficult decisions of my life. Today, at the age of 50, I encourage people to consider entrepreneurship because employment

extremely difficult. I had gone from earning a substantial monthly salary to having no guaranteed income, while also paying salaries to my own employees. Financially and emotionally, it was a challenging period. But once the business gained momentum, I realized that entrepreneurship had been the right decision. We gradually expanded our team, partnered with Systemair, and today we are serving clients

across Pakistan with honesty and professionalism.

One lesson I always remember came from my mentor, Chaudhry Siddique, Chairman of Sabro Group. He used to say, "If you want to do business, do it honestly. If you don't intend to be honest, then choose another profession." That principle continues to guide me today.

ER: You've witnessed engineering evolve from manual calculations to artificial intelligence. How do you view this technological transformation?

AI: The technological revolution has undoubtedly brought tremendous benefits, but it has also created new challenges.

Today's children rely heavily on AI and digital tools for even the simplest tasks. Whether it's solving basic calculations or making everyday decisions, they often depend entirely on technology. While AI increases efficiency, it can also reduce independent thinking if used without balance.

The same applies to social media. It has affected real-world interaction. Children spend less time outdoors, communicate less face-to-face, and often remain absorbed in their devices. In many countries, restaurants now display signs saying, "No Wi-Fi—please talk to each other," which

reflects the growing concern about declining human interaction.

During our childhood, parents closely monitored our daily routines and encouraged discipline and personal responsibility. Today, that level of engagement has become much weaker. I believe the widening generation gap is something we need to address. Parents must invest more time in understanding their children, and young people should also appreciate the struggles their parents have gone through.

AI is an important part of the future, and we cannot ignore it. However, we must ensure that it complements human thinking rather than replacing it.

ER: Having spent so many years in the engineering industry, have you ever considered moving into manufacturing?

AI: Absolutely. Between 2014 and 2016, I spent considerable time preparing feasibility studies for manufacturing. My vision has always been to bring European technology and international standards to Pakistan.

I firmly believe Pakistan has the capability to manufacture world-class engineering products that can compete globally. Unfortunately, the regulatory environment and approval processes make it extremely difficult for companies to invest in advanced manufacturing. Many businesses are discouraged by the complexity of the system.

It's unfortunate that numerous multinational companies have reduced or closed their operations in Pakistan. I believe

the government should create a more supportive environment for manufacturing because it is one of the strongest drivers of economic growth.

Even today, I continue discussing the possibility of establishing local manufacturing facilities with our international partner, Systemair. If the right support and policies are in place, Pakistan has the talent and potential to become a competitive manufacturing hub. ■

Engineering Review's credibility is unmatched. We are delighted to share a strong and longstanding relationship with ER, as does the wider engineering and industrial community. It is a pleasure to work with the Engineering Review team.

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ER: Thank you for speaking with us. When you graduated, what were your aspirations, and how did your engineering career begin?

Engr. Wasif Nazar: I graduated in 2005 when many graduates were pursuing careers in IT, but I chose construction, partly to fulfill my father's wish. Looking back, it was the right decision. My goal was to contribute innovation to Pakistan's construction sector. I joined Habib Rafiq as a Site Engineer and Junior Contracts Engineer, working on projects during an exciting period for the industry.

ER: How important was your first job in shaping your career?

WN: It was invaluable. I spent nearly two years on-site, and that experience gave me a practical understanding of construction. Later, when I moved into design, I realized how site exposure helps engineers create more practical and efficient solutions.

ER: You entered the profession during a period of technological change. What did you observe?

WN: The industry was transitioning from manual drafting to digital engineering. While many senior engineers relied on traditional methods, software tools demonstrated significant improvements in efficiency and accuracy. The experience reinforced an important lesson: engineers must continu-



From Site Engineer to Company Leader: Embracing Innovation in Modern Construction

Engr. Wasif Nazar shares his view on how Advances in construction chemicals and post-tensioning systems have transformed the industry

ously adapt to technological change.

ER: Was there anyone who significantly influenced your professional growth?

with a challenging waffle slab design.

Instead of giving me a direct answer, he guided me through several engineering

of mentorship and lifelong learning.

ER: Artificial intelligence and digital technologies are transforming engineering. How do you view these developments?

WN: Technology is no longer optional. On a road rehabilitation project, traditional surveying took more than 200 days. Today, drones can complete the same work in less than a week with greater accuracy. Similarly, AI, BIM, and digital tools are helping engineers improve decision-making, efficiency, and project monitoring.

ER: What changes in construction technology stand out to you?

WN: Advances in construction chemicals and post-tensioning systems have transformed the industry. These innovations make projects faster, more economical, and technically superior. While some professionals remain hesitant to adopt

new methods, embracing innovation is essential for progress.

ER: Today, you're leading your

own company. How does that compare with your early days as an engineer?

WN: Leadership comes with greater responsibility. My father built an excellent reputation, and my elder brother and I are committed to preserving and strengthening that legacy. Integrity, professionalism, and trust remain at the core of everything

We have known Engineering Review since our childhood, when copies of the magazine would arrive at our father's office. It has evolved remarkably over the years, particularly through its successful digital transformation, and continues to serve the engineering community and industry with distinction.

WN: I remain grateful to the late Bashir Zaidi Sahib. I once approached him

references and taught me how to think critically. It was an outstanding example

we do.■



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ER: You graduated as an electronics engineer from Dawood College of Engineering. Tell us about your educational journey and how you entered the engineering profession.

Engr. Rafiq Ahmed Lakhani: My generation has witnessed one of the greatest technological transformations. I grew up in Karachi when trams still ran on Bunder Road, and today we are living in the era of Artificial Intelligence (AI), Augmented Reality (AR), and Virtual Reality (VR).

I earned my Bachelor's degree in Electronics Engineering from Dawood College of Engineering & Technology and later joined SUPARCO on merit, where I completed a postgraduate diploma in Electronics. Although I later received an offer from another high-security government organization, I chose entrepreneurship because my family had long been involved in business.

ER: What was engineering like when you graduated?

Lakhani: University gave us a strong theoretical foundation, but practical engineering was very different. Personal computers had just

entered international markets, while Pakistan was still unfamiliar with the technology.

Three of us started our own engineering company. Initially, we focused on maintenance and repair to build credibility before moving into advanced medical equipment projects.

ER: What were some of your company's landmark achievements?

Lakhani: One of our earliest milestones was installing



Engineering Has No End, It Continues to Evolve with Every Generation

From Trams to AI: Engr. Rafiq Ahmed Lakhani reflects on five decades of technological transformation, entrepreneurship, and the future of semiconductor engineering in Pakistan.

Pakistan's first Central Cardiac Unit (CCU) monitoring

Hospital. At that time, these technologies were considered

conductor technology?

Lakhani: Semiconductors

Malaysia, and Thailand, which are investing billions

"Engineering Review is doing an excellent job and deserves the support of the entire engineering community. My relationship with the publication goes back many years, and I had the privilege of knowing its founders personally."

system at the National Institute of Cardiovascular Diseases (NICVD). We also installed one of the country's first Philips angiography systems at Liaquat National

highly advanced and helped strengthen our technical expertise.

ER: How do you see Pakistan's position in semi-

represent the future of technology. Pakistan has begun promoting integrated circuit (IC) design, and universities are receiving Electronic

of dollars in semiconductor development. Without sustained investment, Pakistan cannot become globally competitive.

ER: What has been the

biggest technological transformation during your career?

Lakhani: The speed of technological change has been extraordinary. I have seen the evolution from mechanical systems to analogue and digital electronics, computers, the internet, mobile technology, AI, and now virtual and augmented reality. We graduated when personal computers were a novelty; today, engineers design intelligent systems and complex semiconductor chips.

ER: What advice would you give young engineers?

Lakhani: Engineering is a profession of continuous learning. Technology never stands still, so engineers must constantly update their skills. Today's graduates have access to global knowledge, advanced software, and international collaboration from their laptops.

My advice is to build strong fundamentals, stay curious, keep learning, and consider entrepreneurship. Pakistan needs engineers who create technology, not just use it. The future belongs to innovators. ■

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THE INTERVIEW

Engineering Review: Like every engineering graduate, you must have had ambitious plans when you left university. What were your dreams, and how did your professional journey begin?

Engr. Saifuddin Mandviwala: I graduated in Mechanical Engineering from NED University with aspirations similar to many young engineers of my generation. My dream was to pursue higher education abroad. I had secured admissions to universities in both Germany and the United States, and my academic interests were centered around aero gas turbine engines.

I completed my final-year project in that field, became a member of the Royal Aeronautical Society, and hoped to join Pakistan International Airlines (PIA) in a technical role. At the time, aviation represented one of the most exciting fields for a mechanical engineer.

However, life does not always follow our plans. My mother's illness and changing family circumstances required me to remain in Pakistan. Around the same time, the political developments of 1989 and the subsequent embargo affected recruitment in several organizations, including PIA. Suddenly, the future I had envisioned no longer existed.

Looking back, I now realize that what seemed like a setback was actually an opportunity in disguise. I joined Zelin Private Limited, and that decision completely transformed my professional life.

ER: You entered the profession through sales rather than technical engineering. Was that difficult?

SM: Very much so. As a young engineer, I imagined myself working on machines, designs, and technical systems. Instead, I found myself carrying a business card that read "Sales Engineer."

Initially, I struggled with the idea. I thought sales had little to do with engineering. Fortunately, one of my mentors changed my perspective entirely. He explained that engineering sales is not about selling products—it is about understanding complex technologies and helping customers solve problems.

A sales engineer must understand applications, specifications, customer requirements, and technical limitations. In many ways, a sales engineer acts as both an engineer and a consultant.

That advice changed my mindset. What I had initially considered a compromise eventually became one of my greatest strengths.

ER: What was the engineering environment like in those early years?

SM: It was a remarkable period for learning. Zelin enjoyed an excellent reputation, which gave me access to some of Pakistan's leading consulting engineers.

Projects were fewer in number compared to today, but they involved tremendous technical depth. Consultants spent considerable time reviewing every detail, and meetings often turned into extended technical discussions.

Those interactions became an extension of my engineering education. I learned as much from consulting engineers and customers as I did from formal training programs.

In those days, relationships mattered greatly. People invested time in mentoring



Building an Engineering Enterprise: Engr. Saifuddin Mandviwala on Leadership, Technology and Lifelong Learning

The Founder and CEO reflects on his journey from a young Mechanical Engineer at NED University to building one of Pakistan's leading building automation enterprises, sharing lessons on adaptability, mentorship, entrepreneurship, and technological transformation.

young professionals, and that culture played an important role in shaping many engineering careers.

ER: When did entrepreneurship become part of your plans?

SM: Once again, it was the advice of a mentor that influenced me. He told me,

enough to build a successful company. You need to understand how businesses function.

After five years, I felt prepared to take the next step and established my own company.

Engineering Review: Starting a business is never easy. What challenges did you



"Never spend your entire life building someone else's company. Learn everything you can, and then build something of your own."

I took that advice very seriously.

During my five years at Zelin, I deliberately learned every aspect of the business. I

face?

Engr. Saifuddin Mandviwala: It was one of the most challenging periods of my life.

Shortly after I started the company, my father passed away. I had always imagined building the business with his support and

telephone calls, prepared quotations, managed accounts, supervised installations, and commissioned projects.

There were days when I was engineer, technician, administrator, and office assistant—all at once.

Initially, most technical work was outsourced. However, because I understood the business in detail, I gradually developed in-house capabilities. We hired engineers and technicians, established our own workshop, and built a team capable of delivering complete solutions.

Today, Alhamdulillah, we employ more than 30 professionals across offices in Karachi, Lahore, and Islamabad. One of our proudest achievements is maintaining our partnership with Honeywell continuously since 1998 as a certified partner, renewing our certification every three years.

ER: You have witnessed tremendous technological change. How different is today's engineering environment?

SM: The difference is extraordinary.

My first computer was an XT machine with an 8 MHz processor. It used 5.25-inch floppy disks capable of storing just 256 kilobytes of data. There was no Windows or graphical interface—everything operated through DOS commands on monochrome screens.

We used Lotus 1-2-3 for spreadsheets and relied heavily on fax machines for communication. Compared to today's environment, it feels

like another era entirely.

Over the last two decades, technological advancement has accelerated dramatically. Building automation systems, digital controls, cloud computing, and artificial intelligence have fundamentally transformed our industry.

Today, AI assists us with documentation, reporting, communication, and even preliminary engineering tasks. While critical engineering decisions still require human expertise, AI has become an

invaluable productivity tool. The most important lesson I have learned is simple: engineers must continue evolving. Technology will never stop changing, and neither should we.

ER: What advice would you give to young engineers?

SM: First, never stop learning. Your degree is merely the beginning of your education.

Second, do not limit yourself to technical knowledge. Learn about finance, management, logistics, communication, and leadership. The broader your understanding, the greater your opportunities.

Third, value mentorship. Every major turning point in my career came because someone took the time to offer guidance. Young engineers should seek mentors and remain open to learning from everyone around them.

Finally, embrace change. Whether it is automation, digital transformation, or artificial intelligence, engineers who continue adapting will always remain relevant.

My journey taught me that success is rarely a straight line. Sometimes, the opportunities that define your life are the ones you never planned for. The key is to remain curious, adaptable, and committed to continuous improvement.

That, I believe, is the true spirit of engineering. ■

"Fifty years of Engineering Review represent decades of dedication and hard work. The magazine has set its own benchmark in covering developments in engineering. There is no other platform that provides such comprehensive insight into the engineering sector."

spent time not only with engineers but also with accountants, logistics personnel, finance managers, and support staff. I wanted to understand imports, inventory management, taxation, contracts, and organizational management.

Engineering knowledge alone is not

guidance. Losing him at that stage was difficult both personally and professionally.

Fortunately, my brother provided office space, allowing me to begin operations. In those early days, I was effectively the entire organization. I unlocked the office every morning, cleaned the premises, answered

the opportunities that define your life are the ones you never planned for. The key is to remain curious, adaptable, and committed to continuous improvement.

That, I believe, is the true spirit of engineering. ■

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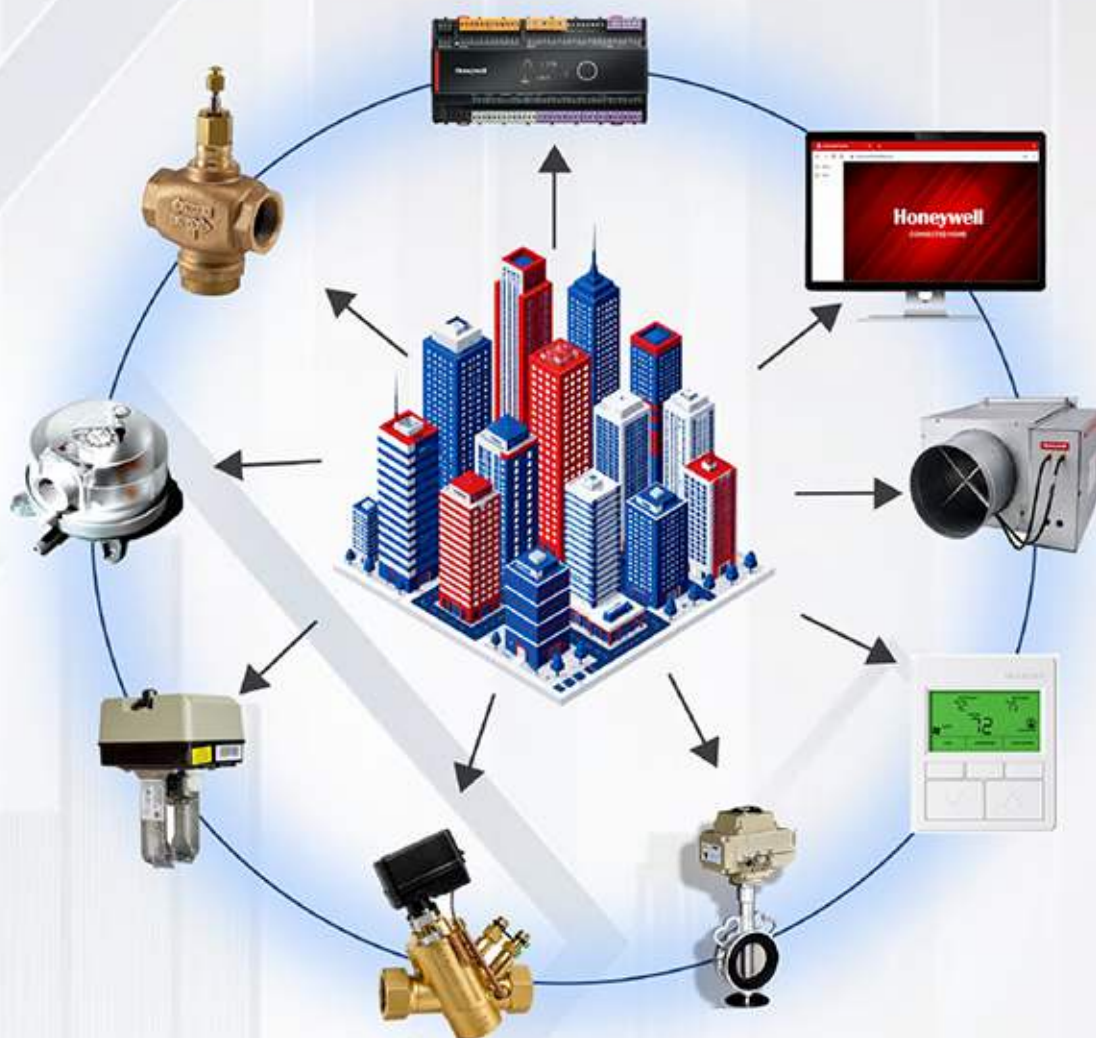
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Engineers Are Solution Providers, Not Technicians: A Conversation with Hasnain Raza Mirza

Engineering Review:
Thank you for speaking with us. Looking back, what dreams did you have when you completed your education, and how did your journey lead to running your own consulting firm?

Hasnain Raza Mirza: In those days, career paths were

After completing my early education, I received a Government of Pakistan scholarship to study in the Soviet Union, where I earned my bachelor's and master's degrees. Upon returning in 1986, I was awarded a U.S. State Department scholarship for a second master's degree

ER: How did your professional career evolve after returning?

HRM: I initially worked with PakTel during the early years of mobile telecommunications in Pakistan. Although telecommunications was outside my specialization, the experience taught

I have known Engineering Review since the 1980s, and I believe the publication has now reached a stage where it should further expand its role by providing more comprehensive analysis of Pakistan's engineering sectors. With its legacy, credibility, and deep industry connections, Engineering Review is well positioned to shape informed discussions on the challenges and opportunities facing the country's engineering landscape.

often influenced by family traditions. My father, uncles, and elder brother were all engineers, so engineering became my natural choice.

and had even begun a PhD. However, a change in government brought me back to Pakistan, where I resumed public service.

me how to establish systems, procedures, and regulatory frameworks.

Later, I joined the consulting firm founded by my



late father. The power sector was entirely new to me, but I was fortunate to receive strong mentorship from his colleagues. They ensured I

gained practical field experience rather than remaining confined to an office. That exposure to power plants, electrification projects, and

engineering design shaped my professional outlook.

ER: What is the most important lesson engineering

Contd on page 62

Warm Congratulations to Engineering Review on Completing 50 Years of Distinguished Service to Engineering and Industry.

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Engineering Review: You have witnessed significant changes in industry over the years. Tell us about your educational background and professional journey.

Kamran Azhar: I completed my master's degree in Peshawar before moving to Karachi to begin my career. My first job was in the automobile sector, where I worked with Pak Suzuki, Shahnawaz Motors, and Transmobile. Later, I spent more than a decade with a private industrial group before joining Universal Cables Industries, where I have now served for approximately 22 years.

Looking back, I have witnessed extraordinary technological change. I belong to the generation that waited years for a landline telephone connection. Today, smartphones place the world at our fingertips. We have moved from satellite dishes and limited television channels to instant access to information through digital technologies.

The arrival of computers, automation, and now artificial intelligence has transformed every industry. While automation has reduced the need for manual labor in many areas, it has also created new opportunities in software, AI, and digital services.

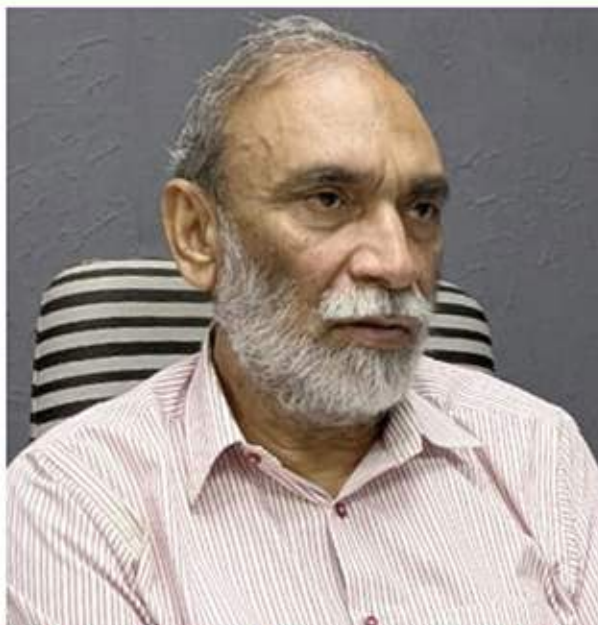
ER: When you graduated, did you have a clear career

path in mind?

KA: Not particularly. My father served in the Pakistan Air Force, and I had hoped to follow a similar path. However, life had different plans.

After moving to Karachi, my immediate goal was simply to find employment. My first opportunity came in material management within the automobile industry, where I spent several years. I later became Plant Manager at Shahnawaz Motors' assembly facility and subsequently joined Transmobile, which manufactured Yasooob trucks for the Pakistan Army.

Eventually, I joined Universal Cables. Although my academic background is not directly related to cable manu-



at our Port Qasim facility, equipped with modern testing equipment that ensures every product meets international standards.

Technology has enabled higher efficiency, improved quality, and greater consistency in manufacturing.

ER: Is there sufficient demand in Pakistan for premium-quality cable products?

KA: There are different types of customers. Some prioritize quality, while others focus primarily on price.

Universal Cables has never compromised on quality. Although there are more than 200 cable manufacturers in Pakistan, only a handful consistently operate according to

for Universal products because they know our standards.

ER: Universal Cables has been supplying major utilities for decades. How important is quality assurance in this business?

KA: Quality is everything. We have supplied cables and overhead conductors to WAPDA's distribution companies for nearly 25 years and have maintained a strong relationship with K-Electric for more than two decades.

K-Electric's requirements are particularly rigorous, making it an important benchmark for our products. We were also among the pioneers of Aerial Bundled Cable (ABC) technology in Pakistan, providing not only the products but also training utility professionals on their applications.

Today, a significant portion of Karachi's ABC cable network has been supplied by Universal Cables.

Our commitment to excellence is further demonstrated through certifications from internationally recognized organizations, including TÜV, DEKRA, and the Pakistan Engineering Council.

For us, quality is not simply a business objective—it is a responsibility. As Pakistan continues to modernize its infrastructure, we remain committed to delivering reliable, world-class cable solutions for the country's future. ■

Connecting Pakistan: Kamran Azhar on Quality, Technology, and the Evolution of the Cable Industry

With over two decades at Universal Cables and a career spanning the automobile and manufacturing sectors, Kamran Azhar reflects on technological transformation, quality standards, and the future of Pakistan's cable industry.

facturing, decades of practical experience have provided me

KA: Technology evolves at an incredible pace. Often, by the time an organization is

been to invest in the best technology available at the time. At Universal Cables, our produc-

recognized international standards. We are proud to be

Engineering Review is an effective vehicle for the engineering community and the industrial sector. It serves as an important source of information, helping engineers and businesses stay informed about market developments, emerging technologies, and key industry trends across Pakistan.

with a deep understanding of the industry.

ER: How challenging is it for industries to keep pace with rapidly changing technologies?

ready to adopt one innovation, a newer one has already emerged.

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THE INTERVIEW

ER: You graduated in engineering and entered the profession during a very different era. People of your generation often say they were fortunate to witness remarkable changes over their lifetime. What was the engineering profession like when you started your career?

Tell us about your journey into engineering and your early professional life.

Engr. Fahim Siddiqi: My journey has been quite long and extraordinary because I have witnessed tremendous changes—not only in engineering but in life itself. I often say that I belong to a generation that has seen everything from oil lamps and trams to artificial intelligence and virtual reality. However, when I look ahead to the next ten years, if life gives me the opportunity, I believe that journey will be even more exciting.

My family lived in East Pakistan because my father was associated with the jute industry. We were six brothers and one sister, all living in Dhaka. I completed my schooling there, but after the 1971 war, our family became prisoners of war for nearly 22 months. We were repatriated to Pakistan towards the end of 1973, and we had to rebuild our lives from scratch.

As soon as I arrived in Karachi, I joined NED University. I had already completed most of my engineering studies in East Pakistan and was in my final year in 1971, but because of the war, I had not touched a textbook for almost three years. I immersed myself in my studies, often studying for 18 hours a day. When the results were announced, I secured third position in theory and fifth position overall.

That achievement reflected both the strong engineering education I had received in East Pakistan and my determination to rebuild my future.

Beginning of My Professional Career

Immediately after my examinations, I was offered a job by Syed Murtaza Kazmi, who had established International Consultants after completing his master's degree in the United States.

He had been one of our external professors, teaching Refrigeration & Air-conditioning, and he was also my final-year project supervisor. He simply asked me, "Would you like to work?" I accepted immediately and joined the company at a monthly salary of Rs500.

I remained there from 1974 until 1987—a period of almost fourteen years. Those were the days when Anwar Saadat was at the top of the consulting profession. Kazmi Sahib had developed a healthy professional rivalry with him because everyone admired Anwar Saadat's work. International Consultants competed with Anwar Saadat's firm and was regarded as the second-leading consultancy company in Pakistan by the time I left.

Although Kazmi Sahib made me a 30 percent partner in the company in 1979,



Engineering Beyond Boundaries: The Life and Legacy of Engr. Fahim I. Siddiqi

From surviving the aftermath of the 1971 war and rebuilding his life in Karachi to founding FND Engineering Consultants, Engr. Fahim I. Siddiqi shares the experiences that shaped his extraordinary professional journey spanning over five decades.

our temperaments were quite different. One of the reasons for granting me the partnership was my work on the Pakistan Atomic

I cared about every detail—from designing the company logo and letterhead to improving office systems and project



Energy Commission's Nuclear Reprocessing Plant at Kahuta, where I designed the air-conditioning and process cooling systems. I spent almost two years in Islamabad with a team of four engineers, and I drove daily to Kahuta to ensure the suc-

cessful execution of the project.

I never thought like an employee because I was highly motivated. From the very first day, I considered the office to be my own. That mindset changed everything.

Since I had graduated with distinction and had gained considerable experience, I began receiving offers from Pakistan Steel Mills, ICI, and several other prestigious organizations with much bet-

ter salary packages. At one stage, I could have almost doubled my income.

However, I had a different philosophy. I did not want to become just another anonymous engineer in a large organization. Instead, I wanted to prove myself in a smaller company where my contributions would make a visible difference. Therefore, I declined all those offers.

Working with Kazmi Sahib proved to be one of the greatest learning experiences of my career. After office hours, when everyone else had left, I would spend another three to four hours every evening reading technical books and manufacturers' catalogues from our firm's extensive library. Most of the literature was American, and those years gave me an exceptionally strong technical foundation. Looking back, I believe that period strengthened my engineering fundamentals more than anything else.

Establishing FND Engineering Consultants

In 1987, I bid farewell to Kazmi Sahib and decided it was time to establish my own consultancy.

That same year, together with Roland de'Souza and Abbas Nanji, I founded Fahim, Nanji & de'Souza (FND) Engineering Consultants. Roland specialized in electrical engineering, Abbas was a structural engineer, while I represented the mechanical engineering discipline.

We belonged to the same generation, shared similar values, and believed that quality should never be compromised. We had complete confidence in one another's professional abilities.

During that period, Arshad Abdullah also encouraged us to establish an MEP consultancy under his organization. While we appreciated his support and encouragement, we believed that if we were to build something lasting, it should be an independent company with its own identity and professional culture. Consequently, we decided to establish FND as an independent consulting firm.

Initially, FND Engineering Consultants provided structural, electrical, and mechanical engineering consultancy services. Later, when Abbas Nanji migrated to Canada, we made a conscious decision to discontinue the structural engineering division rather than appoint someone who did not share our professional standards and vision.

Since then, FND Engineering Consultants has continued as a specialized mechanical and electrical engineering consultancy.

Our philosophy has always been straightforward: quality, integrity, and professionalism must never be compromised. We never believed in becoming the biggest consultancy; instead, we always aimed to be among the most respected. I firmly believe that if you consistently deliver quality work, maintain ethical standards, and earn the confidence of your clients, success naturally follows. ■

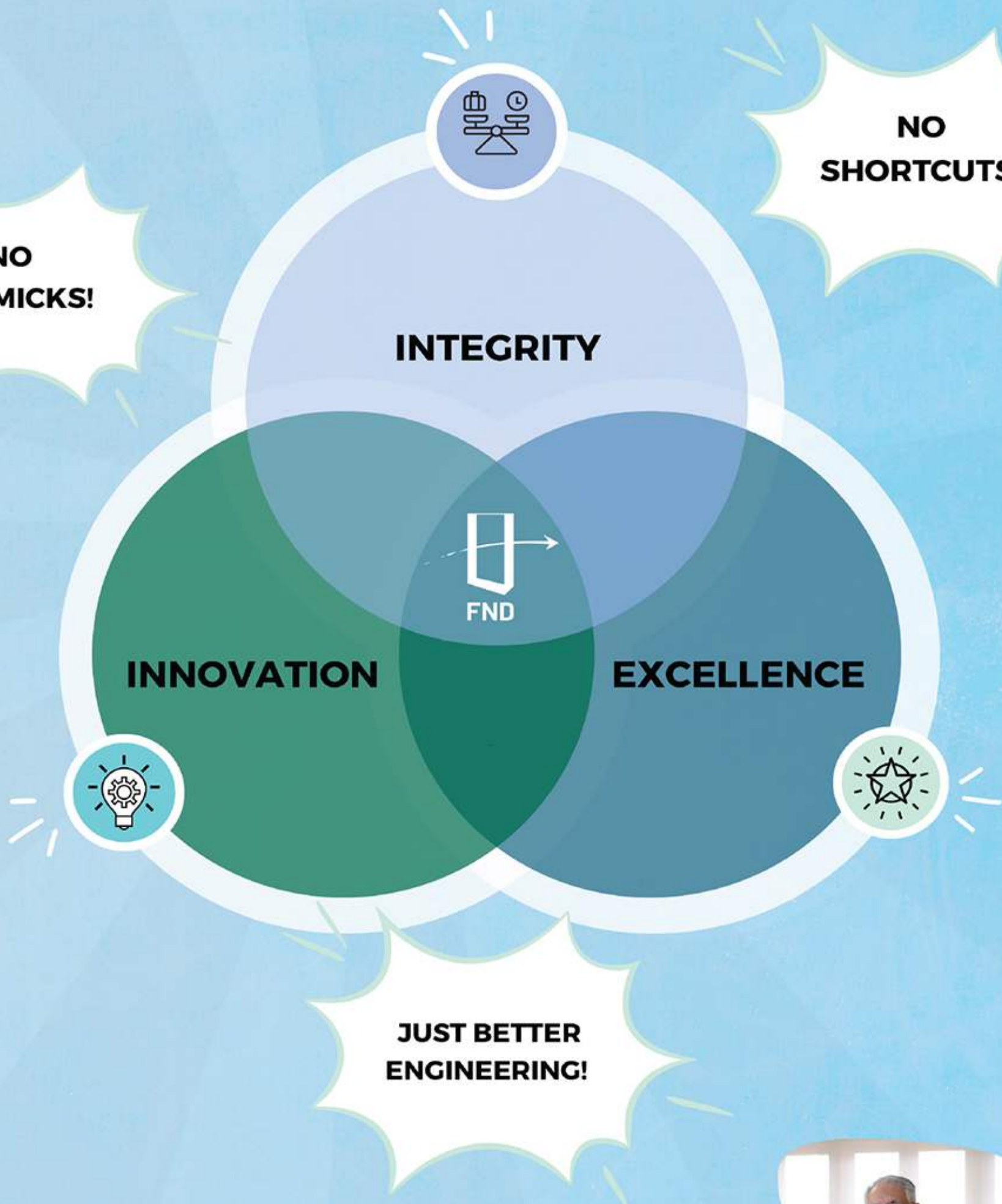
"Engineering Review has maintained a strong presence across engineering and technical domains and has played a significant role in the development of engineers and Pakistan's engineering industry."



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ER: Every engineering student enters university with dreams, but the professional world is often very different. What were your aspirations when you graduated from Dawood University, and what did you discover after entering the profession?

Dr. Vali Uddin: Like many students, I imagined an engineer sitting in an office making decisions. However, through laboratory work and practical training, I realized that engineering is fundamentally about solving real-world problems.

ER: What helped you bridge the gap between theory and practice?

VU: Teaching my classmates played a major role. Since I was good at mathematics, many students came to me with questions. Whenever I didn't know an answer, I studied it and explained it the next day. That habit strengthened my own understanding because every question pushed me to learn more.

ER: How did you conduct research before the internet?

VU: We relied entirely on books and spent long hours in university and Liaquat libraries searching for references. During our final-year project, I focused on the design while my teammate handled the implementation. Alhamdulillah, our project secured first position.

ER: Where did your professional career begin?

VU: I joined Fauji Fertilizer, where we received intensive training in industrial instrumentation, sensors, and process control systems. Industrial practice initially seemed very different from university studies, but the company's disciplined

procedures and excellent documentation provided an outstanding learning environment.

ER: Did fieldwork contribute to your

development? involved restoring a plant-wide sound system that had remained out of service for a long time. After tracing the wiring and grounding, we identified the fault and suc-

cessfully restored the system. It was a valuable lesson in systematic troubleshooting.

ER: What came after Fauji Fertilizer?

VU: After about two years, I joined Pakistan Steel Mills, where I worked in the

Electronics Development Cell. There we converted analogue weighing systems into digital systems and implemented PLC-based control technology. The experience greatly strengthened my knowledge of industrial automation and electronic design.

ER: You have witnessed the transition from analogue systems to artificial intelligence. How do you view this transformation?

VU: It has been remarkable. We have moved from analogue electronics to digital technologies, computers, mobile communications, and now AI. The biggest driver has been the enormous growth in computing power, which has turned AI concepts that existed decades ago into practical tools used across engineering disciplines.

ER: What challenges does AI create for engineering education?

VU: Universities must prepare students for lifelong learning because technology evolves rapidly. Curricula and teaching methods need continuous updating. While

AI is a powerful tool, students must also understand the engineering principles behind it rather

than relying on AI-generated answers alone.

ER: What should engineering education focus on in the AI era?

VU: Strong theoretical foundations must remain the priority. AI should be taught as a tool for solving engineering problems, not as a substitute for engineering knowledge.

Universities should also strengthen research on emerging technologies so graduates can adapt to future innovations while maintaining a deep understanding of engineering fundamentals. ■

Engineering in an Age of Transformation

Dr. Vali Uddin shares his experiences spanning analogue electronics, industrial automation, digital technologies, and artificial intelligence,

"Engineering Review is widely read by engineers and has always been a source of valuable ideas and insights. It is an excellent platform for the engineering community. Sustaining a publication for 50 years in Pakistan is truly an extraordinary achievement."



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THE INTERVIEW

Engineering Review: In the aftermath of the Middle East war, Pakistan's fault lines and weaknesses regarding self-sufficiency have become evident. What would you suggest to policymakers about which sectors of the economy, especially engineering sectors, should be revitalized?

Fadh K. Chinoy: I think the most critical issues that became evident and were highlighted as gaps to self sufficiency is our ability to secure our supply chain for oil and gas. Being a net importer, it became clear that we would need to continue to focus on key strategic geopolitical alliances to secure our availability. In addition, the need for enhancing our storage capacity for strategic reserves became evident. Moreover, it became clear that we must get all stakeholders together and break whatever deadlocks exist around the country's refinery policy, a matter that has been going back and forth for a long time.

Pakistan's shift to renewables has been considered a success but most of the renewable energy has been for captive generation, as opposed to being part of the IPP or larger generation mix. With external shocks such as the ones coming from this war, the acceleration towards renewables at a larger level has become a critical need. In addition, the interconnection of renewable generation onto the transmission and distribution grid, along with debottlenecking of overloaded lines is equally important. Finally, the need to invest in battery storage to support the availability of renewable energy is evident.

You cannot have a self-sufficient industry if you have to import the machines that make the machines. The Pakistan Machine Tool Factory (PMTF) and similar hubs must be upgraded and revived to their true potential. Long-term agenda should be import substitution. We must provide tax holidays for firms producing dies, molds, and precision valves, which are currently imported for our textile and automotive sectors. Similarly, transition from mere "importers of panels" to domestic manufacturers of inverters, mounting structures, and storage batteries. Within the energy sector, grid modernization to reduce line losses and investing in technologies such as PCL's ACCC Conductors that help smart-grid transformers and high-voltage transmission equipment to reduce line losses are some multi-sectoral recommendations.

Restart the "Buy Pakistan" movement and legislate that all government-funded infrastructure projects must source at least 40% of engineering components from local manufacturers.

By revitalizing these core engineering pillars, we turn our current "fault lines" into the bedrock of a self-reliant, export-oriented Pakistan.

ER: Where did you receive your education, and what is the best memory you would like to share with our readers?

FKC: I completed my MBA from INSEAD, France, before which I graduated with a BA in Economics and Political Science from the University of Pennsylvania (US). I completed by my early educa-

tion in Pakistan, a foundation that has been instrumental in my career. Growing up and studying here provided me with a deep-rooted understanding of the resilience of our workforce, and the unique socio-economic dynamics that drive our markets.

My earliest memories of returning to Pakistan in 2008 and joining Pakistan Cables include the time I spent traveling across the country to meet and develop relationships with our customers and in particular our dealer network. Many of these customers had generational relationships with the Company and for me it was a significant adjustment from my previous

career in banking on Wall Street and in Toronto. To understand the expectations and aspirations of our dealers and how our brand and product fit in, was a highly accelerated learning experience.

Another memory involves mentorship and community building when we undertook a recent initiative, where I had the opportunity to engage with middle government school students. We spoke about the concept of building positive habits—the small, incremental changes that lead to long-term success. Seeing the spark of curiosity in their eyes as they realized they have the agency to shape their own futures was incredibly rewarding.

It reminded me of the mentors I had during my own youth who encouraged me to look beyond the immediate horizon.

ER: What kind of engineering and industrial environment did you

encounter after completing your education, and what changes do you observe in modern engineering and industrial practices in Pakistan today?

Reflecting on the shift between the landscape I entered in the late 2000s and the one we operate in today, the transformation has been profound. This is particularly true for Pakistan Cables – as I started my career with our original factory which was based on SITE, Karachi and today we operate out of a bigger state-of-the-art factory, completed in 2025, located at Nooriabad, Sindh. The transformation over this period has been significant, with scale, capacity, modern technology all

being enhanced within our organization.

Unfortunately, the reality is that at a macro level the pace of industrialization in Pakistan has declined significantly. With the industrial and organized sector carrying an overwhelming amount of tax burden, there has been a shift towards other segments of the economy and in some cases this has been towards rent seeking opportunities. The industrial sector has faced inconsistent policy interventions and uncertainty, and coupled with high interest rates and excessive tax burden, money has shifted away from industry.

Having said that, of the companies that are operating within these challenging confines I think the focus has been one of survival but that some organizations are becoming increasingly focused

on broader impact. Many progressive companies are starting to build sustainable systems that are ready for a global, digital-first economy.

ER: What would you suggest to bring industry and academia closer together, and do you think the present model of collaboration is producing meaningful results?

FKC: Perhaps the most inspiring models are the ones that focus on the next generation and calculate impact. Programs at Pakistan Cables such as ASCEND or STEAM Safeer bridge the gap between academia and industry. Pakistan Cables remains the first and only player to successfully run the ASCEND program since 2021, which is a flagship initiative of the Company. It promotes STEM education among women by offering them scholarships and internship opportunities. As an industry, more such platforms need to be introduced and sustained for a collective impact.

ER: How is Pakistan Cables newly launched factory in Nooriabad performing, and what difference is it making?

FKC: Since its launch, the factory at Nooriabad has performed exceptionally well, delivering much higher output than the past and expanding our suite of offerings. It is more than a production site; it is a facility that has future proofed our company. It stands as a testament to the fact that when we combine 70+ years of leadership experience with a vision for output transformation

and sustainability, we create an asset that elevates the entire industry.

Our goal is to ensure it continues to operate efficiently. The facility has streamlined our

production cycles, allowing us to meet the growing demand for specialized solutions, such as upto 69KV MV cables, Solar DC Cables, with speed and precision. We have expanded our capacities for Copper Rod and PVC compound and have backward integrated into Aluminium Rod manufacturing.

The facility's footprint is optimized to minimize environmental impact, proving that large-scale industrial growth can—and must—be environmentally responsible. We have planted the largest forest in an industrial facility in Pakistan, with over 50,000 trees on 3 acres and have

invested in solar and are actively exploring captive wind energy.

Through our Customer Connect program, we have hosted over 200 external stakeholders, showcasing the future of local manufacturing and building confidence in domestic industrial capabilities.

In an era where regional instabilities have exposed the fragility of global supply chains, the Nooriabad facility is a pillar of resilience. By localizing the production of high-end engineering goods, we are enhancing Pakistan's export potential by offering "Made in Pakistan" products that compete on a global quality tie. "In a landscape often dominated by generalist media, Engineering Review has consistently built its authenticity over decades through credible stories. Its value lies in its ability to provide the technical depth and industrial focus necessary for informed policymaking. In my view, Engineering Review is not just a journal; it is a strategic partner for the industrial sector.■

Engineering Pakistan's Future: Fahad Chinoy on Industrial Growth, Energy Security, and Local Manufacturing

In a landscape often dominated by generalist media, Engineering Review has consistently built its authenticity over decades through credible stories. Its value lies in its ability to provide the technical depth and industrial focus necessary for informed policymaking. In my view, Engineering Review is not just a journal; it is a strategic partner for the industrial sector.

THE INTERVIEW

Engineering Review: You are now a senior engineer with decades of experience. We'd like to take you back to the beginning of your career. After graduating in engineering, what was your first job? Did you start with employment or private practice? Please tell us about your journey after graduation.

Engr. Farhat Adil: I graduated in Civil Engineering from NED University of Engineering & Technology in 1980. Since both my parents were government employees—my father worked for Pakistan Railways and my mother was also employed—I naturally leaned towards a professional career rather than starting a business.

In January 1981, I joined NESPAK as a trainee engineer. Over the next 34 years, I progressed through every stage of my career—from trainee engineer to junior engineer, senior engineer, principal engineer, chief engineer, and eventually Vice President and Head of the South Region. I opted for early retirement from NESPAK about a year and a half before my official retirement.

There was one exception during my career. In 2006, I left NESPAK to become CEO of PRIMACO, a company established by the Employees' Old-Age Benefits Institution (EOBI). I remained there for three years. After leaving PRIMACO, NESPAK invited me to return, and I rejoined the organization. That, in short, has been my professional journey.

ER: You entered the engineering profession in 1981, more than four decades ago. How was engineering practiced then compared to today, when AI has become part of almost every profession?

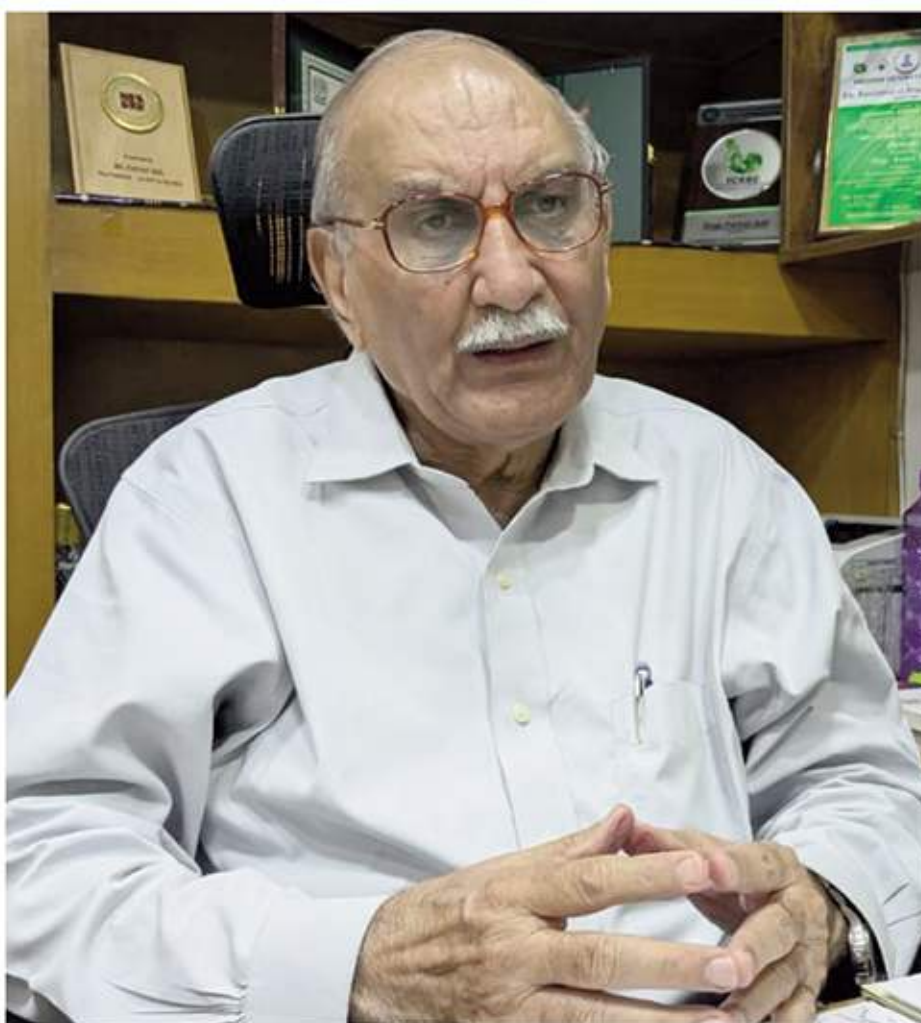
FA: The difference is extraordinary—there is really no comparison. When I entered NED in 1975, we were still using slide rules for calculations. Today's students may not even know what a slide rule is. Soon afterward, programmable calculators appeared, but they were extremely expensive. At that time, a calculator cost around Rs. 750 to 800, while my annual university fee was only Rs. 200.

Technology has evolved continuously since then. We moved from slide rules to calculators, then to computers, and now to AI. Today's students and engineers have opportunities that we could never have imagined.

In our time, if we needed technical information, we spent hours searching through library books. Today, almost everything is just one click away. AI has made learning even easier. You can simply describe a problem, and AI can provide guidance or possible solutions within seconds. Engineers who embrace these new technologies will have a bright future, while those who resist change risk being left behind.

ER: You devoted most of your career to consulting engineering. Is there any project that stands out as particularly memorable?

FA: One of the most memorable projects I worked on was the Mera Ghar Housing Scheme, launched in 1999 during Prime Minister Nawaz Sharif's government. It was an extremely ambitious national housing ini-



Trainee Engineer to Vice President: A Lifetime in Engineering

Engr. Farhat Adil discusses his professional journey, memorable national projects, the rise of AI, and his advice for the next generation of engineers.

tiative. NESPAK was appointed as the lead consultant, and I was assigned as the focal person for the project.

Despite the intense pressure of the workload, one thing I always appreciate is that there was never any pressure regarding

son to become an engineer?

FA: (Laughs) Yes, I certainly tried. He performed exceptionally well in college

and even secured third position in Karachi. He also qualified for admission to NED, but he had already decided that engineering was not the career he wanted. He eventually chose Chartered Accountancy instead, and it proved to be the right decision for him.

One of my daughters initially wanted to study architecture, but after seeing her siblings pursue business and finance, she also chose to complete an MBA.

ER: Finally, would you recommend engineering as a career to the younger generation?

FA: Absolutely. Engineering is fundamental to every aspect of modern life. Whether it is civil, mechanical, electrical, software, or any other branch, engineering drives the world forward. As technology continues to evolve, engineers will always be needed.

My advice to young people is to build their careers gradually, remain patient, and continue learning. Today, many graduates are eager for immediate success, and many also seek opportunities abroad.

We have noticed that far fewer graduates now apply for jobs locally because many plan to leave the country soon after graduation.

Even so, engineering remains an excellent profession.

Those who combine strong technical knowledge with modern tools such as AI and digital technologies will continue to find rewarding opportunities and play an important role in shaping the future. ■



The workload was immense. Our entire team was stationed in Islamabad, where we had to evaluate tenders, prepare drawings, and complete technical work within very

contracts or consultants. Everything was handled strictly on merit. Unfortunately, after the events of October 12, 1999, the project came to an end. Had it continued, I

Even so, engineering remains an excellent profession.

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"I have known Engineering Review since my university days. It is remarkable that this platform for engineers has sustained itself for so long. I am confident it will continue to evolve and transform in the years ahead."

tight deadlines. Looking back, it almost feels like a nightmare because we sometimes spent weeks away from our families.

believe it would have contributed significantly to Pakistan's development.

Later, under General Pervez Mushar-

Speaking to Engineering Review, senior engineer and construction industry leader Engr. Arshad Dad outlined the challenges facing the sector and presented a roadmap for reforms that could transform construction into a major contributor to Pakistan's economy.

"There's a saying in our industry: When construction moves, the country moves," said Engr. Dad. "That statement is absolutely true. A single building project activates nearly 45 industries, while roads and infrastructure projects stimulate another eight to ten sectors."

According to Engr. Dad, Pakistan's construction sector contributes only about 2 percent to the national GDP, compared to approximately 10 percent in neighboring countries such as India and Bangladesh.

"This statistic alone tells us how far behind we are," he said.

Engr. Dad, who has been advocating policy reforms since 2007 through the Constructors Association of Pakistan (CAP), described the industry's biggest challenge as the absence of an "enabling environment."

"Developing an industry

is like operating a vehicle," he explained. "A car needs fuel, water, electricity, and lubricants to function. If one component is missing, it may continue for a while, but eventually it will stop. The same principle applies to construction."

He noted that Pakistan has historically attempted to solve individual problems in isolation rather than addressing the sector's structural requirements. To tackle this, CAP identified eight critical reforms and has presented them to successive governments, including several



Another major obstacle, he said, is limited access to finance. Most banking facilities available to contractors are asset-based, requiring real estate as collateral for bank guarantees.

"This creates a distorted incentive," he explained. "Instead of investing profits in machinery, technology, or expanding their businesses, contractors invest in property simply to qualify for future guarantees."

To address this issue, CAP has proposed the establishment of a dedicated Construction Bank, similar to

option, we will continue compromising quality."

Perhaps his most significant recommendation is the creation of a Construction Industry Development Board to coordinate policy, financing, regulation, and industry development.

"Construction requires a dedicated institution," he said. "Globally, organizations that regulate education do not regulate businesses. Pakistan's construction sector deserves the same distinction."

Encouragingly, some progress has already been made. Through sustained advocacy, duties on mounted construction equipment were reduced from 30 percent to 10 percent in the latest federal budget.

For Engr. Arshad Dad, however, the journey is far from over. His message is clear: Pakistan possesses the talent and entrepreneurial capacity to build a thriving construction industry—but unlocking that potential will require policy consistency, institutional reform, and a long-term commitment to creating an environment where merit, innovation, and professionalism can flourish. - ER

Building an Enabling Environment: Engr. Arshad Dad Calls for Structural Reforms in Pakistan's Construction Sector

Pakistan's construction industry possesses enormous potential to drive economic growth, create employment, and stimulate dozens of allied industries. Yet despite its importance, the sector remains fragmented, underfinanced, and constrained by outdated policies.

prime ministers over the past two decades.

Among the most important recommendations is the introduction of standardized construction contract documents across the country.

Engr. Dad described construction contracts as the equivalent of a "marriage agreement" between contractors and employers, emphasizing that clearly defined rights and responsibilities are essential for minimizing dis-

putes and improving project delivery.

Working alongside industry experts, including Engr. Khalid Bashir and Shahid Rafique, he helped develop updated contract documents based on the latest FIDIC 2017 framework, incorporating amendments up to 2022. Previously, Pakistan's public sector projects largely relied on documentation derived from FIDIC 1987.

"We were effectively

operating under a framework that the world had moved beyond decades ago," he said. "Our objective was to adapt international best practices to Pakistan's realities while ensuring fairness for both contractors and employers."

Although implementation has been delayed due to jurisdictional issues between regulatory bodies, Engr. Dad remains optimistic that a unified framework will soon be adopted nationwide.

institutions supporting the sector in countries such as Saudi Arabia, Turkey, Malaysia, India, and China.

Engr. Dad also emphasized the need to shift from lowest-cost procurement to value-based procurement.

"Internationally, contracts are not awarded solely to the lowest bidder," he noted. "Quality, technical capability, and long-term value are equally important. If we continue prioritizing the cheapest


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THE INTERVIEW

Engineering Review: Sir, after completing your engineering degree, you must have thought about a job, starting a business, or pursuing further studies. Every graduate has dreams at that stage. What were your dreams? And please also tell us about the first engineering job or project you encountered, and how the engineering environment of that time compares with today.

Engr. Khalid Pervez: My start after engineering was very different — not just mine, but that of my entire batch.

Our engineering result was announced on 30 November 1971. Just a few days later, on 3 December 1971, the war with India began, and on 16 December, Dhaka fell. It was a huge national tragedy. The economy was shattered, and there were virtually no new jobs. The country had just emerged from war, 95,000 soldiers were prisoners in India, and the political situation was extremely uncertain.

I came from a very poor family. I had no connections, no recommendations, nothing. Fortunately, I was a very good student in the later part of my educational life. Earlier I had been an average student, but then a turning point came and within less than a year I moved from being an ordinary student to one of the top-ranking students of my division. Even with good academic results, jobs were almost impossible to find.

ER: Where did you do your matriculation and intermediate studies?

Engr. Khalid Pervez: I did my matriculation from Royal School. My father worked in accounts and had a transferable job. After matriculation, he was transferred back to Karachi, so I completed my intermediate there and then got admission to NED University.

ER: At that time many people were going abroad, especially to Dubai. Did you consider that option?

Engr. Khalid Pervez: There was a strong trend of people going to Dubai for jobs, but my nature was different. Despite my difficult financial circumstances, I could not bring myself to leave the country simply for a job. My father also never pressured me to go abroad.

One of my teachers, may God bless him, had established a private engineering college. He invited me to teach there even before my result was officially announced. He said, "You have passed; come and teach some classes." That was how I entered the teaching profession.

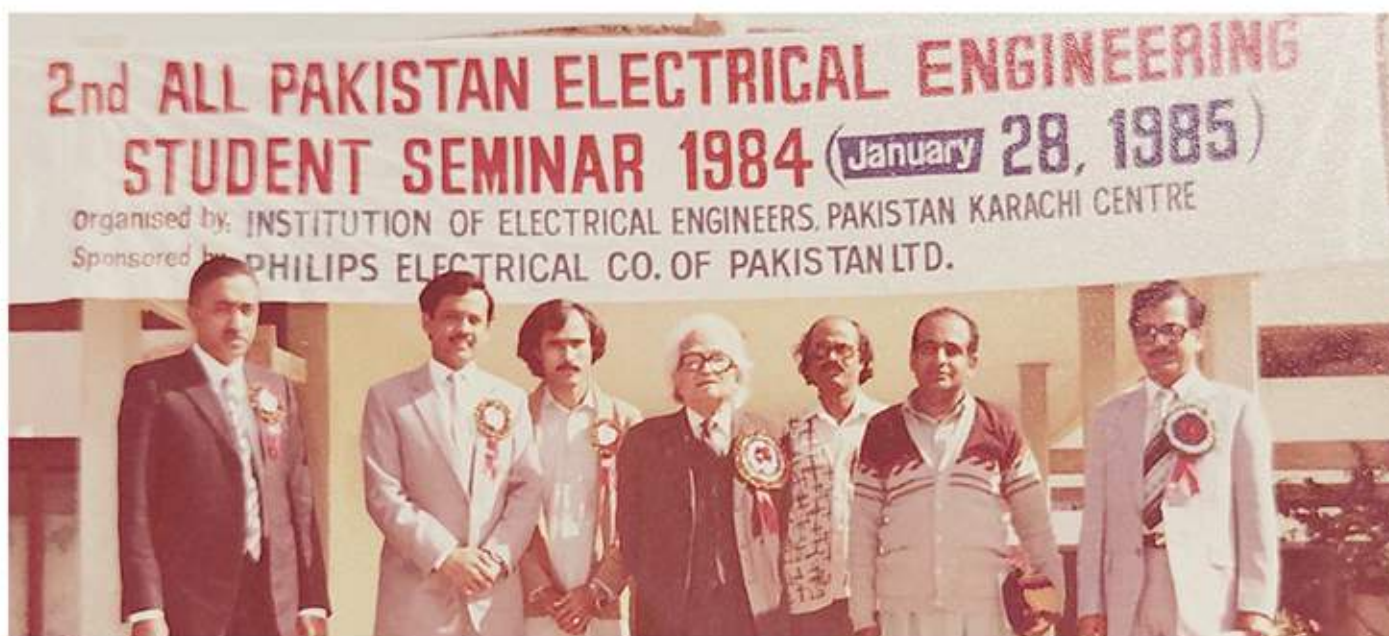
ER: Was it a paid position?

Engr. Khalid Pervez: No, it was completely free of charge. The college was newly established and my teacher did not have the resources to pay me. But I owed him a great



Engineering Through Uncertain Times

Engr. Khalid Pervez shares how resilience, teaching, and entrepreneurship shaped his journey from a young engineering graduate to a respected academic and professional.



deal, so I happily accepted.

Later, he arranged a part-time teaching opportunity for me at NED University as

scarce. I formed a small company called Micron Engineering Company.

At that time, the Electrical Inspector of

local firms were mostly involved in trading or smaller projects.

ER: So would it be fair to say that

foreign companies were responsible for technology transfer?

Engr. Khalid Pervez: Absolutely. They brought technology, standards and expertise.

Pakistani engineers learned from them,

and over time local capability improved significantly. The engineering sector was actually quite robust even in those days because of the presence of these international

companies and the transfer of knowledge they facilitated. ■

"Before Engineering Review, Pakistan did not have a publication of this nature dedicated to engineering. Its extensive coverage of the engineering sector over the decades is truly commendable."

well. That was a great favor on his part.

ER: When did you start your own com-

pany? Karachi, Muzaffar Ali Shah, issued a notice requiring industries to submit their electrical

drawings. I took up that work. I approached

industries and began preparing as-built electrical drawings for them. It became a very



pany?

Engr. Khalid Pervez: My teacher advised me to start my own business since jobs were

drawings. I took up that work. I approached industries and began preparing as-built electrical drawings for them. It became a very

WHEN FAILURE IS NOT AN OPTION



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From Donkeys to Digital Engineering

From donkey-powered excavation to AI-driven design, Engr. Al Kazim Mansoor reflects on four decades of engineering, entrepreneurship, technological progress, and the values that shaped his career.

Engineering of my times

"When we started working, excavation was done using donkeys. If someone today were told how digging was carried out with donkeys, they would be amazed. Workers would create a path, dig the soil, load it onto the donkeys, and the donkeys would carry it up the slope by themselves.

Let me tell you something else: in the early 1980s, computers were

banned in Pakistan. I went abroad and opened a computer terminal. A message appeared asking for my student number. I entered it, but nothing happened. I looked around while some students behind me were waiting for their turn. One of them asked, 'What's the problem? Is the terminal not working?' I replied, 'Yes, I think it isn't working.'

He said, 'I know a little about terminals. May I help?' I said, 'Please.' He

came over, entered the information, and then pressed the Return or Enter key. Our teacher had never told us that after typing, we had to press Enter. We would simply type and sit there waiting.

At that time, my knowledge of computers was so limited that even after graduating in civil engineering, I did not know that I had to press Enter or Return after typing. I am sharing this as a personal example.



The Focus

When I graduated, most people were focused on finding a good job with a reputable company and a good salary. My focus was different. Even during university, I wanted to learn how to work independently. One of the reasons I chose civil engineering was that I believed it was a field in which a person could start his own work even on a small scale.

When I returned from the United States, I received two job offers: one from NESPAK and another from a small company with only a few engineers. Everyone advised

past forty years, the change in engineering is enormous. When we began, construction was largely manual and non-mechanised. I remember visiting the Hub Dam project and seeing excavation being carried out with donkeys. Later, as engineers returned from the Middle East with international experience, modern equipment such as excavators became common.

Initially, our governments were resistant to new technologies. Computers were completely banned, much like VCRs were banned at that time. When I first went to the United States, I had barely seen a

"I have known Engineering Review for the past 45 years and was introduced to it through Najam Sahib and Riaz Sahib. There is no other engineering publication in Pakistan that has maintained its continuity for half a century."

me to join NESPAK because it offered better benefits, including medical coverage.

But I chose the smaller company because I felt I would learn more there. In a large organisation with hundreds of engineers, I might have remained unnoticed, whereas in a small company I quickly received responsibilities.

During that period, many major projects such as Port Qasim, Pakistan Steel Mills and the Indus Highway were under development, so civil engineers were in high demand. By the time we graduated, however, the situation had reversed and many projects had slowed down. Some of my classmates started their careers for salaries as low as 1,000 rupees per month.

After working for five or six years and learning the 'tricks of the trade,' I started my own company. Fortunately, because I had already worked in the field and built relationships, I did not face major difficulties at the beginning.

Paradigm shift in engineering

Looking back over the

computer, while all registration and administrative work there was already computerised. The technology gap between Pakistan and the United States was enormous.

Today that gap has narrowed considerably. Pakistani designers now use the same software and technologies used in America and other advanced countries. Technologically and in terms of equipment, we have progressed significantly.

However, if I compare the last forty years, I see one negative change as well: moral values have deteriorated. Corruption used to be largely confined to government agencies, but over time it has spread widely, including into the private sector. So while we have advanced in technology and engineering practices, our ethical standards have unfortunately weakened."

This translation keeps the original meaning and conversational tone while making it grammatically correct and easy to read in English.

— By Manzoor Shaikh

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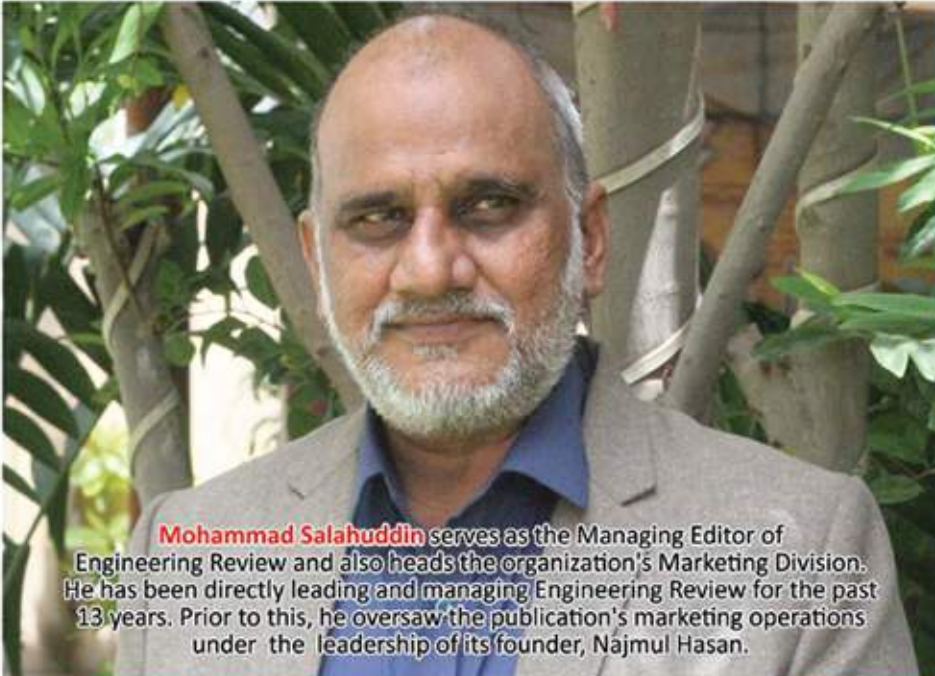


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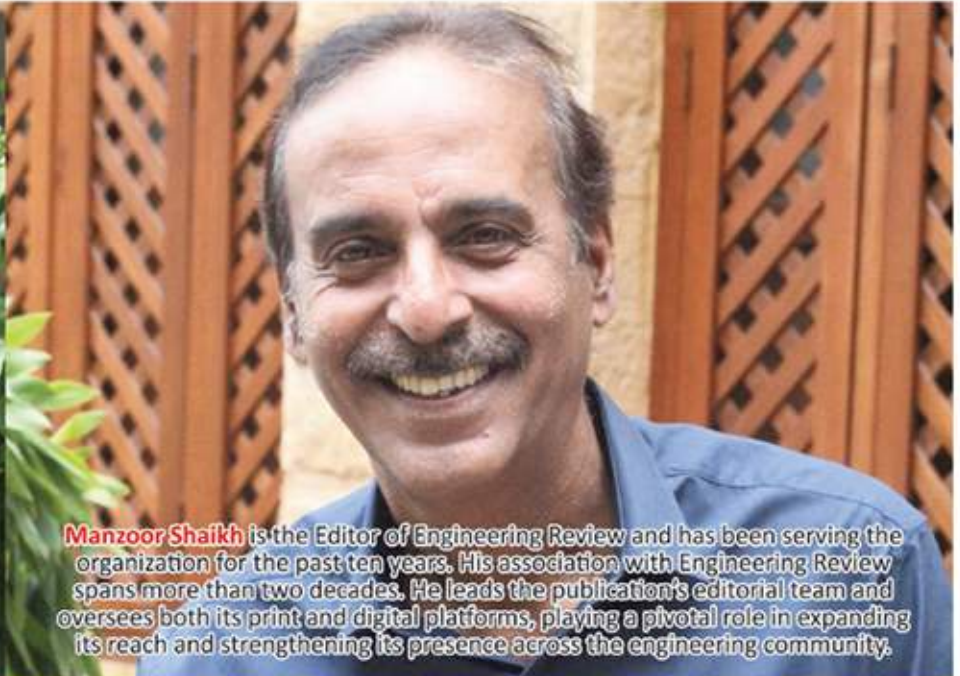
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Team Engineering Review



Mohammad Salahuddin serves as the Managing Editor of Engineering Review and also heads the organization's Marketing Division. He has been directly leading and managing Engineering Review for the past 13 years. Prior to this, he oversaw the publication's marketing operations under the leadership of its founder, Najmul Hasan.



Manzoor Shaikh is the Editor of Engineering Review and has been serving the organization for the past ten years. His association with Engineering Review spans more than two decades. He leads the publication's editorial team and oversees both its print and digital platforms, playing a pivotal role in expanding its reach and strengthening its presence across the engineering community.



Waheed Ahmed serves as the Human Resource and Admin Manager at Engineering Review and has been associated with the organization for the last 30 years. He oversees human resources, administration, accounts and client communications. In addition to his core responsibilities, he contributes across multiple functions of the organization, playing a key role in its efficient operations and continued success.



Shaikh Muhammad Raza ur Rehman is the Graphic Designer at Engineering Review, with an association spanning more than 38 years. He is responsible for the magazine's design and layout and develops visual content for the organization's digital and social media platforms, contributing significantly to Engineering Review's distinctive visual identity.



Muhammad Amin serves as the Incharge of the Video Editing Section at Engineering Review, where he oversees video production and post-production activities. Amin is an active member of the organization's social media management team, contributing to the creation and dissemination of engaging digital content across multiple platforms to enhance Engineering Review's online presence and audience engagement.



Hamza Idrees serves as Manager Marketing at Engineering Review's Lahore office and has been associated with the organization for more than a decade. He oversees the magazine's business operations not only in Lahore but also across various cities of Punjab, helping strengthen Engineering Review's presence and relationships within the region's engineering and industrial sectors.



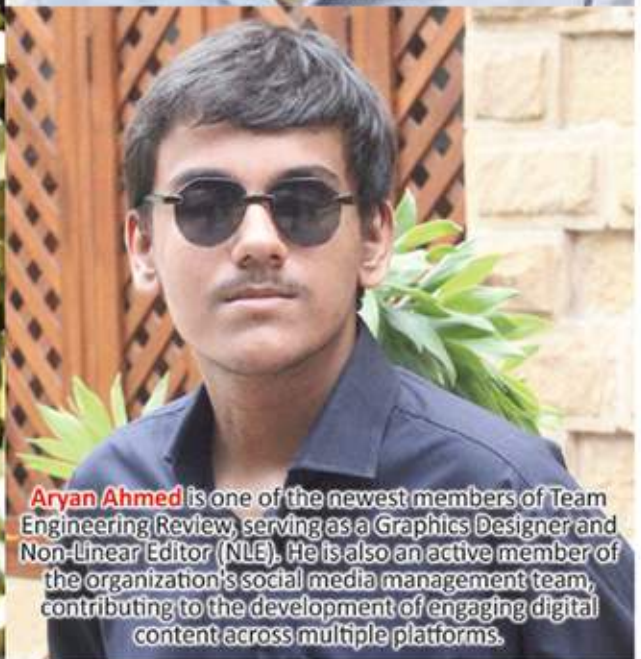
Muhammad Arif Malik serves as Manager Marketing at Engineering Review's Islamabad office and has been associated with the organization for many years. He oversees business development and client communications in the federal capital while also contributing to the magazine's editorial activities, supporting both its commercial and content-driven initiatives.



Shahzad Abid Khan is a member of the Editorial Team and serves as a News Reporter based in Lahore. He covers Lahore and other major business and industrial hubs across Punjab, in addition to reporting on engineering exhibitions and events spanning various sectors of the economy.



Maaz Bin Fakhr serves as a Graphics Designer and Non-Linear Editor (NLE) at Engineering Review. He is also an active member of the organization's social media management team, contributing to the creation of engaging digital content across multiple platforms.



Aryan Ahmed is one of the newest members of Team Engineering Review, serving as a Graphics Designer and Non-Linear Editor (NLE). He is also an active member of the organization's social media management team, contributing to the development of engaging digital content across multiple platforms.

Engineering Review: As part of celebrating 50 years of engineering, we are speaking with some of Pakistan's leading engineers. Looking back at your time as a student, what were your dreams when you entered Mehran University, and how different was engineering in those days?

Engr. Iqbal Yousuf Shaikh: There was a popular joke among engineering students back then. In the first year, everyone thought they would become a Chief Engineer. By the second year, they aimed for Superintending Engineer. In the third year, they settled for Executive Engineer, and by the fourth year, they hoped to become an Assistant Engineer. Once they graduated, however, they were simply wondering where they would find a job.

I studied Electrical Engineering at Mehran University. Like many students of my generation, our parents had simple aspirations for us. There was no internet or exposure to endless career options. If you studied electrical engineering, the dream was to become an SDO in

WAPDA. Civil engineers hoped to join the irrigation or public works departments. That was considered success.

Academically, I performed well and graduated among the top students in my class. Alongside studies, we also enjoyed university life, but I was genuinely passionate about electrical engineering. I remember that after studying power systems, transformers and insulators, I would walk down



written decades earlier. As students, we accepted them because there were very few alternatives.

ER: How did engineering education change after the arrival of the internet and modern technology?

IYS: The biggest difference has been research and access to knowledge. Even before artificial intelligence, the internet transformed engineering education completely.

have become so compact that entire systems now fit onto chips that are almost invisible to the naked eye.

I still remember the mainframe computer at Mehran University. It occupied an entire air-conditioned room, with a huge central processing unit that everyone admired. Today, a tiny processor inside a modern device is thousands of times more powerful than that enormous machine.

ER: What was your experience after graduating? Was professional life what you had expected?

IYS: Not at all. I initially joined Mehran University as a lecturer and spent nearly three years teaching. It was a rewarding experience.

Later, during Prime Minister Nawaz Sharif's first tenure, the government held a competitive examination for engineers. I was selected for a government engineering position. My family was divided over the decision. My father wanted me to continue teaching, while friends encouraged me to gain field experience.

I eventually joined the Sindh Government as an

Contd on page 33

Engineering Classrooms to the Digital Age:

Engr. Iqbal Yousuf Shaikh Reflects on Five Decades of Change

He shares his experiences of engineering in a pre-internet world and discusses how research, computing, and technical education are shaping Pakistan's future.

the road looking at electricity poles, identifying different insulators, transmission lines and transformers. Engineering had become a passion rather than just a degree.

ER: How would you describe engineering education at that time?

IYS: Considering the resources available then, the

education was reasonable. We had dedicated teachers, although, like everywhere, some were better than others.

One issue I noticed was that many professors relied on the same lecture notes for years. There was no internet, and access to updated books was very limited. Some lecturers had been teaching from the same handwritten

notes for nearly two decades without revising them or incorporating new developments.

The textbooks themselves were also quite old. Books by B.L. Theraja and O.P. were considered the standard references and were used across almost every engineering discipline. They were excellent books, but many had originally been

Today, engineers can instantly access updated research, international standards and technical resources.

Electrical engineering itself has evolved tremendously. In our time, we studied relatively simple electrical circuits. Today, integrated circuits, microchips and advanced electronics dominate the field. Components



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Engineering Classrooms to the Digital Age: Engr. Iqbal Yousuf Shaikh Reflects on Five Decades of Change

Contd from page 32

Assistant Engineer. However, the reality was disappointing. On my very first day, the Executive Engineer jokingly asked who had advised us to leave teaching and join government service. There wasn't even a proper office or chair available for us.

For nearly two years, we struggled with limited responsibilities and very little professional growth. One of my colleagues resigned and joined PTCL. Eventually, I also resigned. Looking back, it was the right decision.

ER: After leaving government service, how did your career evolve?

IYS: After resigning, I shifted my career toward the computer field and completed a Master's degree in Computer Science. That decision completely changed my professional path.

Technology was advancing rapidly, and it became clear that engineering alone was no longer enough. Computing, software and information technology were shaping the future, so I adapted accordingly.

ER: Looking at Pak-

istan's engineering sector today, what do you think has driven progress?

IYS: Technology has advanced dramatically

because of long-term national planning.

Unfortunately, successive governments have not consistently followed a

clear roadmap for engineering, education and technological development. Technical education should have

associated with vocational and technical education.

Why do you believe it is so important?

IYS: I work with voca-

cal education and found a 1947 message in which he clearly stated that Pakistan's future depends on its youth, and the success of its youth

alone cannot solve every employment challenge. Graduates also need practical, market-oriented skills.

A student receiving vocational training can often begin earning within a year because they possess hands-on skills. University graduates, despite spending four years studying, sometimes struggle because they lack practical experience. Ideally, higher education and technical skills should complement each other.

ER: Finally, after witnessing five decades of engineering, what is your overall assessment?

IYS: Engineering has undergone an extraordinary transformation. The profession today is vastly different from what it was when I graduated. Technology, research, computing and artificial intelligence have completely reshaped the engineering landscape.

The challenge now is to ensure that education keeps pace with technological change by combining strong academic foundations with practical skills, innovation and continuous learning. That is the path to building a stronger engineering profession and a more competitive Pakistan. ■



worldwide, and naturally Pakistan has benefited from those global developments. However, much of this

progress has happened because the world moved forward, not necessarily

been a national priority much earlier.

I once searched for Quaid-e-Azam Muhammad Ali Jinnah's views on techni-

Institutions like MIT have changed the world through research. But universities

Senior engineers across Pakistan are well acquainted with Engineering Review. Going forward, I believe the magazine should place greater emphasis on the younger generation by highlighting their technology startups, innovative projects, and entrepreneurial achievements. This will inspire future engineers and help showcase the immense talent emerging from Pakistan.

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THE INTERVIEW

ER: You graduated from NED University with a degree in Mechanical Engineering. After completing your studies, did you start working immediately, or did you venture into business? What was your first experience as a professional engineer, and how different was it from what you had learned at university?

Engr. Abbas Sajid: Before answering that, let me go back to how I entered NED University. I completed my Intermediate in 1977. In those days, career options were quite limited compared to today. You either became a doctor or an engineer. Since mathematics was always my strongest subject, I chose pre-engineering and applied to NED.

Admission procedures were very different then. There were no entry tests. Admission depended entirely on your Intermediate marks. I had around 70 percent marks, which was considered excellent at that time. Mechanical Engineering was the most sought-after discipline, and fortunately, I secured admission.

Unfortunately, those years coincided with a politically turbulent period in Pakistan. Student unions were very active, and due to the national political situation after 1977, our four-year degree stretched into almost six years. We finally completed our studies in 1982.

Soon after graduation, I applied for several jobs and received an offer from an HVAC company. My first assignment was at the construction site of Avari Towers in Karachi. That was the moment I realised there was a significant gap between classroom knowledge and real-world engineering.

University had provided us with solid engineering fundamentals, but the technologies being taught were already years behind what the industry was using. Everything at the construction site was new to me.

ER: What was your first assignment at Avari Towers?

AS: My very first responsibility was supervising the assembly of a cooling tower on the twentieth floor. There were no operational lifts at the time, so climbing twenty floors several times a day became part of my routine.

Initially, it was physically exhausting, but looking back, I consider it one of the greatest learning experiences of my life.

Every time I stopped on different floors, I would spend time with technicians, welders and fabricators. I would sit with them over tea, ask questions, observe their work and learn everything—from welding techniques and duct fabrication to insulation systems and piping.

That practical exposure taught me more than any textbook could.

ER: How important were technicians and experienced supervisors in shaping your career?

AS: They played an enormous role.

Interestingly, many of my immediate supervisors were diploma engineers, while I was a graduate engineer. However, they possessed decades of practical experience.

The technicians initially saw me as a "young engineer" who only knew theory. But I never behaved like an office engineer. I always believed in learning from the people actually doing the work.

Even today, I feel comfortable sitting on a roadside tea stall with technicians. Practical engineering cannot be learned from an office desk alone.

ER: After Avari Towers, what came next?

AS: After about eight months, I was transferred to another major national project—the construction of Karachi Airport's Terminal Two.

It was the era of General Zia-ul-Haq,



From NED to Nation Building Engr. Abbas Sajid Shares Four Decades of Engineering, Entrepreneurship and Innovation

and the project was progressing on a war footing. Work continued day and night.

That project exposed me to high-pressure project management. Senior government officials visited the site regularly, and deadlines were extremely tight.

There were days when I spent two or even three nights continuously at the construction site instead of going home. Those experiences taught me discipline, responsibility and decision-making under pressure.

ER: Even today, there is a debate that universities teach theory while industry demands practical skills. Did you experience this gap yourself?

AS: Absolutely. When I studied at NED between 1977 and 1982, the curriculum was quite old. Most textbooks reflected technologies that were already 15 to 20 years outdated.

The fundamentals were excellent, but students had very little exposure to the latest industrial developments.

Fortunately, the situation has changed dramatically today.

Many faculty members now hold PhDs from universities in the UK, the US, Australia, New Zealand and other countries.

universities to maintain strong links with industry.

One initiative I strongly supported was faculty internships.

Students have always undergone industrial internships, but I suggested that university faculty should also spend time in industries. If teachers regularly work in industrial

environments, they can continuously update their knowledge and ensure their teaching remains aligned with industry requirements.

I'm pleased that NED implemented this idea. Faculty members now spend time in industries, gain practical exposure and bring that knowledge back into their classrooms.

ER: Engineering has changed dramatically over the past four decades. How do you compare

today's engineering profession with the one you entered in 1982?

AS: Honestly, when I visit universities today, I sometimes feel like taking admission again.

Today's students have access to opportunities we could only dream of.

The number of engineering disciplines



My association with Engineering Review spans nearly three decades. Throughout this time, I have observed that Engineering Review has consistently covered every segment of the engineering sector and has never limited its scope. I believe the publication should further strengthen its focus on engineering education, as it is fundamental to the future growth and development of the profession in Pakistan.

They bring global exposure and modern teaching methods into classrooms.

I frequently visit NED, deliver lectures and interact with faculty and students. The difference between today's engineering education and what we experienced is remarkable.

ER: You have often spoken about strengthening university-industry collaboration. Why is this so important?

AS: Because engineering cannot survive in isolation.

For many years, I have encouraged

has expanded tremendously. When I studied, NED offered only three major disciplines—Mechanical, Civil and Electrical Engineering.

Today, there are more than twenty engineering disciplines.

Students have access to modern laboratories, advanced software, artificial intelligence, robotics, automation and global knowledge networks.

It is an exciting time to become an engineer.

ER: Some people believe emerging technologies such as Artificial Intelligence may reduce the importance of traditional engineering. Do you agree?

AS: Not at all.

Artificial Intelligence will change engineering—it will not replace it.

Civil engineering, mechanical engineering, electrical engineering and electronics will always remain the foundation of technological development.

Whether a vehicle runs on an internal combustion engine or electricity, it still requires mechanical systems, structures, braking systems, suspension and manufacturing.

Engineering is evolving rather than disappearing.

AI, automation and digital technologies are becoming powerful tools that engineers must learn to use.

ER: You left your job quite early and started your own company. How did that happen?

AS: I worked for only about two years.

Even during my job, one of my senior colleagues constantly encouraged me to start my own business. He believed I was meant to become an entrepreneur.

Interestingly, he even suggested the

name of my company—Engineering Services—which I still use today.

In August 1984, I established my own business.

I had almost no financial resources. My office was literally the trunk of my car.

There were no laptops or mobile phones then. I carried a typewriter, letterheads and a briefcase. Wherever my project site was, that became my office.

Looking back today, it seems unbelievable.

ER: How did your company expand over the years?

AS: We initially focused only on HVAC engineering.

Within a few years, we expanded into plumbing and fire-fighting systems, offering complete mechanical engineering solutions.

Later, two of my university classmates joined me as partners, and together we expanded further.

Over time, we entered telecommunications infrastructure, particularly during the rollout of Mobilink's network in Pakistan.

We were involved in constructing a significant portion of the company's telecom infrastructure, including BTS stations and towers across Pakistan, particularly in remote regions.

We also entered the CNG sector during its early expansion, established multiple CNG stations, and even trained technicians after receiving specialised training from New Zealand, Italy and Argentina.

Today, after more than four decades, our businesses span multiple engineering sectors.

ER: Finally, what message would you like to give to young engineers?

AS: My advice is simple.

Do not think only about finding a job. Think about creating jobs.

Pakistan needs engineers who become entrepreneurs.

Industrialisation cannot happen without engineers taking risks, establishing companies and developing new technologies.

I started my company from the trunk of my car.

If I could build a successful engineering business from such humble beginnings, today's young engineers—who have access to far greater knowledge, technology and opportunities—can achieve much more.

The future of engineering in Pakistan is bright. The country needs innovation, industrial growth and engineering leadership more than ever before. ■



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Machines to Artificial Intelligence: Amir Ul Islam Reflects on Four Decades of Change

The veteran engineer and entrepreneur discusses global experience, construction innovation, and why engineers remain central to Pakistan's future.

Engineering Review: Tell us about your engineering journey. What was your first encounter with engineering after graduation?

Amir Ul Islam: I graduated in Electronics Engineering from Dawood Engineering College. During my student years, I was involved in small construction-related projects, which sparked my interest in the built environment.

After graduation, I pursued a master's degree and later spent several years working in the United States. That experience was invaluable because it exposed me to international engineering practices, business culture, and professional standards.

In 1997, I had the opportunity to establish my own business, and I have been working independently ever since.

What fascinates me most is the pace of technological change. When we graduated in the mid-1980s, fax machines were still uncommon. Then they became indispensable and, eventually, obsolete. Our generation has witnessed an extraordinary journey—from landlines and fax machines to cloud computing and artificial intelligence.

ER: Have Pakistani engi-



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whose guidance and expertise were instrumental in achieving this milestone.

The implementation of NMB Splice Sleeve technology, combined with CSR's technical expertise, significantly accelerated project progress, enhanced overall quality, and delivered substantial time savings.

neers kept pace with these changes?

AI: Absolutely. Pakistani engineers are exceptionally talented and remarkably well-informed. In many instances, I find engineers in Pakistan to be more up to date on technical developments than professionals I meet abroad.

The real challenge is not technical knowledge—it's implementation.

The engineer in the office may be using the latest software and international standards, but construction practices on the ground often resemble those of the 1980s and 1990s. That gap between knowledge and execution is something we need to address.

This is one of the reasons we established Construction Solution Resources. Our objective was to introduce modern construction

ER: How would you assess Pakistan's engineering industry today?

AI: One of the biggest challenges is that engineers are not compensated according to the value they create.

Whenever a project encounters difficulties, everyone turns to the engineer for solutions. Yet, when compensation is discussed, engineers are often among the least rewarded stakeholders.

If we want better infrastructure, higher-quality construction, and more young people entering the profession, engineering must become economically attractive once again. Otherwise, we risk facing a shortage of top talent over the next two or three decades.

ER: Finally, what role should engineering media play?

AI: Engineering journal-

For fifty years, Engineering Review has played an important role in connecting engineers, industry leaders, and academia. Publications like this promote professional growth, encourage innovation, and strengthen the engineering community.

technologies that are already widely used internationally. It was never purely a commercial venture; it was also our way of contributing to Pakistan's development.

ER: How do you see artificial intelligence affecting the engineering profession?

AI: AI will undoubtedly redefine engineering.

Ten or fifteen years from now, engineers will not be performing the same routine tasks they do today. Many repetitive activities will be automated, allowing engineers to focus on higher-value responsibilities.

However, I do not believe AI will reduce the need for engineers. Instead, it will change the skill sets required. Future engineers will spend less time performing calculations and more time solving complex infrastructure, environmental, and societal challenges.

Engineering will become more strategic, not less important.

ism is extremely important. Media shapes awareness and influences how people think.

When engineers read about new technologies, successful projects, or innovative ideas, those insights leave a lasting impact. Progress rarely happens overnight, but continuous exposure to knowledge gradually transforms industries.

For fifty years, Engineering Review has played an important role in connecting engineers, industry leaders, and academia. Publications like this promote professional growth, encourage innovation, and strengthen the engineering community.

Pakistan has no shortage of engineering talent. Our challenge is to modernize implementation, value engineering expertise appropriately, and create an ecosystem where innovation can thrive.

If we can do that, I believe the future of engineering in Pakistan is exceptionally bright. ■

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Mechanical Grout Splice Sleeves and precast technology, to ensure rapid and

cast transoms were cast separately to accelerate installation. Once cured, the transoms

The original grout-filled mechanical connector approved world wide. More than 45 million sleeves used world wide for over 47 years. This patented system is a mechanical coupler for splicing reinforcing bars which uses in a cylindrical ductile iron casting filled with a Portland cement based non-shrink high early strength grout for precast and cast-in-place concrete construction. Super UX/ NXII can be used in a wide range of construction for structural and civil engineering applications. It is mainly used in precast members as a structural connection as well as in area such as columns and beams requiring higher strength rebar splices.

Model	Certifications	Model Name
UX (SA)	ICC ES Type 1/ 2/ 2HS (USA) Class A / Class A (Japan) ASTM A706 Category A / B (Holland)	DIG D41
NX II	Class A (Japan)	1111 - 1751

- Railways
- Power Plants
- Towers & Buildings
- Hospitals
- Industrial Facilities

Project Highlights

Rafi Cricket Stadium, Bahria Town, Karachi
Owner: Bahria Foundation
Client: Paragon Constructors (Pvt.) Ltd.
Consultant: Mushtaq & Bilal – Consulting Engineers

The use of NMB Splice Sleeves in the construction of columns at Rafi Cricket Stadium significantly accelerated and simplified the construction process. This approach resulted in substantial time savings, improved labor efficiency, and the successful integration of advanced construction technology.

The system required no specialized labor training and effectively reinforced column connections without the need for excessive rebar overlaps. The technology was applied in the superstructure columns of the stadium, with individual precast elements weighing between 10 and 40 tons. A large volume of precast components was produced on-site, enabling efficient execution. The project was successfully completed within the allocated time-frame and budget.

To validate the performance of the NMB Splice Sleeve System, strength testing was conducted at NED University. Test results showed that one reinforcing bar ruptured at 568 kN, while the second slipped within the sleeve at 566 kN. In both cases, the system exceeded the strength requirements of a monolithic cast-in-place connection, confirming its superior structural performance.

Malir Expressway, Karachi
Equity Type: Public-Private Partnership (PPP)
Client: J&N Contractors Ltd.

Consultants: Exponent Engineers, ECIL, Loya Associates, AA Associates
The Malir Expressway is poised to become the largest Public-Private Partnership infrastructure project in Sindh. Spanning 39.3 kilometers, the four-lane dualized expressway will reduce travel time to approximately 25 minutes,

Advanced construction methodologies were employed, including

efficient execution. Concrete-in-Place (CIP) piers were constructed, while pre-

soms were lifted and positioned onto the piers using cranes, ensuring speed, safe-

ty, and minimal disruption.

The precast transom at Quaidabad Ramp Grid-6 was launched under CSR's supervision. Weighing approximately 70 tons, the transom incorporated 32-mm-diameter protruding dowels (220 mm long). Each pier shaft was cast with 26 units of 10UX NMB sleeves, later grouted with high-strength SS mortar to achieve the required performance. The entire launching operation was completed in approximately 30 minutes. From a financial perspective, the project achieved substantial cost efficiencies, with estimated daily savings of PKR 15,342,466. Over a period of 289 days, this translated into total savings of approximately PKR 4.43 billion. ■



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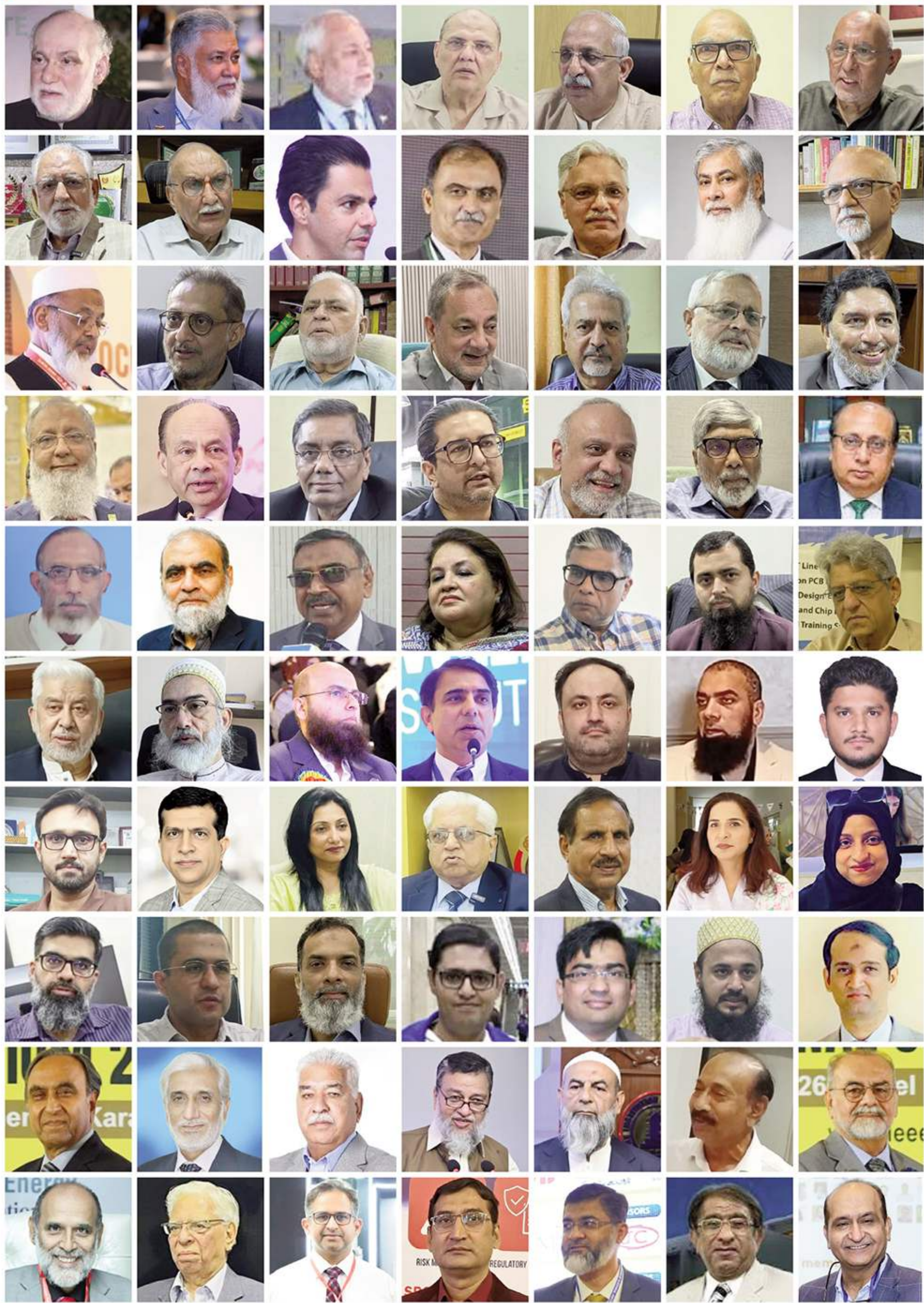
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Pakistan's Engineering Luminaries



Engineering Review:
Every engineering graduate dreams of making an impact. Tell us about your early ambitions and how your professional journey began.

Engr. Saleem Ullah Saeed: I graduated in Chemical Engineering from the University of the Punjab in 1990, when opportunities for engineers were abundant. Even before my final results, I had been interviewed by Descon Engineering and was offered a position. On the day I collected my degree, I joined the company.

My father was also a chemical engineer, so engineering was already familiar to me. I started in Descon's Water and Wastewater Treatment Division as a trainee engineer, working in design engineering. I was fortunate to have mentors who encouraged continuous learning. Computers were just entering workplaces, and we were advised to learn DOS and basic computing alongside our engineering work. Those early years gave me a solid technical foundation.

ER: How did your career evolve after those initial years?

SS: After about two and a half years in design, I wanted field exposure, so I

joined the Kohinoor Edible Oil Refinery project at Jahanian, one of Asia's largest edible oil refinery projects at the time. Later, I returned to Descon, where I combined design with project execution.

Management then encouraged me to move into technical marketing. Initially, I resisted because I saw myself purely as an engineer. However, senior leaders explained that understanding customer needs was just as important as technical expertise. That decision broadened my career, giving me experience in engineering, project management, technical sales, and international business development.

ER: Was there a project that became a turning point in your career?



From Chemical Engineer to Industry Pioneer:

Engr. Saleem Ullah Saeed's 25-Year Journey in Water Treatment

Engr. Saleemullah Saeed reflects on his journey from a trainee engineer at Descon to founding a successful water treatment company, sharing lessons on innovation, entrepreneurship, and the evolving role of technology in engineering.

I became familiar with Engineering Review during my campaign for the Pakistan Engineering Council (PEC) elections. What impressed me most was its impartiality in covering engineers without discrimination. In the same spirit, Engineering Review consistently highlights engineering projects across the country and truly represents engineers of all ages and disciplines in Pakistan.

SS: Certainly. One of the biggest milestones was securing Descon's first

Reverse Osmosis (RO) project for Liberty Textile Mills. We competed against 37

international companies and won through technical excellence and careful planning.

cializing in water and wastewater treatment technologies. Over the past 25 years, we

have introduced advanced technologies while contributing to local manufacturing, skilled employment, and reducing Pakistan's dependence on imported treatment systems.

ER: Which achievements give you the greatest satisfaction?

SS: Winning our first major project was unforgettable. Over the years, we have worked with leading organizations including Engro, Coca-Cola, PepsiCo, Nishat Textiles, and Class Textile Mills.

One of our largest achievements was executing a major water and wastewater treatment project for a chemical complex near Karachi. The project was equivalent to our company's annual turnover at the time and demonstrated how far we had progressed as an engineering organization.

ER: You have witnessed engineering evolve from manual calculations to artificial intelligence. How do you see this transformation?

SS: Our generation has experienced every stage of technological change—from manual calculations and engineering software to the internet and now artificial intelligence. AI is a powerful

Contd on page 69

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THE INTERVIEW

Engineering Review: Imran Bhai, after graduating from NED University of Engineering & Technology, what was the engineering landscape like? Did you begin your career with a job, or did you immediately think about starting your own business? Looking back now as a seasoned engineer, what differences do you see between then and today?

Engr. Imran Zafar: That's a very important question. Today, we encourage young graduates to become entrepreneurs, and I think that's a positive trend. Many engineering students now aspire to start their own businesses immediately after graduation, and I fully support that mindset.

However, from a broader perspective, every country also needs large engineering organizations. If a nation wants to grow industrially, it must have strong engineering companies capable of conducting research, development, and innovation on a large scale.

When I graduated, Siemens Pakistan was one of those organizations. It was a true nursery for engineers, providing an environment where knowledge transfer and research took place at a very high level. We also had multinational manufacturers producing locally. Unfortunately, over the years many of these organizations have declined, and today much of the market has shifted toward trading rather than local manufacturing and R&D.

Small entrepreneurial companies certainly have an important role, but they generally don't have the resources to invest heavily in

research and development. If we want to compete globally, Pakistan needs to revive large-scale engineering, local manufacturing, and product development. AI and digital technologies are valuable, but they cannot replace core mechanical and electrical engineering. Without strengthening our manufacturing base, long-term industrial growth will remain difficult.

ER: Where did you begin your professional career after graduation?

IZ: My first job was with Siemens Pakistan. It was an incredible learning experience and truly shaped my career. One of the biggest opportunities I received was being deputed to Siemens AG, where I worked for about a year and a half.

That experience became a turning point in my professional life. I learned directly from experienced engineers in Germany and then returned to Pakistan to implement what I had learned. Unfortunately, young engineers today have far fewer opportunities to gain that kind of international industrial exposure because there are fewer large engineering organizations operating at that scale in Pakistan.

ER: When you joined the industry, what was engineering like on a day-to-day basis? Were computers already common, or was much of the work still manual?

IZ: I graduated in 2004, so computers and the internet were already available. However, one major difference I notice today is that while technology has made work much easier, it has also



Building Pakistan's Engineering Future Through Innovation and Entrepreneurship

From his early days at Siemens Pakistan to establishing Enercon as a regional engineering hub, Engr. Imran Zafar reflects on mentorship, industrial decline, entrepreneurship, and the need to revive Pakistan's manufacturing and R&D ecosystem.

reduced people's willingness to study in depth.

Earlier, engineers spent a great deal of

time reading manuals, technical books, and documentation. We would analyze information, compare different sources, and develop our understanding through

research. Today, people can simply type a question into an AI tool or search engine and receive an instant answer.

While this has certainly improved effi-

ciency, I believe it has also reduced the habit of investigation and deep learning.

One thing that has never changed, howev-

er, is the importance of good mentors. I was fortunate to work alongside experienced senior engineers at Siemens Pakistan who guided me during the early

years of my career. With the right mentorship, a fresh graduate can mature into a confident engineer within just one or two years.

are extremely proud of because it demon-

strates that Pakistan is not only importing technology—it is now exporting engineering capability as well. ■

and then consider starting your own venture.

ER: How did the company grow after you started?

IZ: We started with just one person—myself. We didn't even have a dedicated office and initially worked from home. Later, we moved into a shared office, and gradually expanded.

Today, Alhamdulillah, we have offices in both Karachi and Lahore, with a team of around 35 professionals. More importantly, we have developed Pakistan into an engineering hub for our regional operations.

Our regional headquarters is in Singapore, and from Pakistan we support projects across Malaysia, Indonesia, Bangladesh, the Philippines, Myanmar, Uzbekistan, the UAE, and Saudi Arabia.

One of our biggest achievements has been technology transfer. In the past, whenever specialized engineering support was needed, experts would come to Pakistan from Singapore or the Philippines. Today, our Pakistani engineers travel to Indonesia, Saudi Arabia, the UAE, and other countries to provide engineering expertise. That is something we

are extremely proud of because it demonstrates that Pakistan is not only importing technology—it is now exporting engineering capability as well. ■



"Engineering Review is an institution in itself. Many people learned from it and went on to establish their own publications, yet Engineering Review has remained steadfast and continued its tradition of principled journalism."



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Engineering Review: You have decades of experience in the engineering industry. Looking back, what dreams did you have when you completed your education, and how did your professional journey begin?

Shafique Ahmad: I completed my diploma in 1985 and began my career in the sales of low-voltage electrical equipment. At the same time, I gained valuable experience working on substation projects, including the installation of SF6 circuit breakers at facilities such as Guddu Power Plant.

During the late 1980s and early 1990s, I helped introduce premium HRC fuses from the Czech Republic to Pakistan. As the industry evolved, circuit breakers replaced traditional fuse systems, and I later launched Swiss electrical products in the local market. Those years enabled me to build relationships with customers across Pakistan that remain valuable to this day.

I later moved to England, where I had the opportunity to work in a highly competitive environment and demonstrate my techni-

cal capabilities. After returning to Pakistan, I focused on introducing advanced technologies to local industries.

Today, through Pyramid Automation, we provide automation systems, power quality solutions, generator synchronization and load-sharing systems, EV chargers, solar automation, and other power management technologies. We are also introducing Danish diesel filtration technology designed to improve fuel quality and reduce maintenance costs for industrial users.

Engineering Review: Most diploma holders pursue technical fieldwork, but you chose sales. What influ-



enced that decision? stand customer requirements, identify market needs, and build long-term professional relationships. Those experiences continue to help me as a business leader today.

Engineering Review: How did you continue developing yourself professionally?

Shafique Ahmad: I strongly believe that learning never stops. Throughout my career, I have tried to learn from anyone who possesses knowledge or experience that I do not have.

Equally important is recognizing and encouraging talented people. Organizations grow when they invest in their teams, promote a culture of learning,

and national progress.

Engineering Review: You began your career long before computers and artificial intelligence became common. How do you view the technological transformation over the years?

Shafique Ahmad: The engineering sector has undergone remarkable changes. In the 1980s, modern circuit breakers represented a major advancement in electrical safety. Later came PLCs, motor protection systems, industrial automation, and digital monitoring technologies, all of which significantly improved efficiency and reliability across industries.

Today, artificial intelligence represents the next major step. AI is a powerful tool that can assist engineers in analysis and decision-making, but it should never replace human judgment or practical experience.

Technology should enhance human expertise, not diminish it. The best outcomes are achieved when engineers combine experience, real-world knowledge, and modern digital tools to solve problems effectively. ■

Bringing Global Technologies to Pakistan: Shafique Ahmad's Engineering Story

The founder of Pyramid Automation reflects on his journey from low-voltage electrical sales to introducing advanced automation and power management solutions in Pakistan, while emphasizing lifelong learning and the responsible adoption of new technologies.

enced that decision?

Shafique Ahmad: It was

embraced it. In hindsight, it proved to be an excellent

to industries, customers, and business operations

and share knowledge openly. Supporting honest and

human judgment or practical experience.

Engineering Review has made an immense contribution to Pakistan's engineering community. It represents engineers from across the country, keeping us informed about who is doing what and where. It is equally important to carry forward the professionalism and values established by the magazine's founders, which have been the cornerstone of its credibility and success.

simply the opportunity available at the time, and I

decision. Sales gave me exposure

throughout the country. It taught me how to under-

hardworking individuals is essential for both personal

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In the aftermath of the Middle East war, Pakistan's fault lines and weaknesses regarding self-sufficiency have become evident. What would you suggest to policymakers about which sectors of the economy especially engineering sectors should be revitalized?

Recent geopolitical disruptions prove that true sovereignty requires supply chain resilience, as Pakistan's heavy reliance on imports leaves our industrial sectors highly vulnerable. To fix these critical weaknesses, policymakers must urgently prioritize three core engineering areas through structural reforms.

First, we must revitalize local chemical synthesis. As we are in construction chemical business, I observed that we are heavily depend on imported raw materials like monomers and polymers. We need comprehensive national incentives to synthesize these basic chemical building blocks domestically.

Second, we must emphasize import-substitution engineering. The country needs to shift away from simple assembly and transition into heavy manufacturing. The government can support this by offering substantial tax holidays and utility subsidies for the local production of industrial machinery and high-precision tools.

Lastly, we need to build strong foundations in renewable energy. Skyrocketing energy costs continue to cripple local industries, making it vital to scale up the local manufacturing of solar equipment and industrial-scale energy storage systems to guarantee long-term survival.

Where did you receive

and what changes do you observe in modern engineering and industrial practices in Pakistan today?

When I first entered the workforce, the industrial landscape was highly traditional and conservative. It relied heavily on legacy systems, manual unit operations, and maintained a steep, costly dependence on foreign technical consultants for basic troubleshooting and system optimizations.

Today, however, a major modernization shift is actively underway across

Revitalizing Pakistan's Engineering Sector: Engr. Muhammad Abraiz Najam Calls for Local Manufacturing and Renewable Energy

Pakistan's industrial sector. For instance, industries are modernizing operations by adopting SCADA systems and real-time data analytics for smarter, data-driven automation.

Furthermore, there is a distinct and highly conscious shift toward industrial sustainability. At Ultra Construction Chemicals, we actively focus on formulating eco-friendly, energy-efficient solutions because modern leadership recognizes that green chemistry is vital for global competitiveness.

Finally, we are witnessing an inspiring rise in local technical ownership. Young Pakistani engineers are no longer content just being passive operators of imported machinery; they are actively reverse-engineering, modifying, and designing local solutions tailored to our specific economic realities.

What would you suggest to bring industry and academia closer together, and do you think the present model of collaboration is producing meaningful results?

The current model of

versity campuses. This allows postgraduate researchers to work alongside industry professionals to

develop commercializable patents.

Lastly, we need to completely redefine academic

faculty Key Performance Indicators (KPIs). University professors should be evaluated and incentivized based on the practical industrial problems they successfully solve or the patents they commercialize, rather than purely on the number of theoretical papers they publish.

What is your opinion about the role of Engineering Review in highlighting and disseminating issues related to Pakistan's engineering sector?

Engineering Review

provides essential and highly objective technical discourse for the industrial fraternity.

Engineering Review does far more than just report—it actively advocates. For business leaders and technical professionals like us, it remains an essential guide for tracking industrial trends and ensuring that the engineering fraternity maintains a powerful, unified voice in shaping Pakistan's economic future.

Engr. Muhammad Abraiz Najam is a chemical Engineer from NUST. He is working as a Director, at Ultra Construction Chemicals (Pvt.) Ltd. His dream is to bring his company to optimal excellence. ■

By amplifying the voices of engineers, industry leaders, and policymakers, Engineering Review plays a crucial role in shaping a stronger and more competitive engineering ecosystem for the country.

your education, and what is the best memory you would like to share with our readers?

I graduated with a degree in chemical engineering from NUST University, Islamabad main campus.

My favorite memory is working late into the night with my peers on our intense final year design projects. Balancing highly complex chemical and thermodynamic simulations with the stunning backdrop of the Margalla Hills taught me a great deal. The inevitable humor shared when a group of stressed-out engineering students tries to solve a process bottleneck at 3 AM showed me that engineering is driven just as much by camaraderie and resilience under pressure as it is by formulas.

What kind of engineering and industrial environment did you encounter after completing your education,

industry-academia collaboration is largely superficial and fails to produce scalable, commercial results. The relationship remains restricted to brief student internships and theoretical final-year projects that sit on library shelves gathering dust while academia focuses on publication counts and the industry focuses on day-to-day survival.

To bridge this gap structurally, I suggest shifting toward problem-centric R&D funding. Private industries should present actual shop-floor formulation bottlenecks and operational challenges to university labs, ensuring that public and private research grants are strictly tied to solving practical issues.

Additionally, we must establish commercial joint ventures by setting up private-enterprise-funded laboratories directly inside uni-

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THE INTERVIEW

Engineering Review: As part of Engineering Review's 50th anniversary celebrations, we are speaking with distinguished engineers who have helped shape Pakistan's industrial landscape. When you completed your education and entered professional life, what dreams did you have? How did your career begin, and what has your journey to PEL been like?

Azeem Talib: Like many fresh graduates, I had ambitions and aspirations for my future, but one thing was always clear in my mind—I wanted to build my career in Pakistan. It wasn't because opportunities abroad were unavailable. In fact, after graduating in Electrical Engineering with a specialization in Power from UET Lahore in 2004, many of my classmates pursued careers in Australia, Europe, North America, and the Middle East, where engineers were highly sought after.

For me, however, success was never defined solely by geography or financial rewards. I wanted to contribute to my own country and remain close to my family, particularly my parents. I believed that Pakistan offered tremendous opportunities for engineers willing to work hard, learn continuously, and contribute meaningfully to industry.

When I began evaluating potential employers, I wasn't looking for the highest salary or the fastest path to relocation. I wanted to join an organization that would expose me to the complete engineering ecosystem—research and development, manufacturing, quality assurance, customer engagement, and after-sales support. PEL stood out because it offered exactly that. It was one of the few organizations where the entire value chain existed under one roof.

Looking back after more than two decades, I can confidently say it was one of the best decisions of my professional life. PEL didn't simply provide me with a job; it provided me with a platform to grow, learn, and evolve both professionally and personally.

ER: What were your early years at PEL like, and how did your career develop over time?

AT: I joined PEL in Technical Services, which proved to be an ideal starting point. The role required close interaction with customers and coordination with multiple departments to resolve technical issues and deliver practical solutions. It gave me a comprehensive understanding of our products and exposed me to the realities of industrial operations.

One of the most valuable lessons I learned early in my career was that engineering cannot be fully understood from behind a desk. I spent considerable time on the factory floor, observing manufacturing processes, working alongside technicians, and understanding how products were assembled. Those experiences taught me humility and helped me appreciate the skills and dedication of the people who bring engineering designs to life.

I firmly believe that every young engineer should spend time in the field and on the shop floor. Technical knowledge acquired in university is essential, but practical experience transforms that knowledge into wisdom. It allows engineers to understand the challenges of implementation and develop solutions that are practical, efficient, and sustainable.

At the same time, I remained committed to continuous learning. I completed my Master's degree in Electrical Engineering



Engineering, Ethics, and Innovation: Azeem Talib on Building a Career and Contributing to Pakistan's Industrial Future

Drawing on more than two decades at PEL, Azeem Talib reflects on his journey from a young electrical engineer to a seasoned industry leader, sharing insights on ethics, lifelong learning, digital transformation, and the role of engineering in Pakistan's progress.

from UET Lahore and later pursued an MBA to strengthen my understanding of business strategy, leadership, and organizational management.

In addition, I became actively involved in ISO auditing, environmental management systems, occupational health and safety,

and quality management practices. Earning internationally recognized certifications broadened my perspective and enabled me to contribute across multiple functions within the organization.

Over the years, these experiences helped me understand an important truth: engineering is not just about technology. It is equally about people, processes, quality, and leadership.



ER: You must have received opportunities from other organizations during

your career. Why did you choose to remain with PEL?

AT: Like many professionals, I received opportunities throughout my career. However, what kept me at PEL was not merely professional growth—it was the organization's culture.

Culture is often underestimated, but it ultimately determines whether people remain committed to an organization over the long term. At PEL, I have consistently witnessed leadership emphasizing quality, ethics, and integrity over short-term gains. In my entire professional journey, I

have never seen our management compromise on quality simply to improve margins or achieve temporary business objectives. That commitment has had a profound impact on me because it aligns closely with my own values.

I have always believed that trust is an organization's greatest asset. Products can be replicated, technologies can evolve, and markets can change, but reputation takes decades to build and only moments to lose. PEL's focus on transparency, professionalism, and continuous improvement created an environment where people are encouraged to learn, innovate, and contribute. When employees feel valued and aligned with an organization's mission, they naturally become more committed to its success.

For me, remaining at PEL was never about staying within my comfort zone. It was about being part of an institution whose values I genuinely believed in.

ER: You began your career in 2004, when technology was very different. How do you view the transformation from those days to today's AI-driven world?

AT: The transformation has been extraordinary. When I joined PEL in 2004, technology played a relatively limited role in day-to-day operations. Computers were primarily used for documentation, email communication was still evolving, and

internet connectivity was far from what it is today.

Many business processes were manual, requiring significant time and effort. Decisions often depended on historical reports and human interpretation, which naturally slowed responsiveness.

Today, we operate in an entirely different environment. PEL has undergone a significant digital transformation. Our backend operations are powered by Oracle ERP, while Salesforce supports our customer-facing activities. These platforms have enabled us to improve efficiency, transparency, and accountability across the organization.

The integration of digital systems has fundamentally changed how businesses operate. Information that once required days to compile is now available in real time. Managers can make informed decisions faster, while employees have greater visibility into processes and performance metrics.

Artificial intelligence represents the next chapter in this evolution.

At PEL, we view AI not as a threat, but as an enabler. AI is helping organizations analyze large volumes of operational, financial, and customer data with unprecedented speed and accuracy. Tasks that once consumed several days can now be completed within minutes.

We actively encourage our employees to adopt AI responsibly and provide them with opportunities

to develop relevant skills. Ultimately, technology should empower people, not replace them.

The pandemic accelerated digital adoption across industries, and AI is now accelerating the next phase of transformation. Engineers who embrace these technologies will continue to thrive, while those who resist change may find it increasingly difficult to remain competitive.

ER: What advice would you give to young engineers entering the profession today?

AT: My advice is simple: never stop learning.

Engineering is one of the few professions where continuous learning is not optional—it is essential. The technologies that define our industry today may become obsolete within a decade. Engineers must therefore remain curious, adaptable, and willing to acquire new skills throughout their careers.

I would also encourage young engineers to seek practical experience early. Spend time in factories, laboratories, construction sites, and production facilities. Understand how things work in the real world.

Equally important is integrity. Your technical competence may earn you opportunities, but your character will determine how far you ultimately go.

Finally, remember that engineering is a profession of service. Every system we design, every product we manufacture, and every innovation we introduce has the potential to improve people's lives. That responsibility should always guide our decisions.

Pakistan has immense talent and tremendous potential. I remain optimistic about our future because I continue to see young engineers bringing energy, creativity, and fresh ideas to the profession.

If we can combine strong technical education with ethics, innovation, and a commitment to excellence, there is no reason Pakistan cannot emerge as a leading engineering and manufacturing hub in the region.

That, ultimately, is the future I hope to see—and one I believe our engineers are fully capable of building. ■

PEL has enjoyed a longstanding association with Engineering Review. Through its platform, you have brought together professionals and organizations from across the engineering community, keeping us informed about industry developments and showcasing the capabilities that exist within Pakistan. We value this relationship and look forward to continuing our association with Engineering Review in the years ahead.



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For more than four decades, Khalid has witnessed the evolution of Pakistan's engineering sector—from an era when infrastructure development was still taking shape to a time when Pakistani firms are competing successfully in international markets. A graduate of NED University of Engineering & Technology, Khalid began his career as a junior engineer before pursuing higher education in the United States and returning to contribute to some of Pakistan's most significant transportation projects.

Over the years, he has helped transform a family engineering business into an internationally recognized consultancy specializing in pavement engineering and infrastructure management. With experience spanning more than 300 to 400 transportation projects—including airports, highways, and municipal road networks across Pakistan and the United Arab Emirates—his career offers valuable insights into technical excellence, strategic growth and the future of engineering.

In this conversation with Engineering Review, Khalid discusses his professional journey, the challenges of infrastructure development, and the lessons Pakistani engineering firms must embrace to succeed on the global stage.

THE INTERVIEW

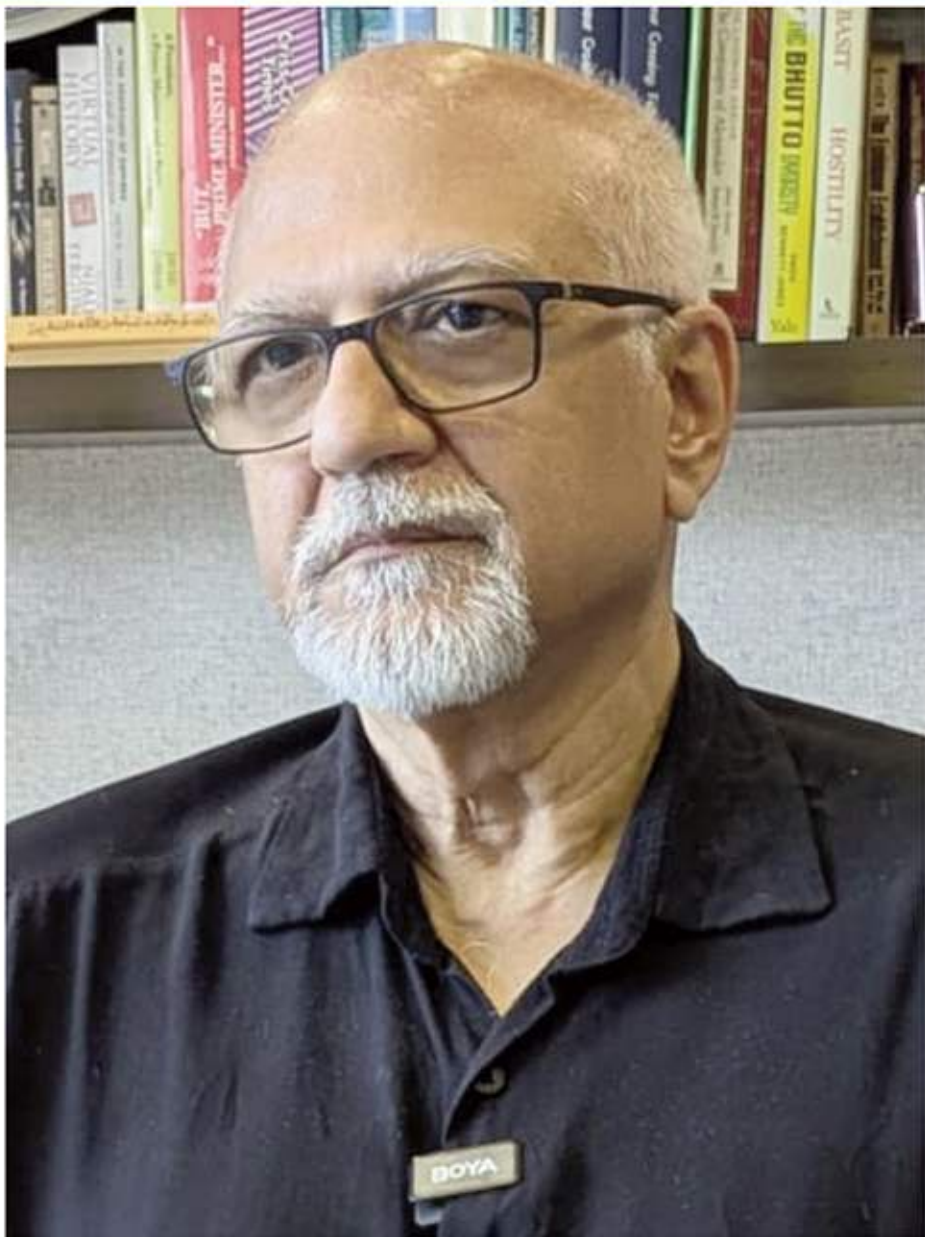
Engineering Review: Every engineering graduate enters professional life with big dreams. When you graduated from university and stepped into the real world, where did your journey begin, and what was the engineering landscape like at that time?

Engr. Khalid Mirza: I graduated from NED University of Engineering & Technology in August 1984 with a specialization in transportation engineering. My father encouraged me to begin my career with another company so I could gain independent professional experience. Although we explored that option, it did not work out, so I joined our family firm as a junior engineer. Working under experienced senior engineers gave me a strong foundation in practical engineering and project execution.

ER: What were the next steps in your professional development?

Engr. Khalid Mirza: After working for two years, I went to the United States to pursue my master's degree. I returned in 1988 with the goal of applying what I had learned to Pakistan's transportation infrastructure. One of my earliest assignments was evaluating the runways, taxiways, and apron pavements at Karachi Airport. It was a rewarding experience because the project received strong support from the Civil Aviation authorities and demonstrated that high-quality engineering solutions could be delivered locally.

ER: Looking back, what was the biggest challenge in implementing engineering solutions in Pakistan?



Engineering Beyond Borders: Engr. Khalid Mirza on Infrastructure, Innovation, and Global Growth

Transportation engineer Khalid Mirza reflects on his journey from NED University to leading thousands of infrastructure projects across Pakistan and the Middle East, sharing lessons on pavement engineering, international expansion, and the importance of quality, perseverance, and long-term thinking.

Engr. Khalid Mirza: The challenge was not technical capability—it was long-

remain in service for decades beyond their original design life, but this requires

projects, ranging from short-term technical studies to major infrastructure developments. One of our landmark projects was the Islamabad–Peshawar Motorway, where we were involved from concept development through implementation. Projects of this scale often take many years to complete, while others may last only a few months. Every project, regardless of size, requires the same commitment to quality and professional delivery.

ER: What has been the key to your company's long-term success?

Engr. Khalid Mirza: I believe success comes from consistently delivering quality work that meets the objectives of clients and funding agencies. Every engineering firm has talented professionals; what distinguishes an organization is its ability to work collectively, maintain technical excellence, and deliver projects efficiently. Strong execution and client satisfaction are the foundations of a lasting reputation.

term maintenance and timely implementation. Pavement engineering requires continuous monitoring and preventive main-

a scientific, long-term maintenance strategy rather than waiting for complete reconstruction.

meets the objectives of clients and funding agencies. Every engineering firm has talented professionals; what distinguishes an organization is its ability to work collectively, maintain technical excellence, and deliver projects efficiently. Strong execution and client satisfaction are the foundations of a lasting reputation.

"The partnership between Engineering Review and ECIL goes back many years. Engineering Review is a valuable asset, and its videos effectively cover every aspect of the engineering sector."

tenance. Delaying maintenance significantly increases rehabilitation costs. International studies have shown that properly maintained pavements can

ER: Did these challenges motivate you to explore international opportunities?

Engr. Khalid Mirza: Yes. Around

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THE INTERVIEW

Engineering Review: Every successful engineering career begins with a first step. When you graduated and entered the professional world, what kind of opportunities did you find, and how did your journey begin?

Mohammad Rashid: Like every fresh graduate, I entered the profession with enthusiasm and a desire to learn. Engineering is a field where classroom knowledge is only the starting point; real learning begins when you step into industry.

I started my professional career in 2006 with Adamjee Diesel Engineering, a company of the Adamjee Group that served Pakistan's power generation sector. It was an excellent place to begin because I was exposed to generator systems, customer requirements, field operations, and the practical challenges of delivering reliable power solutions.

Those early years taught me that technical knowledge alone is not enough. Success in engineering also requires discipline, teamwork, communication skills, and the ability to solve problems under pressure. Every project presented a new challenge, and every challenge became an opportunity to learn.

Over the years, I worked with several respected organizations, including Greaves

Pakistan, then the distributor of Cummins products, Orient Energy, and later Albariyo Engineering, where I established and developed the company's generator division from the ground up.

Each organization contributed something unique to my professional development. Looking back today, I realize that every stage of my career prepared me for entrepreneurship.

ER: At what point did you decide that it was time to establish your own company?

Mohammad Rashid: Entrepreneurship was never an overnight decision. It was the result of years of experience, observation, and confidence built through working on diverse projects.

After nearly sixteen years in the industry, my partners and I believed we had acquired enough technical expertise and market understanding to build something of our own. In 2016, we established Premier Engineering as a partnership firm.

One of the strengths of our company is that each partner brings different expertise. I manage commercial operations and business development, while my partners lead the electrical and mechanical engineering functions.

This division of responsibilities enables us to provide comprehensive engineering solutions rather than isolated services.

Today, Premier Engineering offers integrated solutions covering diesel generators, solar energy systems, battery energy storage systems (BESS), electrical testing and commissioning, switchgear solutions, electromechanical contracting, and engineering services for power plants and Independent Power Producers (IPPs).

Our objective has always been simple: provide reliable engineering solutions while building long-term relationships based on trust, quality, and professional integrity.

ER: Every entrepreneurial journey



Building an Engineering Business from the Ground Up: Mohammad Rashid's Journey of Innovation and Entrepreneurship

From beginning his career in Pakistan's power generation industry to co-founding Premier Engineering, Mohammad Rashid reflects on entrepreneurship, landmark projects, the rapid evolution of energy technologies, and the opportunities awaiting the next generation of engineers.

comes with obstacles. What were the biggest challenges during the early years of Premier Engineering?

Mohammad Rashid: The biggest challenge was undoubtedly financial.

Starting an engineering company requires significant investment in equipment, skilled manpower, testing instruments, logistics, and working capital. Like many entrepreneurs in Pakistan, we started with limited resources.

Another challenge was building credibility. Customers naturally prefer companies with an established reputation. As a new business, we had to convince clients that although the company was new, the people behind it had many years of professional experience.

Instead of making unrealistic promises, we focused on delivering quality work consistently. Every successful project became a reference for the next one.

We also invested heavily in technical

common with multinational companies, there was no advance payment, so we had to carefully manage our cash flow while ensuring timely procurement and installation.

Our engineers worked day and night, often remaining on-site until late hours to meet deadlines. Successfully completing that project significantly enhanced our credibility in the market.

Another memorable project was in Thar, where we worked alongside a Chinese EPC contractor for a Kuwaiti client.

The assignment involved load testing two 1,600-kilowatt generators in a remote desert location. We mobilized high-capacity load banks, transformers, protection relays, specialized cabling, and technical teams under challenging environmental conditions.

Executing such a project required careful planning because any mistake

and face-to-face meetings. Finding suppliers or potential clients often required extensive travel and networking.

Today, digital technology has transformed every aspect of engineering.

Information that once required days of research is now available instantly. Engineers can access technical documentation, participate in online training, collaborate with international experts, and troubleshoot systems remotely.

Within the power generation industry, modern diesel generators now feature advanced electronic control systems, digital diagnostics, predictive maintenance capabilities, and sophisticated monitoring software.

The renewable energy sector has advanced even faster.

Solar photovoltaic technology, battery energy storage systems, Battery Management Systems (BMS), Internet of Things (IoT)-enabled monitoring, and cloud-based energy management platforms have fundamentally changed how power systems are designed and operated.

Artificial intelligence is now beginning to optimize maintenance schedules, improve energy efficiency, predict equipment failures, and support engineering decision-making.

These technologies are not replacing engineers—they are making engineers more productive and enabling better

decision-

making.

ER:

How do you see the future of Pakistan's engineering and energy sectors?

Mohammad Rashid:

I remain optimistic.

Pakistan's demand for reliable electricity continues to grow, while renewable energy is expanding rapidly. Solar energy, battery storage, hybrid systems, and smart grids will become increasingly important in the coming years.

This transition creates enormous opportunities for Pakistani engineers.

However, technology alone is not enough. We also need stronger local engineering capabilities, skilled technical manpower, better vocational training, and greater collaboration between universities and industry.

If we invest in research, innovation, and practical engineering education, Pakistan has the potential to become a regional provider of engineering services rather than simply a consumer of imported technologies.

ER: Finally, what message would you like to share with young engineers who hope to build successful careers?

Mohammad Rashid: My advice is simple.

Never stop learning.

Engineering changes rapidly, and continuous learning is essential. Don't

focus only on earning a salary—focus on developing your skills, solving problems, and understanding your customers' needs.

Don't be discouraged by difficult beginnings. Every experienced engineer started as a beginner.

Be honest, maintain professional integrity, respect your commitments, and always prioritize quality and safety. A good reputation takes years to build but only moments to lose.

Most importantly, don't be afraid of entrepreneurship. If you prepare yourself properly, gain practical experience, and remain committed to excellence, you can build something that creates opportunities not only for yourself but also for many others. ■

Our association with Engineering Review may not be very old, but after exploring the platform, we realized the significant value it offers in terms of visibility and outreach. Our own visibility has improved considerably, and it has positively enhanced the perception of our organization within the engineering and industrial community.

capability and after-sales support because engineering is not just about supplying equipment; it is about ensuring reliability throughout the product's life cycle.

Those early years demanded patience, long working hours, and careful financial management, but they also built the foundation of the company we have today.

ER: Could you share some projects that remain especially memorable?

Mohammad Rashid: Every project teaches something new, but a few stand out because of their complexity.

One of our earliest landmark projects was for the PepsiCo International head office in Lahore.

It was a challenging assignment with a very tight completion schedule. As is

could have serious technical and safety implications. Alhamdulillah, the testing was completed safely and successfully.

Projects like these remind us that engineering is about much more than equipment. It is about planning, teamwork, precision, and the confidence to solve problems under demanding conditions.

ER: Since you entered the profession, engineering has undergone tremendous technological change. How do you compare today's industry with what you experienced nearly two decades ago?

Mohammad Rashid: The difference is remarkable.

When I started my career, engineers relied heavily on printed manuals, physical catalogues, telephone directories,

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THE INTERVIEW

Engr. Tanveer Ahmed Jafri reflects on a distinguished international career spanning energy systems, automotive engineering, and industrial leadership, while sharing his thoughts on artificial intelligence, innovation, and the future of engineering education.

ER: Engr. Tanveer Ahmed Jafri, when you completed your engineering studies and entered the professional field, what kind of engineering work did you encounter? Please share some memories from that time. Where did you start your career, and what was the engineering environment like?

Engr. Tanveer Ahmed Jafri:

My education was in the United States. After completing my bachelor's degree, I had several options—I could pursue hard-core engineering in materials, thermal systems, manufacturing, or energy. I chose the field of energy, which at that time was closely linked with architectural engineering.

I completed my master's degree in Architectural Engineering with a specialization in energy systems. As a graduate student, I was already teaching energy efficiency, solar energy, wind energy, and building energy modeling. In those days, certified energy managers were not common, but we were teaching these concepts academically.

ER: What happened after your master's degree?

Engr. Tanveer Ahmed Jafri: When I graduated, there were very few jobs specifically in the energy field. Many of my classmates received attractive job offers, but my focus remained on energy.

My first offer was from a nuclear facility in the United States. My research on cold air distribution systems was directly applicable there. However, I decided not to join because working on that facility would have tied me permanently to that project, and I wanted to keep the option of returning to Pakistan open.

My second offer came from Cummins Engine Company. Initially, there was some confusion about why I had been hired, but eventually I joined as a Product Design Lead.

ER: How did your role evolve at Cummins?

Engr. Tanveer Ahmed Jafri: While many of my peers remained focused on computer-based design work, I moved into projects and program management. That gave me much broader exposure.

Later, I joined General Motors, where I worked on the premium V8 platform for Cadillac. During a restructuring, I became Program Manager for the Cadillac CTS.

I worked on chassis integration, vehicle programs, and several advanced projects, including the Ford GT anniversary program. One of our biggest achievements was reducing the vehicle development cycle from 38 months to 18 months by using real-time collaborative engineering tools.

ER: You also worked on hybrid technology, correct?

Engr. Tanveer Ahmed Jafri: Yes. In 2004, I became Director of Mechanical Systems for a company developing hybrid trucks and hybrid taxi platforms, including delivery vehicles similar to FedEx fleets.



Engineering, Innovation and the Future of Technology

Engr. Tanveer Ahmed Jafri reflects on a distinguished international career spanning energy systems, automotive engineering, and industrial leadership, while sharing his thoughts on artificial intelligence, innovation, and the future of engineering education.

Those projects were later acquired by Ford.

ER: Today everyone is talking about AI and IT. Do you think traditional engineering is being overlooked?

changing rapidly, but in many cases we are teaching history instead of teaching the future. By the time some students graduate, a significant portion of their technical



Engr. Tanveer Ahmed Jafri: Absolutely. People often forget that behind every AI application there is hard-core engineering. Someone has to build the power plants that generate electricity. Someone has to design factories, robots, mechanical systems, and

knowledge is already outdated.

ER: So what should universities do differently?

Engr. Tanveer Ahmed Jafri: We must challenge students to create something new. Every industry has problems that

them unless engineers understand the fundamentals.

We need stronger practical training, better industry collaboration, and a culture of innovation.

ER: You mentioned that your university had strong industry links. How did that help you?

Engr. Tanveer Ahmed Jafri: American universities maintain very close relationships with industry and government.

As an undergraduate, I worked on research involving diesel engines and catalytic converters. Industry funded the project.

During my master's program, my advisor, Professor Harminder Singh, told me, "Find a problem, secure funding, and solve it yourself."

I approached Honeywell with a project on cold air distribution systems. We developed benchmarking methods for high-efficiency air filtration, including standards related to 2.5-micron particle filtration. Honeywell funded that research.

ER: What was the most important lesson from your early career?

Engr. Tanveer Ahmed Jafri: One lesson came from a colleague who told me, "One 'No' is better than a thousand 'Yeses.'" Another came from a GM manager who said, "Work expands to fill the time you give it."

I learned to use time efficiently instead of simply working longer hours.

ER: After such a successful international career, why did you return to Pakistan?

Engr. Tanveer Ahmed Jafri: Life has its own plans. I was actually planning to move to another city, but circumstances brought me back. During the COVID period, I served as CEO of Jamshoro Thermal Power Plant.

After my father's passing, I chose to join our family company.

For me, the most important thing is self-satisfaction. Money cannot give you peaceful sleep. If you are satisfied that you have done meaningful work, that is real success.

ER: How is consulting different from working in industry?

Engr. Tanveer Ahmed Jafri:

Consulting is about sharing knowledge.

Even during my industry career, I always tried to think beyond the immediate task. For example, I designed an engine oil cooler that was later patented. I often approached problems from unconventional angles.

Today, when clients ask questions, I give them complete answers. Some colleagues say I reveal too much, but my belief is that if someone seeks knowledge, I should share it fully.

Knowledge is a trust from God. A consultant's real role is to spread that knowledge, help solve problems, and contribute to progress.

ER: Finally, what advice would you give young engineers?

Engr. Tanveer Ahmed Jafri:

Do not chase money alone. Chase knowledge, innovation, and meaningful achievements.

Learn continuously, share what you know, and focus on solving real problems. That is what makes an engineer truly valuable. ■

"Our association with Engineering Review dates back to the time of its founders. The publication should continue embracing emerging technologies and evolve with the changing times."

electronic hardware.

Nothing is fully robotic by itself. Even a robot requires concepts, drawings, calculations, materials, manufacturing processes, and engineering design.

What worries me is that many universities are moving too slowly. Engineering is

need solutions. Universities should encourage students to identify those problems and solve them.

For example, why are many public spaces acoustically poor? Why is lighting often badly designed? These are engineering problems. AI alone will not solve

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years of success.

"The ideal engineer is a composite ... He is not a scientist, he is not a mathematician, 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."

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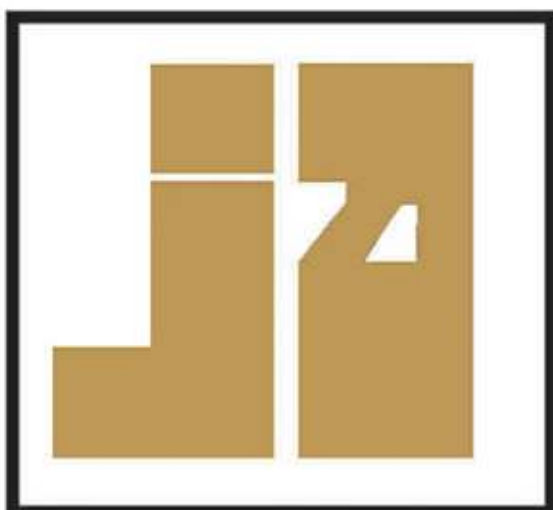
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THE INTERVIEW

Engineering Review: Like many engineering graduates, you must have had ambitious plans when you completed your education. What were your aspirations, and how did your professional journey begin?

Noman Sajid: My academic background is in Software Engineering. After graduating, I joined my father in the family business. From the very beginning, my focus was on learning, and in many ways, I still consider myself a student. I have now been associated with the industry for nearly 16 to 17 years.

My dream was always to contribute to Pakistan by introducing modern technologies to the local market. We wanted to bring products and solutions that were already being used internationally but were not yet available in Pakistan. Innovation and technology adoption have remained at the core of our business philosophy.

Engineering Review: Joining a family business comes with both opportunities and expectations. How did you navigate those challenges?

Noman Sajid: Every business comes with its own challenges, and honestly, that is what makes the journey interesting. Problem-solving is part of entrepreneurship.

The biggest advantage I had was my father's experience and reputation. He spent more than 25 years serving this industry and built tremendous goodwill in the market. His guidance provided a strong foundation for us to build upon.

At the same time, there is always an expectation to maintain and enhance that legacy. We have worked hard to earn the trust of our clients by consistently delivering quality projects. I consider myself fortunate to have inherited not just a business, but a culture of professionalism and commitment.

Engineering Review: You entered the industry nearly two decades ago. How different is today's engineering environment compared to when you started?

Noman Sajid: The difference is extraordinary. When I entered the profession, technology was far less advanced. Artificial intelligence, in particular, has only become mainstream over the last few years, yet its impact has been transformative.

Advancements in software, project management tools, and digital technologies have significantly improved efficiency. Projects that once required two years to complete can now often be delivered within a year because of better planning, improved fabrication techniques, and stronger coordination among teams.

The engineering workforce has also become increasingly professional. Today's engineers have access to tools and information that previous generations could only imagine.

Engineering Review: What role do you see artificial intelligence playing in engineering?

Noman Sajid: AI has become an extremely valuable support tool. It enables engineers to work faster, manage information more effectively, and improve decision-making.

Tasks that once took several weeks can now be completed in a matter of days. Documentation, reporting, scheduling, and even preliminary engineering analysis can all benefit from AI-assisted workflows.

However, I do not believe AI will replace engineers. Instead, it will empower them. Engineering still requires judgment, experience, and accountability. AI should be



Building on Legacy: Noman Sajid on Engineering, Innovation, and the Future of HVAC

The Director of Venture Engineering reflects on his journey from software engineering to leading one of Pakistan's growing HVAC and turnkey project companies, while sharing his views on artificial intelligence, energy efficiency, and the opportunities emerging from a rapidly changing world.

viewed as a tool that enhances productivity rather than a substitute for human expertise.

Engineers who learn to use AI effectively will have a significant advantage in the years ahead.

Engineering Review: While technology

future. Pakistan cannot remain dependent on imports indefinitely. We need to strengthen our industrial base and encourage local production.

Engineering Review: Climate change has also increased demand for

Our association with Engineering Review spans more than a decade. Through the magazine, we have found its content to be both informative and valuable, keeping us updated on industry developments and the people shaping Pakistan's engineering landscape.

is reshaping engineering, global events are also influencing the industry's future. What lessons should Pakistan learn from recent geopolitical developments?

Noman Sajid: The recent tensions in the Middle East highlighted the importance of supply chain resilience and local manufacturing. Pakistan remains a developing economy, which means there is still enormous potential for growth across all engineering sectors.

One of the biggest challenges has been rising import costs. Shipping expenses have increased significantly over the past few years, directly affecting the prices of engineering products, including solar equipment and air-conditioning systems.

At the same time, these challenges present opportunities. Companies investing in local manufacturing and engineering capabilities today will be better positioned in the

cooling technologies. How do you view the future of the HVAC industry?

Noman Sajid: The future is extremely promising. The HVAC sector has experienced steady growth year after year, driven by urbanization, rising temperatures, and increased construction activity.

Pakistan continues to add hundreds of new buildings annually that require modern air-conditioning systems. This creates opportunities not only for contractors and suppliers but also for consultants, engineers, and project managers.

I believe this growth will continue for many years. As our cities expand and climate challenges intensify, efficient cooling solutions will become increasingly important.

Engineering Review: How important is energy efficiency in today's HVAC market?

Noman Sajid: It is absolutely critical. Pakistan continues to face energy challenges, which means engineers must prioritize systems that minimize electricity consumption.

Technologies such as DC inverter systems have become increasingly popular because they offer substantial energy savings while maintaining high performance. Today, clients are much more conscious of operating costs, and consultants are recommending equipment accordingly.

In my opinion, energy efficiency will define the next generation of HVAC systems. The future belongs to technologies that deliver better performance with lower energy consumption.

Engineering Review: Could you tell us about Venture Engineering and some of your current projects?

Noman Sajid: Alhamdulillah, Venture Engineering is currently executing six turnkey projects across Pakistan, including projects in Haripur, Islamabad, Lahore, and Karachi.

One of our most significant projects is an international-standard hospital in Lahore, being developed in accordance with global certifications and scheduled for completion in December 2027. We are also working on another major hospital project in Karachi.

In addition, we have expanded into the light commercial segment. Over the past two years, we have introduced imported cassette units and split air-conditioning systems to better meet market requirements.

Our goal has always been to grow responsibly while maintaining the highest engineering standards. We remain optimistic about Pakistan's future and believe that engineering and innovation will continue to drive economic development.

Engineering Review: Finally, what message would you like to share with

young engineers entering the profession?

Noman Sajid: Never stop learning. Engineering is evolving faster than ever before. Whether it is artificial intelligence, automation, or energy-efficient

technologies, engineers who remain curious and adaptable will always succeed.

Do not be afraid of change—embrace it. Pakistan offers tremendous opportunities,

particularly for young professionals willing to work hard and continue learning. The future belongs to

those who are prepared to innovate, adapt, and build solutions for tomorrow. ■

About Venture Engineering

Venture Engineering (Pvt.) Ltd. works as Air Conditioning / Refrigeration engineers and contractors. The company has been engaged in the air conditioning and refrigeration business since 2004, especially in hotels, hospitals and shopping malls. They have completed many important projects with capacities up to as large as 2500 tons.

Venture Engineering (Pvt.) Ltd. was established by Mr. Sheikh Sajid Qayyum in 2004. The name Venture Engineering (Pvt.) Ltd. is a symbol of standard and quality work. Venture Engineering (Pvt.) Ltd. provides services in the field of Electrical, HVACR, Mechanical Chillers and other HVACR Products.



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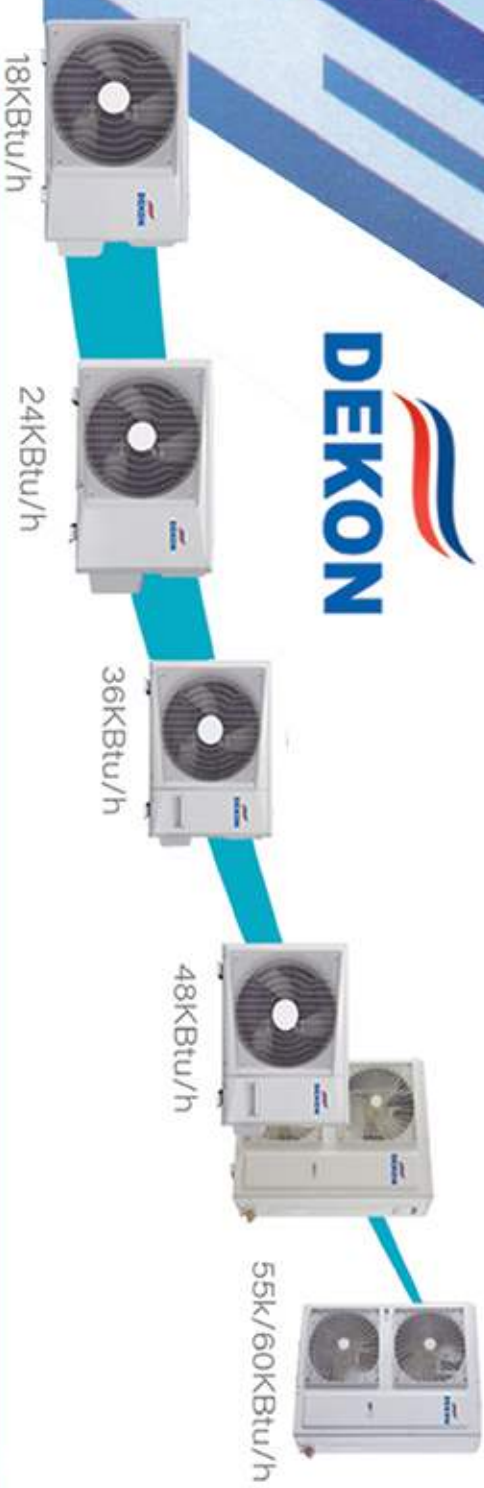


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THE INTERVIEW

Engineering Review: Thank you for taking the time to speak with us. Let us begin at the beginning. When did you graduate, and what was your first experience as a professional engineer?

Mohammad Yaseen: I graduated in 1970 from what was then known as the Government Engineering College, now NED University of Engineering & Technology. Engineering was a highly respected profession, but opportunities were limited compared to today.

I was fortunate to begin my career at Karachi Shipyard & Engineering Works in the Shipbuilding Division. I worked in the Machinery Drawing Office, where my responsibilities included preparing and supervising technical drawings related to ship machinery. Looking back, I often say that my engineering journey began at a drawing board, where every line demanded accuracy, patience, and attention to detail.

ER: You received international exposure very early in your career. Tell us about that experience.

Mohammad Yaseen: It was undoubtedly one of the defining moments of my professional life. Only three months after joining Karachi Shipyard, I was selected—along with three other young engineers—for advanced technical training in Germany.

At that time, Karachi Shipyard had a collaboration with Blohm+Voss, one of Germany's leading shipbuilding companies. I spent approximately eighteen months there, learning from world-class engineers and experiencing an entirely different engineering culture.

The exposure was invaluable. It taught me discipline, precision, and the importance of engineering standards. More importantly, it showed me that engineering is a universal language. Whether in Pakistan or Germany, excellence is achieved through commitment, continuous learning, and attention to detail.

ER: What path did your career take after returning to Pakistan?

Mohammad Yaseen: I returned to Karachi Shipyard and continued working there for nearly eight years. During that period, however, I developed a growing interest in industrial automation, which was an emerging field at the time.

That interest led me to join Zelin (Pvt.) Ltd., the Honeywell representative in Pakistan and one of the pioneers of industrial automation, process control, and building management systems in the country.

I spent 23 years at Zelin, working on projects across Pakistan's major industries, including oil refineries, fertilizer plants, power stations, and manufacturing facilities. Those years provided extensive technical and field experience and allowed me to work with some of the country's most important industrial organizations.

Automation was still relatively new in Pakistan, and it was exciting to be part of



Five Decades of Engineering Excellence: Mohammad Yaseen on Technology, Automation, and Aviation

An NED graduate from the Class of 1970, Mohammad Yaseen reflects on a remarkable career spanning shipbuilding, industrial automation, and aviation engineering, offering a firsthand account of how technology has transformed the engineering profession over the last five decades.

that transformation. We witnessed industries gradually move from manual processes to automated systems, significantly improving

where I have now spent more than twenty years. Established in 1931, the company has a long-standing reputation for technical

ing remain unchanged. Engineers must still understand principles, analyze problems, and develop practical solutions.

I believe the future will belong to engineers who are adaptable and willing to embrace new technologies while maintaining a strong foundation in engineering fundamentals.

ER: Finally, what message would you like to share with young engineers?

Mohammad Yaseen: Never stop learning. Engineering is not a profession

that ends with graduation—it is a lifelong journey.

Technology will continue to evolve throughout your career. The engineers who succeed will be those who remain curious, uphold professional integrity, and continuously adapt to change.

After more than five decades in the profession, I can confidently say that engineering has given me opportunities beyond anything I imagined as a young graduate in 1970. If young engineers remain committed to learning and excellence, the future is full of possibilities. ■

efficiency, reliability, and productivity.

ER: Your career has spanned multiple industries. How did it evolve in later years?

Mohammad Yaseen: After Zelin ceased

excellence and reliability.

My primary focus has been the aviation sector, where we supply, install, test, and commission specialized airport equipment for the Pakistan Airports Authority

"My association with Engineering Review goes back many years and continues to this day. It reaches the right audience and creates meaningful value for engineers and the engineering profession."

operations, I briefly joined another automation company before moving into industrial sales and marketing with Berger Paints, where I spent about two and a half years.

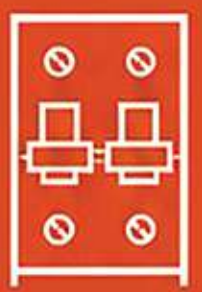
Later, I joined M Electric Company,

and other aviation organizations. Aviation is a highly specialized field where precision and reliability are absolutely essential, and I have found it both challenging and rewarding.



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THE INTERVIEW

Engineering Review: Let us begin with your own journey. When you graduated from university, what aspirations did you have, and how did your career begin?

Dr. Zahid Khand: I graduated in Electrical Engineering from Mehran University of Engineering & Technology. Like many engineering students, I had ambitious dreams and a strong desire to contribute to the country's development through technology and education.

One experience remains particularly memorable. During our final-year industrial visit, we toured Siemens Pakistan. I was deeply impressed by the professionalism, discipline, and engineering culture of the organization. At that moment, I told myself that one day I wanted to work there.

By the grace of God, that dream became a reality. I became the first graduate from Mehran University to join Siemens Pakistan. Out of twelve trainee engineers recruited that year, eleven were from UET Lahore and NED University, while I was the only representative from Mehran.

Working at Siemens provided me with invaluable exposure to international engineering standards, quality systems, and organizational excellence. It taught me that engineers must continuously learn and adapt if they wish to remain relevant in a rapidly changing world.

However, despite enjoying the corporate environment, I eventually discovered my true passion: teaching. I joined academia as a lecturer and gradually progressed through various academic and administrative positions before becoming Vice Chancellor of Aror University. Even today, I consider myself a teacher first and an administrator second.

Engineering Review: What inspired you to dedicate your life to education?

Dr. Zahid Khand: Education has the power to transform societies. Throughout my career, I have believed that universities should not merely award degrees—they should produce problem-solvers, innovators, and future leaders.

As a professor, I had the privilege of working closely with students and witnessing their growth. That experience reinforced my belief that investing in young minds is one of the most meaningful contributions a person can make.

Pakistan has no shortage of talent. What we often lack is the ecosystem to nurture that talent. Our responsibility

as educators is to provide students with opportunities, mentorship, and practical exposure so they can compete globally.

Engineering Review: What reforms are needed to improve engineering education in Pakistan?

Dr. Zahid Khand: We need to fundamentally rethink the role of universities. Every university should have a clearly defined national responsibility.

During my visits to China, I observed institutions dedicated to specific sectors. One university specialized in railway

technologies, another focused on power transmission, while others led research in transportation, chemicals, and manufacturing.

Pakistan should adopt a similar approach. We need specialized national centers of

connected from industry?

Dr. Zahid Khand: Because universities have traditionally expected industry to come to them. In reality, universities must take the initiative.

At Aror University, we approached textile manufac-

significantly more practical.

Research becomes meaningful when it solves real problems. If universities and industries work together, everyone benefits—the students, the companies, and the country.

Engineering Review:

These initiatives demonstrate that universities can become productive institutions rather than remaining solely dependent on government funding.

Engineering Review: You have often spoken about

problems with academic expertise. Publications like Engineering Review can play a critical role in creating that bridge by connecting researchers, employers, students, and policymakers.

If we successfully connect ideas with opportunities, we can unlock an enormous amount of hidden talent across Pakistan.

Engineering Review: Recent geopolitical developments, particularly the Iran conflict, have highlighted the importance of self-reliance. What lessons should Pakistan draw from these events?

Dr. Zahid Khand: First, I would like to congratulate Engineering Review on completing fifty years of publication. It remains one of Pakistan's few platforms that consistently connects industry and academia.

Over the past decade, Pakistan has experienced two defining events: the COVID-19 pandemic and the recent

regional conflict involving Iran. Both highlighted the importance of resilience and self-reliance.

Interestingly, six months before the conflict, two Iranian professors visited Aror University—one from electrical engineering and the other from philosophy. They explained how decades of sanctions had compelled Iran to invest heavily in literacy, university research, reverse engineering, and indigenous technology development.

Their achievements in areas such as drones, cyber technologies, and advanced engineering did not emerge overnight. They are the result of sustained investment in universities and research institutions.

That is the biggest lesson for Pakistan.

If we aspire to technological sovereignty, our universities must become engines of innovation. We cannot depend indefinitely on imported technologies and expect to remain competitive.

Pakistan possesses the talent. What we need now is a national ecosystem that supports research, encourages innovation, and connects universities with industry.

The countries that will lead the future are not necessarily those with the largest populations or

economies—they are the ones whose universities create knowledge, solve problems, and produce indigenous technologies.

I remain optimistic. Pakistan has immense potential, and if we invest wisely in education, engineering, and innovation, our best years are still ahead of us. ■



Siemens to the Vice Chancellor's Office: Dr. Zahid Khand Vision for Engineering, Innovation, and Pakistan's Future

Vice Chancellor of Aror University discusses his journey from Mehran University graduate to academic leader, emphasizing industry-linked education, indigenous technology, and the critical lessons Pakistan must learn from recent global crises.

Ethical Leadership Award for Professional Excellence



excellence linked to universities. Regulatory bodies and government institutions should identify the strengths of each university and provide targeted support.

Imagine if one institution became Pakistan's leading

turers, industrial organizations, and businesses directly. We asked them a simple question: "What skills do you need from our graduates?"

Their responses helped us redesign our curriculum and

Aror University has gained considerable attention in recent years. What makes it different?

Dr. Zahid Khand: We have focused on three principles: merit, quality, and com-

innovation and entrepreneurship. How can universities contribute more effectively?

Dr. Zahid Khand: Every year, Pakistani universities produce thousands of final-year projects and research ideas, but many disappear

I would like to congratulate Engineering Review on completing fifty years of publication. It remains one of Pakistan's few platforms that consistently connects industry and academia.

authority on water resources, another on artificial intelligence, and another on renewable energy. Such specialization would strengthen our research capabilities and accelerate technological development.

Engineering Review: Why do you think university research often remains dis-

improve faculty training. We also sent faculty members into industries so they could better understand real-world challenges.

The results were immediate. Students found internships more easily, industries became more engaged, and classroom teaching became

munity trust.

Admissions are entirely merit-based. In highly competitive programs such as Artificial Intelligence and Cyber Security, we accept only a small percentage of applicants. At the same time, we prioritize scholarships because many exceptionally

after graduation.

We need a national innovation ecosystem. I have proposed the concept of "Aror Connect," a platform where industries can post challenges and students or researchers can offer solutions.

Similarly, I believe Pakistan needs a national "Idea Bank" that connects industry



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- Computer Labs

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- Greened Area of 400,000 sq.ft
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- Planted 500 Fruits Trees

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BS Visual Arts

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BS Climate Change & Sustainable Development
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Faculty of Emerging Sciences & Technology

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BS Cyber Security
BS Multimedia & Gaming

Faculty of Heritage

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BS History
BS Tourism & Hospitality
AD Tourism & Hospitality - 2 Years
(Extended into a four-year BS program)

Fifty Years of Staying in the Room

A tribute to Engineering Review on its Golden Anniversary

By: Mariam Durrani

There is a particular kind of stubbornness that the world tends to mistake for irrelevance.

It is the stubbornness of the institution that refuses to chase the noise, that plants itself firmly in one place, in one conversation, for one community — and simply does not leave. I have come to believe that this stubbornness is not a weakness. It is, in fact, the rarest form of courage.

Engineering Review has that courage in abundance.

Think about what it means to be first. Not first in the breathless Silicon Valley sense — not the first mover scrambling for market share — but first in the way that a foundation is first. First to say: this industry matters, these engineers matter, these challenges deserve a dedicated, serious, sustained voice. When Engineering Review was established, it

made a bet that specialised knowledge deserved specialised attention. That bet has paid off for every engineer, every professional who has ever turned its pages looking not for noise, but for signal.

Fifty years. Generations of engineers who trained with its pages on their desks. Professionals who made decisions — real decisions, with real consequences — because Engineering Review covered an exhibition they could not attend, or surfaced a challenge they had not yet seen coming. The publication has been, in the truest sense, a service.

I remember the first time I sat across from the late Najam Sahab. I was early in my career — young enough to be impressionable, old enough to know I was in the presence of someone who operated differently. He was not a businessman who happened to be in publishing. He was a man of genuine, almost



evangelical belief in the power of knowledge. He spoke about the industry not as a market to be served but as a community to be nurtured. He spoke about information not as a com-

modity but as a responsibility. That distinction — between serving and nurturing, between commodity and responsibility — tells you everything about the culture he built.

What Najam Sahab understood, and what his son Salauddin and the entire team have carried forward with remarkable fidelity, is that integrity is not a strategy. It is not a brand positioning. It is a daily practice, made up of small decisions that accumulate over decades into something that cannot be manufactured: credibility. Engineering Review's credibility is fifty years old. You cannot buy that. You cannot fake it. You can only earn it, one issue at a time, one reader at a time.

And they have done this while running uphill. Let us not be polite about this: print is difficult. For a mid-sized publication serving a specialised industry, the headwinds have been fierce. The temptation to retreat, to simplify, to serve a broader audience must have been real. Instead, Engineering Review did something more interesting. It adapted without abandoning. It

went digital without going shallow. It understood that the medium changes but the mission does not.

That is Najam Sahab's legacy. Not a publication, but a philosophy — the belief that your community deserves the best of your attention, your integrity, and your endurance. That showing up, consistently, for fifty years, is itself an act of profound respect for the people you serve.

So here, on this golden milestone, is my gratitude — to the founder who set this extraordinary standard, to Salauddin for stewarding it with such care, and to every person on that team who chooses, every single day, to stay in the room.

The room needs you. It always has.

Congratulations, Engineering Review. Here is to the next fifty. ■

*Mariam Durrani is
Director, Marketing &
Brands at Pakistan Cables
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Quaid-e-Awam University

of Engineering, Science & Technology, Nawabshah

CHRONOLOGICAL JOURNEY

QUEST | Six Decades of Progress

History, academic expansion, digital transformation, sustainability, research, innovation and global recognition | 1963-2026

INSTITUTIONAL MILESTONES & ACHIEVEMENTS

1963 - Foundation

Sindh University Engineering College was established, marking the beginning of formal engineering education linked to the present QUEST journey.

1972 - Upgrade Decision

The institution was selected for upgradation into a full-fledged engineering university and shifting to Nawabshah.

February 1974 - First Classes at Nawabshah

Academic activities began at Nawabshah, establishing the foundation of engineering education at the present campus location.

1976 - Sindh University Campus

The Nawabshah campus was recognized as an additional campus of the University of Sindh.

March 1977 - Mehran University Status

The campus was upgraded to Mehran University of Engineering and Technology, Nawabshah.

1980 - MUCET Era Begins

The institution became Mehran University College of Engineering and Technology, MUCET, continuing its role as a major engineering education centre.

August 1996 - Birth of QUEST

MUCET was granted independent university status and renamed Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah.

2007 - Digital Learning Begins

Videoconferencing and virtual academic support were introduced, enabling online lectures, academic interaction and remote learning support.

2010 - Larkana Expansion

Engineering College Larkano was established as a constituent college, expanding QUEST's academic reach to Upper Sindh.

2010 - Campus Management Solution

Admissions, academic and examination modules were introduced, supporting digital governance, transparency and academic record management.

2013 - Computerized Admissions

Computerized admission software was introduced for Batch-13, improving transparency, merit processing and student facilitation.

2021 - Single-Visit Admissions, CBT, AI & Solarization

Single-visit undergraduate admissions and Computer-Based Testing with biometric verification were introduced. QUEST also added emerging academic areas, including Artificial Intelligence, Physics and Food Engineering Technology, while advancing the 500 kW solarization scheme.

2022 - Major Academic Portfolio Expansion

QUEST expanded its academic portfolio into emerging fields including Data Science, Cyber Security, Chemistry, Building & Architecture, Biomedical Engineering, Industrial & Manufacturing Engineering, Civil Technology and related technology programmes.

February 2023 - Solarization Approval

Administrative approval was issued for the solarization project, moving the 500 kW solar photovoltaic system toward implementation.

December 2023 - Erasmus+ CATCH-VR Launched

QUEST joined the Erasmus+ CATCH-VR project, supporting capacity building in AR/VR, Digital Twin technologies, curriculum development and graduate engineering education.

2024 - Green Campus & Robotics Milestone

QUEST achieved major green-campus progress through solar energy initiatives and strengthened its emerging-technology profile through robotics recognition and student innovation.

2024 - Academic Scale & Student Support

QUEST reached a wider academic scale with six faculties and 25 teaching departments. It enrolled 4,953 undergraduate and 366 postgraduate students, welcomed 1,307 new undergraduate students, produced 579 undergraduate and 65 postgraduate graduates, and awarded 695 scholarships worth more than Rs. 25.5 million.

2025 - Conferences, ORIC & Evening Programmes

QUEST strengthened its academic and research visibility through major conferences, ORIC development, research and innovation support, industry linkages, and evening programmes including AI, Data Science, Cyber Security, IT, Computer Science and English.

May 2026 - AR/VR & Digital Twin Lab

An AR/VR and Digital Twin Lab was established under the Erasmus+ CATCH-VR project, strengthening immersive learning, engineering simulation and Industry 4.0-oriented education.

June 2026 - THE Impact Rankings / SDG 4

QUEST achieved the 101–200 global band in SDG 4: Quality Education and 1001–1500 overall global band in the Times Higher Education Sustainability Impact Ratings 2026. In SDG 4, QUEST stood 1st among engineering and technology universities in Sindh, 2nd among all universities in Sindh, and among Pakistan's Top 5 benchmark universities.

2026 - QS Asia & Continued Infrastructure

QUEST was listed in the QS Asian University Rankings 2026 in the 851–900 band, while continuing infrastructure and sustainable-campus development, including further solar and campus improvement initiatives.



Times
Higher
Education

**THE Impact Rankings
2026**
**SDG 4: Quality
Education**

101-200

Global Band in
SDG 4

1st

Engineering &
Technology
Universities in Sindh
in SDG 4

2nd

Among all
Universities in Sindh
in SDG 4

Top 5

Pakistan benchmark
universities in SDG 4
Overall Impact Band:
1001–1500



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From a Rs440 Salary to Building Pakistan's Leading Surveying Instrument Brand

Shaukat, CEO, the founder of Sunder Trading Company reflects on his journey from humble beginnings to introducing Pakistan's own surveying instrument brand, while emphasizing honesty, innovation and lifelong learning.

Engineering Review: Mr. Shaukat, today you lead one of Pakistan's leading surveying instrument companies. How did your professional journey begin?

Shaukat Ali Nadeem: My career began with the Punjab Government's Flour Milling Corporation during the tenure of Prime Minister Zulfikar Ali Bhutto. My first salary was Rs440 per month. I lived in a rented house with two roommates, paying just Rs5 each in rent. Those hum-



SAN: Alhamdulillah, it is one of our proudest milestones. About three years ago, we launched Pakistan's first indigenous surveying instrument brand. The products are manufactured in China to our specifications and marketed under our own brand.

We provide a two-year replacement warranty, maintain an internationally authorised calibration laboratory, and have invested heavily in training our technical staff in Japan, Singapore, China and Sweden. Both our company and brand are ISO certified. Customer satisfaction has always been our highest priority.

ER: Many of your employees have remained with you for years. What is your management philosophy?

SAN: Having spent many years as an employee, I understand what workers expect—respect, fairness and appreciation. I try to treat my employees the way I wanted to be treated. When people feel valued, they remain loyal and committed. I believe employees are the greatest asset of any organisation.

ER: How do you view the technological transformation from the 1970s to today's era of AI and GPS?

SAN: The change has been remarkable. In the 1970s, there were no mobile phones, internet, GPS or artificial intelligence. Today, satellite-based surveying enables engineers to complete in minutes work that

ble beginnings taught me discipline, hard work and perseverance.

I started as a clerk and never considered any job too small. By working sincerely and learning continuously, I was promoted to manager and eventually ran a flour mill independently. Those years laid the foundation of my professional life.

ER: What led you from flour milling to surveying instruments?

SAN: The shift came after the flour mills were denationalised. Although I was offered a salary without meaningful work, I could not accept being paid without contributing. I resigned and joined a surveying instrument company in Lahore as a Sales Executive.

Many people saw it as a step down, but I never focused on titles. I focused on learning. Within a few months, I was promoted to Sales Manager because the management recognised my commitment and ability.

I have known Engineering Review since my days in employment. When I established my own organization, I reached out to the magazine and became associated with it. Engineering Review has played a significant role in our growth and development. It is an excellent institution, and we sincerely wish it continued success in the years to come.

ER: How did that experience prepare you for starting your own business?

SAN: I spent years learning every aspect of the surveying business—from sales and customer relations to technical support and after-sales service. Later, I joined a Karachi-based surveying equipment company that opened a Lahore office, where I gained even broader experience.

By 1999, I had the confidence, industry knowledge and customer relationships to establish Sunder Trading Company. We initially represented international brands like Sokkia and gradually built a reputation based on quality, trust and customer service.

ER: Your company now markets its own Pakistani brand. Tell us about that achievement.

once took days or even months.

Technology has transformed the profession, and businesses must adapt. Our company has embraced digital tools and modern marketing because continuous learning and innovation are essential for growth.

ER: What message would you like to give young engineers and entrepreneurs?

SAN: Never underestimate any job. Don't chase titles—chase knowledge, experience and integrity. Work hard, remain humble, keep learning and never hesitate to start from the bottom. Success is built through honesty, patience, dedication and the willingness to adapt. If you stay committed to these values, opportunities will continue to come your way. ■

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Building Type: **Mall & Apartment**
Location: **Islamabad**
Capacity: **1,650 Ton**



Project: **MG Motors**
Building Type: **Industrial**
Location: **Lahore**
Capacity: **700 Ton**



Project: **HBK Hypermarket**
Building Type: **Mall**
Location: **Peshawar**
Capacity: **400 Ton**



Project: **Zong compak Head Office**
Building Type: **Office**
Location: **Islamabad**
Capacity: **1,800 Ton**



ER: You have worked in the fire and security industry for many years. How has the technology changed since you entered the field?

MIK: I entered the fire alarm and ELV (Extra Low Voltage) systems industry in 2004, when we installed a Honeywell fire alarm system at MCB Tower, then one of Karachi's tallest buildings. Since then, the industry has transformed dramatically. Today, Pakistan follows internationally recognized fire safety standards, including EN 54 and UL/FM Approved systems.



From Conventional Fire Alarms to AI-Driven Safety Systems

Muhammed Irfan Khan says: The industry has moved from conventional fire alarm panels to AI-assisted, cloud-connected safety ecosystems. Technology has advanced rapidly, but equally important is how digital learning has empowered today's engineers and technicians.

The biggest change has been the shift to software-driven, cloud-connected, and AI-enabled solutions. Modern systems allow organizations with multiple facilities to monitor all locations from a single control center, improving efficiency and response times.

ER: How has the technical capability of the workforce evolved?

MIK: The improvement has been remarkable. Earlier, obtaining technical manuals, wiring diagrams, or trou-

bleshooting support often meant waiting for manufacturers. Today, AI tools, online documentation, and digital learning platforms provide instant access to information.

Technicians now use smartphones to watch training videos, review installation guides, and troubleshoot problems in real time. This has significantly reduced the learning curve and improved the quality of installations and maintenance.

ER: Has digital access made field-

work easier?

MIK: Absolutely. Tasks that once required extensive consultation can now be completed much faster. Manufacturers publish detailed tutorials, while experienced professionals share practical guidance through online platforms. Engineers and technicians can quickly verify programming procedures, wiring methods, and troubleshooting techniques directly from their mobile devices.

ER: What is the most significant change you have witnessed?

MIK: The industry has evolved from standalone fire alarm panels to intelligent, integrated safety systems connected through cloud platforms, mobile applications, and centralized monitoring centers. At the same time, digital learning has transformed the workforce. Knowledge is no longer limited to manuals or manufacturer support—it is available instantly, enabling engineers and technicians to develop skills faster than ever before. ■

Engineers Are Solution Providers, Not Technicians

Contd from page 20

exposure to power plants, electrification projects, and engineering design shaped my professional outlook.

ER: What is the most important lesson engineering has taught you?

HRM: I still remember my professor's words on the first day of engineering school: "You are becoming engineers, not technicians. Your job is to analyze problems and find solutions."

That principle has guided me throughout my career. Engineers are, above all, problem solvers. They are expected to confront unfamiliar challenges, think critically, and develop practical solutions. Those skills are valuable not only in engineering but in leadership and business as well.

ER: Having experienced both government service and the private sector, how do you compare the two?

HRM: I often use a simple analogy. Government service is like living in a zoo—secure and predictable, but with limited freedom. The private sector is more like the jungle, where success depends entirely on your abilities and decisions.

Entrepreneurship carries greater risks, but it is also more rewarding because your achievements are truly your own. It teaches resilience, adaptability, and accountability.

ER: You have witnessed the

evolution of technology from early computers to artificial intelligence. What are your thoughts on these changes?

HRM: I have seen computing evolve from large machines requiring manual programming to today's AI-driven systems. The progress has been remarkable.

However, we must remember that technology exists to serve humanity. Artificial intelligence is an incredibly powerful tool, but it should complement human thinking rather than replace it. Engineers should first analyze problems independently and then use technology to improve their solutions.

My concern is that excessive dependence on digital tools may weaken critical thinking. We should embrace innovation while ensuring that human judgment remains at the center of decision-making.

ER: Do you believe AI presents long-term challenges as well?

HRM: Certainly. Every technological advancement brings responsibilities. Young people today are increasingly dependent on screens, and many aspects of life—from social interaction to problem-solving—are becoming digitized.

My advice is simple: use AI wisely, but never surrender your ability to think independently. Technology should remain under human control. We created it to improve our lives, and it should continue to serve that purpose. ■



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Self-Reliance in Engineering Key to Pakistan's Economic and Strategic Security: Jalil ur Rehman

Engineering Review: In the aftermath of the Middle East war, Pakistan's fault lines and weaknesses regarding self-sufficiency have become evident. What would you suggest to policymakers about which sectors of the economy especially engineering sectors should be revitalized?

Jalil ur Rehman: Pakistan's diplomatic endeavors gained international recognition by successfully facilitating dialogue between the United States and Iran. The conflict exposed the highly publicized Iron Dome defense system of America, which ultimately failed to stop Israeli attacks on Qatar as well as Iranian strikes on the Gulf States. Extensive drone and missile

strikes caused severe physical damage to Gulf's regional airports, tourism, and oil infrastructure, sparking massive global supply chain and travel disruptions. As a consequence of having strong defense and attacking power Gulf and regional countries perceive Iran as a more serious threat to them. The recent Iran-America war has established Iran as super power of Islamic world.

The supply disruptions pushed global oil prices past \$150 per barrel, drastically inflating Pakistan's import bill. Millions of Pakistani workers residing in the Middle East, faced serious economic losses, the economic downturn and regional uncertainties

endangered the critical flow of foreign remittances.

However, the outstanding technical advancement and defense capabilities of Iran are highly praiseworthy, which are the result of its long term planning, well organized work system and extreme hard work as well as elevated standards of engineering education. The hardworking Iranian nation is an inspiration to us.

During America-Iran war it has become quite evident that Pakistan lag significantly behind our neighbor in defense technology and industrial development. Our defense sector mainly dependent on Chinese technological support and military hardware. Keeping in mind a global

reality that there is no genuine friendship between the countries, relationships are primarily based on mutual interests, which may shift either gradually over time or abruptly, owing to some specific reasons (UAE-Pakistan relation is an example).

Iran is self-sufficient in almost every field of industry, manufacturing toys to modern aircraft, indigenously. In the context of the region's current critical situation, self-sufficiency is the only way to safeguard our independence and sovereignty. In contrast, Iran imports less than 10% of its defense equipment and manufactures more than 90% locally. Despite intense American sanctions,

Pakistan, however, produces only about 20% domestically and imports the remaining 80%. Iran is making swift progress toward manufacturing high-tech equipment and components. Successfully devel-

must formulate a strategic plan to encourage indigenous manufacturing of homegrown brands. As experienced by India, Iran Malaysia, Vietnam and some others.

Reflecting on the past



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The defense capability of any country is directly linked with the economy. Iran is oil producing country, also manufacture majority of industrial and house hold consumer goods locally. It is noticeable that the automotive industry is a cornerstone of Iran's economy, second only to the oil and gas sector. Two

45 years of assembling Japanese vehicles, it is evident that remaining dependent on foreign brand assembly will prevent the country from ever achieving manufacturing and self-sufficiency. "Foreign assemblers are reluctant to establish precision part manufacturing capabilities in Pakistan. The only solution is to develop our own indigenous automobiles. Government must establish a specialized court for commerce and industry to expedite the resolution of disputes.

We aim to establish

Engineering Review has been a leading voice for Pakistan's engineering and industrial sectors since 1975, providing credible coverage of technological developments, policy issues, and industrial progress.

large enterprises manufacturing their own brands of different variants & models, with more than 97% locally manufactured parts. It contributes significantly to national employment and industrial output, serving as the primary driver for over 60 downstream and upstream related sectors. The automobile industry of Iran provides direct and indirect jobs for about 900,000 people. Owing to U.S. sanctions, automobile exports are restricted to just three African countries.

As previously mentioned, the auto industry is a strategic pillar of the national economy and is equally critical to national defense. During wartime emergencies, diverse types of military vehicles play a vital role. Our government

mineral extraction and refining facilities through local companies, partnering with Saudi Arabia or other nations for mutual financial benefits. This initiative will enable the global export of finished products. Establishing our own facilities will eliminate the high transportation costs of sending raw materials abroad and repurchasing the processed goods at inflated prices.

Pakistan is rich in resources including tourism and only needs sincere, well-planned utilization to boost its economy.

Furthermore, the urgent denationalization of industry is necessary to eliminate the unnecessary burden on the economy.

Textiles are Pakistan's major export, requiring

Contd on page 70



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Engineering Review: In the aftermath of the Middle East war, Pakistan's fault lines and weaknesses regarding self-sufficiency have become evident. What would you suggest to policymakers, particularly regarding the engineering sector?

Muhammad Tariq Haq: Recent geopolitical developments have reminded us that national security and economic security are inseparable. Pakistan must therefore pursue a long-term strategy aimed at greater industrial self-reliance while simultaneously integrating more effectively with friendly regional economies.

First, Pakistan should substantially expand trade and industrial cooperation with countries such as China, Türkiye, Bangladesh, Qatar, Iran, and South Korea. These countries offer valuable opportunities for technology transfer, industrial partnerships and supply-chain diversification.

In my own experience of more than thirty years in power generation industry, I have found that high-quality engineering products from China and Türkiye can perform on par with products sourced from traditional Western suppliers. Procurement decisions should be based on technical merit, lifecycle value and after-sales support rather than preconceived notions regarding country of origin.

Pakistan should also aggressively accelerate the exploration and development of its own natural resources—including oil, gas, coal, rare earth minerals and other strategic deposits. Greater indigenous production will strengthen energy security and reduce dependence on

imports. Whenever international conditions permit, enhanced energy cooperation with Iran.

With focused investment in Information Technology, Artificial Intelligence, software development and engineering design services, the

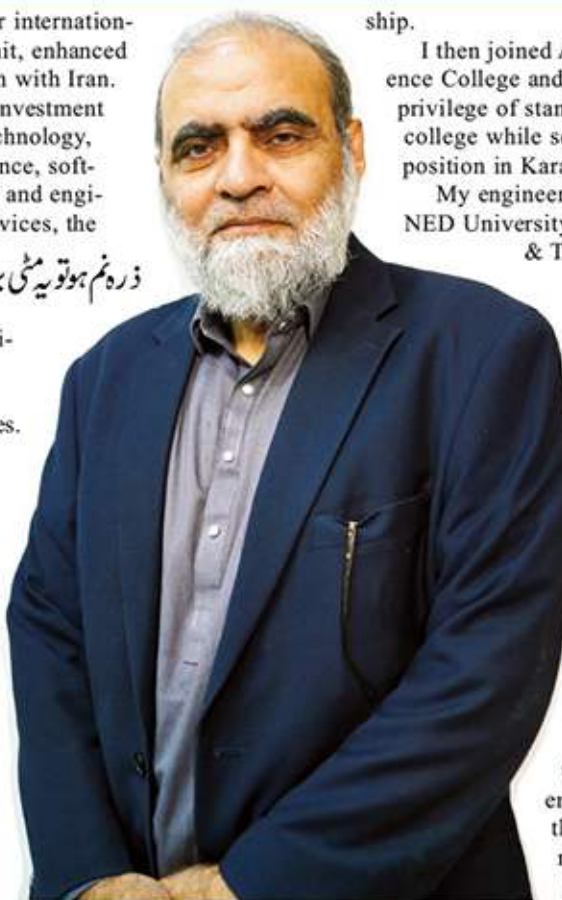
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country can significantly increase its exports of knowledge-based services.

As the poet beautifully observed:

Engineering Review: Where did you receive your education, and what is the best memory you would like to share with our readers?

Muhammad Tariq Haq: I have been fortunate to



ship.

I then joined Adamjee Science College and again had the privilege of standing first in the college while securing the sixth position in Karachi.

My engineering education at NED University of Engineering & Technology

transformed my analytical thinking. One memorable aspect was graduating among the top ten students despite balancing academics with numerous extracurricular interests. More importantly, NED taught me how engineers should think rather than merely what they should

Industrial Internet of Things (IIoT), data analytics and Industry 4.0 technologies. Yet one principle remains unchanged: organisations grow when experienced professionals willingly mentor younger engineers.

Engineering Review: What would you suggest to bring industry and academia closer together, and do you think the present model of collaboration is producing meaningful results?

Muhammad Tariq Haq: Although collaboration between universities and industry has improved over the years, there remains considerable room for strengthening the relationship.

I believe every engineering program should allocate at least ten percent of classroom teaching to experienced industry professionals.

Internships should also become structured learning programs rather than mere formalities. Performance of the student should be jointly evaluated by university faculty and industry mentors against clearly defined learning outcomes.

Universities should also encourage collaborative research projects, final-year design assignments and innovation challenges sponsored by industry.

Engineering Review: What is your

opinion about the role of Engineering Review in highlighting and disseminating

issues related to Pakistan's engineering sector?

Muhammad Tariq Haq: My association with Engineering Review spans almost thirty-five years and has been both professionally rewarding and personally memorable.

I first came across the magazine during my days at Abbott Laboratories, where our Director of Engineering, Mr. Syed Zafar Ali, regularly circulated copies among engineers to keep us informed about developments in the engineering profession. Engineering Review was regarded as an important source of technical and industrial knowledge.

In the mid-1990s, I began advertising my business through the magazine. During those years I had the privilege of interacting regularly with Najam Sb, the Publisher. He always treated me with exceptional warmth and generosity. His encouragement helped establish a relationship that extended well beyond business.

After establishing Energy Solutions (Private) Limited (ESL), Engineering Review naturally became one of our preferred industry platforms because it reached consultants, contractors, manufacturers and decision-makers across Pak-

study.

Thereafter, I completed my MBA from the Institute of Business Administration (IBA), Karachi. I secured the highest marks in nearly half of the subjects, which convinced me that engineering and management together form a powerful combination for leadership.

At present, I am pursuing an intensive program in Islamic studies at Jamia-tur-Rasheed. Standing second in each of the first two semesters has been deeply satisfying. This experience has reminded me that education has no age limit, and that intellectual and spiritual growth should continue throughout one's life.

Engineering Review: What kind of engineering and industrial environment did you encounter after completing your education, and what changes do you observe in modern engineering and industrial practices in Pakistan today?

Muhammad Tariq Haq: I consider myself extremely fortunate to have started my career in organizations that invested in people rather than merely employing them.

My first assignment was with Abbott Laboratories as a Maintenance Engineer. Like many young engineers, I possessed enthusiasm that often exceeded my expe-

More than a publication, Engineering Review has documented the evolution of Pakistan's industrial landscape while inspiring generations of professionals to contribute to the nation's engineering and economic development.

rience. I would frequently stay late into the night dismantling, understanding and reassembling sophisticated production equipment simply to learn how it worked. Occasionally my experiments created problems for the following day's production schedule. Instead of reprimanding me, my supervisors—Mr. Atiq and Mr. Syed Musharraf Ali—treated these mistakes as part of the learning process.

Later, at Philips, I voluntarily worked weekends, night shifts and holidays to deepen my understanding of increasingly complex industrial systems. Despite my limited practical experience, I was entrusted with responsibility for six major manufacturing plants.

Today, Pakistan's engineering landscape has advanced considerably. Modern plants are increasingly embracing automation, digital controls, predictive maintenance, Artificial Intelligence,

istan's engineering community.

Another memorable milestone came in 2021 when Salahuddin Sb encouraged me to begin writing regularly for the magazine. Since then, I have had the honour of contributing technical articles, management blogs, motivational essays and poetry for engineers, entrepreneurs and business leaders.

What distinguishes Engineering Review is that it has consistently served as more than just a magazine. It has acted as a bridge connecting engineers, industry leaders, policymakers and academia. It has documented the evolution of Pakistan's engineering sector while providing a platform for exchanging ideas, sharing innovations and inspiring future generations.

I sincerely hope Engineering Review continues to contribute to Pakistan's industrial and engineering development for many decades to come. ■

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MMP extends its heartfelt congratulations to Engineering Review on the celebration of its Golden Jubilee, marking 50 years of excellence.



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Pakistan Engineers Forum

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The Pakistan Engineers Forum (PEF) is a non-political, non-profit professional organization established in 1979 by engineers committed to strengthening the engineering profession.

It provides a national platform through which engineers from different disciplines, sectors and regions can work collectively for professional excellence, ethical leadership, institutional reform and public service.

Membership of PEF is open to engineers registered with the Pakistan Engineering Council who subscribe to the Forum's constitution, values and objectives.

Our Ideal

The guiding ideal of PEF is to seek the pleasure of Allah Almighty by striving for the continuous improvement of Pakistan's engineering profession in accordance with the principles taught by Allah Almighty and His Messenger, Prophet Muhammad ﷺ. This ideal recognizes engineering knowledge and professional responsibility as an amanah—a trust to be exercised with competence, honesty, justice and concern for society. PEF therefore seeks to develop engineers who combine technical capability with integrity, discipline and a strong sense of national responsibility.

Motto

Honesty — Dedication — Professional Excellence

These principles define the character expected of every PEF member:

- Honesty: truthfulness, transparency, fairness and accountability.

- Dedication: sincere commitment, discipline and service above personal interest.

- Professional Excellence: competence, quality, innovation and continuous learning.

Vision

A united, ethical and globally respected engineering community leading Pakistan towards sustainable development, technological advancement and national resilience.

Mission

To unite and empower engineers through ethical leadership, professional development, knowledge sharing, institutional reform and constructive engagement with academia, industry, government and society—thereby advancing the engineering profession and serving Pakistan in accordance with Islamic values.

Core Values

PEF is guided by:

Integrity and Trust — Upholding honesty, transparency and professional responsibility.

Professional Excellence — Promoting competence, quality, innovation and life-long learning.

Dedication and Service — Serving the engineering community, society and Pakistan with sincerity.

Justice and Merit — Supporting fairness, equal opportunity and merit-based professional recognition.

Unity and Mutual Respect — Bringing

engineers together across disciplines, regions and generations.

Consultation and Collective Wisdom — Addressing professional and national challenges through informed dialogue and collaboration.

Public Interest and Sustainability — Giving priority to public safety, environmental responsibility and long-term national benefit.

Strategic Objectives

PEF seeks to:

- unite engineers around a shared professional and ethical purpose;
- enhance professional competence through continuing development, seminars, conferences, mentoring and knowledge-sharing initiatives;
- promote ethical engineering practice and discourage corruption, negligence and professional misconduct;
- protect the legitimate rights, dignity, welfare, service structures and career progression of engineers;
- support young engineers through internships, mentoring, employability development and professional networking;
- strengthen engineering education and promote meaningful collaboration between academia, industry, government and regulatory institutions;
- contribute constructively to reforms in engineering laws, regulations, procurement systems, professional standards and institutional governance;
- provide expert recommendations on national challenges relating to water, energy, infrastructure, climate resilience,

environment, industry and emerging technologies;

- encourage applied research, innovation, entrepreneurship and indigenous engineering capability; and

- Develop professional linkages with engineering institutions and Pakistani engineers at home and abroad.

Engineering for National Development

PEF believes that engineers have a central role in Pakistan's economic progress, technological advancement and sustainable development. The Forum therefore seeks not only to represent engineers, but also to mobilize their knowledge and experience in the service of the nation.

Its influence must rest on the credibility of its conduct, the quality of its professional contribution and its ability to present practical, evidence-based solutions to national challenges. Through ethical leadership, professional development and institutional engagement, PEF aspires to strengthen both the engineering community and the institutions through which engineers serve.

Pakistan Engineers Forum invites engineers of every discipline and generation to join this professional movement. Together, engineers can strengthen their profession, safeguard its dignity, improve national institutions and help build a more resilient, progressive and prosperous Pakistan.

Upholding Integrity. Advancing Excellence. Engineering Pakistan's Future.■



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Building a Stronger Nation

Contd from page 9

environment did you encounter after completing your education, and what changes do you observe in modern engineering and industrial practices in Pakistan today?

TS: I have been fortunate to work in organizations where the systems were largely managed by competent professionals. When I began my career, the construction industry still maintained a relatively ethical, educative, and professional environment—despite the presence of corruption. There were norms, standards, and a culture of learning that shaped young engineers.

Unfortunately, the situation today has deteriorated significantly. In the construction sector in particular, the environment is no longer ethical, professional, or conducive to learning. The culture of mentorship and knowledge-sharing that existed when I began my career has almost disappeared. Corruption has overshadowed the values, discipline, and professional pride that once guided the industry.

What concerns me most is that the urge to learn has been replaced by the urge to make money quickly. The passion for work, craftsmanship, and continuous improvement has diminished among many young professionals. When financial gain becomes the only motivation, the long-term health of the industry suffers.

In my view, meaningful correction cannot be achieved through regulations alone. Real change must begin at the foundational level—within our schools and our homes. By grooming the next generation in an honest, disciplined, and ethical culture, we can rebuild the moral framework that our professional sectors desperately need.

ER: What would you suggest to bring industry and academia closer together, and do you think the present model of collaboration is producing meaningful results?

TS: I am not fully updated on the latest formal frameworks of industry-academia collaboration, but based on my interactions with fresh engineering graduates, it is evident that the present model is far from effective. Most young engineers today are

uncertain about their career paths, lack exposure to real-world engineering environments, and have limited understanding of industry expectations. This clearly indicates a disconnect between what universities teach and what the industry actually needs.

Bridging this gap is not a simple task, even when sincere efforts are made. However, meaningful progress can be achieved if engineering universities redesign their approach. The most practical and impactful step would be to integrate field-based learning and applied research into undergraduate curricula. Students and faculty should jointly work on industry-oriented projects, site-based studies, and problem-solving assignments drawn from real engineering challenges.

In my view, only through structured field engagement, project-based learning, and genuine partnership between faculty and industry professionals can we expect meaningful results from academia-industry collaboration.

ER: What is your opinion about the role of Engineering Review in highlighting and disseminating issues related to Pakistan's engineering sector?

TS: In my view, Engineering Review is already playing an important role by documenting and publishing the insights of experienced engineers across various disciplines. These interviews and articles help highlight the real issues, gaps, and opportunities within Pakistan's engineering sector.

However, for this effort to create meaningful impact, it is equally important that your work reaches the people who shape national policy. The perspectives and recommendations published in your journal should be systematically communicated to those at the helm of government, regulatory bodies, planning institutions, and public-sector organizations.

If the journal continues to strengthen this bridge between professional insight and policy formulation, its role in Pakistan's engineering landscape will become even more influential and transformative.■

A Journey of Learning and Innovation

Syed Hassan Raza from Multitech Consulting Engineers, reflects on his educational journey & entrepreneurial experience

ER: Please tell us about your educational background and how your professional career began.

Syed Hassan Raza: Wa Alaikum Assalam. My greatest inspiration was my late father, who was a civil engineer.

design, supervision, testing, commissioning, and operational support. Alhamdulillah, our work now extends beyond Pakistan. We are executing projects in Azerbaijan, while solar energy projects in Uzbekistan are expected to begin soon.



Watching his lifelong commitment to engineering and public service motivated me to pursue the same profession. I completed my Mechanical Engineering degree from UET Taxila and began my professional career in 2011, working on major hydropower projects, including Mohmand Dam and the Tarbela Fourth Extension. Later, on my father's advice, I moved to Germany to pursue a Master's degree in Renewable Energy through a European Union exchange programme. My specialization was in solar energy, with my second semester completed in the United Kingdom, while my thesis defence took place at the European Union headquarters in Brussels. After returning to Pakistan in 2016, I joined my father's consulting company and continued building my career in engineering.

ER: How did your business journey begin, and how has it evolved over the years?

SHR: Our first business venture started around 2007 in the construction sector. However, because of the global financial slowdown, we had to close it in 2011-12. In 2013, we established a consulting company specializing in infrastructure and water projects. After returning from Germany in 2016, I established the Energy and Power Department, expanding our expertise into renewable energy. Today, we provide engineering services covering feasibility studies,

We are also pursuing opportunities in transmission lines and substations in other countries. It is a matter of great pride that Pakistani engineers, educated and trained locally, are successfully delivering international projects and demonstrating that local expertise can compete confidently on the global stage.

ER: Technology has changed significantly over the years. How do you view the impact of artificial intelligence on engineering?

SHR: The transformation has been extraordinary. During my university years, engineers mainly relied on software such as Word, Excel, PowerPoint, and AutoCAD. Today, engineering software has become increasingly AI-driven. Artificial intelligence is improving design accuracy, project planning, data analysis, and decision-making while reducing repetitive tasks and increasing productivity. Although AI will not replace engineers, it has become an essential tool for every engineering discipline. Engineers who fail to learn modern AI-based software and digital technologies will struggle to remain competitive internationally. Continuous learning, adapting to emerging technologies, and mastering AI-powered engineering tools are now essential for professional success and for ensuring Pakistani engineers continue contributing effectively to global engineering projects. ■

From Chemical Engineer to Industry Pioneer:

Contd from page 39

tool, but it cannot replace sound engineering judgment. The quality of AI-generated solutions depends on the engineer's knowledge and ability to ask the right questions.

Young engineers today have tremendous opportunities because they are more comfortable with emerging technologies. However, they

must build strong technical fundamentals alongside digital skills.

Pakistan's engineering sector has enormous potential. With political stability, stronger institutions, and continued investment in innovation, I believe our engineers can compete successfully on the global stage.

ER: Finally, what mes-

sage would you like to give young engineers?

SS: Never stop learning. Build strong technical foundations, value your mentors, embrace new technologies, and don't be afraid to take calculated risks. Success comes through integrity, continuous learning, and the courage to create opportunities rather than simply waiting for them. ■

Mazhar Hussain: Pakistan's Future Lies in Opportunity, Self-Reliance, and Better Thinking

For Mazhar Hussain, Sales Director at Lucky Cement, Pakistan is not a country short of resources or opportunities—it is a country that needs better

thinking, stronger policies, and greater collective commitment. With nearly three decades of experience spanning sales, engineer-

ing, manufacturing, and industrial development, Hussain has witnessed Pakistan's economic cycles firsthand. Yet his optimism remains unwavering.

Speaking to Engineering Review, Hussain emphasized that crises often reveal weaknesses that remain hidden during normal times. Recent



thinking, stronger policies, and greater collective commitment.

With nearly three decades of experience spanning sales, engineer-

ing, manufacturing, and industrial development, Hussain has witnessed Pakistan's economic cycles firsthand. Yet his optimism remains unwavering.

"Our opportunities are phenomenal," he says. "The potential for growth and development in Pakistan is limitless."

global disruptions—from geopolitical tensions and supply chain bottlenecks to energy price volatility—have reinforced the

Contd on page 70

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Pakistan's Future Lies in Opportunity, Self-Reliance, and Better Thinking

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need for Pakistan to become more self-reliant.

According to him, Lucky Group's journey itself is proof that long-term commitment to Pakistan can produce extraordinary results. Today, the group has investments across multiple sectors, including cement, automobiles, textiles, power, chemicals, and consumer industries, while exporting to more than 47 countries worldwide.

"Most of our investments are in Pakistan," he notes. "We believe in building here, creating jobs here, and taking Pakistani products to international markets."

Lucky Cement's evolution reflects that philosophy. What began with a single cement plant in 1995 has grown into one of Pakistan's largest industrial groups. The company remains the only cement manufacturer with silos at the port, ensuring uninterrupted supply to customers when they need it

most.

For Hussain, growth is fundamentally about recognizing opportunities before others do.

"Being profitable is one thing," he explains. "Growing continuously is another. We are growing because our foundations were built correctly."

He believes Pakistan possesses all the ingredients required for sustainable development: skilled professionals, investors, natural resources, and entrepreneurial talent. The missing element, he argues, is coordination and long-term policy consistency.

"We need to move from individual thinking to collective thinking," he says. "If every institution focuses on serving people honestly and efficiently, the entire country benefits."

Hussain is equally passionate about climate-conscious development. He points to advancements in environmentally friendly cement production and advocates for greater adoption of technologies such as light-

gauge steel structures, which are lighter, faster to construct, and more energy efficient.

Following the 2008 earthquake, he helped introduce light-gauge steel housing solutions that enabled schools, homes, and community buildings to be constructed in a matter of days.

He also stresses the importance of local manufacturing and value addition. Pakistan, he argues, continues to export raw materials only to import finished products at significantly higher costs.

"We have minerals, talent, and resources," he says. "What we need is the capability to extract, refine, and manufacture locally."

For Mazhar Hussain, the path forward is clear: embrace innovation, strengthen local industry, and think beyond individual interests.

"If we get our priorities right," he concludes, "there is no reason Pakistan cannot become one of the world's success stories." ■

Self-Reliance in Engineering Key to Pakistan's Economic and Strategic Security

Contd from page 64

urgent government intervention to revive the industry. Although Pakistan is an agricultural country, the government must encourage farmers to cultivate cotton and limit sugarcane production. However, the quality of our cotton also needs significant improvement. While we have lacked the R&D to improve quality, India has successfully improved its cotton quality and increased its yield per unit area.

Politicians own more than 90% of the sugar mills of the country. Consequently, encourage growing maximum sugarcane farming to generate a large surplus of sugar for export, allowing them to secure lucrative government rebates. Unfortunately, these same exporters then profit a second time by importing sugar to fill the resulting domestic shortages. This has been a common practice for about 30 years. Millions of rupees of public money go into the pockets of a mafia. This practice has brutally destroyed the textile industry.

Flawed policies enacted by political governments have created massive black holes in Pakistan's economy, pushing the country to the brink of default. The primary drivers include corruption within the sugar mafia, draining capacity payments to IPPs, and 20-year fixed-price, fixed-quantity gas contracts that prevent the country from benefiting from significantly lower international gas prices.

The above stated destructions are the result of last 30 years policies, the beginning of massive economic destruction was started 55 years by unplanned nationalization policy of industry & education etc. In addition to these issues, Pakistan's economic improvement is hindered by complex, multi-

faceted problems. Foreign investment remains low due to political instability, unpredictable policies, unreliable and expensive energy, and a slow judicial system prone to controversial rulings. Coupled with macroeconomic hurdles like high inflation and a severe balance-of-payments crisis, these factors create a highly risky environment for both local and international investors.

The time has come to draw the line. Pakistan's most influential institutions must take the initiative to put the nation back on the right path. The solution needs some bold & hard designs, extreme hard work and organized planning. This may be achieved by establishing a civilian government composed of patriotic politicians and technocrats, student representatives. Make combined and serious to revive long-term policies solely dedicated to the country's welfare.

Pakistan should take the initiative to establish a block of Muslim nations to mutually resolve their economic and defense challenges. Notably, Pakistan already has experience in building such alliances through the RCD.

Engineering Review: Where did you receive your education, and what is the best memory you would like to share with our readers?

Jalil ur Rehman: I hold a BS in Engineering from the International University of Missouri and am a Corporate Member of the Institution of Engineers, UK (MIE).

It was a truly memorable day when we rolled out the first "Proficient" automobile from our manufacturing facility.

Engineering Review: What is your opinion about the role of Engineering Review in highlighting and disseminating issues

related to Pakistan's engineering sector?

Jalil ur Rehman: The pioneering engineering magazine Engineering Review began publication in 1975 and quickly gained popularity within engineering circles. My father, a consulting engineer, was one of its earliest subscribers.

The ER founder demonstrated a profound dedication to the engineering field. I have personally witnessed the dedication of respected Mr. Najmul Hassan and Mr. Riaz ul Hassan. I was surprised to find them well informed with the confidential 'Proficient' project from its earliest stages, and stayed actively involved until the first vehicle was rolled out.

I appreciate that the current management continues to work with the same level of dedication. They are actively and intelligently utilizing social media platforms as well, to convey information and reports quickly and effectively. Additionally, they provide comprehensive coverage of industrial and engineering trade events. Furthermore, they share expert opinions on various issues to facilitate national development.

ER publications effectively highlight the progress of ongoing projects, future plans, government policies, and expert feedback. ER serves as a vital bridge among engineering consultants, contractors, manufacturers, importers, and suppliers. ER has also focused on bridging the gap between academia-industry as well the gap between the industry and government institutions.

I hope that ER will continue its efforts to highlight Pakistan's critical issues and provide viable solutions by collecting the opinions of professionals. ■






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My 35-Year Association with Engineering Review: A Journey of Inspiration, Innovation, and Collaboration

Prof Dr BS Chowdhry, S.I, Distinguished National Professor

It gives me immense pleasure and a deep sense of pride to write these few words on the occasion of the Golden Jubilee (50th Anniversary) of Engineering Review.

My association with Engineering Review spans more than thirty-five years, during which I have had the privilege of serving as its Honorary Consulting Editor and witnessing its remarkable transformation into one of Pakistan's most respected engineering and technology publications.

My journey with Engineering Review began in 1990, soon after I returned to Pakistan from the University of Southampton, United Kingdom, after completing my PhD. One of my earliest academic engagements was at the IEEE Students' Seminar held at Dawood College of Engineering and Technology (now Dawood University of Engineering and Technology, DUET), where the then Principal, Prof. Dr. Abdul Razzaq Memon, entrusted me with chairing one of the technical sessions.

During the event, I had the pleasure of meeting Mr. Najam-ul-Hasan, the visionary Founding Publisher of Engineering Review, for the very first time. I also met Mr. Riaz-ul-Hasan, the long-serving Editor of Engineering Review. Our discussions went far beyond the seminar itself and focused on a subject that has remained close to my heart throughout my academic career—the urgent need to strengthen university-industry collaboration, promote student innovation, and establish a

national platform where engineering students from across Pakistan could showcase their talents.

During our discussion, I proposed organizing an All Pakistan Engineering Students

Chancellor of DUET), who was then Chairman of the Department of Metallurgical Engineering at MUET, we successfully organized TECHNO'91—one of Pakistan's pioneering national engineering student events.



Seminar, Project Exhibition, and Competition under the aegis of TECHNO-91. Mr. Riaz-ul-Hasan warmly appreciated the idea and encouraged us to transform it into reality. Within a year, together with my esteemed colleague Prof. Dr. Faizullah Abbasi (later Vice

TECHNO'91 became a landmark event in Pakistan's engineering education history. It brought together students from engineering universities across the country to participate in technical paper presentations, project exhibitions, and competitions. The conference on

"Recent Developments in Diverse Uses of Computer Technology" was inaugurated by Mr. Nisar Memon, then Country Manager of IBM Pakistan, who later served as a Federal Minister of Pakistan. The grand inauguration of TECHNO'91 was graced by Justice Saeed-uz-Zaman Siddiqui, Acting Governor of Sindh and Chief Justice of the Sindh High Court, as the Chief Guest. The overwhelming success of this event demonstrated the tremendous potential of collaborative efforts among academia, industry, and professional engineering organizations.

Over the years, my professional engagements with organizations such as the Institution of Engineers Pakistan (IEP), the Institution of Electrical and Electronics Engineers Pakistan (IEEEP), IEEE Karachi Section, Pakistan Engineering Council (PEC), and various universities naturally strengthened my association with Engineering Review. Throughout these decades, Engineering Review became an indispensable part of my professional life.

Every fortnight, I eagerly looked forward to receiving the printed copy of Engineering Review on my desk. It served as an invaluable source of information on national and international engineering developments, emerging technologies, industrial innovations, product launches, engineering policies, and comprehensive coverage of major events organized by IEEEP, IEP, PEC, universities, and industry. The magazine was not merely a

Contd on page 73

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My 35-Year Association with Engineering Review: supplements. Topics such as industry-academia collabora-

Contd from page 72 publication—it became a valuable teaching resource that enriched my classroom discussions and helped me expose my students to contemporary technological advancements and professional developments beyond textbooks.

What has impressed me most over these three and a half decades is Engineering Review's continuous evolution. From a traditional engineering magazine, it has transformed into a modern multimedia platform with a strong digital presence, wider social media outreach, and comprehensive coverage of engineering, technology, education, and industrial affairs.

I particularly acknowledge the outstanding leadership of



Engr. Manzoor Ahmed Sheikh, the present Editor, whose vision, dedication, and journalistic excellence have elevated Engineering Review to new heights. Together with the committed efforts of Mr. Muhammad Salahuddin and the entire editorial team, Engineering Review has significantly enhanced both the quality and diversity of its technical content. Their insightful analyses of national engineering policies, higher education reforms, Pakistan Engineering Council initiatives, industrial development, and emerging technologies have made the publication an authoritative voice within Pakistan's engineering community.

One of Engineering Review's greatest strengths has been its commitment to addressing critical national issues through thoughtful editorials, expert opinions, and special thematic

tion, engineering education reforms, technological innovation, industrial modernization, and professional development have consistently reflected the publication's commitment to serving both engineers and policymakers. These contributions have earned Engineering Review its well-deserved reputation as an iconic engineering publication in Pakistan.

It has always been my privilege to contribute to Engineering Review whenever possible. More recently, I had the pleasure of introducing Engineering Review as an Associate Partner in our European Union Erasmus+ Capacity Building Project, CATCH_VR (Building Capacity in AR/VR and Digital Twin for Graduate Engineering Education), thereby extending its visibility within international academic and research collaborations.

As Engineering Review celebrates its remarkable Golden Jubilee, I wholeheartedly congratulate the entire team, its founders, contributors, readers, advertisers, and all those who have contributed to its outstanding journey over the past fifty years. The vision of Engr. Manzoor Ahmed Sheikh to further expand Engineering Review's presence across the Middle East, South Asia, and the global engineering community is both timely and commendable.

I sincerely pray that Engineering Review continues to

inspire engineers, researchers, educators, policymakers, industrial leaders, and future generations by promoting excel-



lence in engineering, innovation, technology, and professional development.

Congratulations on completing fifty glorious years of



excellence. May Engineering Review continue to illuminate the path of engineering and technological progress for many decades to come. ■

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From Business School to Smart Farming: Mahmood Nawaz Shah on Transforming Pakistan's Agriculture

The agricultural leader reflects on his journey from business education in the United States to farming in Sindh, highlighting the importance of smart agriculture, soil health, and why changing Pakistan's water management mindset is essential for the country's future.

For many Pakistanis, agriculture remains a traditional profession passed down through generations. For Mahmood Nawaz Shah, however, it became a conscious choice—one shaped by education, public service, and a desire to modernize one of Pakistan's most important sectors.

Educated in Hyderabad, Karachi, and later in the United States, Shah completed both his Bachelor's degree in Marketing and his Master's studies abroad before returning to Pakistan with ambitions of building a career in business. Yet, by the late 1990s, he found himself drawn toward his family's agricultural roots—a decision he describes as one of the most rewarding of his life.

"Unfortunately, there has always been a misconception that farming is for those who could not succeed elsewhere," he says. "I completely disagree. Agriculture is one of the most important professions in any country, and I have never regretted choosing it."

Beyond farming, Shah served on several public-sector boards, including the Federal Government's Privatisation Board, the Export Development Fund, and as one of the pioneering directors involved in establishing the Sindh Board of Investment. His broad experience eventually led him to the Sindh Abadgar Board, where, after more than 25 years of service, he was elected President.

According to him, higher education and international exposure significantly influenced his approach to agriculture—not by changing the fundamentals of farming, but by strengthening his management and decision-making abilities.

"Agriculture is not only about identifying pests or choosing fertilizers," he explains. "It is equally about management, strategy, and making informed decisions."

Today, Shah's farm cultivates sugarcane, mangoes, and vegetables. Over the years, he has focused on improving productivity on challenging soils while reducing water con-

sumption. Through better farming practices and management techniques, his operations have consistently remained among the leading producers in the region.

ture, and crop health in real time. Powered by solar energy and connected through GSM technology, the system allowed online monitoring of farm conditions.

"At that time, very few people in Pakistan were talking about precision agriculture," Shah recalls. "Today, many companies are active in this space, but we were fortu-

nate to be among the early adopters."

addressing two critical challenges: soil health and water management.

"Pakistan has some of the lowest levels of organic matter in its soils anywhere in the world," he says. "Healthy soil is the foundation of sustainable agriculture. Without it, even the best technologies cannot deliver long-term productivity."

He notes that Pakistan's harsh climate accelerates carbon depletion, making soil management significantly more difficult than in many other countries.

Equally concerning is the country's inefficient use of water. While Pakistan allocates nearly 95 percent of its available water to agriculture, its water productivity remains among the lowest in the region.

"For every cubic metre of water, Pakistan produces roughly 13 kilograms of agricultural output, while India produces more than 20 kilograms," Shah explains. "This is not simply a water problem—it is a mindset problem."

According to him, Pakistan has converted less than one percent of its farmland to high-efficiency irrigation systems, compared to approximately 12 percent in India. While initiatives supported by international institutions have faced implementation challenges, he argues that abandoning them would be a mistake.

"The biggest obstacle is our mindset," Shah concludes. "Whenever we discuss water, we immediately talk about dams and canals. Infrastructure is important, but efficiency is even more important. Unless we embrace modern agricultural practices, improve soil health, and change how we think about water, Pakistan's agricultural challenges will remain unresolved."

His message is clear: the future of Pakistani agriculture will depend not only on technology and investment, but on the willingness to rethink old assumptions and embrace a more sustainable path forward. ■



Driving Innovation in Electrical Engineering: Mubashir Shahid on Family Business, Technology, and the Future of Smart Solutions

ER: Thank you for your time. Let's begin by looking back at your journey. Where did you study, and what were your ambitions after graduation? Did you begin your career in the family business or elsewhere?

MS: I completed my schooling and intermediate education in Lahore before moving to the United Kingdom to pursue a degree in Electrical and Electronic Engineering with a specialization in Power Engineering.

From an early stage, I knew I wanted to build my career in this field because our family business was already operating in the electrical engineering sector. My education complemented the business, enabling me to contribute effectively upon my return.

It has been nearly 19 years since I joined the company. During this period, the industry has undergone significant transformation driven by technological advancements and the introduction of new products. We remain closely connected with the international companies we represent.

Their research and development teams keep us informed about emerging technologies, while we provide feedback from the Pakistani market to ensure solutions meet local requirements.



ER: Many Pakistanis who study abroad

choose to settle overseas. Since you studied in the UK, what motivated you to return to Pakistan?

MS: Everyone has different priorities, but I was fortunate to have a well-established family business waiting for me. My

grandfather, father, and uncles spent decades building the company, creating a strong foundation for future generations.

While remaining in the UK was certainly an option, returning to Pakistan felt like the right decision. There was an opportunity to contribute to and expand upon what previous generations had achieved, so I never seriously considered staying abroad.

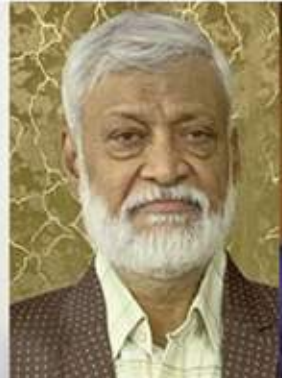
ER: Engineering has changed dramatically over the past two decades. How do you compare the industry then and now?

MS: Twenty years ago, most engineering systems were still analogue, and today's level of automation and connectivity did not exist. Our business focuses on energy, electrical safety, and security solutions. While artificial intelligence is not yet central to our sector, technologies such as programmable logic controllers (PLCs) and the Internet of Things (IoT) have transformed the industry.

Home automation, for example, has evolved from complex wired systems to simple Wi-Fi-enabled smart devices. Consumers can now control and integrate systems more easily, while manufacturers offer increasingly advanced and affordable solutions. Keeping pace with these technological developments remains a key part of our business strategy. ■

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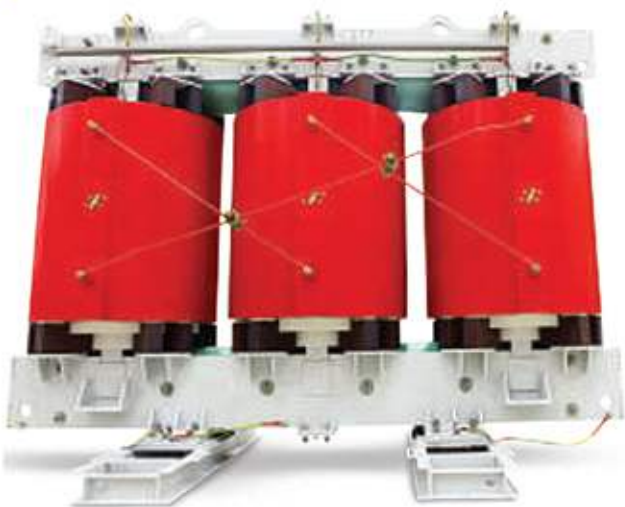

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ER: You have witnessed several decades of Pakistan's engineering and construction sector. How do you compare the engineering profession of the past with what we see today?

AR: I have seen Pakistan's engineering sector through many different eras. In earlier times, particularly during the Ayub Khan period, engineers placed tremendous importance on quality. Even when contractors won projects through competitive bidding, engineers would call them in and make one thing very clear: quality would never be compromised.

They understood that delivering quality work could sometimes result in financial losses for contractors. To balance this, they would try to compensate by assigning additional work or finding other legitimate ways to support them. The objective was simple—ensure that the project met the highest standards. Unfortunately, I believe that mindset has gradually faded. Today, in many cases, the priorities have changed, and quality does not always receive the attention it deserves.

ER: Could



Building with Integrity

Afzal Ur Rehman Reflects on Engineering, Accountability and Karachi's Infrastructure

you share any examples that illustrate the level of professional responsibility engineers once demonstrated?

AR: One example that has always stayed with me is the tunnel failure at the Tarbela Dam project. Although the problem was eventually rectified, the project engineer responsible for the work felt such a deep sense of professional responsibility that he took his own life. While I certainly do not present that as something to emulate, it reflected the extraordinary level of accountability engineers once felt toward their profession.

Another historical example comes from the British era, when a railway tunnel was being constructed in Balochistan. The tunnel was excavated simultaneously from both ends, with the expectation that the two sections would meet precisely. When it appeared that an error in alignment might prevent the two ends from connecting, the supervising British engineer was reportedly so devastated by the possibility of his professional failure that he ended

his life.

Today, we have seen massive infrastructure projects suffer enormous cost overruns and technical failures, yet very rarely do we witness anyone being held accountable. That decline in professional responsibility is something that concerns me greatly.

ER: Tell us about your own journey. Where did you study, and how did your professional career begin?

AR: My path was somewhat unconventional. I did not receive a formal university engineering education in the traditional sense, although I pursued AMIE qualifications. More importantly, I never worked as an employee.

Perhaps it was simply my temperament. I have always believed that if I have an idea, I should have the freedom to implement it. Employment never suited my personality. Although I received several attractive job offers, I declined all of them because I wanted to remain independent.

Interestingly, this was not something I inherited from my family. My family background was primarily in agriculture, public service and the judiciary. In those days, business was not viewed as a particularly prestigious profession. However, I preferred independence over employment, and that decision shaped my entire career.

ER: When did you establish your own business, and how did it evolve over the years?

"I have known Engineering Review since its inception. It has consistently done remarkable work for engineers and Pakistan's industrial sector."

AR: I started my business in 1969 and have remained self-employed ever since.

Over the years, I worked in several different sectors. I was involved in horticultural exports, marble exports, real estate development, trading and construction. We also represented engineering-related companies from Japan, Italy, other European countries and China in Pakistan.

Eventually, construction became our primary focus, while engineering-related trading continued alongside it. This diversified experience helped us build both technical expertise and business strength.

ER: Looking back at your career, which projects remain your proudest achievements?

AR: One project that I remember with great satisfaction was the Greater Karachi Water Supply Scheme, where we completed a 65-million-gallon-per-day water supply project in the early 1990s.

As part of that project, we installed an 84-inch diameter pipeline. I am proud to say that from the day it became operational until today, that pipeline has never developed a leak. Considering that many other water pipelines require frequent repairs and often suffer bursts, this remains one of the achievements I value the most in my professional career.

ER: Since we are discussing Karachi's water infrastructure, what is your assessment of the K-IV water supply project?

AR: The technical capability certainly exists, and there are competent engineers working on the project. However, in my opinion, the real issue is not engineering—it is ownership and governance.

Any city develops when those responsible truly consider it their own. Unless Karachi receives that level of commitment from the institutions responsible for it, projects like K-IV will continue to face delays regardless of the technical expertise available.

For me, the central question is not whether the engineers are capable, but whether there is sufficient institutional ownership and determination to see such projects through to successful completion. Without that commitment, even well-designed projects struggle to achieve their intended objectives. ■

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Engineering Review: In the aftermath of the Middle East war, Pakistan's fault lines and weaknesses regarding self-sufficiency have become evident. What would you suggest to policymakers about which sectors of the economy, especially engineering sectors, should be revitalized?

Rabia Rehman: Recent geopolitical events have reinforced the importance of self-reliance. Pakistan has immense potential, but we need to move beyond being a consumer economy and become a producer of technology and engineered solutions.

I believe policymakers should prioritize advanced manufacturing, industrial automation, semiconductor support industries, renewable energy technologies, precision engineering, medical devices, and agricultural engineering. Alongside manufacturing, investment in software engineering, artificial intelligence, cybersecurity, and industrial digitalization is equally important because modern engineering is no longer limited to machines. It is powered by data and technology.

The government should also encourage public-private partnerships, support engineering startups through incentives, simplify regulations for innovators, and increase funding for research and commercialization.

ER: Where did you receive your education, and what is the best memory you would like to share with our readers?

RR: I completed my schooling at The City School, Karachi, where I developed my curiosity, confidence, and love for learning. I then pursued both my Bachelor's and Master's degrees in Computer Science from Iqra University, Karachi.

One of my most cherished memories from my university years was not limited to a single classroom or project. It was discovering that technology could be used to solve real business problems. I enjoyed working on group assignments and presentations because they taught me that success comes from collaboration, communication, and understanding people as much as understanding technology. Those experiences shaped my leadership style and eventually inspired me to build my own company.

Looking back, education gave me much more than academic knowledge. It taught me resilience, adaptability, and the confidence to create opportunities instead of waiting for them.

ER: What kind of engineering and industrial environment did you encounter after completing your education, and what changes do you observe in modern engineering and industrial



Beyond Technology: Rabia Rehman on Leadership, Innovation, and Pakistan's Engineering Future

practices in Pakistan today?

RR: After graduation, I began my career as a content writer, working closely with technology companies and learning how businesses communicate innovation to the world. That experience gradually introduced me to software development, digital transformation, and technology-driven industries from a business perspective.

Eventually, I founded Hyperminds, a digital marketing agency that specializes in helping technology companies, startups, SaaS businesses, and engineering-driven organizations build their brands and generate business globally.

Today, Pakistan's engineering and industrial sectors have evolved significantly. There is far greater awareness of digital transformation, automation, artificial intelligence, cloud technologies, and data-driven decision-making than there was a

decade ago. Many engineering companies now understand that technical excellence alone is not enough. They also need global branding, digital visibility, and strategic marketing to compete internationally.

The challenge now is not capability but scalability. Our engineers are highly talented, but we need stronger systems that help convert innovation into globally competitive products and businesses.

ER: What would you suggest to bring industry and academia closer together, and do you think the present model of collaboration is producing meaningful results?

RR: While there has been progress, there is still a considerable gap between academia and industry.

Universities should involve industry professionals in curriculum development, encourage students to work on real industrial challenges, and make internships and industry-led research an essential part of higher education rather than an optional activity.

Similarly, industries should invest time in mentoring students, offering research opportunities, and collaborating with universities beyond recruitment drives.

Innovation flourishes when students experience practical problem-solving before they graduate. The current collaboration model is improving, but it remains fragmented.

ER: What is your opinion about the role of Engineering Review in highlighting and disseminating issues related to Pakistan's engineering sector?

RR: I believe Engineering Review plays an important role in giving visibility to the engineering community and encouraging meaningful dialogue around industrial growth, technological advancement, and innovation.

Engineering is one of the strongest foundations of economic development, yet the achievements, challenges, and opportunities within the sector often do not receive the attention they deserve. Publications like Engineering Review bridge that gap by connecting industry leaders, policymakers, academia, and young professionals on a common platform.

By highlighting success stories, emerging technologies, policy discussions, and industry challenges, Engineering Review contributes to building a stronger engineering ecosystem and inspires future generations to pursue innovation that can positively shape Pakistan's economy. ■

Engineering Review plays an important role in giving visibility to the engineering community and encouraging meaningful dialogue around industrial growth, technological advancement, and innovation.

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ER: Thank you for joining us. We'd like to learn about your professional journey. After graduating as a civil engineer, every young engineer enters the field with dreams and ambitions. When you left university and stepped into practical engineering, what was the industry like? How different was engineering then compared to today?

Engr. Bushra Nadeem: The difference is remarkable—not just in engineering, but in almost every aspect of life. When I graduated in 1986, even a calculator was considered an advanced tool. Today, everyone carries far more powerful technology in their pocket.

My father was one of the pioneers of engineering consultancy in Pakistan, and after graduation he invited me to join him in the business. One of the first things we did was purchase our first computer in 1987. At that time, we were still learning the basics—even simple formatting on a computer seemed challenging. Today, however, complete structural calculations can be completed within minutes.

In those days, engineers relied much more on their

own analytical skills and understanding of engineering fundamentals. While today's software is incredibly efficient, I sometimes feel that younger engineers depend heavily on technology and may not always have the same command of the basic engineering formulas. The principles haven't changed—only the tools have.

ER: So your career began alongside your father in the consultancy business?

BN: Yes. My



From Drawing Boards to Digital Design

Drawing on nearly four decades of experience, Engineer Bushra Nadeem discusses the transition from traditional engineering practices to today's technology-driven construction industry.

father taught me how to work as an engineer, and I spent nearly 28 years in engineering consultancy.

remain in one place throughout their career. Construction offered a new challenge, and I'm grateful that the company has continued to grow

that experience like?

BN: We belong to a generation that experienced both worlds firsthand. For example, in surveying, we started

rapidly transforming engineering. Many people fear automation will reduce employment opportunities.

ment in construction. On the contrary, I believe it will create new opportunities.

Instead of trying to resist technology, we should focus on educating people so they can develop the skills required for the future. New technologies require engineers, quantity surveyors, project managers, and digital specialists who understand how to use them effectively.

Even if some traditional jobs change, many new and better-paying roles will emerge. As workers acquire new skills and move into more advanced positions, their standard of living should also improve. Technology should be viewed as an opportunity to grow rather than something to fear.

ER: Having worked through every stage of this technological evolution, what advice would you give to young engineers?

BN: Master the fundamentals first, and then embrace technology. Software and artificial intelligence are powerful tools, but they should complement engineering knowledge—not replace it. Engineers who understand the basics and are willing to adapt to new technologies will always remain valuable to the profession. ■

When I graduated from university and joined my father's company, Najam Sahib was already a familiar presence there. He accomplished something truly remarkable by bringing together engineering and journalism—a rare combination—and devoted immense effort and dedication to building Engineering Review into the institution it is today.

About 12 to 15 years ago, I decided to move into the construction sector. I believe every professional should continue to grow rather than

successfully.

ER: You've witnessed the complete transformation from manual engineering to digital technology. What was

with plane table surveys, manually measuring and mapping sites. Later, we adopted total stations and modern surveying equip-

What is your perspective, particularly for the construction industry?

BN: I don't believe technology will reduce employ-

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Rethinking Restructuring: Why Organization Design Matters More Than Layoffs

Why Pakistan's Rising Cost of Labour Demands Better Organization Design, Not Bigger Layoffs

By: Syed Shoaib (PHR), KFLA™

Pakistan's corporate boardrooms are facing an uncomfortable reality. Although inflation has eased from the historic highs witnessed over the past two years, the pressure on businesses has not. Labour costs continue to rise, energy prices remain volatile, imported raw materials remain expensive, and employees understandably expect salaries to keep pace with the increasing cost of living. For many organizations, the immediate response is predictable: freeze hiring, reduce headcount, or launch another restructuring exercise.

Yet history repeatedly demonstrates that restructuring alone rarely solves financial pressure. What determines success is not whether an organization restructures, but how it restructures.

According to the Federal Budget 2026-27, the government expects average inflation to remain at 8.2% during the current fiscal year while proposing a 10% increase in the national minimum wage (Source: Dawn, June 2026). This was followed by the recommendation from the Pakistan Institute of Development Economics (PIDE), which proposed a 12.5% increase in the minimum wage to better reflect prevailing economic realities, as reported by Dawn.

For employers, these figures represent far more than economic statistics; they translate directly into higher payroll costs that ultimately affect the bottom line.

Consider a manufacturing company

employing 1,000 workers. A monthly increase of Rs5,000 per employee would raise annual payroll expenditure by approximately Rs60 million, even before accounting for EOBI, social security contributions, gratuity, overtime, bonuses, leave encashment, and the inevitable salary compression adjustments required across higher grades. Similar pressures are being experienced across engineering, construction, manufacturing, logis-



tics, utilities, and infrastructure sectors.

Meanwhile, production costs continue to challenge industry. Pakistan's manufacturing sector has shown encouraging signs of recovery, with overall manufacturing growing by 6.6% and Large-Scale Manufacturing expanding by 6.5% during FY2025-26.

(Dawn) Yet higher production does not automatically translate into higher profitability. Rising labour expenses, energy tariffs, imported inputs, financing costs, and regulatory compliance continue to squeeze operating margins.

This is precisely where many organizations make costly mistakes.

When financial pressure intensifies, restructuring often becomes synonymous

with downsizing. Departments are merged, positions are eliminated, reporting layers are compressed, and hiring freezes are imposed. While these actions may temporarily reduce payroll expenses, they frequently overlook a more fundamental question:

Are we paying for the right work, or simply paying fewer people?

The relationship between strategy and organization design is much like that between an architectural blueprint and a building's structural framework. Strategy defines what the organization intends to achieve, while the structure enables it to achieve those objectives. Just as a structural engineer would never remove steel or concrete to cut costs without understanding their role in supporting the building, organizations should never eliminate positions or budgets without first understanding how every function and role contributes to executing the business strategy.

Once the organization defines the strategy, the organizational structure determines how work should be organized to achieve those objectives. Aligning the organizational structure with the business strategy enables leaders to objectively evaluate roles based on their contributions rather than on job titles, tenure, or the individuals who occupy them. Without this alignment, organizations risk inefficiencies, duplicated effort, unclear accountability, and unnecessary cost. Only then can restructuring decisions improve efficiency while preserving the capabilities needed to execute the strategy.

The missing piece in many restructuring initiatives is job evaluation; it transforms restructuring from intuition into science.

Job evaluation provides the analytical discipline required to support effective restructuring. Rather than relying on job titles, tenure, or individual incumbents, a structured job evaluation assesses the relative value of each position using objective compensable factors such as know-how, problem-solving, accountability, responsibility, decision-making authority, and organizational impact.

When integrated with organization design, job evaluation helps validate the new structure by ensuring that roles are appropriately sized, reporting relationships are logically aligned, overlaps and unnecessary layers are identified, career paths are clearly differentiated, and compensation reflects each role's relative contribution to the organization.

The outcomes of job evaluation provide the foundation for a logical grading structure and an equitable compensation framework. They ensure that employees are rewarded according to the value of the role they perform rather than the title they hold or the number of years they have served. More importantly, they strengthen internal equity, improve transparency, and provide employees with clearly defined career progression pathways.



Viewed in this way, restructuring is not an exercise in reducing headcount; it is an exercise in improving organizational effectiveness. Workforce optimization should therefore be the outcome of sound organization design. Otherwise, organizations risk removing critical capabilities while leaving the real structural inefficiencies untouched.

Engineering organizations illustrate this particularly well. Consider a manufacturing plant where multiple supervisors oversee nearly identical production activities across different shifts, each with its own administrative staff. Rather than eliminating technical expertise, a comprehensive organizational review may reveal opportunities to streamline supervisory layers, consolidate administrative support, automate routine reporting, redefine spans of control, and improve decision-making. The result is lower operating costs without compromising operational excellence, quality, or safety.

The same principle applies equally to project engineering firms, EPC contractors, utilities, and construction companies.

Additionally, today's business environment also demands a shift from labor-intensive growth to productivity-led growth. As automation, artificial intelligence, digital engineering, industrial analytics, and smart manufacturing become increasingly common, organizations will compete less on workforce size and more on workforce capability. Successful organizations will not necessarily employ fewer people; rather, they will employ the right people, in the right roles, performing the right work.

Pakistan's economic landscape is sending a clear message. Rising wages, persistent inflationary pressures, and increasing production costs are unlikely to disappear soon. Organizations that continue to respond with reactive downsizing may achieve temporary financial relief but risk weakening their long-term capabilities and competitiveness.

Those that invest in aligning strategy with organization design, supported by disciplined job analysis, objective job evaluation, equitable grading structures, and strategic workforce planning, will be far better positioned to manage costs while strengthening performance.

Inflation increases the cost of doing business, but poor organization design increases the cost of inefficiency. In an economy where every rupee matters, the smartest investment is not simply reducing payroll; it ensures that every role creates measurable value and directly contributes to executing the organization's strategy. ■

The author is an HR Transformation and Organization Development professional with over two decades of experience across Pakistan and Saudi Arabia. His work focuses on organization design, job evaluation, workforce planning, competency mapping, and technology-enabled organizational effectiveness.

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Waqas Farooqi: Engineering Entrepreneurship in the Age of AI

For Waqas Farooqi, the path from engineering graduate to business leader has been defined by difficult choices, continuous learning, and a belief that entrepreneurship is ultimately about creating opportunities for others.

Today, as Head of Business Development at FRP Engineers, Farooqi looks back on more than two decades of professional experience with a sense of gratitude and perspective. "When you spend twenty years in professional life, it becomes important to revisit your decisions," he says. "You realize that every choice, every challenge, and every setback has contributed to making you who you are today."

A Chemical Engineering graduate from the UET, Lahore, Farooqi completed his studies at a time when multinational companies in the oil and gas sector were offering some of the most sought-after career opportunities for young engineers. He had several promising job offers in hand.

Yet, instead of pursuing the conventional route, he chose to join his father's startup—a modest family business founded by a fellow chemical engineer.

"It was a crossroads moment," he recalls. "A corporate career offered security and prestige, but building a business offered purpose."

The decision was far from easy. Unlike a traditional engineering role, entrepreneurship demanded expertise across multiple disciplines. In addition to technical knowledge, he had to learn management, finance, costing, and regu-

latory compliance, while navigating the complexities of doing business in Pakistan.

"There are no Sundays. Problems don't arrive on schedule—they come unexpectedly, and each one is different from the last."

Despite the challenges, Farooqi says entrepreneurship has given him something that a salaried position could not: the opportunity to create employment. "The greatest satisfaction comes from knowing that you are helping other people build their lives and support their families."

His career has also unfolded during one of the most transformative periods in technological history. He recalls spending months visiting libraries across Lahore to gather research material for his final-year project.

"Today, the same work can be done in minutes from your desk," he says.

Recognizing the importance of digital transformation, FRP Engineers has adopted enterprise technologies, including an AI-enabled ERP system. Farooqi believes that AI will redefine the future of business.

"It is now a war of data," he says. "The companies that survive will be the ones that organize, understand, and leverage their data effectively. AI is not just a tool—it is becoming a necessity."

For Waqas Farooqi, the future belongs to organizations that embrace innovation while remaining committed to the people they serve. ■



From Veterinary Medicine to Energy Solutions: A Lifetime of Sales, Innovation, and Leadership

At 69, Sohail Rana prefers to describe himself as a "young man," a reflection of his enduring enthusiasm for work and life. With a career spanning more than four decades, his journey from veterinary medicine to the energy sector is a testament to adaptability, passion, and lifelong learning.

His professional story began in 1980

after earning a Doctor of Veterinary Medicine (DVM) degree from Lahore's Veterinary College, now the University of Veterinary and Animal Sciences. Although he entered the veterinary profession at his father's encouragement, he soon realized that his true calling lay elsewhere.

"I always believed I was born to be a salesman," he recalls. Even during his brief stint as a veterinarian, he found himself more interested in selling poultry feed than practicing medicine.

In 1982, he moved to Singapore to pursue a career in sales and marketing. Over the years, he broadened his expertise through postgraduate studies in Gemology in the United States and professional marketing courses in Germany, France, Japan, and the UAE. In 2007, he returned to Pakistan to join Orient Energy, where he eventually became

General Manager for the Northern Region, leading a team of approximately 250 professionals. After nearly a decade with the company, he joined Power Vision, where he continues to contribute his vast experience.

Having witnessed the evolution of technology firsthand, Rana considers himself fortunate to have lived through every major

technological transition—from push-button radios and film cameras to artificial intelligence. He proudly recalls introducing Pakistan's first XT computer and one of the country's earliest fax machines. During his 19 years in Dubai, he also helped install the first fax machine aboard an Emirates aircraft.

Throughout his career, he has contributed to

several landmark projects, including the introduction of Jenbacher gas generators in Pakistan, the supply of 200 MW of generation capacity to KESC, and major wind energy initiatives across Sindh and Balochistan.

Today, at Power Vision, he remains committed to promoting environmentally responsible power solutions, proving that passion, innovation, and leadership have no age limit. ■



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This milestone marks the first time a cable of such high-voltage grade manufactured in Pakistan has been certified by KEMA. The KEMA type test, which is conducted in the Netherlands, is the global gold standard in energy testing.

For decades, Pakistan Cables has been synonymous with uncompromised quality. By securing this prestigious seal of approval, the company not only elevates domestic manufacturing capabilities but also reinforces its position as Pakistan's largest exporter of wires and cables.

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Pakistan Cables holds the distinct honour of being the first wires and cables manufacturer in Pakistan to attain a KEMA certification back in 1984. The latest 35KV achievement puts a definitive stamp on the Company's quest to continue to lead and innovate.

Commenting on this landmark achievement, Fahd K. Chinoy, CEO, Pakistan Cables, stated:

"Securing the KEMA certification for our 35KV Medium Voltage cables is a triumph for our team and a proud moment for Pakistan. In 1984, we pioneered the KEMA standard in Pakistan. Today, we have stretched the horizon of what is possible locally. This achievement is not just a certificate; it is an enduring promise of safety, performance and world-class capability."

All up-to-date KEMA certifications are available on the Company's website.

Elevating the Infrastructure Standard

The KEMA certification provides an independent, globally recognized validation that Pakistan Cables' 35KV MV cables can withstand extreme operational stress, ensuring

maximum safety, reliability, and longevity for major infrastructure, industrial, and utility projects.

As an icon of quality, Pakistan Cables continues to blend its rich heritage with forward-looking innovation, ensuring that the nation's grid is powered by sophisticated, world-class engineering and that we continue to lead the way for cable exports.

About Pakistan Cables Limited

Founded in 1953, Pakistan Cables is the premier and most reputable cable manufacturer in Pakistan. As the first wire and cable manufacturer listed on the PSX since 1955, the company is driven by a commitment to innovation, quality, and ethical business practices. It manufactures a wide range of international-standard cables, wires, and copper products, serving as a trusted partner in the nation's growth. It is also a member company of the Amir S. Chinoy group. The company has the largest geographical footprint in Pakistan and is the nation's largest exporter of wires and cables. It is ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007 certified and various cables type tested by KEMA, Netherlands.

About KEMAPakistan

Founded in the Netherlands in 1927, KEMA's testing laboratories were later part of DNV GL, and in 2019/2020, the KEMA High-Power and High-Voltage Laboratories were acquired by CESI, a global leader in energy engineering and testing. Today, it operates globally under the KEMA Labs (a division of CESI) brand. KEMA is universally recognized as the world's leading, independent testing, inspection, and certification authority for high-voltage and medium-voltage electrical components such as cables, transformers, and switchgear. A KEMA Type Test Certificate is not just a standard safety check; it is an exhaustive, highly rigorous destruction and endurance test. Passing it proves that a product's design and manufacturing quality can withstand extreme electrical, thermal, and mechanical stress under real-world, high-risk conditions. ■

Engineering Review at 50: A Golden Legacy of Trust, Excellence, and Innovation

By Muhammad Hasan Masood

Fifty years is not just a milestone for any publication—it is the reflection of a journey built on vision, commitment, credibility, and the confidence of its readers. As The Engineering Review – The Voice of Engineers celebrates its Golden Jubilee, it is a fitting moment to acknowledge the extraordinary contribution of a publication that has remained an important part of Pakistan's engineering and industrial sector for half a century.

Since its launch in October 1975, Engineering Review has consistently served as a reliable source of information for engineers, architects, consultants, contractors, manufacturers, policymakers, and industrial professionals. Long before technical journalism became common in Pakistan, the publication recognized the need for a dedicated platform where stakeholders come together.

This remarkable initiative was the vision of the Najam ul Hasan sb, whose contribution to engineering journalism deserves lasting recognition. He was much more than a publisher; he was a mentor, a guide, and a respected professional who believed that quality journalism could contribute to national industrial development. His dedication and

foresight laid the foundation of an institution that continues to earn the respect of the engineering community even today.

Many professionals who had the privilege of working with him or learning under his guidance are now serving in leading positions in their fields. That, perhaps, is one of the greatest measures of his legacy.

My association with the Najam Sb was not limited to professional interaction. It was a relationship built on mutual respect, trust, and affection that continued for nearly three decades. During those years, I had the opportunity to witness his humility, integrity, discipline, and unwavering commitment to excellence. Those memories remain among the most valuable experiences of my professional life.

Over the last fifty years, Engineering Review has evolved far beyond the role of a newspaper. It has become an important archive of Pakistan's engineering progress, documenting industrial development, technological innovation, infrastructure projects, engineering achievements, and emerging market trends that continue to shape the country's future.

One of the publication's greatest strengths has been its willingness to evolve with time. While preserving its editorial values, it has successfully embraced the digital era through its website, LinkedIn, YouTube, Facebook and other social media platforms. The mission with which it began five decades ago remains unchanged, but today it reaches a much wider audience through modern channels of communication. These initiatives have enabled Engineering Review to connect with a younger generation of engineers

while continuing to serve its long-standing readership.

At a time when information is available everywhere but credibility is increasingly rare, the reputation earned by Engineering Review over fifty years has become one of its greatest strengths. Trust cannot be achieved overnight. It is built patiently through integrity, consistency, and professional responsibility—qualities that have always defined this publication.

On this memorable occasion, I extend my heartfelt congratulations to the management, editorial team, contributors and readers. I also pay my sincere tribute to Najam sb, whose vision and dedication transformed an idea into one of Pakistan's most respected engineering publications.

"Institutions are not remembered because of the buildings they occupy or the brands they create. They are remembered because of the vision they uphold, the values they protect, and the trust they earn. For fifty years, Engineering Review has exemplified all three." ■

About the Author

He is Managing Partner of Industrial Source Book of Pakistan, he is also Organizer of PAK-INDUSTRIA EXPO & Conference, Pak Events & Exhibition. He is a Digital Creator and Content & Storytelling Specialist.



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Jamal Nasir: Balancing Engineering, Business, and the Human Element in the Age of AI

For Jamal Nasir, leadership is not simply about running a successful family business—it is about continuously learning, adapting, and maintaining the balance between technological advancement and human values.

An Electrical Engineering graduate from the University of Engineering and Technology (UET) Lahore, Class of 2004, Nasir's professional journey did not begin in the family enterprise. At the advice of his father, he first entered the corporate world to gain practical experience before taking on the responsibilities of the business.

He joined Avanceon as a Technical Support Engineer, becoming the first fresh graduate inducted into the department. Working closely with his supervisor, he gained valuable exposure to engineering and problem-solving during his year with the company. However, as responsibilities within the family business grew, he was encouraged to become more actively involved.

Determined to prepare himself for the challenges ahead, Nasir adopted an academic approach to business. After a brief stint teaching at UET Lahore, he enrolled in the MBA program at the Lahore University of Management Sciences (LUMS). What he initially believed would be a straightforward transition from engineering to business studies quickly proved otherwise.

"I underestimated how demanding an MBA would be," he recalls. "It was an extremely rigorous and disciplined experience that completely changed the way I viewed management and leadership."

After completing his MBA in 2008, Nasir

formally joined the family business. At the time, the company operated from a showroom on Lahore's Brandreth Road. Believing that growth required a more professional environment, he helped establish an office in Model Town. Over the years, the organization expanded its operations, developed specialized departments, and broadened its engineering capabilities.

The transition from a corporate and academic environment into a family business was not without its challenges. Nasir admits that he initially tried to apply corporate systems directly to a family-owned enterprise, only to discover that family businesses have their own culture and rhythm.



"You have to know when to insist on an idea and when to respect tradition," he says. "If your intentions are sincere and you remain committed, Allah makes the path easier."

Reflecting on the technological changes of the past

two decades, Nasir believes society has moved through three defining eras: the pre-smartphone age, the smartphone revolution, and now the age of artificial intelligence. While AI is transforming businesses and increasing efficiency, he warns against becoming overly dependent on technology.

"AI is a powerful tool, but businesses are still run by people," he says. "Human judgment, ethics, patience, and problem-solving cannot be replaced. My biggest concern is that as technology grows stronger, our human capabilities may become weaker. That is a trend we must address."

For Jamal Nasir, the future belongs not only to those who embrace technology, but to those who preserve the human qualities that make innovation meaningful. ■

Conflict, Self-Reliance, and the Future of Engineering in Pakistan

Recent geopolitical tensions have served as a reminder of Pakistan's vulnerability to global disruptions, particularly its dependence on imported technologies and energy resources. According to Mohammad Usman Farooq, a leading engineering professional and UET Lahore alumnus, the lessons learned from recent conflicts should encourage Pakistan to accelerate efforts toward industrial self-reliance and stronger coordination between industry, academia, and policymakers.

He noted that Pakistan remains heavily dependent on imports across multiple engineering sectors, including electrical, mechanical, plumbing, information technology, and semiconductors. During the recent conflict, import routes were disrupted, delivery timelines extended, and several critical shipments were delayed or stranded altogether.

"Our import dependency has become one of our biggest challenges," he said. "When international supply chains are affected, the impact is immediately felt by businesses and ultimately by ordinary citizens."

Energy security is another area requiring urgent attention. Pakistan's reliance on

imported oil and gas leaves the country exposed to fluctuations in global prices. The recent rise in energy costs demonstrated how external events can directly affect households and industries alike. He emphasized the need to make greater use of indigenous resources, particularly hydropower and solar energy, to minimize future risks.

While acknowledging that serious efforts are underway across various min-



istries, departments, and institutions, he stressed that a lack of coordination remains a major obstacle. "Everyone understands the significance of the issue, but we need a coordinated national effort to produce meaningful results," he remarked.

The engineering sector also faces challenges related to foreign exchange volatility and project execution. Large engineering projects often span two to three years, making them particularly vulnerable to currency fluctuations and import-related disruptions.

Equally concerning is the gap between academic training and industry requirements. Although Pakistani engineers are highly regarded internationally, many fresh graduates enter the workforce without sufficient practical experience. He called for greater industry-academia collaboration, including internships, research partnerships, and faculty members with hands-on industrial experience.

Organizations such as the Pakistan Engineering Council and the Institution of Engineers Pakistan have launched initiatives to address these challenges, including graduate training programs and employment opportunities for young engineers.

His own organization contributes through internships, CSR-based training initiatives, and engineering services spanning electrical, mechanical, IT, and public health sectors. The company also manufactures smart AMI meters, switchgear solutions, and supports emerging IT startups.

"For Pakistan to thrive," he concluded, "engineering must become a national priority driven by innovation, collaboration, and self-reliance." ■

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"When you aim for perfection, you find out it is a moving target."

- George Fisher

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FORTNIGHTLY
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بقیہ: ہم بھی اس کہانی کا کردار ہیں

اس دوران امی کے جنیوری وہ ڈانٹنگ نیکل جس کے گرد بیٹھ کر ہم چٹے چٹا کر رہے تھے وہ بھی اب کے دفتر شفٹ ہو چکی تھی۔ کبھی کبھی امی اس میز کی یاد میں بھی آجیں جھرتیں۔ وہ میز کچھ عرصے بعد واپس آگئی اور آج تک ہمارے گھر کا حصہ ہے۔ آج ہمارے بچوں کے لیے وہ صرف ڈانٹنگ نیکل ہے شاید ایک اولڈ فیشن ڈانٹنگ نیکل لیکن ہم بہن بھائیوں کے لیے وہ یادوں کا خزانہ ہے۔ ابو کو اقبال پڑھتے اور مردھنتے دیکھا۔ اسی میز پر ابو کو فخر کے بعد قرآن پاک تفسیر کے ساتھ پڑھتے دیکھا۔ بیٹیں بیٹھ کر ابو نے اپنی یادداشتیں بھی قلمبند کیں۔ ہاں فخر کے بعد ناشتے سے پہلے چائے کے پیپلے کپ سے بھی تو امی ابوبیٹیں بیٹھ کر لطف اندوز ہوتے تھے۔ سن امی کی دہائی کے اوائل میں چچا جان ریاض الحسن مرحوم بوجہ اسلام آباد شفٹ ہو گئے اور امی دہائی کے وسط میں ان کی کراچی واپسی ہوئی۔ یہ ضرور یاد ہے کہ چند بار ہم ابو کے دفتر گئے۔ اس وقت انجینئرنگ روڈ کا دفتر پاکستان انسٹی ٹیوٹ آف انٹرنیشنل انفراسٹرکچر (پی آئی آئی اے) کی عمارت میں ہوا کرتا تھا۔ چھوٹا سا کمرہ تھا اس میں دو میزیں ایک غالباً ابوبی اور دوسری بھتیجی کی اور ہماری امی کی ڈانٹنگ نیکل موجود ہوا کرتی تھی۔ دفتر جانے کے دو بنیادی محرکات ہوا کرتے تھے، ایک تو ابوبی گھومنے والی کرسی پر بیٹھنا اور دوسرے بابر کا کھانا کھانا جس کا اس زمانے میں ہمارے گھر میں تو کم از کم اور عواماً حاشے میں کوئی رواج نہ تھا۔

سن 1987 میں میرے میٹرک کے امتحانات کے بعد ملنے والی تعلیمات میں ابو اور چچا جان نے مجھے ایک نئے کام پر لگا دیا۔ انجینئرنگ روڈ کے لئے جو انٹرویوز کیے جاتے تھے وہ عموماً میپ ریکارڈر پر ریکارڈ کیے جاتے تھے۔ چچا جان مرحوم کی یادداشت کمال کی تھی اور انہیں اپنی یادداشت پر پھر ورس بھی بہت تھا۔ وہ جو انٹرویوز کرتے تھے اس کو سن و سن کا فائدہ پر منتقل کر لیا کرتے تھے۔ ان ریکارڈ شدہ انٹرویوز کو کاغذ پر لانے کا کام مجھے یا میرے بھائی محمد علی کے سپرد کیا جاتا تھا۔ ٹرانسکرپشن کا یہ عمل بھی ہمارے اور خاص طور پر میرے لئے سکھائی کا بڑا ذریعہ بنا۔ آج کے بچے تو میپ ریکارڈر سے واقف نہیں ہوں گے لیکن مجھے یاد ہے سی ڈی ایکس کی ٹیسٹس ہوتی تھیں چھوٹا سا ایکس پی ریکارڈر ہوتا تھا اور ٹیکسٹ کو بار بار ریو ایڈ کر کے لکھنا پڑتا تھا۔ ساتھ ہی ہدایت تھی کہ جملے کی ساخت پر بھی

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اس دوران میرا انٹرمیڈیٹ ہو گیا۔ جامعہ کراچی میں شعبہ ابلانغ عامہ سے میرے صحافتی سفر کا آغاز ہوا۔ چار سال اس شعبے میں گزارے اور ساتھ ساتھ بہت کچھ لکھا۔ اس کے لیے انہوں نے "ہیں" کب رپورٹر" (Cub Reporter) کا اعزاز عہدہ دیا۔ ایڈیٹر، اسٹنٹ ایڈیٹر، سب ایڈیٹر وغیرہ جیسے الفاظ سے تو ہم سب مانوس تھے لیکن "کب رپورٹر" کی اصطلاح ہم سب کے لئے نئی تھی۔ چچا جان نے وضاحت کی کہ "کب" (Cub) شیر کے بچے کو کہا جاتا ہے اور بطور صحافی کام کرنا میری سی ڈی ایئر کی قضا کرتا ہے اس لئے انہوں نے ہمیں "کب رپورٹر" کا نام دیا ہے۔ کچھ دن ان کے ساتھ کام کر کے معلوم ہوا کہ کام بھی شیر کی کچھار میں ہی کرتا ہے۔ مکی سطح پر انجینئرنگ کے بہترین شمارہ میں بطور "کب رپورٹر" کام کرنا اور پھر نام کا بچپنا یہ ہم پہلے علموں کے لیے بہت بڑا اعزاز تھا۔ ڈگری مکمل ہونے کے بعد دیگر سماجی تو اپنی اپنی راہ چلے گئے لیکن میں نے انجینئرنگ روڈ میں جو ان کرنے کا فیصلہ کیا۔ ایسا نہیں تھا کہ میرے اوپر کوئی دباؤ تھا کہ مجھے اپنا خاندانی ادارہ دوسری شکل ہونا ہے۔

بطور اسٹنٹ ایڈیٹر میں نے 1993 میں انجینئرنگ روڈ کو جو ان کیا یہ سفر قریب پانچ سال جاری رہا اس وقت لگتا تھا کہ یہ ایک مہر آرماء عرصہ تھا۔ اپنے مہربان ترین رشتوں کو سخت باسز کی صورت میں دیکھنا کڑی آزمائش محسوس ہوتا تھا۔ آج لگتا ہے کہ وہ پانچ سال ہی پیشہ ورانہ زندگی کے روشن ترین سال ہیں کہ آئندہ آنے والے سالوں میں میرے لئے چراغ راہ رہے اور آج بھی ہیں۔ میری ذمہ داری خجروں کی ری رائٹنگ تھی۔ وسائل کی کمی کے باعث انجینئرنگ روڈ کے پاس بہت زیادہ پورٹرنٹس تھے۔ میری ذمہ داری یہ تھی کہ میں روزنامہ ڈان اور بزنس ریکارڈر کے بزنس صفحات پر چھپنے والی انجینئرنگ سے متعلق خبروں کو نکالوں، ان کا انتخاب کروں اور ان کو ری رائٹ کروں۔ یہ کام سننے میں آسان تھا لیکن ریاض صاحب کے ساتھ کام کرتے ہوئے یہ ایک بڑا چیلنج بن گیا تھا۔ میں لکھتی تھی ریاض صاحب کے پاس جاتی تھی اور ریاض صاحب کچھ اور کچھ دیکھتے بغیر ہی اس کو ریجیکٹ کر دیتے تھے اور دوبارہ لکھ کے لانے کا حکم دیتے تھے۔ وہ بار بار کی لکھا، بار بار کی ریجیکشن اور بار بار یہ رگڑ امیرے لیے کبھی کبھی ناقابل برداشت ہو جاتا تھا لیکن کمال کا حال تھی کہ ریاض صاحب کی شکایت انہم صاحب سے کی جائے یا کیا حال تھی کہ ریاض صاحب کی شکایت خود انہی سے کی جائے اس لیے مر تکیا نہ کرتا تو روز جاتے تھے روز رگڑا کھاتے تھے روز سمجھتے تھے۔ جس وقت میں نے انجینئرنگ روڈ جو ان کیا، لطیف صاحب اور ان کی ٹیم انجینئرنگ روڈ کی کمپوزنگ کا کام کیا کرتے تھے اور دفتر کا ہی کچھ حصہ ان کے لیے مخصوص تھا۔

انجینئرنگ روڈ کے دفتر میں دونوں بھائی ایک دوسرے کے ساتھ جس احترام کے ساتھ پیش آتے تھے میں نے اس کی مثال نہیں دیکھی۔ دفتر میں کسی بھی معاملے کے حوالے سے جب کوئی مینٹگ ہوتی تو دونوں بھائی ایک دوسرے کو نام سے مخاطب کرتے۔ چچا جان ابوکوٹھم صاحب کہتے اور ابوکوٹھم صاحب کہتے۔ بحث ہوتی، گرما گرمی ہوتی، لیکن ایک دفعہ جب انہم صاحب کوئی فیصلہ کر لیتے تو چچا جان اس کو سر اٹھوں پر رکھتے، پھر اس سے اختلاف نہ کرتے۔ فیصلہ ہو جانے کے بعد میں یا کوئی اور بھی جا کے ان سے اس فیصلے کے خلاف کوئی بات کرنے کی کوشش کرتا تو کہتے ہیں بھائی جان فیصلہ کر چکے ہیں اب ایسا ہی ہوگا۔ ریاض صاحب دفتر میں لوگوں کے ساتھ چھپڑ چھاڑ اور مذاق کرتے رہتے۔ کوئی بھی کام پہلی بار ہوتا تو ریاض صاحب مٹھائی کا مطالبہ کرتے۔ آپ کو پکھنٹ لیٹر لیا مٹھائی کھائیے، آپ کی پہلی تنخواہ آگئی مٹھائی

کھائیے جتنی کہ ایک صاحب نے نوکری چھوڑی تو چچا جان نے ان سے پوچھا کیا یہ آپ کی پہلی نوکری تھی انہوں نے جواب دیا جی ہاں۔ چچا جان نے کہا گویا یہ آٹھٹی بھی آپ کا پہلا آٹھٹی ہے۔ انہوں نے اقرار کیا تو بتایا گیا کہ پھر تو مٹھائی جتنی ہے مٹھائی کھائیے! ابو کے ایک دوست اکثر دفتر آیا کرتے۔ ابوان سے کاروباری مشورے بھی کیا کرتے۔ ان کا نام آئی آر کاظمی تھا۔ چچا جان ان کو اکثر چھوڑتے کہ آپ اپنا نام ٹھیک کریں۔ اگر مٹی تو اوند کے مطابق آپ کا نام آئی ایم کاظمی ہونا چاہیے۔ اسی زمانے میں انہم صاحب نے مارکیٹ کی نبض دیکھتے ہوئے یلو پیپر کی طرز پر انجینئرنگ کے مختلف شعبوں کی ڈائریکٹریز چھاپنے کا فیصلہ کیا۔ جسے رجسٹر کا نام دیا گیا۔ ہم نے کئی شعبوں کے رجسٹر بنائے۔ جن میں الٹی وی اے سی آر، الیکٹریکل، پلاسٹک، جلیفیک شامل تھے۔ یہ رجسٹر سالانہ بنیاد پر شائع کئے جاتے تھے۔ اس کاوش کو بھی انجینئرنگ سے متعلق تمام لوگوں کی بھرپور پذیرائی ملی۔

1998 میں انجینئرنگ روڈ کے ساتھ میرا رشتہ بطور اسٹنٹ ایڈیٹر ختم ہو گیا لیکن پرچہ کے ساتھ تعلق کبھی ٹوٹنے والا نہیں۔ 2012 میں ابوبی وفات کے بعد ذمہ داریاں میرے چھوٹے بھائی محمد صلاح الدین کے کاندھوں پر آ گئیں جو پہلے ہی ابوبی کی زیر بیت تھا۔ پھر چچا جان کی طویل بیماری اور 2020 میں انتقال کے بعد منظور صاحب نے بطور ایڈیٹر ذمہ داری سنبھالی۔ انجینئرنگ روڈ کو پاکستانی صحافت میں ہمیشہ ایک نمایاں مقام حاصل رہا ہے۔ اپنی نوعیت کا پہلا جریدہ ہونے کے باعث اپنی جگہ بنانے کے لئے کئی کئی محنت سے لیکر آج انجینئرنگ روڈ کے پچاس سال مکمل ہونے تک اپنی ساکھ اور ایک نامی قائم رکھنے کی مسلسل اور انتھک مشقت کا یہ سفر صرف صلاح الدین کے لئے نہیں ہم سب بہن بھائیوں اور ہمارے بچے زادوں کے لئے باعث افتخار ہے۔ ابوکوٹھم صاحب کہتے کہ رزق صرف مال نہیں، عزت بھی رزق ہی کی ایک قسم ہے۔ شاید اعلیٰ تر رزق۔ ہمارے گھر میں مالی فراوانی نہیں تو کبھی بھی نہیں تھی۔ شکر گزاری، وقار و مہربانے اپنے والدین سے سیکھا۔ اس سبق کا ایک وسیلہ انجینئرنگ روڈ بھی رہا۔ ہم نے ہمیشہ ابو اور چچا جان کو انجینئرنگ روڈ کو ایک مشن سمجھ کر شائع کرتے دیکھا۔ بالترتیب 10 اور 8 سال کی عمر میں پاکستان ہجرت کے دوران پیش آنے والے دلچسپ تجربوں نے پاکستان کی کوان دونوں کے لئے کل متاع بنادیا تھا۔ دونوں کا ایمان تھا کہ انجینئرنگ روڈ کے ذریعہ پاکستان کی ترقی میں حصہ ڈالنا ان کا فرض ہے۔ اللہ کریم انجینئرنگ روڈ کو ان دونوں کے لئے صدقہ جاریہ بنائے۔ آمین ■

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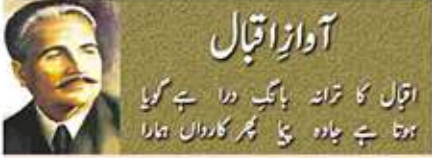
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آوازِ اقبال

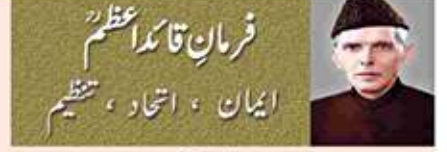
اقبال کا ترانہ باگ در ہے گویا
ہوتا ہے جادو بچا پھر کارواں ہمارا

اے ہمالہ کوئی بازی گاہ ہے تو بھی جسے
دست قدرت نے بنایا ہے عناصر کے لئے
ہائے کیا فرط طرب میں جمومتا جاتا ہے
فیل بے زنجیر کی صورت اڑا جاتا ہے

تیری عمر رفتہ کی اک آن ہے عہد کہن
وادویں میں ہیں تیری کالی گھٹائیں خیمہ زن
چوئیاں تیری شریا سے ہیں سرگرم سخن
تو زمیں پر اور پہنائے فلک تیرا وطن
چشمہ دامن ترا آئینہ سیال ہے
دامن موج ہوا جس کے لئے رومال ہے
ابر کے ہاتھوں میں رہوار ہوا کے واسطے
تازیانہ دے دیا برقی سر کو ہمار نے



کھڑے کھڑے کر کے ہیں۔ ہندوستان کے نقشہ پر مسلم ہندوستان
اور ہندو ہندوستان پہلے ہی سے موجود ہیں نہ معلوم اس کے متعلق
اتنا دوا کیا کیوں کیا جاتا ہے۔ وہ ملک ہے کہاں جس کے کھڑے کھڑے
کیے جائیں گے؟ اور وہ قوم کہاں ہے جس کی قومیت فنا کی جائے کو ہے؟
وہ طاقت جس کے قبضہ قدرت میں آج ہندوستان ہے وہ
انگریزوں کی طاقت ہے اور یہ جو ایک خیال دماغوں میں بیٹھ گیا
ہے کہ ہندوستان ایک متحدہ ملک ہے اور اس کی اپنی حکومت ہے وہ
صرف اس وجہ سے ہے کہ انگریز اس سارے ملک پر حکمران ہیں۔
(مسلم لیگ کانفرنس، بمبئی، 26 مئی 1940ء)



فرمان قائد اعظم

ایمان، اتحاد، تنظیم

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راج گوبال چاہیے کہتے ہیں: "بچے کے کھڑے کیلئے ہندوستان"
قدرت نے پہلے ہی سے ہندوستان کو یکم کر رکھا ہے اور اس کے

ہم بھی اس کہانی کا کردار ہیں

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زمانے میں تازہ تاہم آباد میں تعمیرات تیزی سے جاری تھیں۔ گھروں
کی زینائش میں استعمال کے بعد بچ جانے والے پتھر یہاں وہاں
پڑے مل جاتے۔ تیار پٹیوں کو اڑانے سے بچانے کے لئے ایسے ہی
پتھروں کو جمع کر کے بطور پیر وینٹ استعمال کیا جاتا۔

یہ مشن سینے میں دو بار ہوئی تھی اور ایک کمرے میں ہر طرف یہ
کانڈکی پٹیاں سوختی ہوئی نظر آتی تھیں جب یہ پٹیاں سوکھ جاتیں تو ان کو
صفائی کے ساتھ بلحاظ شہر جمع کر کے دفتر بھیج دیا جاتا۔ پھر ان پٹٹیوں کے
بچے میں انجینئرنگ کے روپ کو فوٹو لڈ کر کے رکھا جاتا اور سپروڈاک کر دیا

جاتا تھا۔ یہ سلسلہ کافی عرصے جاری رہا لیکن 1985 میں دادا جان کی
وفات اور پھر ہماری پچھلی شادی کے بعد مجھے نہیں یاد کہ یہ کام گھر پر
دوبارہ کیا گیا ہو۔ یہ بچپن کی بہت خوبصورت یادوں میں سے ایک یاد

ہے اس میں ہم نے بہت کچھ سیکھا مثلاً احساس ذمہ داری، محنت مند
مقابلہ، وقت پر کام کرنا، وقت پر زیادہ سے زیادہ مگر معیاری کام کرنا۔
اس وقت معلوم نہیں تھا کہ اس تمام عمل کو ٹیم ورک کہتے ہیں لیکن بلاشبہ ٹیم
پائیر بننے کی ابتدا ہمیں سے ہوئی۔ لگ بھگ چالیس سال بعد اب جب

میں یہ مضمون لکھ رہی ہوں تو میں محسوس کرتی ہوں کہ ہم سب کی پیشہ
ورانہ زندگیوں کی بنیاد میں وہ پرستری مشقت موجود ہے جو خاموشی
سے اپنے بہت دیر پا اثرات کہیں نہ کہیں ہمارے اندر چھوڑ گئی۔

اب 1985 تک، میں اور میرے دو چھوٹے بھائی اس عمر کو پہنچ
چکے تھے کہ ہمیں یہ احساس ہونے لگا تھا کہ ہمارے والد ایک اہم کام کر
رہے ہیں۔ وہ راتوں کو دیر سے گھراتے تھے کیونکہ اس رات پرچہ

پر لیس جانا ہوتا تھا۔ کئی بار پرچہ مختلف وجوہات کی بنا پر لیت ہو جاتا تھا
لیکن پرچہ لیت نہ ہوا اس کے لیے ایوان پچا جان (مرحوم ریاض الحسن
صاحب) جس طرح پریشان ہوتے اور جان مارتے، اس سے ہم

سب لاشعوری طور پر کہیں نہ کہیں سیکھتے رہے کہ ذمہ داری کی اہمیت کیا
ہوتی ہے، ذمہ داری کو وقت پر پورا کرنا کس قدر ضروری ہے۔ اس
عرصے میں مجھے یاد ہے کہ ہمارے کچھ بے تکلف رشتہ دار میری والدہ کو

چھیڑا بھی کرتے تھے کہ خبر کو کہیں ایسا تو نہیں کہ ختم صاحب نے ایک اور
گھر بھی بسا رکھا ہو اور میری والدہ ہمیشہ منت سے مسر کر کہ کبھی تھوڑا
سائیں کر اس بات کو طرغ دے جاتی تھیں۔ میاں بیوی کے درمیان
میں اعتماد و رفاقت اور اچھے برے وقت میں ایک دوسرے کا ساتھ دینا

کیا ہوتا ہے، ہم سب بہن بھائیوں نے ہمیں سے سیکھا۔ یہ بھی یاد ہے
کہ امی کبھی کبھی تھوڑی سی رنجیدہ ہو جاتا کرتی تھیں جب امی کی بچت جو
کمٹیوں کی شکل میں ہوتی ایوان جلد واپسی کے وعدے پر لے جاتے

تھے۔ لیکن ایسا کبھی نہیں ہوا کہ انہوں نے مانگا ہو اور امی نے منع کر دیا ہو۔
بقیہ صفحہ 86 پر

انجینئرنگ روپ کی بنیاد رکھی۔
ان کا ایک خواب تھا جو وہ پورا نہ کر سکے۔ وہ ایک اور جریدہ بھی
نکالنا چاہتے تھے۔ وہ چاہتے تھے کہ اس جریدے میں ایسے موضوعات
ہوں جو کہ خواتین خاندان خاندان کے ہر فرد کی دلچسپی کے ہوں، اس
نئے جریدے کا فارمیٹ بھی مختلف رکھنا چاہتے تھے۔ مگر زندگی نے

انہیں یہ موقع نہ دیا۔
صلاح الدین صاحب ان کی زندگی ہی میں ان کے ساتھ
انجینئرنگ روپ میں شامل ہوئے، اور میرا ان سے بھی تعلق ہے۔ نجم
اگر صاحب اکثر مذاق میں کہا کرتے تھے۔ "یاسین تم نے تو باپ

اور بیٹے دونوں کو قاتل کر رکھا ہوا ہے۔"
آج بھی کبھی کبھی ان کی شدت سے یاد آتی ہے۔ اللہ تعالیٰ انہیں
اپنے جوار رحمت میں جگہ عطا فرمائے۔ آمین۔ ■



داری کے قابل سمجھے جانے پر تقریباً مغروری ہو جاتا۔ بہر حال یہ کام
ہماری نسبت بڑے گز کے ذمے لگایا جاتا تھا کہ وہ ایک سکیل (نئے
ہمارے بچے آج رولر کہتے ہیں اور ہم اس زمانے میں فکا کہا کرتے
تھے) کی فٹنی کے مد سے ان تین کاموں کو الگ الگ کرے۔ پھر ہر کالم

میں موجود ہر پتے کو کسی فٹنی کے مد سے مزید الگ کیا جاتا تھا اور پتوں
کی یہ تمام پرچیاں خالی ڈبوں میں جمع کر لی جاتی تھیں۔ یہ سارے
پتے شہروں کے حساب سے ہوتے تھے کہ راجی کے پتے ایک ڈبہ میں،
لاہور کے پتے دوسرے ڈبہ میں۔ پشاور، کوئٹہ، اسلام آباد، غرض یہ کہ

ہر شہر کے پتے الگ الگ ڈبے میں جمع کر لیے جاتے تھے۔
اب اگلے مرحلہ ہماری پچھی طیبہ خیرالہ کی قیادت میں شروع ہوتا
تھا۔ یادداشت میں ہے کہ گلو کی بڑی بڑی بوتلیں آتی کرتی تھیں۔ بچے

پارٹی کے لئے گلو کال کے چھوٹی چھوٹی پیلیوں میں امی کی بھیڑی
ڈانٹنگ ٹیکل پر سجادی جاتی تھی۔ جن ڈبوں میں پتے ہوتے تھے وہ بھی
کچھ کچھ فاصلے پر رکھ دیے جاتے تھے اور تمام بچوں کو کنڈکی چوڑی

پٹیاں بانٹ دی جاتی تھیں۔ اب ہر بچے کی ذمہ داری ہوتی تھی کہ
نفاست سے پتے کی پرچی کے پیچھے گلو کال کے کندے کے ربن کے سین
درمیان میں چپکا دے۔ صفائی کا خاص خیال رکھنا ضروری تھا۔ پھر ان
پٹٹیوں کو پھیلا دیا جاتا تھا تاکہ یہ اچھی طرح خشک ہو جائیں۔ اس

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محمد یاسین۔ جنرل مینجر۔ دی امپیریل الیکٹرک کمپنی

سنجیالتے تھے۔ وہ مجھے "یاسین" کہہ کر پکارتے تھے۔ اور اس میں
"صاحب" کی ضرورت کبھی محسوس نہیں ہوتی تھی، کیونکہ ان کے انداز
خطاب میں بے پناہ شفقت اور محبت ہوتی تھی۔

نکسی بھی جریدے کو چھاننے کے لیے جہاں معیاری ادارتی
مواد ضروری ہوتا ہے، وہیں اشتہارات بھی اس کی بنیاد ہوتے ہیں۔
اس مقصد کے لیے انہیں خود کٹائٹس کے پاس جانا ہوتا تھا۔ ان کا ایک

جلد آج بھی یاد ہے، وہ کہا کرتے تھے۔ "میں ایک جوجی ہوں، اور
جوجی کا کام تو پچھیرہ لگانا ہوتا ہے۔" وہ مجھ سے بے تکلف تھے اور ہر
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Dr. Tufail on Higher Education, Research, and Bridging the Gap Between Universities and Industry

ER: When you were a student at NED University, like every young graduate, you must have had dreams for your future. What were your ambitions, and how did your journey unfold after graduation?

Dr. Mohammad Tufail: Even during my bachelor's degree at NED University, I had a clear goal—I wanted to pursue higher education. Instead of looking for a job after graduation, I went directly to the United Kingdom for my master's degree. Interestingly, I had also secured admission to a university in the United States, but I chose the UK because completing a master's there required less time.

During my master's studies, I became inspired to pursue a PhD after seeing many young researchers already holding doctoral degrees. At that time, Pakistan's universities faced academic disruptions, and completing a four-year engineering degree often took five years or more. Seeing the international academic environment motivated me to continue my education. Fortunately, I received a scholarship and completed

my PhD in composite materials, focusing on lightweight, high-strength fibre-reinforced plastic composites widely used in aerospace and defence industries.

major companies. However, when I approached Pakistan's automotive industry, I was told that there was little research activity and that I would have to join as a fresh

found that the university had undergone remarkable improvements in management and academic culture. That temporary decision turned into a lifelong career,

tions exist. Many institutions were established with excellent visions and once performed exceptionally well, but their effectiveness has declined over time. Rather

demographic publications. Recently, we reviewed our projects and found around 65 research initiatives with direct societal impact. NED developed products such as ventilators and several other innovations that have practical applications. We are now signing agreements with industries to commercialise these technologies through licensing and revenue-sharing arrangements.

ER: Industry participation in university research is still quite limited. What is the solution?

MT: Industries naturally seek quick financial returns, while research requires time and investment. To bridge this gap, universities need platforms that can develop prototypes, test markets, and demonstrate commercial potential before approaching industry. At NED, we are establishing a dedicated company for this purpose. Once innovations prove their market value, industries will be far more willing to invest. I believe this is the most practical path towards strengthening collaboration between academia and industry in Pakistan.



ER: Did you plan to remain abroad after completing your PhD?

MT: No, my intention was always to return to Pakistan. I hoped to work in industry because, in countries like the UK, PhD graduates actively contribute to research and development in

engineer. I respected their honesty, but it highlighted the lack of industrial research in the country.

Eventually, I joined NED University after receiving an offer from the late Dr. Abul Kalam. Initially, I thought it would be temporary before moving into industry, but I

and I have now spent over 26 years at NED University.

ER: Do you believe Pakistan provides enough opportunities for PhD graduates outside academia?

MT: Opportunities remain limited. Apart from universities, only a few government research organisations

than creating new systems repeatedly, we should strengthen and modernise the institutions we already have.

ER: How has your research experience influenced NED University?

MT: We believe research should solve real problems rather than exist only for aca-

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From Peshawar to Germany:

Engineer Irfan Reflects on Pakistan's Lost Industrial Momentum

For Engr. Irfan Ahmed, engineering was once a symbol of opportunity and national progress. When he graduated from Engineering College Peshawar in 1971, Pakistan's engineering sector carried immense promise, and young graduates believed they would help build an industrialized nation.

"Engineering was considered one of the most prestigious professions," he recalls. "We thought Pakistan's future was closely tied to industrial development."

According to Irfan, there was considerable optimism during the 1960s regarding industrial expansion, particularly along the Lahore-Faisalabad corridor. However, changing global priorities eventually shifted Pakistan's focus away from manufacturing.

"The unfortunate reality is that today we are neither an industrial power nor fully self-sufficient in agriculture," he says.

His career began in academia when he joined Engineering College Peshawar as a Senior Lecturer, teaching electrical machines and supervising electronics laboratories. Yet the post-1971 environment offered little encouragement to aspiring engineers.

"Except for me, none of my classmates had secured employment," he says. "Many

young engineers had already begun losing confidence in the profession."

Seeking new opportunities, Irfan joined

immersed himself in the German education system.

"Looking back, it was a blessing in dis-

joined Siemens Pakistan, where he spent nearly three decades until his retirement in 2014. During that time, he witnessed the remarkable transformation of global technology.

"I grew alongside technology, so its evolution never surprised me," he says. "What disappointed me was Pakistan's inability to keep pace."

He notes that Pakistani engineering graduates of the early 1970s were comparable to their international counterparts.

"When I arrived in Germany, there was very little difference between us and students from other countries," he says. "The gap emerged over the next fifty years as the world moved ahead and Pakistan fell behind."

After retirement, Irfan established his own consultancy and became involved in Pakistan's wind energy sector. He remains convinced that Pakistan's greatest challenge has been its gradual loss of confidence in local expertise.

"We stopped relying on our own capabilities and became increasingly dependent on external support," he says.

Despite his concerns, Irfan remains optimistic. His journey—from Peshawar to Germany, Siemens, and renewable energy—stands as a testament to the enduring potential of Pakistani engineers.

"The talent has always existed," he says. "What Pakistan needs is the vision and commitment to put it to work." ■



Pakistan Television (PTV) in 1972, where he played a role in establishing Lahore's permanent television station.

"It was an exciting time," he recalls. "We were helping build an important national institution."

In 1974, he moved to Germany for higher studies, only to discover that engineering degrees from Pakistan and several other countries were not recognized there. Rather than giving up, he restarted his studies and

guise because I learned engineering at a much deeper level," he says.

He completed his degree in six years and later began doctoral research in Nuclear Engineering. However, political developments prevented him from continuing.

"Restrictions were imposed on Pakistani nationals working in sensitive technological fields, and I had to abandon my PhD," he explains.

Returning to Pakistan in 1985, Irfan

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Farrukh Ashraf: From the Retail Counter to Leadership in Pakistan's HVACR Industry

For Farrukh Ashraf, success in business did not begin in a corner office with a revolving chair. Instead, it began behind a retail counter, learning the difference between copper pipe gauges, refrigerants, and expansion valves.

Today, as a senior executive in Pakistan's HVACR sector, Ashraf credits his professional growth to humility, continuous learning, and a willingness to start from the ground up.

His educational journey began at Army Public School, Saddar, where he completed his O Levels, followed by A Levels at The City School. Although he initially pursued pre-engineering studies, growing up in a business-oriented family eventually led him toward business administration. He went on to earn a BBA, MBA, and MPhil from Bahria University, while also completing internships and management programs with leading organizations such as Pakistan State

Oil (PSO) and Unilever.

However, a turning point came following the passing of the family patriarch, Muhammad Iqbal. The family encouraged him to join the business and apply the knowledge he had acquired through his education and corporate exposure.

Unlike many second-generation business leaders, Ashraf did not assume an executive role from day one. Instead, he spent nearly eight years working at the retail level.



"People assume that after an MBA and MPhil, you expect a large office and assistants waiting outside your door," he says. "But learning begins when your ego ends."

Working at the shop floor level, he developed an understanding of more than 500 HVACR components, ranging from copper pipes and refrigerants to compressors and spare parts. The experience, he says, funda-

mentally changed his perspective on business and leadership.

Over time, he transitioned into banking, imports, and international business operations, eventually expanding his involvement in Pakistan's HVACR industry. Yet, despite his senior position, Ashraf insists that he remains a student.

His career has unfolded alongside one of the most transformative periods in technological history. Having witnessed the transition from window air conditioners to Variable Refrigerant Flow (VRF) systems, and from handwritten letters to artificial intelligence, he believes adaptability is the industry's greatest strength.

"Technology has made our work faster and easier," he says. "Today, a customer can send a WhatsApp message, and within minutes we can finalize a deal worth millions of rupees without ever meeting in person."

For Farrukh Ashraf, the lesson is simple: titles may come with time, but a commitment to learning never ends. ■

Rana Ajmal: From AC Technician to Building an Engineering Enterprise

Few professional journeys illustrate the power of perseverance and lifelong learning as effectively as that of Ajmal Iqbal, Founder and CEO of MEP 360.

What began in 1996 as an entry-level position in the air-conditioning industry has evolved into a successful enterprise serving some of Pakistan's leading organizations.

Ajmal grew up with a father who worked as a Store In-charge at the Government College of Technology, Lahore, and dreamed of seeing his son become an engineer. Following matriculation, Rana enrolled in a DAE in Refrigeration and Air Conditioning.

He began his career as an AC technician at Dawlance, an experience he still credits for providing his first exposure to professionalism and workplace discipline.

A defining moment came early in his career when a client made a dismissive remark after he requested a ladder to perform maintenance work. Rather than discouraging him, the incident became a turning point.

"I realized that if I remained at the same level throughout my career, I would continue to face similar situations," he recalls. "That day, I decided I had to keep learning and moving forward."

Another major influence was his mentor, Farhat Hashmi, who instilled the values of discipline and professionalism. Strict standards regarding punctuality, appearance, and

workplace etiquette left a lasting impression and helped shape Iqbal's leadership style.

Over the years, he transitioned from field operations into HVAC design, technical sales, and management. His career included leadership positions at organizations such as Hi-Tech, INSA International, Mecatech, Orient Energy Systems, Gree Pakistan, and Smart Climate Solutions, progressing from Assistant Manager to Manager-level roles.

In March 2023, he founded MEP 360 with the encouragement of another mentor,

Anees, a veteran professional. The company's first major assignment—the VRF project for Ramada Hotel—helped establish its reputation in the market.

Today, MEP 360 provides comprehensive Mechanical, Electrical, and Plumbing engineering services, including HVAC, firefighting, installation, commissioning, and maintenance. In just a few years, the company has built a client portfolio exceeding 65 organizations.

Alongside his professional career, Iqbal completed an MBA in Marketing and later earned an MS in Project Management.

"Technology will continue to evolve," he says, "but strong values, technical competence, and a commitment to learning will always remain the foundation of success."

From repairing refrigerators to leading an engineering company, Ajmal's story is a reminder that careers are built not in a single moment, but through years of determination, discipline, and growth. ■



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Revival After NSCT 2026: An action-oriented guide for university leadership, faculty, and students

By: Prof. Dr. Tariq Rahim Soomro

(This article is based on the findings of the HEC NSCT 2026 Complete Report and Analytics, published by the Higher Education Commission of Pakistan).

Pakistan's higher education sector just received its most honest report card in years. The National Skills Competency Test (NSCT) 2026, a landmark initiative by the Higher Education Commission (HEC) in collaboration with MoITT, PSEB, P@SHA, and NCEAC, assessed over 33,000 IT students from 188 universities across 122 cities. Conducted on April 4-5, 2026, it is the country's first nationwide, standardized benchmark of computing skills against real industry requirements.

The results are revealing, but data without action is just noise. This article is a call to action for every Vice Chancellor, Dean, Faculty Member, and Student. The next NSCT will be won or lost in the decisions we made today.

Students across Pakistan demonstrated genuine capability in several domains:

Subject Area/ Proficiency Rate

1. Web Development Basics 54.1%
2. AI & Machine Learning 50.8%
3. Software Engineering 50.1%
4. Problem Solving & Analytics 49.1%
5. Programming 47.8%

This is encouraging. Pakistani students are engaged with contemporary technology and are clearly motivated by areas that align with market visibility and employment opportunities. The same report, however, exposes alarming weaknesses in the foundational subjects that define serious engineering competence:

Subject Area/ Proficiency

- Rate
1. Cybersecurity 47.2%
 2. Database Systems 42.3%
 3. Data Structures & Algorithms (DSA) 40.2%
 4. Computer Networks & Cloud Computing 39.6%
 5. Operating Systems (OS) 33.8% (Lowest nationally)

Operating Systems scored the absolute lowest at 33.8%. This is not a minor gap; these subjects are the backbone of all high-tier software engineering. Without mastering them, even students who excel in AI or web development will struggle to build secure, scalable systems demanded by global employers.

Living in an urban center provides students nearly a 15-point baseline advantage in clearing the NSCT. This is not a talent gap; it is an infrastructure and access gap. In rural districts, male students took the test at more than double the rate of female students (6,630 Vs. 2,964). Yet when both groups sit the test, their failure rates are nearly identical,

hovering at approximately 71-74%. This confirms that rural underperformance is not gender-specific; it is a systemic failure of educational infrastructure affecting all students equally.

For University Leadership: Structural Actions That Matter

1. Every department offering CS, IT, SE, AI, or Data Science should hold an urgent curriculum audit. Map each low-scoring NSCT domain, particularly Operating Systems, Networking, and Data Structures; against current course offerings. Ask hard questions: Are these subjects taught as rigorous, assessed disciplines, or are they treated as checkbox courses? Course Files are best to review. Establish a standing NSCT Performance Committee with representation from academic, industry, and student bodies. Review results each cycle and tie curriculum updates to measurable improvement targets.

2. The NSCT assesses applied competencies, not rote memorization. Institutions must shift CLOs from

theoretical recall to practical problem-solving. A student who can recite the OSI model but cannot troubleshoot a network configuration has not learned networking; they have memorized it. Require all computing faculty to revise CLOs in foundational subjects to include hands-on lab components, real-world case studies, and scenario-based assessments that mirror NSCT-style evaluation.

3. The geographic data makes clear that institutions in Balochistan, KP, AJK, and Gilgit-Baltistan are operating with a significant structural disadvantage. HEC and provincial governments must invest urgently in computing labs, reliable internet access, qualified faculty, and digital learning resources in these regions. Apply for HEC's development grants specifically to upgrade computing infrastructure. Partner with tech companies under CSR



frameworks to equip labs and provide licensed software environments.

4. The NSCT was designed explicitly to bridge the industry-academia gap. High-performing universities do not produce better graduates by accident; they maintain active industry advisory boards that shape their curriculum. If your institution lacks such partnerships, that is where to start. Invite IT companies to co-design Final Year Projects, guest lecture series, and internship pipelines. Use the national talent pool created by NSCT,

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where high-performing students are shared directly with IT companies; as a recruitment incentive to attract industry collaboration.

For Faculty: Teaching Toward Deep Competence

1. A 33.8% proficiency rate in Operating Systems is a pedagogical emergency. This subject is often taught through slides and textbooks alone, when it demands hands-on exposure to system calls, process scheduling, memory management & its algorithms, and file systems in live environments. Integrate Linux-based labs as a required component of OS courses. Use platforms like Docker and VMs to simulate real system environments. Assign students to implement mini-schedulers, memory allocators, and shell scripts as part of assessment.

2. Data Structures & Algorithm's 40.2% proficiency rate signals that students are not getting enough practice with problem-solving under constraints. This subject cannot be crammed; it requires consistent, progressive engagement across semesters. Introduce weekly competitive programming sessions using platforms like LeetCode, HackerRank, or Codeforces. Introduce DS

array-based tutorial to visualize how each DS is working and behaving in each situation. Embed algorithmic thinking across multiple courses, not just a standalone DSA class.

3. Database Systems (42.3%) and Computer Networks (39.6%) are both critical for industry readiness. These courses must go beyond textbook theory. Students should be querying real databases, designing schemas, optimizing indexes, setting up network topologies, and configuring security policies. Replace final-exam-only assessment with project-based models. A student who builds and deploys a relational database with proper normalization, indexing, and query optimization has learned database systems. One who only memorizes ACID properties, for example, has not.

4. With a 47.2% proficiency rate, cyber security is not yet a strength and in a world of escalating digital threats and deception, this is a national risk, not just an academic gap. Many universities treat cyber security as an elective or a final-year add-on. Introduce cyber security fundamentals as a core requirement in the 3rd or 4th semester. Cover

encryption, network security, ethical hacking basics, and secure coding practices. Partner with PSEB and industry to offer cyber security certifications alongside degrees.

5. One of the most overlooked contributors to the NSCT performance gap is the distance between what faculty teach and what industry actually does. A professor who last worked in a live software environment five years ago cannot credibly teach the applied competencies the NSCT measures. The curriculum may be current on paper, but the classroom experience is old. What is the remedy? Every computing faculty member should complete a minimum four-to-six-week immersive internship at a registered software house during the summer break. This is not a courtesy visit or an advisory role; it is active participation in real project delivery; writing code, reviewing architecture, debugging production issues, and sitting in sprint reviews. PSEB and P@SHA, both partners in the NSCT initiative, are well-positioned to facilitate formal faculty placement agreements with member companies.

6. Universities should make summer industry immersion a mandatory pro-

fessional development requirement for all computing faculty, reviewed annually as part of performance appraisal. Faculty returning from internships should be required to present at least one curriculum update; a new lab exercise, a revised case study, or an updated assessment; directly informed by their industry experience. HEC should create a national Faculty-Industry Engagement Register to track participation and share best practices across institutions.

7. A well-designed course outline means nothing if it is not delivered. Across many Pakistani universities, there exists a quiet, but damaging gap between what is documented in a course file and what actually happens in the classroom. Lectures skip difficult topics. Lab sessions are cancelled or reduced. Assessment rubrics drift from industry-relevant problem-solving back to familiar rote questions. The NSCT results, particularly the collapse in OS, Networking, and DSA scores are in part a consequence of this delivery gap. Course file audits must become a rigorous, semester-by-semester institutional practice. Each course file should record intended

CLOs, weekly lecture plans, lab session logs, assessment instruments, and student performance data. At the end of every semester, a departmental audit committee, ideally including an external industry reviewer, should verify that what was planned was actually taught, and that learning outcomes were genuinely assessed.

8. Departments should adopt a three-layer audit model. Self-assessment by the course instructor, peer review by a senior faculty colleague, and a biannual external review by an industry practitioner. Any consistent gap between planned and delivered content should trigger a formal remediation plan, not a routine sign-off. NCEAC's accreditation criteria should be updated to require audit trail documentation as a condition of continued program accreditation.

For Students: Your Personal Action Plan

1. The NSCT data shows that students are strong in the subjects they find exciting; Web development, AI; and weak in the subjects that require disciplined study, OS, networks, and algorithms. Excitement is not a learning strategy. Schedule deliberate study blocks for

your weakest NSCT subjects. Use the Feynman Technique (<https://fs.blog/feynman-technique/>); if you cannot explain process deadlocks or TCP/IP handshakes to a classmate without notes, you do not yet understand them.

2. The NSCT is designed to test whether you can apply knowledge, not just retrieve it. Build things. Break things. Rebuild them. Set up a home Linux environment. Practice SQL on real datasets. Simulate network configurations using Cisco Packet Tracer or GNS3. Implement algorithms from scratch.

3. One of the clearest lessons from the NSCT 2026 results is that many students, regardless of how much they studied, were unprepared for the format and pressure of the assessment. Applied, scenario-based MCQs under time constraints test a different cognitive skill than answering end-of-chapter questions at home. Preparation without simulation is incomplete preparation.

4. Universities/DAIs must institutionalize mock NSCT tests as a structured part of the academic calendar; not as a one-time event in the final week before the exam, but as a rolling preparation.

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The Role of Media in the Development of Engineering

Engineering has always been a driving force behind human progress. From the construction of roads, bridges, dams and power plants to the development of digital communication, artificial intelligence, renewable energy and space exploration, engineers shape the modern world. However, engineering achievements often remain unnoticed by the general public because they are highly technical and complex. This is where the media plays a transformative role. By informing, educating and connecting society with technological advancements, the media serves as a bridge between engineers, policymakers, industry and the public.

In the twenty-first century, media is no longer confined to newspapers and television. Digital platforms, online news portals, podcasts, social media, documentaries, webinars and educational websites have expanded the reach of engineering knowledge. They have made technical information more accessible, encouraged innovation, inspired young people to pursue engineering careers and promoted public understanding of science and technology. The relationship between media and engineering has become increasingly important as countries strive for sustainable development, industrial growth and technological self-reliance.

Creating Public Awareness

One of the primary contributions of the media is creating awareness about the importance of engineering in everyday life. Most people interact daily with engineering marvels—electricity, transportation

systems, water supply networks, mobile phones, internet services and healthcare technologies—without realizing the expertise involved in their creation.

Media outlets help explain how engineering solutions improve quality of life. News reports on infrastructure projects, renewable energy plants, smart cities and transportation networks demonstrate how engineering contributes to economic growth and public welfare. Such coverage helps society appreciate the value of engineering and encourages public support for investment in scientific research and technological innovation.

For example, media coverage of major engineering projects such as metro rail systems, highways, hydropower dams or digital connectivity initiatives informs citizens about their long-term economic and social benefits. Public awareness generated through media also helps build trust in engineering insti-

tutions and encourages community participation in development projects.

Inspiring Future Engineers

Media plays a significant role in motivating young people to pursue engineering as a career. Television programs, documentaries, YouTube channels, educational podcasts and social media platforms introduce students to exciting fields such as robotics, aerospace engineering, artificial intelligence, biotechnology and renewable energy.

Profiles of successful engineers and innovators inspire students by showing how engineering can solve real-world problems. Stories about engineers developing affordable medical devices, designing sustainable buildings or creating clean energy technologies encourage young minds to view engineering as a meaningful profession.

Educational media also provides access to tutorials, virtual laboratories, online courses and engineering competitions.

Students from remote or underprivileged areas can now learn programming, electronics, mechanical design and other technical skills through free online resources. This democratization of knowledge has significantly expanded access to engineering education across the world.

Promoting Innovation and Research

Engineering thrives on continuous innovation, and media serves as an important platform for sharing new discoveries and technological breakthroughs. Scientific journals, technology magazines, research websites and professional media outlets disseminate information about emerging technologies and engineering solutions.

Researchers rely on media to communicate their findings to industry partners, investors and policymakers. Innovations in fields such as nanotechnology, autonomous vehicles, green construction materials, cybersecurity and renewable energy receive

global attention through media coverage, leading to greater collaboration and investment.

Engineering conferences, exhibitions and innovation summits are also amplified through digital media, enabling professionals worldwide to exchange ideas without geographical limitations. Live-streamed conferences, webinars and virtual workshops have transformed professional learning, making continuous education more accessible than ever before.

Supporting National Development

Engineering and national development are closely interconnected. Economic progress depends heavily on infrastructure, industrial capacity, energy production and technological innovation. Media contributes to national development by highlighting engineering projects that improve transportation, healthcare, education, agriculture

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The Role of Media in the Development of Engineering

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and communication.

When governments launch major development initiatives, media informs citizens about project objectives, implementation progress and expected benefits. Transparent reporting encourages accountability while educating the public about the importance of engineering investments.

Media coverage of successful engineering achievements also strengthens national confidence. Reporting on locally developed technologies, indigenous manufacturing capabilities and engineering innovations promotes pride in domestic talent and encourages further investment in research and development.

Countries that actively promote engineering achievements through media often succeed in attracting foreign investment, strengthening international partnerships and encouraging technology transfer.

Facilitating Public Debate

Engineering projects frequently involve environmental, economic and social considerations. Construction of dams,

highways, industrial zones, mining projects or nuclear power plants often affects communities and ecosystems. Media provides an essential platform for public discussion and informed debate on these issues.

Responsible journalism presents multiple perspectives by including engineers, environmental experts, policymakers and local communities. Such balanced reporting enables citizens to understand both the benefits and potential challenges associated with major engineering projects.

Constructive media coverage encourages transparency, improves decision-making and helps governments address public concerns before implementing large-scale infrastructure projects. In democratic societies, informed public debate contributes to better engineering policies and sustainable development.

Enhancing Professional Development

Media has become an indispensable tool for the professional development of engineers. Online journals, engineering magazines, webinars, technical blogs and pro-

fessional networking platforms enable engineers to remain updated on the latest technologies, standards and industry trends.

Professional organizations regularly publish articles, interviews and case studies that share best practices across engineering disciplines. Engineers can participate in online discussions, attend virtual conferences and collaborate with experts from different countries.

The availability of digital learning platforms has made lifelong learning an integral part of engineering practice. Engineers can now acquire new certifications, learn advanced software tools and update their technical knowledge without leaving their workplaces.

This continuous access to information improves the quality of engineering services and enhances the competitiveness of industries in the global market.

Encouraging Ethical Engineering

Media also contributes to promoting ethics and accountability within the engineering profession. Investigative journalism has exposed

engineering failures resulting from poor construction practices, corruption, negligence or inadequate safety standards. Such reporting raises awareness about the importance of professional ethics, quality assurance and regulatory compliance.

Positive media coverage of engineers who demonstrate innovation, integrity and public service reinforces ethical values within the profession. It highlights the importance of designing infrastructure that is safe, sustainable and socially responsible.

Engineering is not solely about technical expertise; it also involves protecting human lives, preserving natural resources and ensuring long-term sustainability. Media helps communicate these ethical responsibilities to both professionals and the general public.

Supporting Disaster Management

Engineering plays a crucial role in disaster preparedness, response and recovery. During natural disasters such as earthquakes, floods, hurricanes or landslides, media serves as a critical communication channel

between engineers, emergency responders and affected communities.

Media disseminates engineering-based safety guidelines, structural assessments and reconstruction plans. It also educates the public about disaster-resistant construction techniques and preparedness measures.

Following disasters, media often highlights the contributions of civil engineers, structural engineers and infrastructure specialists working to restore essential services. This recognition emphasizes the vital role engineering plays in protecting communities and rebuilding societies.

Driving Sustainable Development

The global focus on climate change has increased the importance of sustainable engineering. Media has become instrumental in promoting awareness about green technologies, renewable energy, energy-efficient buildings, electric vehicles, waste management and environmentally responsible engineering practices.

Documentaries, news reports and educational campaigns encourage governments, industries and citizens to adopt sustainable technologies. Media also showcases successful examples of

solar farms, wind energy projects, smart irrigation systems and environmentally friendly construction methods.

By communicating scientific evidence and engineering solutions, media helps society understand that sustainable development depends on technological innovation and responsible engineering practices.

Challenges in Engineering Communication

Despite its positive contributions, media also faces challenges in reporting engineering issues. Technical subjects are often simplified to make them understandable for general audiences, which may sometimes lead to incomplete or inaccurate interpretations.

Sensational reporting during engineering accidents or infrastructure failures can create unnecessary public fear if technical facts are not presented responsibly. Social media may also spread misinformation regarding emerging technologies, construction projects or environmental impacts.

To overcome these challenges, journalists should collaborate closely with engineering experts and scientific institutions. Engineers

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The value of engineers

The Invisible Force That Built Modern Society

Take a moment and imagine a world without engineering. No electricity. No bridges connecting cities. No clean drinking water flowing into homes. No air-planes crossing continents, no mobile phones in our pockets, and no internet bringing people together across thousands of miles.

It is difficult to imagine such a world because engineering has become so deeply woven into our everyday lives that we rarely stop to think about it. Yet, if history teaches us anything, it is this: engineering has been one of humanity's greatest tools for progress. Behind every thriving civilization, every industrial revolution, and every technological breakthrough stands the work of engineers.

The story of human development is not only the story of kings, politicians, and entrepreneurs. It is equally the story of those who designed the roads, built the dams, connected the power grids, and imagined a better future long before others could see it.

Throughout history, engineering has quietly shaped

societies. It has transformed deserts into agricultural lands, connected isolated communities, improved public health, and given nations the confidence to dream bigger. Whether in ancient Egypt or modern Singapore, societies that embraced engineering have consistently moved forward.

More than 4,500 years ago, workers under the direction of some of history's earliest engineers built the Great Pyramid of Giza. Even today, experts continue to debate how such an extraordinary feat was achieved with the tools available at the time. It was not merely a monument; it was a statement of human capability.

The Romans understood this well. They built roads that connected vast territories and aqueducts that carried fresh water across long distances. Their engineering achievements did more than support an empire—they helped create one. Centuries later, many of those structures still stand, reminding us that good engineering often outlives generations.

In Asia, engineering played a similar role. China's Grand Canal connected regions, facilitated trade, and strengthened governance. Across the world, civilizations learned an important lesson early on: societies

prosper when they invest in infrastructure.

Fast forward to the eighteenth century, and engineering once again changed the course of history. The Industrial Revolution began with a simple but transformative idea: machines could do more work in less time. Steam engines powered factories, railways connected cities, and manufacturing reached levels never seen before. Entire economies were reshaped within a few decades.

Britain emerged as an industrial giant because it understood the value of innovation. Germany became synonymous with precision engineering, while the United States combined engineering with entrepreneurship to create industries that would dominate the twentieth century.

Engineering did not merely create wealth—it changed the way people lived. Families moved from villages to cities. Goods became more affordable. Travel became faster. Education became more accessible. For the first time in history, millions of people began experiencing a better quality of life because engineering had made it possible.

Perhaps the greatest contribution of engineering, however, has been one that

often goes unnoticed: public health.

Today, most people take clean drinking water for granted. We turn on a tap without thinking about the complex systems behind it. Yet, for much of human history, contaminated water was responsible for disease and death on a massive scale. The introduction of modern sanitation systems changed everything. Cities that once struggled with cholera and other epidemics became safer places to live. Engineers designed sewage systems, treatment plants, and water distribution networks that dramatically increased life expectancy around the world.

Healthcare itself has become increasingly dependent on engineering. MRI machines, robotic surgery, artificial limbs, and telemedicine are all products of engineering innovation. During the COVID-19 pandemic, engineers worked alongside doctors and scientists to develop ventilators, improve supply chains, and support vaccine production. Their contributions may not always make headlines, but they save lives every day.

The development experiences of nations around the world tell a remarkably consistent story. Japan rebuilt itself after the devastation of World War II through indus-

trial excellence and technological innovation. South Korea transformed from one of the poorest countries in Asia into a global leader in electronics and automotive manufacturing within a single generation.

Singapore, a small island nation with limited natural resources, chose to invest in education, infrastructure, and engineering. Today, it is recognized as one of the world's most advanced economies.

China's rise is perhaps the most striking example of all. Over the past four decades, it has built high-speed rail networks, modern ports, airports, bridges, and industrial zones at a scale rarely seen in human history. While economists debate policies and political scientists examine governance models, one fact remains undeniable: engineering has been central to China's transformation.

The same can be said for the Middle East. Cities such as Dubai have demonstrated how engineering can redefine a nation's image. Fifty years ago, few could have imagined the skyline that exists today. Behind every iconic building and every ambitious infrastructure project lies a simple truth—someone first had to design it.

Engineering also changes societies in less visible ways.

Think about how much the world has changed in the last twenty years alone.

A student in Karachi can now attend an online lecture delivered from London. A farmer in rural Pakistan can access weather forecasts on a mobile phone. A small business owner can sell products globally without ever leaving home. These changes did not happen by accident. They happened because engineers developed communication networks, satellites, smartphones, and digital platforms that made them possible.

The internet, perhaps humanity's most transformative invention in recent history, is itself an engineering achievement.

Today, we stand at the beginning of another great transition. Artificial intelligence, robotics, renewable energy, and smart cities are reshaping our understanding of what is possible.

Engineers are designing buildings that consume less energy, vehicles that produce fewer emissions, and technologies capable of diagnosing diseases in seconds. Around the world, governments are investing billions of dollars into clean energy and digital infrastructure because they recognize that the future will belong to

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FORTNIGHTLY
**ENGINEERING
REVIEW**

The voice of engineers



Reigniting the Engineering Spirit: How Global Organizations Are Working to Inspire the Next Generation

A few years ago, the President of the World Federation of Engineering Organizations (WFEO) made an observation that resonated across the engineering community:

"The world needs more engineers than ever before, yet fewer young people are choosing engineering as a career."

It is a paradox that many countries are struggling to understand.

At a time when humanity faces climate change, water scarcity, food insecurity, rapid urbanization, and an accelerating digital revolution, engineering should be among the most sought-after professions in the world. Instead, in many developing countries, engineering is steadily losing its appeal. Young people are increasingly gravitating toward careers perceived as more lucrative, glamorous, or less demanding.

This trend has become a matter of concern not only for governments and universities but also for major international organizations. Over the past two decades, institutions such as the United Nations, UNESCO, the World Federation of Engineering Organizations, the World Bank, and numerous international development agencies have intensified efforts to highlight the role of engineering in achieving sustainable development and improving people's lives.

Their message is simple yet powerful: without engineers, there can be no sustainable future.

Engineering is not merely about machines, bridges, and factories. It is about creating solutions for people. It is about bringing electricity to villages, clean water to communities, safer transportation systems to cities, and better healthcare to millions. In many ways, engineering remains one of the greatest instruments for social change.

Recognizing this reality, the United Nations has increasingly integrated engineering into its global devel-

opment agenda.

The adoption of the United Nations Sustainable Development Goals (SDGs) in 2015 marked a turning point. While the goals themselves do not exclusively focus on engineering, nearly every one of the seventeen SDGs depends upon engineering solutions.

together.

Put simply, engineering is the invisible thread connecting the Sustainable Development Goals.

Recognizing this, UNESCO and the World Federation of Engineering Organizations launched World Engineering Day for Sustainable Development,

organize events highlighting engineering achievements and encouraging students to consider engineering careers. Thousands of schools around the world participate in awareness campaigns, competitions, and exhibitions designed to showcase the transformative power of engineering.

same countries face severe shortages of engineers.

According to UNESCO estimates and various international studies, many developing nations do not produce enough engineers to meet their infrastructure and industrial needs. This shortage affects economic growth, technological advancement,

ration with international partners, repeatedly emphasizes the importance of engineering for sustainable development. The reports document how engineers contribute to poverty reduction, disaster resilience, environmental protection, and economic growth.

One recurring theme emerges from these studies: engineering changes lives.

Consider rural electrification projects supported by international development agencies. Millions of people who once lived without electricity can now study after sunset, access healthcare services, and participate in local economies. Behind every transmission line and every solar installation stands the work of engineers.

Similarly, water engineering projects supported by organizations such as UNICEF and the World Bank have brought clean drinking water to communities that previously relied upon unsafe sources. The impact extends beyond health; it influences education, productivity, and social stability.

Engineering's contributions are perhaps most visible during times of crisis.

When earthquakes strike, engineers assess structural safety and oversee reconstruction efforts. During floods, they design protective infrastructure and improve drainage systems. During public health emergencies, they develop medical technologies and strengthen supply chains.

The COVID-19 pandemic provided a powerful reminder of engineering's importance. Around the world, engineers contributed to the design of ventilators, expanded digital communication networks, improved manufacturing systems, and supported vaccine distribution efforts.

Yet, despite these contributions, engineering continues to struggle for recognition in many societies.

Part of the problem lies in visibility.

Children grow up seeing doctors save lives, lawyers arguing cases, and entrepreneurs building companies.

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Ending poverty requires infrastructure and industrial development. Achieving food security depends on

celebrated annually on March 4. Officially proclaimed by UNESCO in 2019, World Engineering

The initiative carries particular importance for developing countries.

In many parts of Africa,

and the capacity to address critical challenges such as water management, housing, and energy access.



agricultural engineering and irrigation systems. Access to clean water requires environmental and civil engineering. Affordable and clean energy demands innovation in renewable technologies. Sustainable cities depend upon urban planners, architects, and engineers working

Day has become an important global platform for promoting engineering among young people and demonstrating its role in addressing humanity's greatest challenges.

Every year, universities, engineering institutions, governments, and industries

Asia, and Latin America, engineering continues to struggle with perception problems. Students often view engineering as difficult, underpaid, or lacking social prestige compared to careers in medicine, business, or information technology.

Ironically, many of these

Global organizations have increasingly recognized that reversing this trend requires more than simply promoting engineering as a profession. It requires changing how societies think about engineering itself.

UNESCO's Engineering Report, published in collabo-

The Invisible Force That Built Modern Society

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those who innovate.

Yet, engineering's growing influence also brings new responsibilities. Climate change, urbanization, and resource scarcity present challenges that previous generations never faced.

The engineers of tomorrow will need to think beyond technical specifications. They will be expected

to consider sustainability, ethics, and social impact alongside innovation. Future societies will not judge engineers solely by the height of their skyscrapers or the speed of their trains. They will ask more important questions: Did these innovations improve lives? Did they protect the environment? Did they create opportunities for future generations?

These are questions that matter.

For developing countries, including Pakistan, the global experience offers valuable lessons. Nations do not become prosperous overnight. Progress requires investment in education, research, and infrastructure. It requires governments that understand the importance of long-term planning and

industries willing to support innovation.

Most importantly, it requires people who believe that problems can be solved. That is what engineers do. They look at a river and see a bridge. They look at darkness and imagine electricity. They look at a challenge and begin asking, "How can we make this better?"

Perhaps that is why

engineering remains one of humanity's most hopeful professions. It is built upon the belief that tomorrow can be better than today.

As Engineering Review celebrates fifty years of documenting Pakistan's industrial and technological journey, it is worth remembering that behind every milestone in human history are individuals who dared to build

what others thought impossible.

Engineering has never been merely about steel, concrete, or machines. It has always been about people. And if history is any guide, engineers will continue to shape the societies of tomorrow—quietly, persistently, and often without recognition—just as they have done for thousands of years. ■

Reigniting the Engineering Spirit: How Global Organizations Are Working to Inspire the Next Generation

Rarely do they see the engineers responsible for making modern life possible. Engineering often operates quietly in the background, its successes taken for granted.

Global organizations are increasingly attempting to change this narrative.

The World Federation of Engineering Organizations, which represents millions of engineers worldwide, has actively promoted engineering through international campaigns, conferences, and educational initiatives. Its partnership with UNESCO on World Engineering Day reflects a broader effort to position engineers as agents of positive change.

Similarly, organizations such as UNICEF and the United Nations Development Programme (UNDP) frequently highlight engineering's role in development projects. Whether constructing resilient schools, improving sanitation systems, or expanding renewable energy access, engineers remain central to many international initiatives.

The World Bank has also consistently emphasized infrastructure as a foundation for economic development. Its investments in transportation, energy, and urban development projects have created opportunities for engineers across the developing world.

However, attracting young people to engineering requires addressing several persistent challenges.

First, engineering education in many countries remains disconnected from industry needs. Students often graduate with strong theoretical knowledge but limited practical experience. International organizations have repeatedly encouraged universities to strengthen partnerships with industry and adopt more modern teaching approaches.

Second, there is a need to make engineering more inclusive.

Women remain underrepresented in engineering in many regions of the world. UNESCO has actively promoted gender equality in sci-

ence, technology, engineering, and mathematics (STEM), recognizing that societies cannot afford to overlook half of their potential talent pool.

Programs encouraging girls to pursue engineering careers have produced encouraging results in several countries. Female engineers are increasingly assuming leadership roles in academia, industry, and government, challenging traditional stereotypes associated with the profession.

Third, engineering must be presented not merely as a technical discipline but as a means of improving lives.

Young people are increasingly motivated by purpose. They want careers that make a difference. Engineering offers precisely that opportunity.

An environmental engineer working on water conservation can positively impact entire communities. A biomedical engineer can help develop life-saving technologies. An electrical engineer can expand access

to renewable energy in underserved regions.

Global organizations have recognized that highlighting these human dimensions of engineering may prove more effective than focusing solely on salaries or employment opportunities.

The emergence of climate change as a global priority has further strengthened engineering's relevance.

The transition toward sustainable energy, resilient infrastructure, and climate adaptation will require unprecedented engineering capacity. The International Energy Agency estimates that achieving global climate goals will require millions of additional skilled workers over the coming decades.

Engineers will design the solar farms, wind turbines, energy-efficient buildings, and smart grids that define the future economy.

For developing countries, this represents both a challenge and an opportunity.

Countries that invest in engineering education today will be better positioned to



participate in emerging industries tomorrow. Those that fail to do so risk becoming increasingly dependent on imported technologies and foreign expertise.

Pakistan's experience reflects many of these global trends.

The country possesses a large youth population and produces thousands of engineering graduates annually. Yet concerns regarding employment opportunities, industry engagement, and professional development continue to influence perceptions of the profession.

Organizations such as the Pakistan Engineering Council, universities, and industry associations have an important role to play in strengthening engineering's appeal. International partnerships and participation in global initiatives such as World Engineering Day can further contribute to these efforts.

The challenge is not unique to Pakistan. It is shared by many developing societies seeking to balance immediate economic pressures with long-term investments in science, technology, and innovation.

Ultimately, the efforts of global organizations are driven by a fundamental understanding: engineering is indispensable to human progress.

The roads we travel, the hospitals we depend upon, the communication networks we use, and the technologies that

shape our daily lives are all products of engineering. Modern civilization itself is built upon engineering achievements accumulated over centuries.

Perhaps the greatest challenge facing the global engineering community is not a shortage of problems to solve but a shortage of people willing to solve them.

That is why the work being undertaken by the United Nations, UNESCO, WFEO, the World Bank, and countless other organizations matters.

They are not simply promoting a profession.

They are promoting an idea—that societies can improve through innovation, that poverty can be reduced through infrastructure, and that human ingenuity remains one of our greatest resources.

Engineering has always been about building a better world.

The task before global organizations today is to ensure that future generations continue to believe in that mission.

Because if engineering loses its attraction, the world risks losing many of the people capable of solving its most pressing challenges.

And in an age defined by uncertainty, humanity needs engineers more than ever. — ERMD ■

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