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Pakistan Moves Toward Local Lithium-Ion Battery Manufacturing as Policy Work Begins

Pakistan is taking concrete steps toward local manufacturing of lithium-ion batteries as the Ministry of Industries and Production initiates consultations to formulate a comprehensive national Lithium-Ion Battery Policy.

The move is aimed at reducing import dependence, supporting the country's electric vehicle (EV) ambitions, and strengthening its energy storage ecosystem amid rapidly growing demand.

In this regard, a high-level meeting on the formulation of the Lithium-Ion Battery Policy was held in Islamabad under the chairmanship of the Special Assistant to the Prime Minister (SAPM) on Industries and Production, Haroon Akhtar Khan. The meeting was co-chaired by Minister of State for Finance and Railways, Bilal Azhar Kayani, and attended by Secretary Industries Saif Anjum, Chief Executive Officer of the Engineering Development Board (EDB) Hamad Mansoor, and representatives from relevant public and private sector organizations.

During the meeting, participants held detailed discussions on promoting local production and full-scale manufacturing of lithium-ion batteries in Pakistan. SAPM Haroon Akhtar Khan stated that, in

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Engr. Sohail Bashir Clinches IEP Presidency

Engr. Sohail Bashir, a renowned engineer and former President of the IEP Karachi Center, has been declared the President of the Institution of Engineers Pakistan (IEP). He secured 3,487 votes.

His competitors, Mian Sultan Mahmood and Engr. Masood Ali Khan, received 384 and 56 votes, respectively.

The outgoing President of the Institution, Engr. Farhat Adil, administered the oath to the newly elected President, Engr. Sohail Bashir.

Official Winners

Vice Presidents

Vice President (Civil & Allied): Engr. Masood Ali Khan

Vice President (Electrical & Allied): Engr. Tahir Basharat Cheema

Vice President (Mechanical & Allied): Engr. Ayaz Mirza

Vice President (Chemical & Allied): Engr. Khalid Bashir

Central Council Members

Civil & Allied – Karachi (Seats: 9)

Engr. Prof. Dr. Sarosh Hashmat Lodi, Engr. Prof. Dr. Abdul Jabbar Sangi, Engr. Faiza Saeed, Engr. Al-Kazim Mansoor, Engr. Bushra Nadeem Mufti, Engr. Mukesh Kumar, Engr. Ashkar Dawar, Engr. Syed Nadeem Arif, Engr. Sajid Ali Abbasi

Electrical & Allied – Karachi (Seats: 7)

Engr. Dr. Dur-e-Jabeen, Engr. Muhammad Idris Khan, Engr. Aftab Ahmed, Engr. Muhammad Sadiq Ali Khan, Engr. Eraj Humayun Mirza, Engr. Syed Azhar Ali, Engr. Dr. Muhammad Ibrar-ul-Haque

Mechanical & Allied – Karachi (Seats: 4)

Engr. Prof. Dr. Muhammad Tufail, Engr. Ghulam Farooq Maniar, Engr. Asim Murtaz Khan, Engr. Mustafa Hussain Khan

Chemical & Allied – Karachi (Seats: 2)

Engr. Shagufta Ishtiaque, Engr. Afaq Ali Siddiqui

Civil & Allied – Lahore (Seats: 8)

Engr. Muhammad Afzal Goraya, Engr. Shahid Hamid, Engr. Khalid Habib, Engr. Aftab Islam Agha, Engr. Muhammad Majid Sarwar Wattoo, Engr. Ch. Shabbir Hussain, Engr. Muhammad Bilal Karimi, Engr. Mubasher Bajwa

Electrical & Allied – Lahore (Seats: 6)

Engr. Muhammad Usman Farooq, Engr. Mamoon Rizwan, Engr. Muhammad Zahid, Engr. Muhammad Hafeez Khan, Engr. Muhammad Naseem Akhter, Engr. Ch. Muhammad Naeem

Mechanical & Allied – Lahore (Seats: 3)

Engr. Tahir Anjum Iqbal Qureshi, Engr. Anwar Ahmad, Engr. Muhammad Ashraf Ch.

Civil & Allied – Islamabad (Seats: 4)

Engr. Hafiz M. Ehsan-ul-Haq Qazi, Engr. Dr. Attaullah Shah, Engr. Dr. Muhammad Ashraf Khalid, Engr. Kamran Hafeez Chohan

Electrical & Allied – Islamabad (Seats: 4)

Engr. Gr. Capt. (R) Muhammad Najamuddin, Engr. Shafiq-ur-Rehman, Engr. Muhammad Ali Khalid, Engr. Muhammad Asif

Mechanical & Allied – Islamabad (Seats: 2)

Engr. Ahmad Shamim, Engr. Dr. Javed Ahmad Khan Tipu

Civil & Allied – Hyderabad (Seats: 1)

Engr. Abdul Wahab Khan ■

Pakistan Moves Toward Local Lithium-Ion Battery Manufacturing

Contd from page 1

developing a comprehensive policy framework to encourage domestic manufacturing. He highlighted that at present, lithium-ion cells and key components are largely imported and only assembled locally, underscoring the urgent need to build indigenous manufacturing capacity across the value chain.

To ensure broad-based consultation, the SAPM announced the formation of three dedicated working groups tasked with engaging stakeholders from industry, academia, and government. These working groups have been instructed to submit their recommendations within two weeks, after which the policy will be finalized.

Minister of State Bilal Azhar Kayani emphasized that adoption of modern technologies such as energy storage systems would play a critical role in power conservation, industrial efficiency, and productivity enhancement. He stressed that the upcoming policy must include concrete incentives and facilitative measures to attract investment, promote technology transfer, and encourage local manufacturing.

Officials informed the meeting that under existing tariff structures, the import of raw materials for lithium-ion batteries is subject to zero tax, while a 12 percent tax is imposed on fully assembled batteries. Meanwhile, the Ministry of Science and Technology assured full support for testing, certification, and quality assurance facilities to ensure that locally manufactured batteries meet international standards.

The policy initiative is closely aligned with Pakistan's National Electric Vehicle (EV) Policy 2025–2030, which targets the conversion of 30 percent of all vehicles to electric by 2030. To support this transition, the government has already announced incentives, including subsidies for electric two-wheelers, three-wheelers, and cars. Global EV manufacturers, including China's BYD, have entered the Pakistani market, with plans for local EV production, while several other Chinese manufacturers are also exploring opportunities in the country.

According to officials, Pakistan also holds untapped potential for lithium-related resources in regions such as Balochistan, Azad Jammu and Kashmir, Gilgit-Baltistan, Khyber Pakhtunkhwa, and the Cholistan Desert, making local battery manufacturing strategically attractive in the long term.

At the same time, demand for battery energy storage systems (BESS) is rising rapidly. A recent report by the US-based Institute for Energy Economics and Financial Analysis (IEEFA) estimates that Pakistan imported around 1.25 gigawatt-hours (GWh) of lithium-ion battery packs in 2024 and another 400 megawatt-hours (MWh) in the first two months of 2025 alone. If current trends continue, battery imports could reach 8.75 GWh by 2030—equivalent to about 26 percent of projected peak electricity demand.

IEEFA cautioned that unmanaged growth in battery storage could lead to stranded generation assets and higher financial losses for the grid. However, the report also noted that Pakistan's high rooftop solar penetration provides a strong foundation for decentralized solar-plus-battery solutions. Despite high taxes, solar-battery systems remain attractive, with payback periods ranging from three to six years across residential, commercial, and industrial sectors.

The meeting concluded with a reaffirmation of the government's commitment to fostering innovation, supporting clean energy adoption, and building a resilient industrial base through localized lithium-ion battery manufacturing—seen as a critical pillar for Pakistan's future energy and mobility transition. – ER eport/APP/MD

Fifth Consecutive Victory

Pakistan Cables Wins 40th MAP Corporate Award

Pakistan Cables Ltd. was honored with the prestigious 40th Corporate Excellence Award, organized by the Management Association of Pakistan (MAP) recently in Karachi.

The Company's fifth consecutive win reaffirms its reputation as a benchmark for trust and transparent business practices in the industry.

The award was presented by Mr. Saeed Ghani, Provincial Minister of Sindh for Local Government, to Mr. Arshad Shafiq, Director Supply Chain & HSE, Pakistan Cables, at a ceremony attended by distinguished business leaders from across the country.

As one of Pakistan's premier wires and cables manufacturers, Pakistan Cables continues to fuel the industry's growth by delivering world-class product quality, operational excellence, sustainability, and ethical business conduct. The recognition further strengthens its rich heritage as a pioneer shaping the future.

Founded in 1953, Pakistan Cables is the pioneer, premier, and most reputable wires and cables manufacturer in Pakistan. Being the first and only wires and cables manufacturer listed on the PSX since 1955, it has the largest geographical footprint in the country, with a presence in over 200 cities and towns. It is also a member company of the Amir S. Chinoy Group.

The Company is ISO 9001:2015, ISO 14001:2015, and ISO 45001:2018 certified, and various cables have been type-tested by KEMA, Netherlands. Its science-based emission reduction targets are validated and approved by SBTi. Pakistan Cables is also a signatory to the UN Global Compact and its net-zero commitment. - PR

Pakistan HVACR Society

Newly Elected Local Councils (2025–27) Assume Office

The Karachi Local Council oath-taking ceremony was held on December 06, 2025, at the Pakistan HVACR Society – Anwar Saadat Secretariat, Karachi Chapter. Yousuf Hasan, President of the Pakistan HVACR Society, administered the oath to the local council. Khalid Mansoor, Chairman, Karachi Chapter; Farrukh Ashraf, Hony. Secretary; Basit Karim, Hony. Treasurer; Rashid Shafique, Hony. Media Secretary; Mohsin Ashraf, Events Coordinator; Syed Hassan Ali, Hony. Coordinator Student Affairs; and Zafar Ahmed Syed, Hony. Membership Promotion Secretary, are the newly elected office bearers.

Abdur Rauf Chaudhry, Chief Election Officer of the Society, administered the oath to the Islamabad Local Council. Mian Arif Hussain, Chairman, Islamabad Chapter; Naureen Ghaffar, Hony. Secretary; Haseeb Zubairi, Hony. Treasurer; M. Ahmad, Hony. Media Secretary; M. Bilal, Membership Secretary; Muizz Ahmad, PEB Coordinator; and Qazi Luqman, Coordinator, are the newly elected office bearers. The ceremony was held on December 01, 2025.

Khalid Mansoor, Chairman, Karachi Chapter, and Mian Arif Hussain, Chairman, Islamabad Chapter, chaired their first local council meetings. In these meetings, the office bearers were finalized, and an outline of upcoming chapter activities was discussed. The councils have planned an engaging and diverse lineup of initiatives, including professional development programs, technical seminars, industry–academia linkages, as well as cultural, social, and sports events.

The Local Councils aim to enhance member engagement through consistent, meaningful, and interactive opportunities. Special focus will be placed on supporting startups, fostering innovation, and strengthening connections between industry and academic institutions. The team is committed to increasing member participation through dynamic, inclusive, and community-focused activities. Khalid Mansoor and Mian Arif Hussain expressed gratitude to the senior regional members for their valuable participation and insightful suggestions, appreciating their continued support and guidance for the progress and betterment of their chapters.

The Pakistan HVACR Society has also formed an Advisory Council for the term 2025–27. Mubesher Ahmad has been appointed as Chairman of the Advisory Council.

In accordance with the Society's rules and procedures, the senior-most member, M. Abbas Sajid, has concluded his tenure. The Society expresses its gratitude for his invaluable services, dedication, and long-standing contributions.

Mubesher Ahmad is the newly appointed Chairman, Advisory Council (2025–27), and the other members are Azim Ashraf, Khurram R. Malick, Ahmad Nawaz, and Ramzan Sharif. The Society is hopeful for their guidance and support as they lead the Advisory Council toward strengthening the Society's mission and future growth. - PR

Pakistan HVACR Society Honors Farrukh Ashraf

Pakistan HVACR Society recognized Farrukh Ashraf's contributions during his tenure from 2023 to 2025. At the oath-taking ceremony for the newly elected council, Society President Yousuf Hasan, along with Khalid Mansoor, Abbas Sajid, Aley Mohammad and Safdar Ali, presented him with an appreciation shield for his hard work, consistency, and new initiatives.

Farrukh Ashraf is currently serving as the General Manager of Luck Trade—one of Pakistan's prominent stockists and importers offering complete HVACR solutions.

His outstanding performance is reflected in several notable achievements, including successfully adding 104 new members to the Chapter, raising its total strength to 236, and leading the organization of 31 highly professional technical seminars. He played a key role in co-organizing the Indoor Cricket Gala, which generated an impressive PKR 1.6 million in revenue for the Society.

Showcasing his technical expertise, he independently delivered a seminar lecture and actively participated as a signatory in all three MoUs, two of which—EDHI Institute and PCSIR—were arranged solely through his efforts. His commitment to environmental responsibility was evident through the successful execution of two plantation drives, resulting in the planting of 800 saplings across multiple locations.

Demonstrating exemplary discipline, he maintained 100 percent attendance in all meetings throughout his tenure. Additionally, he introduced the Founder's Gallery initiative—a meaningful contribution to preserving the Society's legacy—and consistently supported the Office Secretary in various administrative reports and projects, thereby enhancing overall operational efficiency. - ER

Fossil Fuel to Electric Conversion of Used Vehicles - II

A viable option for low-income individuals to acquire an electric vehicle

By: Jalil ur Rehman

More Considerations

• Range Limitations: Converted vehicles often have a limited range, typically around 150–200 km. They are suitable for daily urban driving.

• Battery Cost: The battery pack is the single most expensive component of an EV conversion, accounting for a significant portion of the total cost. The cost of the battery depends on the required range per charge.

Initial Cost Comparison

• Conversion Costs: The average cost of converting a conventional car to an EV typically ranges between Rs. 700,000 and Rs. 1,500,000, depending on the type of vehicle, battery capacity (range per charge), and labor costs incurred by the conversion company.

• New EV Purchase Costs: In contrast, even the cheapest new EVs often exceed Rs. 4 million, which is a prohibitive upfront expense for low-income individuals.

In conclusion, fossil-fuel-to-electric conversion is an economically viable option for those who cannot afford a new EV, offering significant long-term financial relief through reduced operating costs.

Test/Safety Requirements for Converted Vehicles

Fossil-fuel-to-electric converted (retrofitted) vehicles must adhere to stringent safety and testing requirements, with a core focus on ensuring electrical safety, crash integrity, and functional reliability.

Converted vehicles must comply with the same safety standards applicable to new vehicles. Those exceeding specific speed and voltage thresholds (e.g., greater than 40 km/h and 48 volts) must conform to FMVSS 305 (Federal Motor Vehicle Safety Standard).

• High-Voltage Protection: The primary safety concern is the high-voltage (HV) system, typically defined as above 60V DC or 30V AC. Systems must provide protection against electric shock through insulation and securely covered high-voltage components, with covers requiring tools for removal.

• Shock Prevention: All high-voltage components and wiring must be protected against direct and indirect contact through insulation or secured covers requiring tools for removal.

• Cable Identification: High-voltage cables (excluding those inside enclosures) must have an orange external coating for easy identification by technicians and emergency responders.

• Isolation: The HV traction battery system must be isolated from the vehicle's chassis and any auxiliary low-voltage (ELV) components to prevent electric shock hazards. A ground-fault detection circuit should alert the driver or service technician in case of a fault.

• Auxiliary Power: An independent 12V auxiliary battery is typically required to ensure essential safety equipment—such as lights, brake boosters, and hazard lights—remains operational even if the main battery system shuts down.

Battery Safety

Batteries are a critical component and must meet stringent requirements.

o Restraint: The battery bank must be securely fixed to withstand significant G-forces in a crash (e.g., 20g front impact, 15g side, 10g rear and vertical) to prevent it from breaking loose and creating a hazard.

o Containment & Venting: Batteries must be enclosed to resist water and foreign objects (at least an IP2X rating). If batteries produce hydrogen gas (e.g., some lead-acid types), their compartments must be sealed from the passenger area and vented directly to the atmosphere.

o Overcharge Protection: The charging system must automatically shut off power when the battery is fully charged to prevent overcharging.

o Testing: Battery packs undergo specific tests for overcharge, vibration, extreme temperatures, short circuits, humidity, and fire.

System Disconnects

o Inertia Switch: An inertia (G-force) switch must be installed to automatically disconnect the main traction battery pack in the event of a collision.

o Key Switch Operation: The power-on procedure must be controlled by a key switch that cannot be removed when the drivetrain is energized.

Component Testing

o Electrical Safety Testing: Components and the integrated system undergo testing to ensure compliance with standards such as ISO 17409 and IEC 61140 to minimize shock hazards.

o Performance Testing: The converted vehicle's performance—including range and motor efficiency—must be tested against operating specifications.

o Environmental & Stress Testing: Batteries and other components may undergo testing for resistance to temperature, impact, and other adverse conditions.

• Professional Expertise: Conversions should be carried out by certified installers with specific training and experience in high-voltage systems.

• Documentation: A comprehensive "build book," including wiring diagrams, component serial numbers, test results, and maintenance procedures, must be maintained for traceability and inspection.

• Performance Verification: The final system must be tested to ensure it performs according to the required operating specifications.

Adherence to these standards is necessary to ensure safety.■

NED Career Fair 2025 Connects Students With Industry and Government

The Graduating Career Fair 2025, organized by the Directorate of Industrial Liaison (DIL) at NED University of Engineering & Technology, brought together students, employers, and industry leaders for a vibrant networking event aimed at bridging the gap between academia, industry, and government.

More than 50 renowned organizations showcased their exhibits, while over 20 delegates from the government sector graced the occasion with their presence. Additionally, 250+ industry professionals delivered insightful presentations and engaged enthusiastically with students, offering guidance, mentorship, and career advice. To further strengthen academia–industry–government collaboration, multiple MoUs were also signed with Pakistan Machine Tool Factory (PMTF) and Logiciel Services, paving the way for enhanced partnerships, opportunities, and future initiatives.

The fair offered graduating students a platform to connect with employers through company booths, on-campus recruitment drives, and interviews conducted in video conferencing halls. Students explored opportunities for job placements, internships, industrial visits, final year design projects (FYDPs), and other collaborative activities.

The day began with an inaugural session at Syed Mehmood Alam Auditorium, followed by the formal opening of the exhibition area. The event received extensive media coverage, highlighting its impact and reach.

Speaking on the occasion, Vice Chancellor Dr. Muhammad Tufail said, "This event acts as a vital platform connecting students with employers, creating first-entry career opportunities and reinforcing collaboration among industry, academia, and government."

Dr. Ali Zulqarnain, Director of Industrial Liaison, added, "This full-day event successfully met its purpose by bringing students and industries together and cultivating strong, productive partnerships."

DIL extends sincere acknowledgements to all participating organizations, dignitaries, delegates, faculty, staff, and students whose active involvement contributed to the event's success. A special acknowledgement is reserved for our Mega, Platinum, Gold, and Silver Sponsorship Partners, whose generous support and partnership played a pivotal role in elevating the scale, quality, and overall impact of Career Fair 2025. Their commitment to empowering youth and strengthening academia–industry–government linkages (Triple Helix Model) is truly commendable. - PR

Tech Entrepreneurship: A Breeding Ground for Social Innovation

Engr. Dr. Muhammad Nawaz Iqbal

Technology entrepreneurship is quickly becoming an extremely influential force in contemporary society.

What used to be exclusive to the realms of software creation or digital utility has now evolved into a vibrant ecosystem whereby technological solutions are becoming carriers of change in society. Today, entrepreneurs are not only looking at technology as a means of profitability but also as an avenue through which they can solve long-standing social, economic, and environmental issues. This new attitude of valuing society alongside business has made tech entrepreneurship one of the most promising sources of social innovation, where novel ideas are generated at the crossroads of digital resourcefulness and human necessity.

The ability to carry out rapid experimentation and iteration is one of the characteristic advantages of tech entrepreneurship. Conventional social interventions may take years to negotiate policy, secure funding, or pass bureaucratic clearances before being implemented. Conversely, technology-based enterprises have the ability to build prototypes faster, pilot them within communities, collect data, and optimize models in a fraction of the time. Such responsiveness helps entrepreneurs address emerging social problems as they arise, such as improving telemedicine during health crises, developing AI-assisted farming technologies to help small farmers, or producing real-time learning applications for under-resourced schools.

Scalability is another significant contribution tech entrepreneurship offers to social innovation. A technology-based solution can serve millions of users with comparatively fewer resources than traditional programs. Social-impact solutions are no longer limited by geographical boundaries or socio-economic constraints due to mobile platforms, cloud computing, and digital distribution. A mental-health application created in Pakistan can assist users in Kenya or Indonesia; a supply-chain transparency tool based on blockchain can empower ethical producers across continents. This scalability is what gives social innovations created within tech ecosystems both impact and sustainability.

Additionally, tech entrepreneurship introduces a culture of informed decision-making into the social innovation space. Analytics, algorithms, and user data help entrepreneurs understand patterns, identify root causes, and test hypotheses. This approach is more accurate, minimizes guesswork, and improves social service interventions. For example, machine-learning algorithms can identify the risk of student dropout before it occurs, enabling educators to intervene earlier, while predictive analytics can help municipal governments manage traffic congestion or air pollution more effectively. Data thus becomes a powerful ally, making social innovation more refined and evidence-based rather than intuitive.

Another feature of tech entrepreneurship that benefits social innovation is collaboration. Technological projects usually operate within ecosystems where developers, designers, investors, academic institutions, non-governmental organizations, and policy bodies interact. Such cross-sector partnerships bring diverse expertise to the table and make solutions more contextual and holistic. For instance, a health-tech startup may collaborate with hospitals, government health departments, and international organizations to develop universal platforms for remote diagnostics. These cooperative models ensure that social innovations are grounded in real-world needs and supported by multidimensional expertise.

Tech entrepreneurship also promotes inclusivity by democratizing access to resources and opportunities. Digital tools allow marginalized groups to participate more actively in both economic and social spheres. Technology can empower women entrepreneurs, rural populations, and differently abled individuals to acquire new skills, establish businesses, and access markets previously unavailable to them. Micro-entrepreneurship platforms, digital payments, and online marketplaces enable these groups to engage in and benefit from the innovation economy. This democratization of opportunity itself represents a significant form of social innovation.

The rise of social-impact technology start-ups has introduced new approaches to value creation. Rather than focusing solely on financial performance, many ventures now adopt blended-value or triple-bottom-line models, where social and environmental outcomes are considered as important as financial returns. Subscription-based educational platforms, pay-per-use solar energy grids, and community-driven financing systems are examples of how business innovation can balance profitability with social well-being. These models support long-term sustainability while ensuring that impactful solutions remain financially viable.

Tech entrepreneurship also acts as a driving force behind environmental sustainability. Innovative companies are leading efforts in renewable energy, smart waste management, climate sensing, and digital agriculture. These innovations address immediate environmental challenges while supporting communities vulnerable to climate-related risks. For example, IoT-based water-management systems can conserve resources for farmers and enhance crop resilience, illustrating how technology-driven solutions can simultaneously transform environmental and social outcomes.

Moreover, tech entrepreneurship has transformed education and skill development. EdTech platforms offering personalized learning, immersive simulation environments, and AI-assisted tutoring help bridge educational inequalities. These digital tools provide quality education to students in remote or low-income areas that would otherwise be inaccessible. This not only improves literacy and employability but also nurtures a new generation of problem solvers equipped with the skills needed to drive further social innovation.

In the health sector, tech entrepreneurship has enabled solutions that make care more accessible, affordable, and effective. Telemedicine platforms connect physicians with patients, wearable technologies monitor chronic conditions, and AI-based diagnostics enable earlier disease detection. These innovations reduce systemic burdens and improve health equity, particularly in underserved regions. By integrating technology with healthcare delivery, entrepreneurs create social value that extends beyond treatment to prevention and awareness.

Finally, tech entrepreneurship is redefining civic engagement and public governance. Digital platforms that promote transparency, citizen participation, and accountability strengthen democratic processes. Applications for reporting municipal issues, participatory budgeting platforms, and AI tools for detecting corruption demonstrate how technology can reinforce civic institutions. These innovations strengthen the relationship between citizens and institutions, laying the foundation for more resilient and responsive governance.

Another significant contribution of tech entrepreneurship lies in advancing financial inclusion. Digital banking, fintech solutions, and mobile payment systems have transformed how individuals and small businesses manage finances. In many developing markets, fintech providers offer microloans, savings tools, and credit assessments that bypass traditional banking barriers. This economic empowerment fosters entrepreneurship, enhances household resilience, and supports inclusive economic growth. ■

آوازِ اقبال

اقبال کا ترانہ بانگِ درا ہے گویا
ہوتا ہے جادہ پیما 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 جھومتا جاتا ہے ابر
فیل بے زنجیر کی صورت اڑا جاتا ہے ابر
تیری عمر رفتہ کی اک آن ہے عہد کہن
وادیوں میں ہیں تیری کالی گھٹائیں خیمہ زن
چوٹیاں تیری ثریا سے ہیں سرگرم سخن
تو زمیں پر اور پہنائے فلک تیرا وطن
چشمہ دامن ترا آئینہ سیال ہے
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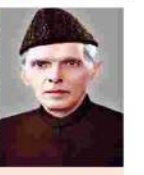

فرمانِ قائداعظمؒ

ایمان ، اتحاد ، تنظیم

اصول اور تفصیلات

گاندھی جی کہتے ہیں: "ہندوستان کو جیتے جی ٹکڑے ٹکڑے کیا جارہا ہے۔"
راج گوپال اچاریہ کہتے ہیں: "بچے کے ٹکڑے کیے جارہے ہیں۔"
قدرت نے پہلے ہی سے ہندوستان کو تقسیم کر رکھا ہے اور اس کے ٹکڑے ٹکڑے کر رکھے ہیں۔ ہندوستان کے نقشہ پر مسلم ہندوستان اور ہندو ہندوستان پہلے ہی سے موجود ہیں، نہ معلوم اس کے متعلق اتنا واویلا کیوں کیا جاتا ہے۔ وہ ملک ہے کہاں جس کے ٹکڑے ٹکڑے کیے جائیں گے؟ اور وہ قوم کہاں ہے جس کی قومیت فنا کی جانے 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 کانفرس، بمبئی۔26 مئی 1940ء)

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AI-Powered Bird Repelling System at Lahore Airport

ATERMES, IEC secure Landmark Contract

ATERMES, a French leader in advanced surveillance and security solutions has announced in partnership with The Imperial Electric Company (IEC), the award of a major contract by the Pakistan Airports Authority (PAA) for the deployment of a state-of-the-art Bird Repelling System (BRS) at Lahore International Airport.

This milestone project represents a first-of-its-kind integrated solution combining SURICATE, ATERMES' advanced AI-enabled multi-sensor surveillance system, with acoustic and laser deterrence technologies. The system delivers a fully automated, intelligent, and environmentally friendly approach to mitigating bird-strike risks; one of aviation's most persistent safety challenges.

The SURICATE system, developed by ATERMES in France, brings together cutting-edge optronics, embedded AI, and edge computing to continuously monitor airfields, identify potential avian threats in real-time, and automatically activate deterrence mechanisms.

Once a bird threat is detected by the system's deep-learning algorithms, SURICATE autonomously triggers the surrounding acoustic and laser repellers, driving the birds away from critical flight zones such as runways and taxiways.

This unique synergy between AI-based detection and automated multi-modal deterrence marks a turning point in airport security and environmental protection. Unlike traditional manual or time-based repelling systems, the BRS for Lahore Airport operates only when necessary, optimizing energy use and minimizing disturbance to the surrounding ecosystem.

Lionel Thomas, Chairman of ATERMES, stated: "This project is not just about technology; it's about redefining how airports ensure safety through intelligence. By merging AI, optics, and deterrence, we're transforming bird control into a predictive, autonomous, and eco-responsible process."

Sajid Jamal, Executive Director of The Imperial Electric Company, added: "Our partnership with ATERMES reflects Pakistan's growing commitment to embracing advanced, AI-driven safety systems. Lahore will become the first airport in the region equipped with such an integrated and intelligent Bird Repelling System."

The project underscores a strong collaboration between France and Pakistan in technological innovation. ATERMES will provide the detection and control systems, while IEC, a key player in Pakistan's engineering and infrastructure sectors, will oversee integration, installation, and local support. Together, they will ensure the delivery of a robust, scalable, and sustainable system that sets a benchmark for other international airports in the region. - PR

BISMILLAH HIR REHMAN NIR RAHEEM

Surah Al-Waqi'ah — The Event

By Muhammad Tariq Haq | www.eslpk.com

A message sublime and dignified,
--When the last hour strikes, all truth will be clarified.

The mountains will crumble, the earth subside,
--Some will be honored; others horrified.

Into three groups, mankind will divide:
--The foremost, the right, and the left—identified.

The foremost will dwell in gardens of delight,
--In paradise with their wives, forever satisfied.

With peace, mercy, and favors, the righteous abide,
--Alongside their pure, eternal brides.

The left-hand ones in torment reside,
--Paying for pleasures once enjoyed with pride.

From seed you sow to crops that rise,
--From drop in womb to life inside, then born outside.

The fire you strike from wood once dried,
--The rain from clouds that drift and glide.

Each sign proclaims His power and might
--None can escape, none can hide.

The Creator provides all that's supplied,
--Every grain and drop of water required.

By radiant stars that gleam and guide,
--And black holes where the lights subside.

The Sacred Scripture, He sanctified,
--None may touch it but the purified.

When the summons of death will arrive,
--No soul survives; false pride's denied.

Only deeds, good or ill, will decide,
--Where souls in eternity will reside.

The Oneness of our Lord will be recognized,
--Polytheism and disbelief subside.

Strive for ranks exalted high;
--Let excellence be your guide.

Let the Name of your Lord alone be magnified
--The Most Dignified.

پندرہ روزہ

انجینئرنگ ریویو

GOLDEN JUBILEE 50 ENGINEERING REVIEW 1975 - 2025

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پاکستان کی پہلی ڈرائیورلیس کار کی کامیاب ٹیسٹ ڈرائیو

این ای ڈی یونیورسٹی کے انجینئرز آرٹیفشل انٹیلی جنس کے ذریعے تجربہ کیا، پروجیکٹ کو میچورٹی تک پہنچادیا، کار تیار کرنے والی ٹیم کے سربراہ کی گفتگو

این ای ڈی یونیورسٹی آف انجینئرنگ اینڈ ٹیکنالوجی کے انجینئرز نے آرٹیفشل انٹیلی جنس کے ذریعے پاکستان کی پہلی بغیر ڈرائیور کے چلنے والی کار (DriverlessCar) کی ٹیسٹ ڈرائیو کا کامیاب تجربہ کرلیا ہے، ٹیسٹ ڈرائیور سے ڈرائیورلیس کار این ای ڈی کی سڑک پر رواں دواں ہے جس نے سب کو حیران کردیا ہے، ڈرائیورلیس کار کی تیاری ایک سال قبل شروع ہوئی تھی اور اس پر کام این ای ڈی یونیورسٹی کے نیشنل سینٹر فار آرٹیفشل انٹیلی جنس شعبہ کمپیوٹر انفارمیشن سائنس میں شروع ہوا تھا اب یہ Selfdriving یا Aldrivingcar این ای ڈی کی سڑکوں پر رواں دواں ہے۔

چین سے درآمد شدہ الیکٹرونک وہیکل میں آرٹیفیشل انٹیلی جنس، روبوٹکس، میپنگ اور سینسر/ ویژن اوع اے آئی انگورتھم کی مدد سے اسے ڈرائیورلیس بنایا گیا ہے، ڈرائیورلیس کار تیار کرنے والے انجینئرز کی ٹیم کے سربراہ اور نیشنل سینٹر فار آرٹیفشل انٹیلی جنس کے ڈائریکٹر ڈاکٹر محمد خرم نے دوران ڈرائیونگ بتایا کہ ہم ایک سال سے اس منصوبے پر کام کررہے تھے، ہم نے اسے پروجیکٹ کو اب میچورٹی تک پہنچادیا ہے، اس وقت ہم کار

کے ٹرائلز بھی کررہے ہیں، روڈ ڈرائیور بھی کررہے ہیں، ہم نے ریڈار ٹیکنالوجی اور کمپیوٹر ویژن کے ساتھ اسے آگے بڑھایا ہے، اسٹیئرنگ کنٹرول کے بعد اب ہم آبجیکٹ ڈیٹیکشن، لین ریک گنیشن، اسپیڈ لیمنٹ ڈیٹکشن اور سگنل لائٹ ریک گنیشن پر بھی کام شروع کرچکے ہیں جس سے کار ایک مکمل Autonomousdriving پر آجائے گی۔

واضح رہے کہ فی الحال گاڑی کی اسپیڈ الگورتھم میں 15 سے 20 رکھی گئی ہے آٹونومس ڈرائیونگ میں ٹرننگ موڈ اور سامنے سے آنے والے کسی بھی ٹریفک کی judgment موجود ہے، اے آئی ہمیں ڈرائیورلیس کار بنانے والی انجینئرز کی ٹیم کے ایک رکن انضمام خان نے بتایا کہ دنیا کی ان چند گاڑیوں میں سے ایک ہے جو پاکستان کے urban uncontrolled environment کا سامنا کررہی ہے، ہماری سینسر ٹیکنالوجی بہت اسٹرونگ ہے۔

واضح رہے کہ یہ منصوبہ این ای ڈی یونیورسٹی کے سابق وائس چانسلر پروفیسر ڈاکٹر سروش حشمت لودھی کے دور میں شروع ہوا تھا جو موجودہ وائس چانسلر پروفیسر ڈاکٹر طفیل احمد کے دور کے آغاز میں ہی ایک سنگ میل عبور کرچکا ہے۔■

وزیر ریلوے کا سندھ میں ترقیاتی منصوبے شروع کرنے کا فیصلہ

روہڑی اسٹیشن اپ گریڈیشن کا ماسٹر پلان تیار، رواں ماہ ٹینڈر ہوگا، حنیف عباسی

وزیر ریلوے حنیف عباسی کی زیر صدارت سکھر ریلوے ڈویژن سے متعلق اہم اجلاس ہوا۔ وزیراعظم کی ہدایات پر وزیر ریلوے کا سی ایم سندھ کے اشتراک سے سندھ میں ریلوے ترقیاتی منصوبوں کا آغاز کرنے کا فیصلہ کیا گیا۔

وزیر ریلوے نے کہا کہ کراچی کینٹ ریلوے اسٹیشن کی کامیاب اپ گریڈیشن کے بعد اب روہڑی ریلوے اسٹیشن کی اہم جنکشن کے طور پر اپ گریڈیشن کا جامع ماسٹر پلان تیار ہے، جسے رواں ماہ ٹینڈر جاری کیا جائیگا، منصوبے کی لاگت کا 50 فیصد سندھ حکومت جبکہ 50 فیصد پاکستان ریلوے برداشت کرے گی۔ روہڑی ریلوے سٹیشن کی اپ گریڈیشن آئندہ سال جون تک مکمل کرنے کا فیصلہ ہوا، سکھر ریلوے اسٹیشن کو اس کی اصل تاریخی اور جمالیاتی حالت میں اپ لفٹ کرنے کا فیصلہ بھی کیا گیا، وزیر اعلیٰ سندھ کی جانب سے روہڑی منصوبے اور دیگر ترقیاتی امور میں مکمل تعاون کی یقین دہانی کرائی گئی ہے۔ غیر محفوظ ریلوے کراسنگز کو محفوظ بنائے جائیں گے، مسافروں کو معیاری اور محفوظ خوراک کی فراہمی کیلیے سندھ فوڈ اتھارٹی کو خطار سال کرنے کا فیصلہ کیا گیا۔■

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1975 - 2025
The voice of engineers

A Paradigm Shift in Engineering Regulation: One Year of Reform at PEC

Clients, contractors, and consultants must be aligned. Innovative solutions are required so that conaultnst and contractors benefit from global boom. I firmly believe that where there is a will, there is a way, says Chairman Pakistan Engineering Council Engr, Waseem Nazir in a special interview with Engineering Review. Here are his views.

One Year Down The Road

Today I have the opportunity to explain whether, during my one year as Chairman PEC, I have delivered justice or not. You are right—this is a golden opportunity to improve this profession as much as possible through proper regulation. I have been saying for a long time that if we do not put the profession on the right path, we will fall behind. As you mentioned, the world is changing, technology is changing, and the difference between three years ago and today is unimaginable. If this pace accelerates further, then to put the profession on the right track we must change mindsets and learn to accept change.

Many engineers believe that if they remain confined to the drawing board, they are true engineers. But if we move with the world, we fear we will be left behind. In reality, we think in reverse. When I took over, my first slogan was "Looking Engineering Forward." As the world changes, institutions must transform accordingly. This is only possible when your mindset is forward-looking. Complaining is easy—saying things did not happen. I believe that if you want to move ahead with the world, you must actually move ahead.

It Is Time for PEC to Play Its Role

Expectations from PEC are absolutely justified. The real question is how to take it forward so that it meets present and future needs. To do this, a total paradigm shift is required. I have been saying this from the beginning. Now that I have the opportunity, I intend to act more and talk less.

What Is a Paradigm Shift?

A paradigm shift means strengthening our own home—PEC. Our family consists of engineers and stakeholders: consultants, contractors, and operators. This is a complete ecosystem. To run it, we need a for-

Contd on page 16

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How AI Is Transforming HVACR Design, Operations, and Energy Efficiency: Sh. Noman Sajjad

Venture Engineering: Leveraging AI and New Technologies to Redefine HVACR and Firefighting

HVACR & New Technologies

AI and other technologies have supported the HVACR industry for many years, especially in the design sector.

AI is now deeply involved in the design process and has reduced design hours by nearly 50 percent. In operations as well, AI is highly supportive, enabling instant access to information.

AI at Venture Engineering

We have fully adopted AI in our design department. Firefighting, HVAC systems, hospitals, and shopping malls—all these designs are now AI-supported. Designs are developed in compliance with international standards through AI-based tools.

Pakistan-Made Products in the HVACR Industry

In terms of percentage, nearly 75 percent of the products currently in use are imported. The remaining portion is locally manufactured and mainly used in the industrial sector. Overall, the industry relies heavily on imported products.

Energy Efficiency

In buildings, nearly 60 percent of total energy consumption is attributed to HVAC systems. Product selection is therefore critical. Higher-end products offer better energy efficiency. Unfortunately, local manufacturing has not yet fully achieved this standard, which is why imported products remain in demand. That is why careful selection, with a focus on low energy consumption, is essential.

Venture Engineering

We have been operating in this field for the last 25 years. Our core business is central air-conditioning systems. We serve three major segments: hospitals, hotels, and shopping malls. Projects are executed on a turnkey basis. We also provide operation and maintenance services, maintaining clients' systems over long periods. Many clients have been using our services for the past 15 years.

We launched another wing three years ago—the light commercial division. Under this wing, we offer split units under the brand "Dekon," cassette-type units of 2 and 4 tons, modular chillers, and more. We are now also installing central air-conditioning systems in luxury houses ranging from 2 to 4 kanals.

Venture Engineering in Firefighting

Firefighting is a key area of our operations and has been part of our services for the last 15 years alongside HVAC. We design systems in accordance with NFPA 70 standards and import equipment from well-known brands such as Sffeco. Firefighting systems are now mandatory under government regulations. In this segment, we provide complete solutions, including design, supply, and after-sales services.

Industry Concern for Firefighting

Firefighting systems are now a prerequisite for building approvals in Punjab. Specific systems are prescribed depending on building type. During inspections, systems are verified by the authorities. At the final stage, we also provide maintenance and servicing. We test entire systems weekly as part of our standard schedule. Government support has increased significantly, and inspectors regularly visit buildings to examine systems, documentation, and maintenance practices. This process is gradually improving compliance across buildings, regardless of size.

After-Sales Service

We respond within 24 hours, with engineers and technical staff available round the clock. Some clients maintain their own teams, whom we train. While our maintenance services may cost 5 percent more, clients' expensive machinery remains protected. We also ensure safety and minimize the likelihood of incidents. The incident at Centaurus Mall is a case in point, where responsibility ultimately fell on the client after handover. Had after-sales maintenance remained with the contractor, such an incident might have been prevented.

Future Plans

As mentioned earlier, we launched the light commercial wing three years ago, focusing on cooling solutions for luxury homes in Punjab. Currently, we are also working on a major hospital and a shopping mall. We completed the Mall of Sargodha project in 2022—an iconic turnkey project featuring a 4,400 US RT air-conditioning plant along with firefighting systems. We continue to handle its operation and maintenance. Earlier, Mall of Gujranwala was another landmark project. We have also completed projects in Quetta and at Dow University in Karachi.■

Burning the Boats: Why Building Pakistan's Engineering Institutions Matters

Engr. Chaudhry Foad Hussain is the Managing Director and a Board Member of National Development Consultants (Pvt.) Ltd. (NDC), one of Pakistan's oldest and most respected consulting engineering firms. Over more than two decades in practice, he has built a career at the intersection of hydropower, dams, irrigation and municipal infrastructure, helping to shape projects whose combined capital value runs into tens of billions of dollars across Pakistan.

A graduate of the University of Engineering & Technology (UET), Lahore in Civil Engineering (2002), he later earned a full-ride scholarship for M.Sc. in Civil Engineering from the University of Minnesota, Twin Cities, a leading Big Ten research university, specializing in hydraulics and water resources. At Minnesota's Saint Anthony Falls Laboratory he deepened his expertise in numerical and physical hydraulic modelling, sedimentation and large-watershed hydrology, skills that later became central to Pakistan's mega-infrastructure program.

Foad began his professional career in the United States with HDR, serving as a Water Resources Engineer. HDR is consistently ranked among Engineering News-Record's Top 10 design firms worldwide and currently holds the No. 6 position in ENR's Top 500 Design Firms list, giving him early exposure to the systems, standards and culture of a tier-one global consultancy. After several years working on complex water and infrastructure assignments, he made a deliberate decision to "bring back" that experience to Pakistan.

Responding to a call from his father, NDC's founding leader, Foad returned home to join NDC full-time and help lead a generational transition in the firm's leadership. He has since been deeply involved in the design and management of some of Pakistan's most strategic projects, comprising feasibility, detailed design, construction supervision and contract administration roles across a hydropower portfolio exceeding 20,000 MW.

Under his management, NDC has also served as Prime/Lead Firm on USAID's Architect & Engineering Services IQC (2011–2017), a multi-award Indefinite Quantity Contract with a shared ceiling of US$120 million and later as a key partner in the follow-on A&E IDIQ (2018– onward) with an additional US$60 million ceiling. Complementing his corporate role in the industry, Foad has been President of the American Society of Civil Engineers (ASCE) Pakistan Section since 2018 and also serves on the Executive Council of the Pakistan Engineering Congress, reflecting his wider commitment to advancing the profession nationally.

You built a promising early career in the United States, earning a fully funded master's degree and working with HDR, one of ENR's top-ranked design firms. How difficult was it to leave that trajectory and return to Pakistan?

It was a difficult decision, indeed. After my M.Sc. at the University of Minnesota, I stepped into a comfortable role as a Water Resources Engineer with HDR. Professionally, the path ahead was clear: a stable career in a top-tier ENR-ranked firm, exposure to cutting-edge projects and a predictable life for my family.

At the same time, there was a different kind of responsibility tugging at me. My father, who had established NDC from the ground up over decades, wanted me to bring that international experience back and help steer the firm through its next phase. It was not an easy choice to walk away from the security and lifestyle of the U.S., but I felt strongly that Pakistan needed engineers who were willing to "burn the boats" and commit to building institutions at home rather than only exporting talent.

I, therefore, made a conscious decision: I resigned from HDR, left a settled life in the U.S., and returned to Lahore to work full-time with NDC. Once I came back, there was no looking over my shoulder. I threw myself into the work, initially as a Project Engineer (design and construction supervision) and later as Director, determined to contribute to Projects that truly move the needle for Pakistan's water, energy and infrastructure security.

ER: Looking back over the past two decades, what do you see as NDC's most significant success stories under your leadership?

When I look back, I see NDC's story as one of steady, institution-building growth rather than a single "big win." That said, a few milestones stand out.

Our role on projects like Diamer Basha HPP(4500 MW), Neelum–Jhelum HPP (969 MW), Dasu HPP (4,200 MW), Jalalpur Irrigation Project, Taunsa-Sukkur-Sulaimanki Barrages, Sukkur-Multan Motorway (492 km), Punjab, KPK & Sindh Agricultural Productivity Improvement Project, has been transformational. These are technically demanding schemes in some of the most challenging terrain in the world. Being entrusted with detailed design, construction supervision and contract administration on such projects signaled that a Pakistani firm could stand shoulder-to-shoulder with leading international consultants.

Another major success has been our long-term partnership with USAID. In 2011, NDC was selected as a Prime awardee for USAID/Pakistan's Architect & Engineering Services Indefinite Quantity Contract (IQC), a multi-million-dollar award covering rapid-response infrastructure, energy and municipal services across the country. Building on that performance, NDC has continued as a key local partner under the follow-on A&E IDIQ contract from 2018 onwards. Together, these 15 years of USAID work, from dams and power plants to flood protection, municipal services and reconstruction programs including roads/highways, have not only strengthened NDC's technical depth but also our internal systems, QA/QC culture and transparency.

Beyond the numbers, I am proud that NDC today is recognized among Pakistan's top consulting firms, with more than 450 professional and support staff, over 250 completed projects and an aggregate capital value of infrastructure projects undertaken exceeding US$50 billion while also meeting the expectations of international financiers and development partners.

ER: How does Pakistan's engineering consultancy ecosystem compare with international standards? Are foreign consultancy firms overshadowing local firms, or are they helping raise standards through competition?

In my view, Pakistan's leading consulting firms now operate at a standard that is close to international practice in several sectors. Our firms have invested in qualifications, systems and QA/QC, and long exposure to international lenders and partners has significantly raised the bar.

Foreign consultants still have an important role, but mainly where very specialized expertise is genuinely not available in Pakistan. This, in fact, is the real spirit of joint ventures: to supplement, not substitute, local capacity. Here the Pakistan Engineering Council can play a critical role. Through clearer regulations and RFP guidelines, PEC should ensure that foreign inputs are required only for niche gaps, while projects in areas of established local strength give a leading, prime role to Pakistani consultants so they can take responsibility, build track record and continue to raise standards.

ER: Are engineering graduates entering the market adequately prepared for industry demands?

In general, our engineering graduates have a solid theoretical base, but there is still a noticeable gap between classroom preparation and industry expectations. The main issues are not with the students themselves, but with curricula, laboratories and teaching methods that in some cases have not kept pace with modern practice. Universities need to update syllabi and lab equipment more frequently. If we can align curricula and lab resources more closely with current industry needs, I believe our graduates will be very well placed to compete anywhere.

ER: What policy-level support is needed from the government to strengthen the engineering and consultancy sectors?

At policy level, the single most important shift is to put quality ahead of price in consultant selection. Today many public clients still use 80/20 or even 70/30 technical vs financial weightages, which pushes firms to underbid and cut back on technical depth just to win work. For larger and more complex projects, I strongly believe we should move toward a 90% technical / 10% financial evaluation formula, with a clear project-value threshold where this rule applies. This would encourage genuine qualifications-based selection, allow consultants to invest in stronger teams and ultimately raise the overall standard of Pakistan's engineering and consultancy sector.

ER: As NDC approaches its fifth decade, how do you envision the firm's role in Pakistan's infrastructure landscape over the next 10 years?

As NDC enters its fifth decade, I see our role in Pakistan's infrastructure story becoming even more central and diversified. By the grace of Almighty Allah, the last 24 months alone have seen NDC win a series of flagship assignments - WAPDA's Chashma Right Bank Lift-cum-Gravity Canal Project, the Sindh Water and Agriculture Transformation Project (World Bank), Khyber Pakhtunkhwa Hydropower & Renewable Energy Project (World Bank), Punjab Urban Development – DREAMS I Construction Supervision Project (ADB), the 44 MGD Faisalabad Wastewater Treatment Plant Project (Danida) and the KPK Irrigated Agriculture Improvement Project (World Bank).

Our strategy for the next 10 years is clear: to remain the partner of choice for large, donor-funded water, energy, urban and climate-resilient infrastructure, while deepening our technical innovation and investing in young Pakistani engineers. If we can continue to deliver at this level, I believe NDC will not only help secure Pakistan's water and energy future, but also emerge as an exportable regional centre of excellence in consulting engineering.■

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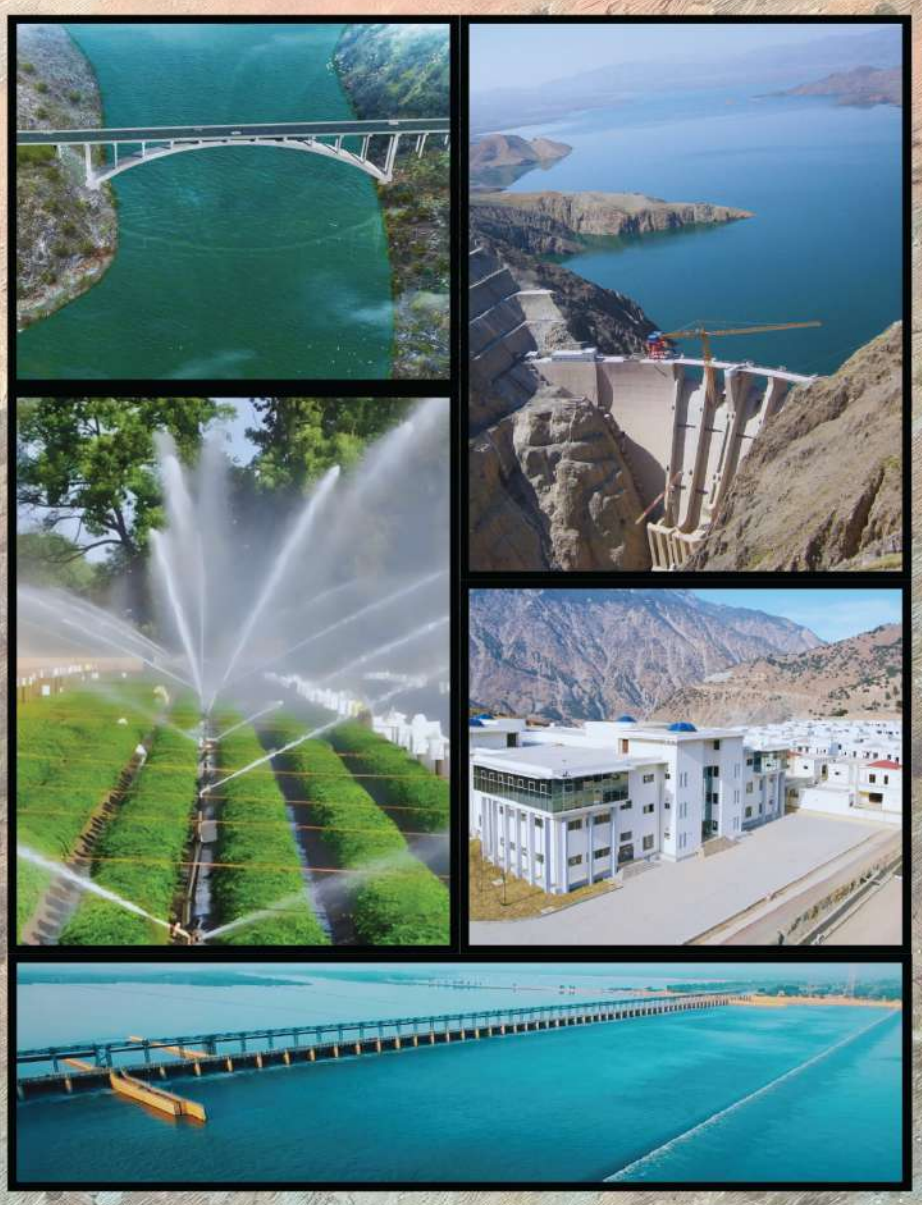

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National Development Consultants (NDC) is one of the Pakistan's premier consulting engineering organization which has attained international standard and is ranked among the Pakistan's top 5 consulting firms. It was established in 1977 and is progressing successfully for more than 49 years.

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KPK Office: House No. 17-C, Old Bara Road, Afzal Abad, University Town, Peshawar
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Emerging Green Solutions (EGS) stands as a leading force in Pakistan's renewable energy sector, providing internationally acclaimed power generation and industrial solutions.

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A Paradigm Shift in Engineering Regulation: One Year of Reform at PEC

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ward-thinking, smart, and digital institution—one that understands present needs and anticipates future demands. Its institutional capacity must be strong enough to comprehend these challenges and lead in policy-making.

Therefore, it is essential that PEC becomes a modern, 21st-century institution. This is a fundamental requirement, and I am fully convinced of it. Today, after one year, I can honestly say that I am satisfied that I have initiated a paradigm shift—a very difficult task. Changing an institution's direction requires commitment, and commitment requires a roadmap whose results appear over time.

I have separated operations from regulation, placed the right person in the right job, and provided a roadmap for digital transformation. I reviewed outdated rules and regulations that were burdening stakeholders. Without AI, we will fall behind. Engineers cannot compete only within Pakistan; they will only excel when they compete globally.

First, realization is necessary—and that is what we often lack. We refuse to accept our mistakes. We say, "We are fine," or "There is a problem," but we do not say how to move forward or what prerequisites are required. Most of those prerequisites have now been addressed. When people see these reforms, they will realize they are meant for a 21st-century institution.

Exchange Between PEC and Pakistani Engineering Companies

Exchange always produces positive results. PEC will complete 50 years next year. When I compare PEC with similar organizations worldwide, it stands at a strong position. It started in 1976 from a one-room office and, within 26 years, became the voice of engineers across Pakistan and delivered commendable work—appropriate for the needs of that era.

However, if we do not change ourselves today, we will become irrelevant. If Pakistani engineers fail equivalence tests abroad or contractors cannot work overseas, PEC's utility will gradually decline. The dilemma is to move forward at the same pace as the world.

PEC is a mentor to institutions in Saudi Arabia, Kuwait, Nigeria, and Kenya. It has strong capacity—but can we keep up and maintain it? In a changing environment, fast-track change is essential.

PEC performs three core functions: registering engineers, registering contractors, and ensuring their professional development. Every institution does this, but the question is whether it is done in an orthodox or a modern way. Modern methods minimize human interference, reducing nepotism and favoritism.

I introduced policies on health and safety, ethics, and corporate social responsibility. Institutions that ignore these areas fall behind. We have begun work on ISO 9000 certification this year. Sustainability is challenging but necessary. In today's world, if we do not introduce e-cards, what will we do? A generation that does not even touch paper wants to see its credentials on a mobile phone.

We have launched e-cards, integrated PEC into NADRA's portal, and now engineers' IDs will appear in Pak-ID. CPD, training, and all relevant data will be included—things that never existed before. PEC has begun a new journey.

New Relationship Between PEC and Contractors

The remaining major focus is on contractors, who are our stakeholders. Who will facilitate them to work abroad? Who will support them? Obviously, PEC must step up and be ready. Stakeholders must help us bring change; otherwise, stagnation will harm the profession.

It is painful to see engineers needing recommendations to obtain certificates,

Contd on page 16

CSR: Transforming Project Management with Advanced Construction Technologies

Construction Solutions Resources (SMC-Private) Limited (CSR) is committed to redefining project management practices for mega infrastructure, residential, and commercial developments within the construction industry.

Through the structured use of advanced technology and innovative construction solutions, CSR delivers efficient, reliable, and future-ready outcomes.

Our mission is to introduce cutting-edge technologies that have gained global recognition and to promote construction systems capable of transforming conventional building practices. By combining technical expertise with innovation, CSR aims to enhance construction quality, efficiency, and sustainability across all project scales.

Professional Associations & Quality Standards

At CSR, effective risk management and uncompromising quality assurance are fundamental to every project. We strictly comply with global professional standards, ensuring the use of certified materials and adherence to internationally accepted construction processes. This approach guarantees structural integrity, safety, and long-term durability.

Our mechanical splicing solutions are certified by the Precast Concrete Institute (PCI) and are implemented under the close supervision of CSR's Quality Control Department. To ensure proper execution, we provide on-site and virtual technical support, as required, enabling local workforces to confidently and efficiently adopt our systems.

Backed by over 40 years of proven experience, CSR offers a reliable portfolio of proprietary products. Our high-quality mechanical splicing solutions are suitable for projects of all sizes—from small developments to multi-million-dollar infrastructure works—providing a comprehensive, cost-effective, one-stop solution for reinforcement needs.

Our Products

- Rebar Splicing Solutions
- Reinforcement Couplers
- Anchorage Devices
- Rock Bolts
- Tunnelling Equipment
- Pre- and Post-Tensioning Systems
- Fiber Reinforcements

Our Services

- Supply, procurement, and testing of rebar splicing solutions
- Technical assistance for installation and inspection of connection systems
- Consultancy services for quality control and structural performance assurance

OUR SECTORS

- Airports
- Bridges & Subways
- Tunnels
- Ports & Stadiums
- Railways
- Power Plants
- Towers & Buildings
- Hospitals
- Industrial Facilities

The original grout-filled mechanical connector approved world wild. More than 45 million sleeves used world wild 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.

Sleeve	Certifications	Rebar Size
UX (SA)	ICC-ES Type 1/ 2/ 2HS (USA) Class SA / Class A (Japan) ISO15835 Category S / B (Romania)	D16 – D41
NX II	Class A (Japan)	D10 – D51

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 timeframe 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, significantly improving traffic flow and regional connectivity.

Advanced construction methodologies were employed, including Mechanical Grout Splice Sleeves and precast technology, to ensure rapid and efficient execution. Concrete-in-Place (CIP) piers were constructed, while precast transoms were cast separately to accelerate installation. Once cured, the transoms were lifted and positioned onto the piers using cranes, ensuring speed, safety, 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.■

A Paradigm Shift in Engineering Regulation: One Year of Reform at PEC

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while lieutenants and doctors receive theirs immediately. I have now ensured that on the day results are announced, engineers receive their certificates automatically—on their phones and at home. This is now an automated process. In 2026, no graduate will say they had to physically collect a certificate.

How Consultants and Contractors Can Benefit from the Mega Engineering Boom Abroad

Pakistan has a population of 250 million. We produce about 20,000 engineers annually. There are 400,000 registered engineers, 65,000 registered contractors, and about 6,000 major consultants. This landscape demands that we help engineers and contractors work abroad and build teams.

From my analysis, major hurdles for contractors include performance bonds, advance bank guarantees, and insurance bonds, which block initial investment. We are working on these issues and engaging with the government, but innovative solutions are required. I firmly believe that where there is a will, there is a way.

However, industry must first correct itself. How many Pakistani contractors actually meet international requirements? Today, institutional capacity is assessed: organizational structure, ethics policy, health and safety policy, data management. International competition demands compliance.

You cannot export poorly polished fruit; similarly, you cannot export underprepared engineers or contractors.

If an engineer completes CPD from home without seriousness, they may cause international bans the very next day. Going abroad requires effort from both sides—the institution and the individual. One hand alone cannot clap.

Do We Need a Different Approach?

We have three stakeholders: clients, contractors, and consultants. All three must be aligned. Clients operate independently and often ignore the concerns of contractors and consultants, who then complain about being sidelined. Without harmony, clients will not realize that development is like a rickshaw with three wheels. The client holds the steering, but all three wheels are essential.

For the past year, I have been working to make clients realize that alignment is necessary for sustainable development.

Many approaches will be introduced; a single solution will not work. We are launching a Project Director Certification program. In development projects, the project director plays the most critical role. If we train 50–100 project directors annually at an international level, Pakistan's construction industry will transform within 10 years.

This three-month certification, in partnership with the National Defence University (NDU), will produce Chartered Project Directors. Many participants will be from client organizations. When clients, consultants, and contractors train together, the industry landscape will change significantly. Timely, high-quality project completion will build confidence. Engineers' confidence, self-esteem, and professional standing must rise.

Confidence That Reforms Will Continue

I am 100 percent convinced that the roadmap developed over one year is sustainable and on the right track. Achieving a paradigm shift in one year was an enormous task. Tremendous effort has gone into building a futuristic PEC, involving engineers, contractors, consultants, and universities.

This is not desk work. I have met 500 contractors across seven locations, engaged with 54 universities to address their issues, and met engineers in every city. I have traveled 33,000 kilometers in one year to assess ground realities.

I have introduced deep institutional changes. PEC's secretariat is stronger today than ever before. Reforms can only be sustained when institutions are strong—otherwise, reforms collapse. – **By Manzoor Shaikh**

WB Project to Improve Urban Services in Punjab

The World Bank's Board of Executive Directors has approved $400 million in financing for a new project that will provide safely managed water, sanitation and basic hygiene services, and help improve the institutional and financial performance of local urban administration in Punjab province.

The Punjab Inclusive Cities Program (PICP) will support the improvement and rehabilitation of water supply networks, sewerage systems, and wastewater treatment plants, provide stormwater drainage, and enhance the capacity of local governments to sustainably deliver services and increase revenues in 16 secondary cities in Punjab. The program will also support the improved performance of solid waste management systems in Punjab, including for sanitary disposal of waste.

"Reducing child stunting is essential for Pakistan's future. Through the Punjab Inclusive Cities Program, we are investing in safe water, sanitation, and hygiene services to break the cycle of malnutrition and disease that holds back so many children from reaching their full potential," said Bolormaa Amgaabazar, World Bank Country Director for Pakistan. "In collaboration with the Punjab Government, the program represents a signifi-

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PEL's Global Footprint and National Pride

Indigenous Design and In-House Use of Advanced Technologies Are Our Hallmark: Azeem Talib

Pak Elektron Limited (PEL) is one of Pakistan's leading engineering and manufacturing companies, with a legacy of more than seven decades.

Established in 1956, PEL has played a key role in the country's industrial and infrastructure development by providing reliable and high-quality electrical and energy solutions. PEL specializes in the design and manufacture of power and distribution transformers, switchgear, energy meters, and other electrical equipment, serving utilities, industries, and major infrastructure projects. The company is known for its strong indigenous design and engineering capabilities, in-house R&D, and a consistent focus on quality and innovation. In addition to serving the domestic market, PEL has a significant international footprint, exporting its products to around 40 countries across Europe, the Middle East, Asia, Africa, and North America—proudly carrying the "Made in Pakistan" identity. With a reputation for reliability, durability, and robust after-sales support, PEL continues to strengthen Pakistan's position in the global engineering sector. Here are the views of Azeem Talib, Sr. Regional Head (South), Power Division, of the company

PEL's Role and National Pride

PEL is a unique organization of its kind that today is not only serving Pakistan but is also projecting the country's name globally through Made in Pakistan products. Our products, including modern transformers, are being exported to Europe, the USA, and a total of around 40 destinations worldwide—under the PEL brand and with the Made in Pakistan identity.

This is unique because, generally, technically advanced products are imported into Pakistan. It is rare for highly sophisticated engineering products manufactured in Pakistan to be exported. This is a matter of pride for all of us. Personally, I feel immense pride in being associated with PEL—an organization that has been serving the country for the past 70 years.

Selling in a Consumer- and Import-Ridden Country

Pakistan has different types of customers, many of whom are highly price-sensitive. When you talk about world-class quality, you are naturally offering a premium brand. If you look at the PSX-listed companies, almost every company is our customer.

Customers understand that the premium they pay is returned in the form of reliability, product durability, and long life. It is relatively easy to decide whether to import a similar product or buy a Made in Pakistan product from an institution like PEL, which also ensures continuous service and support.

The real challenge arises where the purchaser is not technically sound or does not understand the sensitivity of technology-related decisions. This usually includes individuals who are involved in real estate or projects purely as financiers and make purchase decisions. We understand that they are not yet our core customers; however, with time, they will learn.

AI & PEL

Most of PEL's products are not high-end consumer products. Once you purchase and install equipment for a substation, you usually forget about it. In large malls or high-rise buildings, people rarely know where panels or transformers are installed—until a problem arises.

In this field, the primary objective of innovation is to ensure uninterrupted and reliable power transmission. Advancements in materials, processes, design, and engineering worldwide are often not visible to the general public. However, when you look at PEL's product footprint and reliability, you will find no blemish on PEL's track record. This reflects how critical a reliable and robust product is in ensuring uninterrupted power supply.

In-House Use of New Technologies

It is true that processes have completely changed. The era of hand-drawn drawings is long gone; everything has shifted to computers, where AI, software, and various tools are used.

What is distinctive about PEL is that our design and engineering are indigenous. We learn, transfer technology, and benefit from global experience, but the application and product improvement processes are carried out locally. We do not simply copy external designs and reproduce them. Our R&D is based on local data, environmental conditions, and multiple contextual factors.

PEL places special emphasis on quality, for which equipment and processes are continuously updated.

PEL Exports

A general issue is the

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Engineering Against the Odds: A Journey of Indigenous Excellence

Consolidated Engineering Services chief Jamshed A. Danish shares his story of vision of 'Building Capability at Home' with ER

A Long Journey

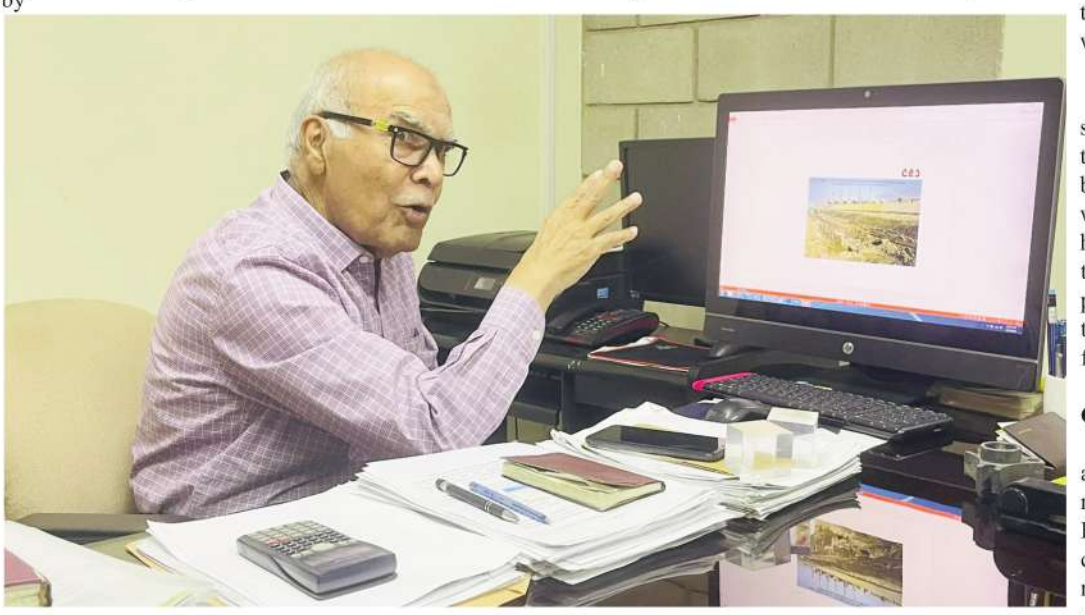
I returned to Pakistan in 1988 and established this company with the motto that we should undertake all mega projects indigenously, which were otherwise being done by people from outside the country. I have continued to pursue what I started, and by the grace of God, I have been successful so far.

We executed major projects for which facilities did not exist locally; we developed them domestically and completed the projects. My educational background from AIT, followed by service with NESPAK, helped me greatly. I also worked at Pakistan Steel and Port Qasim. In Saudi Arabia, I worked with Aramco and Jubail and was involved in some of the biggest projects. I used that knowledge in Pakistan and tried to deliver excellent work locally.

AI & Civil Engineering Today

AI and other platforms may be technically useful in our work; however, ours is a field-oriented discipline where AI, at least for now, cannot innovate. It may do so in the future, but at present it does not have the required database. I believe we should all remain knowledgeable and keep ourselves updated with AI developments.

Yes, AI is probably being used in drawings, but in my experience, even AutoCAD is not used as extensively as it is in the developed world. The reason is that engineers abroad are required to learn AutoCAD themselves even today. As a result, there is no separate AutoCAD draftsman, which makes a significant difference. Here, drawings are mostly prepared by draftsmen. In Pakistan, people have orientation, but the issue is that graduates assume themselves to be at a different level. It will take time before this change unfolds. Engineers will have to do the work themselves as draftsmen gradually disappear, which will help bridge the gaps that are evident today.



Export of Engineering Services

Recently, a delegation of the Constructors Association of Pakistan (CAP) visited Saudi Arabia. I was part of the team as a geotechnical expert. During discussions with my fellow delegates, I was of the view that the level of performance needs to be upgraded, as it is currently low. Instead of general delegations, specialized expertise forums should be formed to move forward.

When the delegation visited and witnessed the situation firsthand, they realized the gaps, and work in that direction is now underway. It is a fact that in the 1980s many Pakistanis were active there. Gammon, NC, and ADA were present and worked extensively. I believe that after changes in government, these matters were neglected, and the situation deteriorated.

Additionally, we are short of resources. For example, if a project costs US$10 billion, you need matching resources. Equipment must be replaced every three years, which again requires capital. Without these resources, one cannot compete. While the government seemingly agrees, in practical terms little happens, and tenures come to an end. During the visit, I also conveyed to the Saudis that we are short of resources and that they need to assist us, as they did in the past. If the government here supports companies the way it did in the Pakistan Steel case, we can move forward.

Level of Engineering Graduates

There is much to be done regarding syllabus and quali fications. I believe there is no meaningful interaction between academia and field practice, which is essential. Very little attention has been paid in this direction. I have tried to involve final-year students in my projects every year or so, facilitating them in research, data collection, and fieldwork.

A Company That Loves to Accept Challenges

Our niche lies in technical expertise and resources. We do what others do not, and we willingly accept challenges. For example, when the Chinese were constructing a deep terminal, they required a pile load test of 4,000 tones. At that time, there was no facility to conduct such a test. We accepted the challenge and successfully performed it by fabricating the equipment locally.

CONSTRUCTION OF PILES 241 NOS 900MM 4, 30M DEPTH COMPLETED IN 70 DAYS (2019) M/S. HINUCON (PVT) LTD, PILE FOUNDATION WORK AT PLOT #IT-03-A3 AND IT-04-A3 KORANGI CREEK INDUSTRIAL PARK, KARACHI.

Currently, I have been working on the HMR Seafront Towers project for the last five years. We have completed six projects and are working on the seventh. There are many other challenging projects that we have executed through our efforts so far. In deep excavations, I believe I have done more work than anyone else in Pakistan. ■

– By Muhammad Salahuddin

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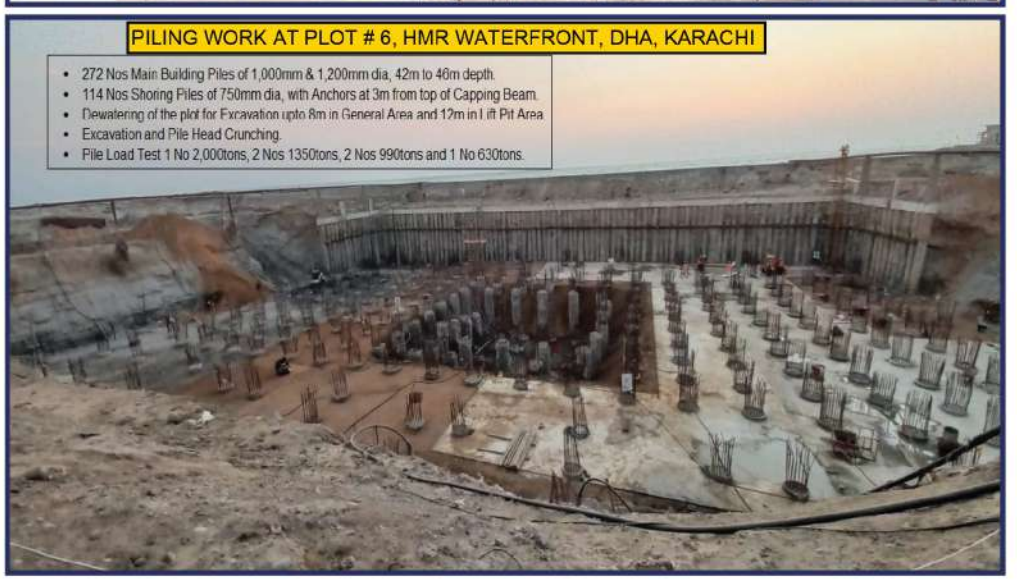
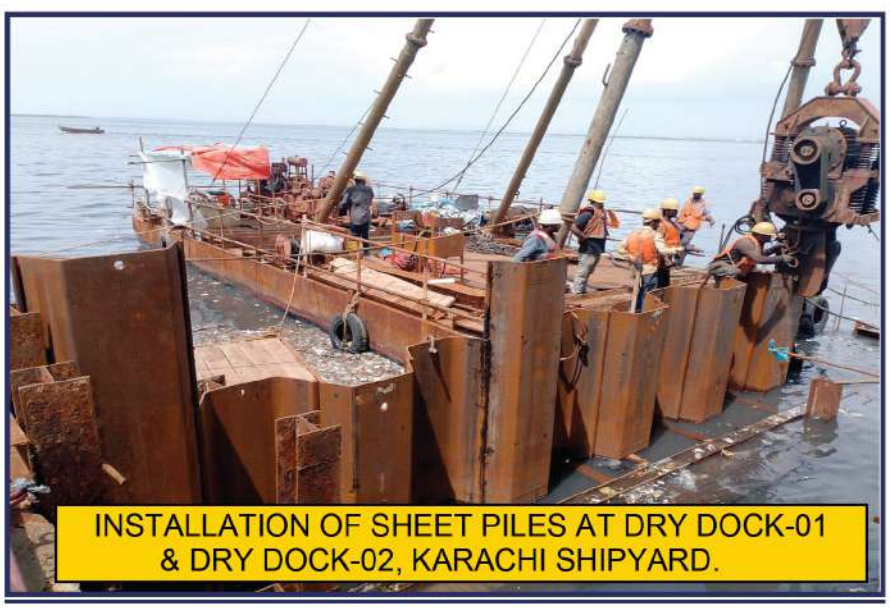
ces is an engineering firm with backing of highly qualified and experienced professionals. CES was founded with the aim to provide high quality services in the discipline of Civil Engineering, specialized mainly in Geotechnical, Foundations, Shoring for Deep Excavation, Ground Water, Dewatering, Marine Structures, Highway, Airports/Airfields Pavements, Materials engineering and related works. The activities of CES presently cover the following fields:

1. Geotechnical & Materials Engineering including Drilling of investigation boreholes and sampling, Field and Laboratory Testing, Instrumentation, Geophysical Testing.
2. Foundation Engineering including Design of Pile Foundation, Construction of Pile Foundation, Pile Load Testing, Underpinning/Micropiling, Soil Improvement.
3. Highway and Airfields Pavements including Pavement Evaluation, Pavement Design, Pavement Management System.
4. Ground Water Studies and Dewatering-Design and Construction.
5. Shoring System for Deep Excavations-Design and Construction including RCC Contiguous, Secant & Soldier Piles, Anchoring, Grouting, Waler Beam and Capping Beam.

ces has indigenously completed projects including over 2500 Boreholes (over 400 Projects) of Geotechnical Investigation, over 18000 Piles (over 100 Projects), over 30 Projects of Shoring, over 34 Projects of Dewatering and over 200 Pile Load Tests. A number of projects of Geotechnical investigation, Piling and Load tests were executed at offshore locations.





Water Engineering in Pakistan: The Case for Local Design and Institutional Reform

AI Has Limits in Water Engineering, Says Engr. Saleem Ullah Saeed

Water Engineering & Management Services (WEMS) specializes in the design, engineering, and implementation of water treatment, desalination, and wastewater management systems across key industrial sectors, including textiles, sugar, power, and food & beverages.

The company is known for integrating international technologies with local engineering expertise, delivering cost-effective solutions, and providing strong after-sales support. Over the years, it has built a solid reputation for technical reliability, regulatory compliance, and sustainable water management solutions in Pakistan.

Engr. Saleem Ullah Saeed is a seasoned chemical engineer with more than three decades of professional experience in water and wastewater engineering. After serving Descon Engineering for 11 years, he co-founded Water Engineering & Management Services in 2001 to address Pakistan's growing need for locally designed and engineered water solutions. He is widely recognized as one of the pioneers who introduced membrane technologies and later industrial wastewater treatment systems in Pakistan. Here is his views.

AI & Water Engineering

Water is a very critical subject around the globe. In Pakistan, it is even more important at present. Here, AI has not significantly affected our field because there is a difference between technology and engineering. Technology does not assess engineering; it provides a general overview, but you cannot design a plant through AI systems. For this, one must rely on experience and synchronize it with the technologies in use.

I feel proud that in 2001 I was the very first person to introduce membrane technologies in Pakistan. After three years, we introduced industrial wastewater treatment technologies. Before that, all such technologies, plants, and equipment were imported, but we started local integration and system manufacturing in Pakistan. Critical equipment is still imported, but we have been doing complete system design locally for the last two decades.

AI provides general information, whereas specific information required for design is not available. We neither get facilitation from AI nor face any threat from it. Maybe in the future, advancements will produce modules that can help; however, at present, there is nothing substantial in water treatment technologies.

Water Institute

To explore any technology, knowledge is essential. It is also important what questions you ask. Unfortunately, there is no dedicated institute for water and wastewater in Pakistan. Pakistani universities also do not offer specialized studies in this area. We have bookish knowledge and old technologies, but membrane technologies, wastewater treatment, and aerobic technologies—newer technologies—are not being focused on by universities. Even the government has not set up any institute to address this need.

This is one of the reasons why projects like Saaf Pani failed, as there was no trained manpower. Most plants failed due to the lack of trained personnel.

Why Universities Stay Away

I think this is due to a drawback in our education system. The main stakeholders are the faculty. It is like a person teaching driving without ever having driven themselves. Faculty members often lack practical experience. Universities remain disconnected from technology due to the absence of industry–academia linkages, resulting in limited awareness of market technologies.

In our universities, students—regardless of discipline—are taught design, yet very little is actually designed in Pakistan. Less than one percent of employment is based on engineers' design capabilities. Most job opportunities are in operations and maintenance, as these are the real industry challenges. Design is practically sidelined.

We are an agricultural country and have exported agricultural produce for decades, yet the machines we use are imported. We are not even able to reverse-engineer machines. I believe we should initially focus on reverse engineering; this was China's model many years ago.

Water Awareness and the Textile Industry

There are two categories within the textile industry. Export-oriented industries comply with standards because they supply major international brands. They adhere to requirements related to water conservation, treatment, and sustainability. However, local manufacturers hardly care about water consumption.

Under EPA guidelines, the textile industry was required to install treatment plants by the end of 2025 as the first phase. In the second phase, treated water is supposed to be recycled. In the food and beverage sector, multinational companies have set a target of using 1.2 liters of water per bottle produced. Earlier, it was three liters per bottle. Through various measures, they achieved a target of 1.5 liters per bottle.

Water Quality and Ordinary People

We follow guidelines set by the WHO and the government. Bottled water standards differ from water for general consumption. Total dissolved solids (TDS) are important. The permissible mineral level in drinking water is set at 1,000 ppm, while 500 ppm is considered standard.

In cities, water sources include both underground and surface water. Surface water is generally less contaminated than groundwater.

The issue is that the government relies on only one method for water treatment—RO plants. RO plants are not required for every type of water. Water quality must first be assessed to determine the appropriate treatment. For example, if water has high arsenic levels but is otherwise acceptable, only an arsenic removal plant is required. Gradually, awareness is increasing, but consultants and governments largely still focus only on RO solutions.

About Water Engineering & Management Services

I completed my chemical engineering degree in the 1990s and served Descon Engineering for 11 years. In 2001, I launched this company with my friend Ashfaq ur Rehman, who had experience in desalination in Saudi Arabia. There was a significant gap in Pakistan in this field, which we explored by introducing membrane technologies.

In 2004, we expanded into wastewater treatment. Over the past 20 years, we have worked across multiple sectors, particularly textiles, collaborating with Gul Ahmed, Nishat, Interloop, and others, as well as the sugar and power sectors. In the sugar industry, wastewater treatment was a major challenge, but we successfully implemented plants at Alliance Sugar Mills, RYK, and Chashma 1 and 2. Provincial EPAs confirmed our results.

We achieved 30–40 percent cost reduction in projects through local engineering and development of components. While costs are not low, they are significantly lower compared to foreign companies. Local after-sales service is a major advantage. We have built a strong reputation, and even foreign companies now collaborate with us and assess our work.

Initially, there were concerns about us being a local company, but once industries saw international brands integrated through local design and engineering, confidence increased.

Future Plans

Establishing a Water Technology Institute is my dream, and I hope it becomes a reality. Skill institutes should train people in wastewater treatment and related technologies. Business is not my primary concern anymore. After 35 years in engineering, I no longer think only for myself—I think about contributing to the country.

I have tried at multiple levels, but the idea has not yet materialized, perhaps due to a lack of vision. The Engineers Pakistan, led by Engr. Jawed Salim Qureshi, made significant efforts in this regard, including establishing a reverse engineering cell and promoting industry–academia collaboration. This is an ongoing process, and we will continue our endeavors. - ER

Technology, Cost, and Quality: The Changing Landscape of Civil Engineering

Engr. Tahir Sultan on Technology, Policy, and the Future of Civil Engineering

Engr. Tahir Sultan is a seasoned civil engineer with extensive experience in infrastructure development, geotechnical investigations, and power transmission projects. He is the founder and Chief Executive of Firm DECON International, an engineering and consulting firm actively engaged in surveys, subsoil investigations, and infrastructure-related services. Under his leadership, Firm DECON has adopted modern engineering tools, including drone-based surveys, GPS, satellite imagery, and digitized laboratory testing, enabling greater accuracy and efficiency in project execution.

Engr. Tahir Sultan is also a strong advocate for professional development and engineering education. He is the founding force behind the Pakistan Society of Civil Engineers (PSCE), a professional platform established to promote continuous learning, knowledge sharing, and ethical engineering practices through regular technical lectures and engagement with senior engineers in Pakistan and abroad.

How Technology Is Affecting Civil Engineering

There are four factors that affect civil engineering at the moment in Pakistan. The cost of modern machines is expensive, including duties, which in return affects the cost of projects. In Pakistan, the rates do not match the actual cost that includes the use of modern technology. Then, if we look at technology like AI, modern machines are controlled by modern software. You need operators with high skills, and they also require training.

Moreover, the next factor is quality. It begins with the client, and at this stage, government policies come into effect. Our policies either do not bind you or do not include provisions to ensure quality work using modern machines and processes. For instance, look at batching plants versus coffee-pot mixers for concrete mixing. A batch plant user does not receive a justified rate for the project — how will such a contractor work? The same issue exists in deep excavations, where modern methods are required to ensure there is no collapse. For ensuring safety, there is no policy. In this situation, projects become unfeasible for those who use technology and modern processes.

Let alone big projects done by foreign companies here, we should make strict regulations for common projects in the country. Only then will we start improving — and it will take time.

Firm DECON & New Technologies

We use made-in-Pakistan conventional machines in the field. If we use modern machines, they are expensive and do not make us competitive. However, we have set up a modern laboratory for soil testing, and the testing machines are modern and imported. We have trained people, and slowly and gradually we are digitizing the machines. We have digitized the unconfined compression test and rock testing machines; they are now program-based. Some machines are in the process of being imported from China. In sum, we are digitizing our local machines, and some we are importing.

Benefits of the Use of Technology

The use of modern technology has benefited us a lot, especially in topographic surveys. We are using drones in surveys and have abandoned older technologies. We are using satellite images and GPS. All this has saved 60 percent of our time. We directly retrieve data from these sources and use it. The good thing is that everyone is using these machines now, so the increase in rates has become a norm in this area of work.

Export of Services

Saudi Arabia has created a good environment for our companies. At the moment, two Pakistani companies are working very well there in EPC. We are in transmission; I do not know more details though. However, I have not witnessed any other Pakistani company in general construction there. The Saudi government has facilitated companies, and I am also trying to set up a company there, and others are also considering it.

We have worked in Nigeria in the past and helped a company in EPC grow into a mature company that is now working there independently. We can export our services in Africa as well. In contrast, Pakistani companies have to learn from Saudi Arabia. The Pakistan government, however, does not seem to attach importance to Africa. The government is entangled in its own issues.

We have been advocating for setting up a construction bank for a long time, but those in power are unable to understand that the industry will not pick up without such measures. They do not realize that no industry can generate more employment than the construction industry.

New Technologies and Academia

I think there are not many issues with engineering universities, and the curriculum is aligned with the world. The real issue is the mushroom growth of universities that do not have quality faculty, along with problems linked to the Pakistan Engineering

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AI in Pakistan: Bridging the Technology Gap Amid Talent and Infrastructure Challenges

Regional Director, AI Engineers Pakistan, Mujtaba Shaikh Speaks on AI Adoption, Talent Retention, and Global Delivery in an Interview with ER

Pakistan and the Challenges for AI

The answer to your question is interesting, as I have been working in the United States for the past 12–13 years. So, for my organization, this is not only a challenge of working in Pakistan, but also a personal challenge for me. Pakistan is a difficult country from a business perspective. There are many challenges, and local systems are not as advanced or sophisticated.

For the projects we are working on—particularly large infrastructure projects or those in international markets—bringing foreign firms into Pakistan, getting them registered locally, and sending their remittances abroad, or transferring remittances from our parent company, are major challenges. Another significant issue Pakistan faces is talent retention. When we graduated, people used to go abroad for master's or PhD programs; now students are leaving at the high-school level. Acquiring engineering talent has become extremely difficult.

Compensation packages in the Middle East are far higher than what Pakistan can match. Additionally, there has been a major influx of technology-driven remote delivery services. At present, AI Engineers Pakistan—together with our parent company and other clients—derives around 40–45 percent of its business from international markets. Remote delivery also has challenges, including infrastructure limitations, internet availability, and connectivity issues.

Finally, for local clients, project approvals through authorities and the overall uncertainty in the environment make investors reluctant. Unfortunately, multinational companies have to deal with these issues, and we are facing the same challenges. Over the past six years, we have learned to understand the system, and we are hopeful that things will turn positive in the next few years.

Coping with the Technology Gap

There is a significant difference between the technologies used in the United States and those in Pakistan. I recently visited the US to attend conferences. AI is currently a major buzzword, and its growth is accelerating. For some time, I believed that adoption would take one or two decades, but I realized that this thinking was wrong.

At the conferences, it became clear that AI is not just about using ChatGPT or Copilot. Many advanced AI and generative software tools have emerged and are being widely adopted in the industry. Tools are now available that can complete engineering applications in hours—tasks that previously took engineers months. In this context, Pakistan has a lot of catching up to do.

There is growth, especially among the younger generation, which is rapidly adopting these technologies. However, there is still a strong need for improvement in infrastructure.

How Is AI Engineers Pakistan Catching Up?

We have made significant investments in our offices. Our foreign clients and overseas projects had high demands for data security and connectivity, so AI Pakistan invested heavily in technology, including firewalls, switching, and security systems. We are also actively and rapidly working on AI adoption.

A positive development is that AI Pakistan US has initiated its own Enterprise Artificial Intelligence system, which is currently under development. This is a costly investment and will be installed at our global headquarters in the US. Once implemented, the entire company will operate within an AI-enabled environment. The company also has a dedicated task force working on technology adoption. We are trying to overcome Pakistan's limitations through our own technologies, tools, and team training, and progress is being made.

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Nurturing Talent: How Trust and Training Create Engineering Leaders

AI and emerging technologies have significantly impacted the HVACR sector: Saifuddin Mandviwala

The head of JES Instrumentation & Controls speaks about AI, the quality of young engineers, and the ethics that drive business growth in an interview with Engineering Review.

Engineering Industry, AI, and Emerging Technologies

There must be acceptance of technological trends within the industry, and in our HVACR sector their impact is quite significant. These technologies are being used almost 100 percent. For example, those of us working in controls integrate our Building Management System (BMS) software. The benefit is that predictive actions for lighting can be taken. All past data is incorporated, and future predictions are made with the help of AI. In this way, when BMS is directed toward energy efficiency, AI plays an active role, and this industry has accepted it very positively.

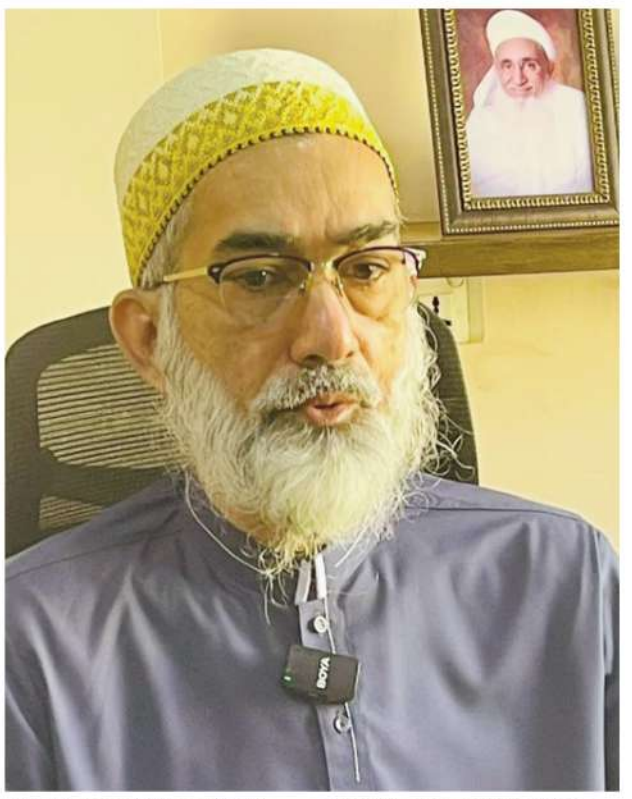
Good consultants, especially those inclined toward controls and automation, are accepting this technology and also explaining its benefits to end users (such as pharma, textile, and other sectors). However, when it comes to the Seth (traditional industrialist) culture, they become fearful of such terms and go on the back foot. Even hearing the term BMS makes them hesitant. Sometimes the consultant presents it in a softened way and even asks us not to explain it openly. Consultants are very interested in implementation. There is a need to educate those who are hesitant. The educated segment accepts this technology with an open heart. Older people want to run even controls on old systems; AI is a much more advanced concept.

Role of AI in Operations

Earlier, report writing, letter writing, and emails took a lot of time; now this tool saves many times over. It is a very good tool. Final copies, however, are still checked by us ourselves. There should be skill in knowing how to benefit from AI.

Quality of New Engineering Graduates

Two things are happening in the industry. There are employment difficulties as well. Good universities produce good graduates, but not very strong, regardless of the university. There are also smaller institutions whose students are weak; in interviews they do not even know



among them the best try to go abroad and do not stay here. Brain drain is taking place. Average graduates remain behind. Their level is what final-year project they completed, yet they pass and graduate.

Very good students have very high expectations. Engineers should understand that they need to learn first; money comes with time. After two years, it becomes clear which field one should pursue—there are many fields. About 50 percent of people do not know what they want to do. I train them myself. Some other companies here also do this work because they have an interest in developing talent from young people.

I once spent a lot of time training a young man in BMS. One day he said to me that his electronics were strong and he wanted to go fully into electronics. I got angry at first, then asked him to wait for a day, and afterward I opened a separate electronics department for him. That department still exits, and we have created many value-added solutions. That young man progressed tremendously.

JES Instrumentation & Controls

Our original name is Jamali Engineering Services, which we started in 1995. I began my career in 1990. I did five years of service because I wanted to learn, and after another five years I decided to start my own business. In the Bohra community, our Syedna Sahib has always encouraged the belief that we are born to do business—it is in our blood.

When we founded JES, the beginning was difficult and it took time. Earlier I was alone; today we have more than 30 employees in Karachi, Lahore, and Islamabad. Our teams and offices represent JES. Product-wise, we started with Honeywell. After graduating from NED, I worked for Honeywell, and even today we are working with them. We have on boarded additional systems.

In 2009, we introduced a new technology: prepaid electricity meters, a Chinese brand, INHEMETER, which is very good. Consultants like it, and it has been widely installed across Pakistan. This concept also exists in Europe and America—pay first, then use. We have brought in VAVs and are currently working with Air Venturi Valves. We also manufacture field devices for other OEMs. There are many other products that we have on boarded and are marketing

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Governance First: The Missing Link in Pakistan's Economic Recovery

Engr. Khalid Mirza, leading ECIL explains reasons why Pakistan Keeps Falling Despite Repeated IMF Programs in an interview with ER

Any Good News

Good news is hard to come by in Pakistan, unfortunately. However, the government's claim that the economy is improving may be true to the extent of the stock exchange or certain numerical indicators. The reasons behind this are not clear to me. Remittance figures also appear to have improved; I do not know the dynamics behind that either. Still, as long as they are increasing, it is good news.

But the stock exchange and remittances alone do not define an economy. There are many other sectors that need improvement. If we closely examine different sectors, I believe most of them require serious reforms. The single factor controlling all of this is governance—and that is absent from our system.

For example, look at the introduction of the e-challan system. Once fines were imposed, many things improved automatically. This shows that the law must be applied equally to everyone. Until we discipline ourselves at the most basic level, neither development nor evolution is possible.

Any Fresh Breeze of Hope?

No, I don't think so. There is no doubt that the volume of construction contracts has increased. One reason is rising prices, and in my personal view, another reason is the lack of governance, which itself inflates volumes.

If you look at other countries, their large projects are iconic—projects you can showcase on international platforms. Which project do we have that we can proudly present internationally? Can anyone point to even one?

Increase in Projects Is Not Necessarily Positive

This increase is not beneficial because Pakistan's dynamics require that all provinces be developed together. We cannot uplift one region or one city while ignoring others. The result is disparity, increased polarization, and—most importantly—the inability of the entire nation to rise together, which is essential for real development.

China lifted 600 million people out of poverty, and you can see where China stands today. In Pakistan, poverty is increasing, which means no matter what we do, the pace of development will remain slow. There is a saying related to the army: the speed of a convoy is determined by its weakest link, because the convoy has to move together. Strengthen everyone, and the pace will increase.

Nothing meaningful can happen until we eliminate poverty and document our undocumented economy. We don't even know the true size of our economy; it is said that what we see is only one-tenth, with ten times more underground. As a result, taxes keep being imposed on the documented and salaried class, destroying them. Today, people are paying more than 50 percent of what they earn in taxes.

Industry and Its Influence on Policy

Industry and professional representative bodies have so far failed to bring about any policy change. Suggestions are given, but there is no implementation. We provided many recommendations to PEC, the Ministry of Commerce, and other forums, but no positive outcome emerged. Ultimately, decisions are made by those in power, according to what they want.

Governance and the IMF

Pakistan is among the countries that have gone to the IMF the most. Over the last 60–70 years, few countries have approached the IMF as frequently as Pakistan. Has this led to improvement? In real terms, we have only declined.

Look at our standards: education has deteriorated, civic duties and responsibilities have weakened, and our international image has declined. If positive progress were actually happening, this situation would not exist.

You may have heard recently that the UAE imposed visa restrictions—why did that happen? Look at the reasons. Mere speculation achieves nothing. We never address root causes. We always make superficial policies, take superficial actions, and the result is zero. If development is desired, root causes must be examined and addressed, even if the decisions are bitter.

Corruption has become so deeply entrenched that even a vegetable vendor is involved in some form of it. Corruption is embedded throughout society.

Alternatives

Look at the figures showing how many people are leaving Pakistan. These are mostly highly educated and capable individuals who want to stay away from corruption. The country is losing its best human capital. Meanwhile, those involved in malpractice are being posted here. Eventually, we will be forced to bring in foreign professionals to execute projects.

The only way to stop this is to review policies, rely on our own people, and—most importantly—learn to respect ourselves. Until we do, the world will not respect us. Asking people to bring in dollars from abroad will never work. Our economy is considered high-risk, so no one wants to invest.

Look at Dubai's figures and see how many Pakistanis have invested in real estate there. If that same money were invested in Pakistan, the situation would be very different. We need to look inward and ask what we are doing wrong. Identify the root causes and address them. Malaysia does not borrow from the World Bank, ADB, or the IMF—and that itself is a lesson. – **By Manzoor Shaikh**

Nurturing Talent: How Trust and Training Create Engineering Leaders

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very effectively, while also using them ourselves. Alhamdulillah, the business has expanded. My children are also involved; two of them are now working with me in managing the business. We have a professional team, including diploma holders. This professional touch brings satisfaction to the company. Whatever we do, we try to do it in the best way. No matter how big the volume becomes, it still feels small as the team keeps growing. The real achievement is the young people I trained, who are now very successful in their respective fields.

JES–Honeywell Partnership

A person has their own nature; one should be content, and that nature should be long-lasting. Loyalty should also be part of one's character. This is a natural process—do not be overly opportunistic, and relationships become long-lasting. The same applies to personal relationships; friendships last when there is loyalty and sincerity.

Honeywell is a good brand, a premium brand, with good people and no unethical practices. Their corporate culture has never promoted shortcuts. Their product line is also excellent. I always intended—and still intend—to work with good brands. Walking with Honeywell has been a major success for us because we have trained engineers. We received training ourselves; my cousin was with Honeywell, so we are trained according to their standards. Our strength is application and design—our designs have zero error. In 35 years, there has never been an error. Honeywell says, "You are the only partner who has given us no trouble." Even today, they hold us in high regard. We continue this relationship with loyalty.

In the last two years, we have significantly increased Honeywell's business without any failures, which is why the connection remains strong. We are the only HVAC controls and BMS partners of Honeywell in Pakistan. – **By Muhammad Salahuddin**

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Success demands commitment, determination, ingenuity, flexibility, optimism, and an assertive spirit!

Engineering Consultants International (Private) Limited has witnessed several ups and downs during its 64-year history, during which the most distinguishing characteristic has been "never giving up" to sustain the spirit to succeed.

We succeed because of our professionals, their values, and their perseverance to achieve the required goals through continuousand sustained efforts to maintain leadership through professional skills and knowledge through applying state-of-the-art technology in their respective fields. This resolve inherently represents the fundamental building blocks that nurture the Spirit-to-Succeed and motivate their desire to excel and aspire to make a real difference in enhancing the quality of life through progress and development.

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One Roof, Multiple Disciplines: MAES's Integrated Engineering Consultancy Model

Mirza Associates Engineering Services (Pvt.) Ltd. (MAES) was established in 1986 to provide consultancy services in several development fields both in public and private sectors.

It is perhaps the greatest advantage which MAES has over most of the other national consulting firms, that it can provide services in almost all areas under one roof: water resources, agriculture, energy, transportation, communications, environment, and GIS. The nature of the services varies from conceiving a project, carrying out master planning, prefeasibility and feasibility and planning studies, preparing designs, tender documentation, management consultancy, construction supervision, contract management, preparing operation and maintenance manuals, and specialized services for periodic inspection of engineering works. It is a multidisciplinary company supported by a team of highly qualified and well-experienced experts as well as strong infrastructure backup facilities, to provide services for multi sector projects.

With the high reputation of its experts and dynamic and resourceful management, within a short span of time, MAES has been selected to provide consultancy services on projects of WAPDA Pakistan, Private Power Infrastructure Board-Government of Pakistan, World Bank, Asian Development Bank (ADB), Various Ministries and Autonomous Bodies of the Government of Pakistan and Private Sector.

Our engineering approach using the most modern engineering and analysis tools provides the most reliable, efficient, and precise analyses and specifications.

HUMAN RESOURCE

It was with just a handful of people that MAES set out to make its mark in the field of engineering consultancy in 1986, but the enormous workload it was able to generate for itself obliged it to expand rapidly. Today, on its rolls are highly qualified architects, engineers, town planners, sociologists, geologists, economists, environmentalists, and other professionals. Each one of our specialists has over 20 years of experience in the field.

QUALITY & EXCELLENCE

MAES prides itself on its professionalism, as well as in the provision of best quality of services to its clients. The company is ISO 9001 and ISO 14000 certified. As far as possible, we look for developing our management procedures and systems using in-house resources in order that the processes are cost-effective and suited to the needs of both our company and our clients. Our QA/QM systems are constantly evolving in keeping with both the emerging industry standards and the nature of MAES business.

SKILLS & SERVICES

From energy, buildings, transport, water, and the environment to communications, our teams of expert engineers have extensive experience across the full spectrum of civil, structural, mechanical, and electrical engineering disciplines. The hallmark of MAES is turning an idea of a project into reality.

MAES is committed to the preservation of the environment and has been sensitive to the environmental parameters in the planning and implementation of its development projects. It has a team of highly qualified and well-experienced professionals for offering services in this Sector. These specialists are well versed in the latest techniques of environmental protection and applicable international standards.

In the Energy Sector, MAES provides complete spectrum of consultancy services for Generation, Transmission and Distribution Projects. The services provided for the Sector cover all aspects from conceiving an idea to completion of the project.

The competitive construction sector nowadays has increased the demand for better design concepts, improved construction programs, and lower maintenance costs. MAES provides the professional and technical skills to plan, design, and supervise the construction of a wide range of Infrastructure projects.

We have supervised construction, installation, and commissioning on a large variety of challenging and demanding projects. As well as undertaking supervision services as part of our full suite of services for project planning, design, and delivery, we also provide this capability in a specialist capacity. By virtue of more than 35 years of valuable experience in the Energy Sector, the company is now capable of offering comprehensive services in all fields related to this sector. With extensive experience in many fields and professionals in various disciplines, our team can investigate and advise on technical problems that may arise during construction, commissioning, and in operation.

MAES has a strong experience of rural and mountain area telecom networks. The whole telecom network of Azad Kashmir and Gilgit Baltistan area of Pakistan had been planned and designed by MAES. These networks consist of switching, microwave, optical fiber, VSAT, etc.

MAES has also designed the roads and bridges for high axil loads and long vehicles. The geologists at M/s. MAES are experienced in underground structures and tunnels for commercial and defense use. Following is the list of activities and the scope of services in brief.

SCOPE OF SERVICES

1. Project Planning and Designing
   - o Concept, Pre-Feasibility & Feasibility Studies.
   - o Project Field Investigations Works.
   - o Project Engineering and Design.
   - o Development of project cost estimates.
   - oEconomic and Financial Analysis and Evaluation.
2. Field Investigation
   - oTopographic Survey & Mapping.
   - oGeological, Geophysical, Seismic & Neo-Tectonic Investigations.
   - oHydrological Investigations
   - oEnvironmental Investigations
   - oGeotechnical & Subsurface Investigations
3. Project Procurement Process
   - oPreparation of Tender Documents.
   - oBids Evaluation, Equipment Evaluation/Selection.
   - oContracts Negotiations and Preparation of Contract Documents.
4. Project Implementation, Supervision & Contract Management
   - oProject Cost and Time Scheduling and Monitoring.
   - oQA&QC. Inspections, Testing & Reporting Project Commissioning.■

Late Mirza Hussain Ali *Late Muhammad Waseem Khan* *Hasnain Reza Mirza*

Why Pakistan's Engineering Consultancy Model Is Unsustainable

Engr. Khalid Pervez, CEO, KPWS Consulting speaks on Governance, Consultancy, and Decline in Pakistan

Improving the Economy and Our Consultants

Engineering consultancy is a very important sector for any country, and in Pakistan it is equally critical. Since I am associated with electrical engineering, and we also work in mechanical engineering, I believe these two sectors are the backbone of industry and major projects.

In Pakistan, we face a situation that is not seen elsewhere—an uneven playing field. What I mean by this is that on one side, competent consultants like us are struggling for survival despite hard work in an unpredictable economy. Maintaining quality standards becomes very difficult. To some extent, contractors face similar issues.

On the other hand, public-sector consultants receive large projects and face no economic pressure. For example, if I expect a 4 percent consultancy fee, it becomes extremely difficult. People talk about 3, 2, or even 1.5 percent, whereas public-sector consultants receive work at 5 or 6 percent. They own buildings in multiple cities, reflecting their financial strength. Naturally, when the government allocates work to them easily, they enjoy a clear advantage.

Although we operate in the private sector, we no longer compete for public-sector projects—we quit them long ago because we simply cannot compete. There are also several other issues associated with working with public-sector departments.

Consultants: Public vs Private

I do not know the exact figures, but the share available for private-sector consultants compared to the public sector is negligible. Large projects naturally remain with the government. Another issue is that if you have a strong public sector, there is at least some realization of the value of consultancy and the need for appropriate fees.

In the private sector, that realization is almost nonexistent. A "seth mentality" prevails—extract as much as possible. There is no percentage-based fee structure; everything is done on a lump-sum basis for a small amount. I have been trying to explain this for 28 years. When my fee was reduced from 4 percent to 2 percent, it meant saving 2 rupees out of 100—but without realizing how much damage that caused to the project itself.

Another major issue is the sheer number of consultants in Pakistan, many of whom are not actually consultants at all.

Do Private Projects Understand the Importance of Consultants?

There has been some realization. For example, in the past, builders did not approach good consultants. Now that luxury and modern buildings are being constructed—with advanced security systems and other requirements—they are turning toward consultants. This is a positive change.

Industry is also moving toward consultants more than before, which is encouraging. However, there is another side to this: many good companies that benefited consultants greatly are leaving Pakistan. This means that the companies remaining will mostly be lower-tier, with different mindsets.

How to Repair the Damage

It is difficult. Those

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SPCAD: Pakistan's Spatial CAD Plugin Goes Global

By: Dr. Zaheer Malik

For many years, engineers in Pakistan have relied on imported CAD software.

Licenses were expensive. Support was far away. Local standards and local realities often came second.

Now a different story is emerging. SPCAD, developed by Cadomation (Private) Limited in Lahore, is a homegrown plugin that works inside leading CAD platforms such as AutoCAD and BricsCAD. It does not try to replace these programs. Instead, it extends them and turns a general CAD environment into a spatially aware civil and GIS workspace.

SPCAD is already used in more than 50 countries. The message behind it is simple and confident: "Made in Pakistan, used globally."

At first sight, SPCAD looks familiar. It lives inside the CAD screen that engineers already know. The ribbons, menus and commands sit next to standard CAD tools. There is no need to abandon existing habits or retrain whole teams from zero. Users stay in AutoCAD or BricsCAD. SPCAD adds the extra intelligence on top.

That extra layer is all about space and reality. SPCAD treats coordinates, terrain and ground position as core elements of every project. Lines and polylines are not just shapes on a black screen. They represent features on the earth, with real positions, elevations and relationships. This is why the product is presented as "The Spatial CAD."

The plugin comes with more than 150 tools focused on civil engineering, surveying, GIS and town planning. The idea is that most steps in a spatial project can happen inside the same CAD session. A team can import survey points and breaklines, build a TIN surface, design a platform or a road, compute cut-and-fill volumes, and then prepare drawings and reports, all without leaving AutoCAD or BricsCAD. The need to jump between several separate applications is reduced. So are file conversions and the errors that often come with them.

SPCAD is also designed for teams that stretch across borders. It is available in eight languages: English, Spanish, Greek, Polish, Czech, Turkish, French and Portuguese. This means a designer in Pakistan, a checker in Europe and a contractor in South America can work with the same plug-in in the same host CAD program, while each one uses the interface language that suits them. The data remains consistent. The tools behave the same. Collaboration becomes easier.

A major strength of SPCAD lies in the way it handles coordinate systems and projections. Many CAD users struggle when drawings must match survey grids, GIS layers or national coordinate systems. SPCAD places coordinate integrity at the center of the workflow. Users can work in local or global systems, transform data between them and keep survey, GIS and design layers aligned. For highways, canals, pipelines, city extensions and utility networks, this accuracy is not a luxury. It is essential.

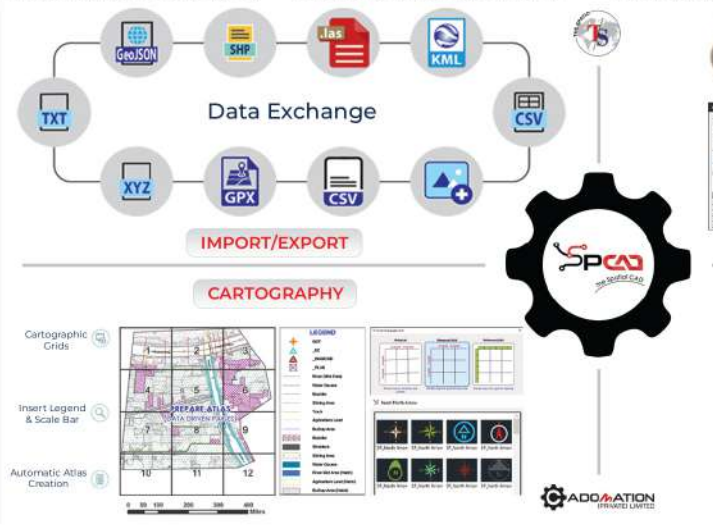
Town planning and cadaster work are another focus area. Planning authorities and consultants can subdivide land, manage parcel areas and numbers, and match layouts with coordinate-based land records, all while staying inside their CAD environment. This helps them move smoothly from concept sketches to plans that support legal and administrative processes, without constantly switching to separate GIS software.

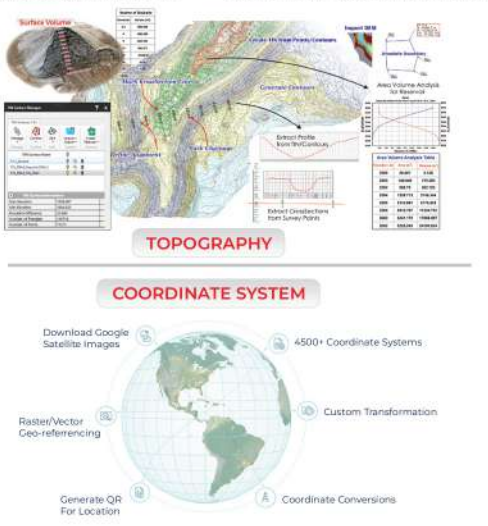
GIS and spatial professionals also find a bridge in SPCAD. They can work with geometry, attributes and coordinate systems inside a familiar CAD window, then pass spatially correct drawings back to engineers and contractors. The gap between CAD and GIS becomes smaller.

For Pakistan's engineering and technology community, SPCAD represents more than a technical achievement.

It shows that complex, domain-heavy software can be designed, built and supported locally, and still compete on a global stage. Creating a full spatial CAD plugin demands deep knowledge of geometry, projections, civil practice, GIS concepts and user experience. It takes years of refinement on real projects. The fact that SPCAD is now in use in more than 50 countries is a sign that this effort has found a market well beyond its home base.

With its spatial focus, multilingual interface and more than 150 specialized tools, SPCAD has moved beyond the idea of a simple add-on. It has become a spatial engine inside mainstream CAD platforms, connecting design, data and geography in one familiar workspace – from Pakistan to the rest of the world.■





Cadomation Brings Next-Generation BricsCAD Technology to Pakistan's Engineering Community

By: Murad Ali Kisana

A new chapter is opening for Pakistan's designers, drafters and engineers as Cadomation, a certified solution partner of BricsCAD, expands the reach of the global CAD platform across the country.

From infrastructure and process plants to architecture and manufacturing, local organizations now have direct access to a modern DWG-based design environment backed by on-ground support, training and implementation services.

For years, many Pakistani firms have relied on a single dominant CAD brand for 2D drafting and 3D modelling. BricsCAD enters this landscape not just as an alternative, but as a full ecosystem that covers classic drafting, mechanical design, BIM and civil workflows within one family of products. Because BricsCAD is built on the industry-standard DWG format and supports familiar commands, toolbars and customization options, most users can move into the environment with minimal disruption to their existing workflows.

Cadomation's team believes this combination of familiarity and innovation is exactly what the market needs. A spokesperson for the company explains that many organizations are looking for ways to modernize their design tools without sacrificing the thousands of drawings, LISP routines and standards they have built over decades. BricsCAD addresses this by offering advanced 2D/3D functionality while remaining natively compatible with existing DWG data and automation scripts.

Some of Pakistan's most respected names in engineering and industry have already embraced this direction. Companies such as Engro, Fatima Fertilizers, Attock Refineries, Pakistan Engineering Services, Noor ul Haq Brothers, Pakistan Petroleum Limited and NESPAK are among the organizations that have turned to Cadomation to deploy BricsCAD in production environments. Their projects span heavy industry, energy, infrastructure and consulting—sectors where accuracy, reliability and productivity are non-negotiable.

From a technical perspective, BricsCAD offers a broad toolset that supports the full lifecycle of a project. Designers can start with conceptual 2D layouts, move to 3D models, add mechanical components or BIM data, and prepare construction documents, all within a consistent user interface. Intelligent features such as AI-assisted drawing optimization, parametric design tools and flexible model navigation help engineering teams work faster while maintaining standards and quality.

For Pakistani organizations, however, software capability is only one part of the story. Local support, training and implementation guidance are equally critical. Cadomation positions itself as a long-term technology partner, not just a software reseller. The company provides onboarding workshops, migration assistance, customization services and technical support tailored to the needs of engineering offices, design departments and project teams across the country. This local presence helps reduce the learning curve and ensures that BricsCAD deployments align with each client's standards and quality procedures.

Another factor driving interest is the growing demand for interoperability. Many projects today involve joint ventures, international consultants and multiple software platforms. Because BricsCAD reads and writes standard DWG files and integrates with common third-party tools, it fits naturally into multi-platform environments. This allows Pakistani firms to collaborate more easily with international partners while keeping control of their own data and processes.

Looking ahead, Cadomation sees BricsCAD as a strategic technology that can strengthen Pakistan's digital engineering ecosystem. By combining a powerful, modern CAD platform with localized services and a growing base of high-profile users, the company aims to give engineering teams more choice in how they design, document and deliver their projects.

Engineering Review Magazine readers who are exploring options for upgrading their CAD environment can now consider BricsCAD as a serious, future-ready platform—one that is already proving its value in the hands of leading Pakistani companies, and is fully supported by a dedicated local partner in Cadomation.■

Why the Future of Consultants in Pakistan Demands Urgent Reform

Fahim I. Siddiqi, the head of 'Fahim, Nanji & deSouza' (Pvt.) Limited, a private multi-disciplinary consulting engineering firm based in Karachi, Pakistan on Reform, Technology, and Survival of Consultants

Where Our Consultancy Services Stand in a Changing World

A short answer is that, in this regard, the country stands exactly where everything else stands—at a low point. It is unfortunate. The detailed answer is that there was a time when Pakistan was a country that Korea, Thailand, and other nations used to come to study. They studied our five-year plans, and in fact benefited by implementing those plans. Whatever the reasons may be, a downward trend in society has been continuing for a long time and shows no sign of stopping. Not only consultants—any other business you take up is part of this society, and its reflection also falls upon us.

The biggest challenges facing consultancy, in my view, are two. First, the appropriate fees that should be received are not received. Second, for one reason or another, there is a curve that is continuously declining. I started my career in 1974 with International Consultants owned by Sibte Murtaza Kazmi. I worked there for 14 years, and after three years became a 30 percent partner. In those days, consultancy costs were a percentage of the project cost. For a design worth 100, one would receive 2–4 percent. A reasonable livelihood was possible. Technology was not advanced then; its growth was slow and work volume was lower. Today, in the time of one project back then, three projects emerge. Pressure has increased. Communication has become much faster, but consultancy fees keep declining, creating a downward spiral, and things have reached an unsustainable level.

A consultant is not an individual anymore. Designs have become complex and require large teams. Construction requires close attention. The quality of contractors has also declined; they too have become like factories. Extracting correct work takes a lot of time. Top supervision has changed as well—you now have to stand on-site to get work done. Sustainable fees are those that can cover an organization's basic salaries and around 20 percent other overheads, as in our case.

The More Projects, the Lower the Fees

Yes, the number of projects today is greater, and that is necessary. In the past, all calculations were manual; work that took a month can now be done by software in two hours, with 45 minutes to an hour for input. So shouldn't returns be higher? Yes—but the issue is that if fees are taken below even 1 percent, they are no longer sustainable. An organization must function, retain good people, keep some savings, maintain staff during slow periods, and generate some profit.

Why Are Consultancy Fees Declining?

In a nutshell, it is consultants' own stupidity. We have cut our own legs with an axe. Fees keep falling; greed is also a factor. There are other reasons too—people say, "Just secure the work; the money will come anyway." Alhamdulillah, at FND, the fees we receive come only from consultancy—our only source of income. We hear people say, "Your fees are double or triple," often from those who are our competitors. We have spoken with many architects and consulting firms, and the consensus is that what is happening is very wrong. Yet despite this, the belief persists that we cannot fix it.

Now there is a need for institutions to come into the system. If an owner wants work done, they know a consultant will save them money. But commonly it is said, "This consultant works for 10 rupees—why are you asking for 20?" There is no further thinking beyond that. In large organizations, supply chain management has been introduced. Consultants are procured through supply chain departments, and managers follow SOPs as if they are buying furniture. You can't do consultancy like that—though a few do avoid this practice.

I say that on an investment of 100 rupees, you should be willing to spend 1 rupee to ensure the project's safety and smooth execution—but they are not even willing to pay that one rupee. Today, I have come down to the level of saying, "All right, give me one percent of the project cost." Now a trend has started of charging per square foot, and competition has pushed this down to levels like 0.7 to 0.3. In this situation, we will have to do something.

Consultants' Registration with PEC

If we look at it from another angle, PEC registers consultants. PEC has set a criterion: if someone is a graduate engineer with ten years' experience, or a master's degree holder with the required experience, that is considered sufficient. But when contractors are registered, there are many categories. There is nothing similar for consultants. So FND with 150 people and a three-person firm in Islamabad are both simply "consultants." Competition is not fair. I think PEC needs to play a role here. My wish is to form a committee and take this up. There is also a need to sit with ACEP and take it forward. So far, their thinking has not gone in the direction of categorizing consultants. When I went to receive an Engineering Excellence Award at PEC, I had a brief conversation that made me realize more dialogue is needed. That needs to happen.

Regulatory Intervention

There is a need for regulatory authorities to step in and set some market standards. In fact, there is profiling of consultants, but it is not like contractors, who are categorized according to experience, size, and capacity. Among architects and consultants, some do quality work, but people have long said that one day foreign consultants and architects would replace locals—and that is happening. There are two reasons for this. First, our people have not achieved the technological level they should have, leading to weaknesses in presentation.

I must say that for anything good to happen, there must be good people behind it—a strong team. Where will that come from? If I search the market for a good engineer with five years' experience, I won't find one because they are all abroad. There is brain drain—another major challenge. It is happening in engineering and architecture as well. As a result, people cannot deliver quality work here, while those working abroad deliver and get results.

CPEC and Pakistani Companies

I am focusing on consultancy services, but it is true that most of this work has gone to Chinese companies. Since it is their investment, complete designs come from China—this has happened. The same applies to construction. Whenever you take a loan, baggage comes with it.

Technology vs. Human Resources

As a company owner, I should be very happy—I could reduce the workforce by 50 percent. There is talk that AI will take over 90 percent of jobs over time, and it may happen, because the evolution of AI over the past two to three years is astonishing. In our MEP engineering, the impact has been limited so far—mainly in documentation, not in design. Design is still done in a traditional manner using software, but not AI-supported design yet. I did some research and found that a few companies have integrated AI into MEP; this still needs to be observed.

When computers were introduced around the year 2000, a rosy picture was presented—that a day's work would be done in an hour. That didn't fully happen. I believe that as AI evolves, other factors will emerge, and the importance of humans will remain. I am talking about the short term, because right now we are discussing AI. Then there is something called Artificial General Intelligence, which would be equal to human cognitive capability—imagine what that would mean. After that comes AI superintelligence, many times more powerful. What that will be, we don't know. The world will definitely change.

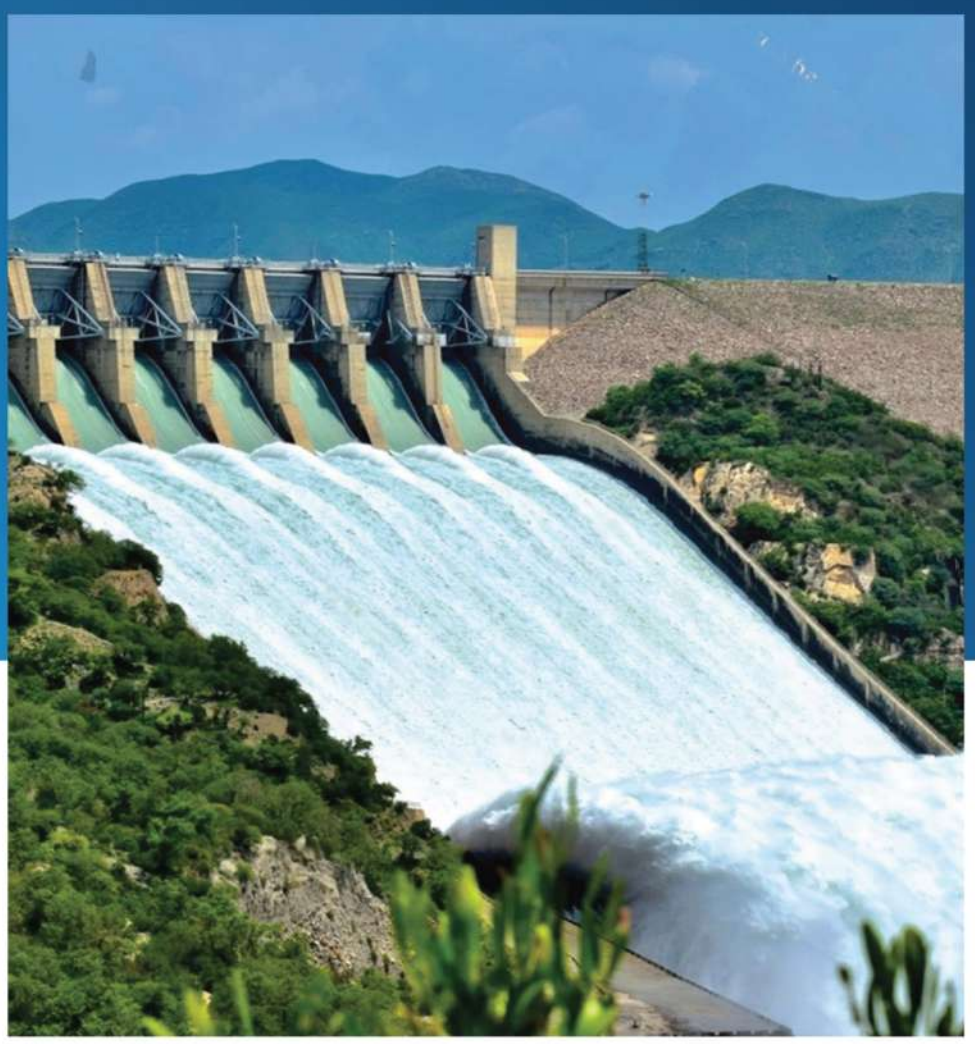
In the long term, there is fear that AI could take over the world. They say we will build safeguards into AI to ensure it is human-friendly and ensures the continuity of the human race. But it is also said that one day AI may realize that humans are the worst enemies of humanity and decide to wipe them out. I don't know how the world will evolve, but I must say this is not far in the future.

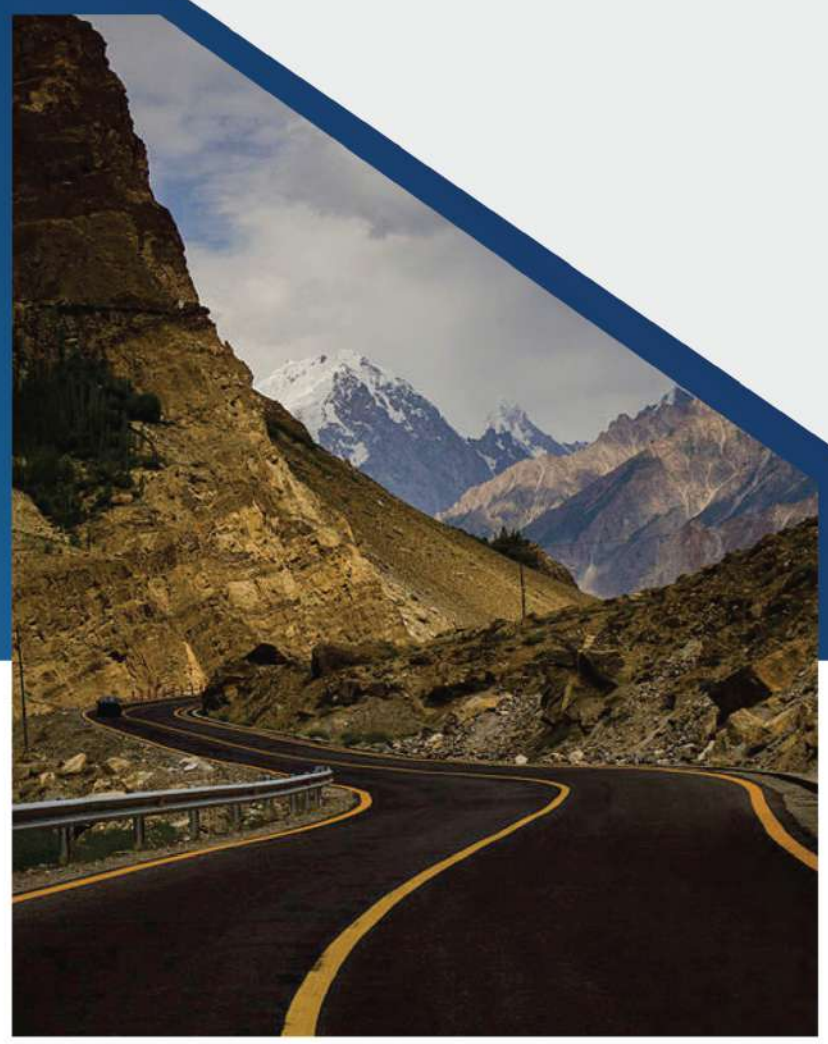
I think we need to integrate with AI, because everything in use will involve AI and it facilitates human life. These are very exciting times—I would love to live and see where this is going. Most importantly, learning has become very simple. Every piece of information is available at the click of a button. It is up to you to turn that information into knowledge. – By Manzoor Shaikh

ABOUT US

MMP

Established in 1986 as a "one-stop" solution for projects, MM Pakistan (MMP) has grown into a powerhouse in the field of engineering, management, and development consultancy fueled by a deep-rooted passion for transformative solutions and sustainable development.





WATER & AGRICULTURE | WATER & WASTE WATER | DAMS & HYDROPOWER | THERMALPOWER | TRANSMISSION & DISTRIBUTION | URBAN MASTER PLANNING | ARCHITECTURE & BUILDING SERVICES | ROADS & HIGHWAYS | RAIL & METRO | AVIATION | HEALTH & EDUCATION | GOVERNANCE & INSTITUTION

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1000+ Professional Staff

39 Years Experience

100+ Clients Base

500+ Projects

Multi Skilled

50+ Disciplines

4.0+ Billion Rs Turn Over

8 Regional Offices Nationwide

WHAT MAKES US UNIQUE:

DIVERSIFICATION

Our diverse expertise across sectors, skills, and geography enables us to tackle projects of any size, in any sector, at any development stage, nationwide.

CUSTOMER CARE

We are known for delivering quality work efficiently, saving our customers time and money without compromising on quality. Our goal is to provide speedy, flexible, and efficient services for every project.

PROFESSIONAL EXCELLENCE

Our goal is to ensure customer success by understanding their needs and providing optimal solutions. We foster excellence and innovation, and promote knowledge-sharing and leadership through various forums and competitions.

Data Center UPS Market: Emerging Trends, Opportunities, and Regional Insights (2024–2029)

By: Asif Hasnain
Deputy General Manager | Head of UPS Department | S.M. Jaffer & Co.

1. Lithium-Ion UPS Systems

The rapid adoption of lithium-ion battery technology is fundamentally transforming the data center UPS landscape. Lithium-ion UPS systems offer several advantages over traditional lead-acid solutions, including:

- Longer Lifespan: Lithium-ion batteries typically last 8–15 years, compared to just 3–5 years for lead-acid batteries. This reduces the frequency and cost of battery replacements over a data center's operational life
- Superior Efficiency: With charging efficiencies exceeding 95% (versus 80–85% for lead-acid), lithium-ion UPS systems reduce energy losses, and contribute to overall operational cost savings
- Faster Recharge and Lower Maintenance: Lithium-ion batteries recharge in 2–4 hours (compared to 6–12 hours for lead-acid) and require minimal maintenance, further enhancing uptime and reliability
- Growing Adoption: The market share of lithium-ion UPS systems is rising rapidly, especially in new data center builds and major upgrades, as operators prioritize efficiency, sustainability, and total cost of ownership

2. DC Power Distribution

Direct Current (DC) power distribution is gaining traction as data centers seek to maximize energy efficiency and simplify integration with renewable energy sources:

- Efficiency Gains: DC architectures

can improve overall system efficiency by 5–7% by reducing the number of AC-DC and DC-AC conversions, which also lowers cooling needs and operational costs

- Seamless Renewable Integration: DC systems allow for direct use of solar storage, supporting sustainability goals and future-proofing data center infrastructure
- Implementation Challenges: Broader adoption is currently limited by the availability of DC-compatible equipment, lack of industry standards, and the complexity of retrofitting legacy AC-based facilities

3. DCIM & Automation Tools

The integration of Data Center Infrastructure Management (DCIM) platforms and automation tools with UPS systems is driving operational excellence:

- Centralized Monitoring and Real-Time Alerts: DCIM platforms provide unified dashboards for monitoring UPS health, load levels, and battery status, enabling proactive maintenance and rapid incident response
- Capacity Planning and Compliance: Data-driven insights from DCIM tools support better capacity planning, regulatory compliance, and reporting, making them essential for modern, scalable data centers

4. Modular and Scalable UPS Architectures

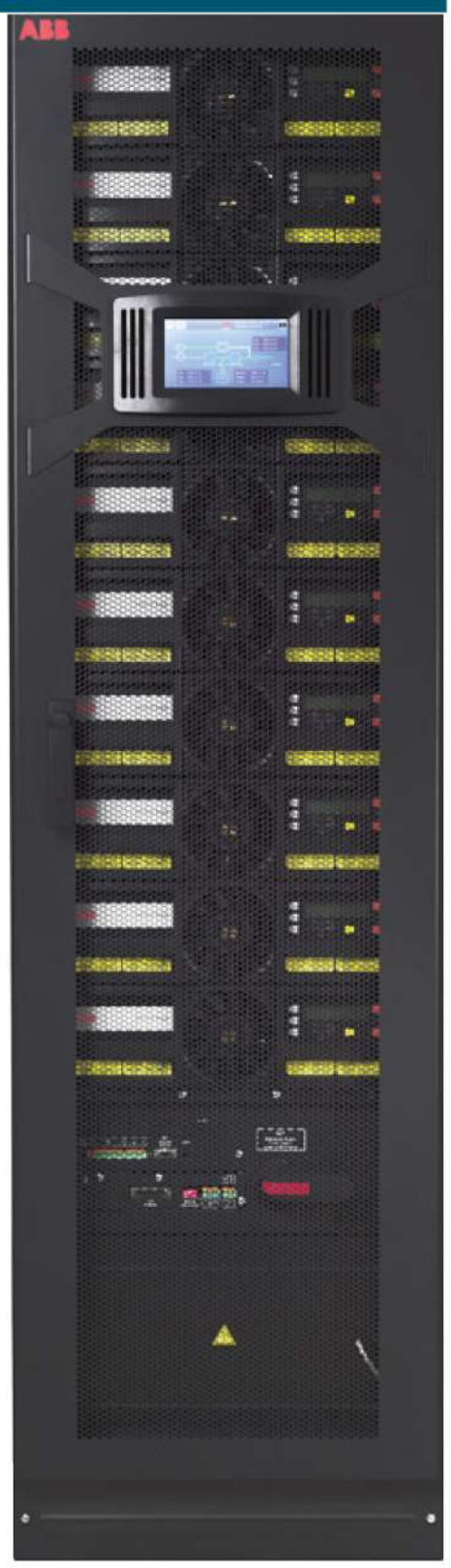
Modular UPS systems are increasingly favored for their flexibility and scalability:

- Seamless Expansion: Operators can add or remove UPS modules without disrupting operations, aligning power protection with evolving IT loads and minimizing upfront capital expenditure
- Edge and Micro Data Centers: Modular and compact UPS solutions are enabling reliable backup power for distributed, edge, and micro data centers, supporting the growth of IoT and low-latency applications

5. Sustainability and Green Data Centers

Sustainability is a key driver in UPS innovation:

- Energy-Efficient Designs: There is



a strong shift toward UPS systems with high efficiency ratings (e.g., ENERGY STAR certified), supporting data centers' net-zero and green initiatives
- Integration with Renewables: UPS systems are increasingly designed to work alongside on-site renewable energy sources and microgrids, reducing carbon footprints and supporting grid stability. ■

WB Project to Improve Urban Services in Punjab

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cant step forward in improving urban infrastructure and strengthening local institutions, thereby laying the foundation for healthier communities and a more prosperous Pakistan."

PICP aims to deliver improved water, sanitation, hygiene and drainage services to approximately 4.5 million people and improved solid waste management services to an additional 2 million people. The Program will help reduce healthcare costs by lowering waterborne disease, lower child stunting rates, and strengthen the capacity of urban local governments to deliver sustainable services.

"The program complements infrastructure investments with capacity building and revenue generation, helping to ensure that service delivery is well sustained," said Amena Raja, Senior Urban Specialist for the World Bank. "It will also help Punjab's cities better withstand floods and droughts, ensuring urban development is both environmentally responsible and resilient to climate change."

The program also delivers important gender benefits by prioritizing hiring women especially in decision-making roles, establishing gender complaint desks, and providing targeted capacity building to help female workers develop new skills and advance. Community campaigns also promote better hygiene practices at the household level to support improved health outcomes. The program aims to mobilize private capital to support water and sanitation services in secondary cities in Punjab.

The new program aligns with Pakistan's national development priorities and provides support to ongoing provincial programs including the Punjab Development Program and the Suthra Punjab Program. It is the second phase of the World Bank-supported Pakistan Urban Water, Sanitation and Hygiene Services Multiphase Programmatic Approach. - ERMD

Economy Shows Signs of Recovery, but Structural Challenges Persist: Sohail Bashir

Newly elected President of IEP speaks on solarization, skills development, and the future of Pakistan's engineering sector in an interview with Engineering Review

Is Pakistan's economy improving?

This is a comparative issue—whether the economy is improving depends on the point in time we compare it with. Are we comparing it with the period before 2018 or after that? If we compare it with the pre-2018 period, we have not yet reached that level, because the economy was quite buoyant then. Subsequently, the political situation deteriorated, changes took place, and the economy weakened. Despite political challenges, the economy has improved to some extent.

There are significant challenges, especially for the manufacturing sector. High energy costs prevent our products from being competitive in international markets. In the local market, where monopolies exist, this is not a major issue. However, internationally—whether in garments or the textile industry—production costs are very high due to energy prices. That is a major challenge. Having said that, if the current upward trend continues, economic indicators suggest further improvement. Despite challenges, progress is taking place.

Does improvement in the economy encourage the engineering industry to move ahead? There is a lot of solarization in the industry.

As far as solarization is concerned, the industry has adopted it to a large extent. Many see it as a capital investment that can be recovered in the short term. Solar costs have fallen significantly. However, in the recent past, some government policies have been unfavorable toward solar energy. Due to surplus capacity in power plants and issues related to capacity charges, the government—while earlier strongly encouraging solar—has slowed its support.

Even so, the industry believes that operating solar systems, even beyond net metering and as captive plants, can result in substantial savings. By reducing energy costs, industries can make their products more competitive. Solar prices have dropped from around Rs150 per watt in the past to Rs80, Rs75, and even Rs60 per watt. Panels are also becoming more efficient. This is a booming area, and if the government extends benefits beyond net-metering users, a very positive situation could develop for our industry.

Export of engineering services

The picture is not as rosy as it once was, particularly in the 1970s and 1980s, when Pakistani construction companies were active globally. About a decade ago, Iranian companies came to Pakistan to build bridges—for example, an Iranian company constructed the Shaheed-e-Millat Road—whereas earlier, Pakistani companies used to work in Iran, building highways, and also executed projects in Iraq, Saudi Arabia, and across the Gulf.

Today, Pakistani manpower is still being used, but Pakistani companies are not being engaged in the same way. In Saudi Arabia's NEOM Project, some individuals have gone, but not in the significant numbers seen in the past. Pakistanis are going as labor or individual consultants, not as companies, unlike earlier when organizations like NESPAK executed major projects.

One reason is that Gulf countries' confidence in European and American firms has increased significantly. When you visit Dubai, it feels like a European country, with offices of almost every European firm. Pakistani consultants are present, but not at the same scale. Perhaps Europeans have a technical edge, and while they are more expensive, they are perceived to deliver better results. Chinese companies have also emerged as strong competitors, particularly in infrastructure projects.

To move forward, we must operate on a company-to-company basis and also send more trained manpower abroad. Many European firms employ Filipino, Bangladeshi, Indian, and Pakistani workers. If we send more of our skilled people, many opportunities can be created.

Have we lagged behind in new technologies?

The definition of skilled manpower has changed globally. Here, we consider anyone who can work as skilled, but internationally, a worker must not only know the job but also be certified. We face certification issues, and there is also a lack of full exposure to Health, Safety, and Environment (HSE) standards. Companies abroad are certified in these areas.

Some efforts have been made locally, particularly for plumbers and carpenters, to provide certifications. Once certified, opportunities open not only in the Gulf but also in Australia, Japan, Canada, and Korea. Japan and Korea, in particular, have strong demand—provided workers know the local language. We should develop programs that include language training along with professional certifications.

Are our engineering bodies thinking of doing something in this regard?

Some Pakistani companies are outstanding and continue to compete internationally, such as Descon, NESPAK, and Paragon. They have developed themselves well. In Pakistan, international companies operate and engage Pakistani firms in the same manner as they do in Dubai, with

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Pakistan's Economy and Engineering Sector on a Gradual Upswing: Engr. Abbas Sajid

Why Stability Matters: Engineering Services Chief Speaks on Investment, Industry, and Pakistan's Economic Future in an Interview with ER

Pakistan's Economy

To some extent, I agree that certain things are improving in our country. This is natural when a government is stable. Whenever a government comes in and people have the perception that it will remain in place and its policies will continue consistently for several years, investment follows—both from the private sector and from abroad—and natural economic growth takes place. I have personally observed this over the past two to two-and-a-half years: perceptions have turned positive and investors are investing.

If we look at indicators, for example automobiles, we can see how car consumption in Pakistan has increased. The influx of large vehicles and SUVs itself indicates demand; companies would not bring in vehicles or start importing CKDs and setting up manufacturing plants if there were no consumption. Recently, a very large tyre plant has been set up, and we are currently completing work there; commissioning is underway. These are some examples, but overall, if we look at the bigger picture, perceptions are positive. We pray that this positivity continues so that progress can move forward.

Along with this, allied industries such as construction also pick up. People's capacity increases, investment grows, buying power improves, and sectors like real estate, cement, and steel become active. I am a very hopeful and positive person. I have lived in Pakistan all my life and struggled here. I want stability to prevail, government policies to be long-lasting, and continuous dialogue between the government and business community so that things can improve.

Are things moving in the industry?

Absolutely. We observe this directly in our own field. We are from the mechanical side, and in any project you see everything—mechanical, electrical, civil, and allied industries. I see new people entering this field every day, which is a very positive sign. That is why they are establishing themselves.

Let me mention another positive aspect. I am involved with NED University and also serve as the General Secretary of the NED Alumni. We run two programs there, so I regularly seek feedback from NED about where our graduating students are going—whether they are being absorbed by the market or sitting idle at home. I will tell you something surprising: around 95 percent of students are finding jobs. And this is not limited to government universities; students from private universities are also being employed. NED has 24 disciplines, and about 94 percent of its graduates are being absorbed, which is a big achievement.

Where do our engineering companies stand in today's fast-changing world full of opportunities?

I have two answers to this question: one at the local level and the other at the international level. If you compare our local construction industry today with where it was 30 or 40 years ago, you will see a huge difference. The quality of construction, techniques, and materials being used today were unimaginable in the past. High-rise buildings are now common; constructing 20- to 24-storey buildings is no longer unusual. Earlier, buildings rarely went beyond four or five storeys. This is the result of the development and expertise of local companies, and I consider this a major achievement, even if people do not always recognize it.

Our people have learned abroad and then implemented that knowledge back home—whether in civil construction, mechanical engineering, or electrical works. There has been tremendous improvement across all fields.

Internationally, if we look at neighboring regions such as Saudi Arabia, Dubai, and Abu Dhabi, there is massive development and a boom. Yes, they have money and their dynamics and demographics are different, but we should be proud of the role Pakistanis have played in building those countries. When I went to Dubai more than 40 years ago, I clearly remember what it was like—sandstorms, camels, and very limited infrastructure. There were hardly any decent hotels in Dubai; we used to stay in Sharjah, which was better at the time. We would visit Dubai in the morning for exhibitions and return to Sharjah in the evening. Today, look at where Dubai stands. Up to 50 percent of the contribution has come from Pakistani workers and engineers. This is a big achievement. Our engineers, technicians, workers—even drivers—are operating at that level. All of this contributes significantly to improving the living standards of our people back home.

Do our companies have the desire to work abroad like foreign companies do?

Two years ago, the Big 5 exhibition was held in Riyadh. At that time, we considered opening an office in Dubai, as the opportunity seemed good. When we went there, we realized how many Pakistanis were present and how many Pakistani companies were already operating there, as well as how many were in the process of setting up. Alhamdulillah, many large Pakistani companies are working there, including major mechanical firms like Descon. Our own process there has also been completed. We met many people and felt encouraged. It is not true that the whole world is working there and we are not. That perception is incorrect.

Government policy push

Things improve policy-wise when continuity is maintained. Frequent policy changes create confusion and cause people to lose confidence. Investors say they invested under one policy, but then it changed—tax exemptions promised for ten years are withdrawn after four years, and such practices discourage investment. These things should not happen.

The government is part of us; often it is not the individuals but the system that creates problems. However, we have very capable people in our governments who understand how policies should be formulated. We have even helped other countries, including Korea, in policy development.

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Why Pakistan's Construction and Engineering Sectors Are Falling Behind

Engr. Al Kazim Mansoor, Head of Soilmat Engineers, shares the reasons why Pakistani engineering companies are unable to benefit from the construction industry boom in countries around Pakistan. These views were expressed in an interview with Engineering Review.

Talk of Improving Pakistan's Economy & the Ground Reality

The question is: from which point in time are we making the comparison? If we compare today with the situation two to two-and-a-half years ago, there is some improvement. There is relative stability: the dollar has stabilized, and the interest rate has come down from 22 percent to 10.5 percent. However, the real question is whether this improvement is sufficient. If we continue to move forward at this pace, we will not reach a desirable level.

Our GDP growth is around 3 percent; even if it increases to 3.5 percent, it is still inadequate. In the past, Pakistan did experience higher GDP growth at times, but that growth was import-led, which later resulted in foreign exchange crises. Currently, over the last two to two-and-a-half years, foreign borrowing has not increased, which has suppressed GDP growth.

India's GDP growth is around 8 percent, while Pakistan's is about 3 percent. Pakistan's population growth is 2.3 percent compared to India's 1.9 percent. Bangladesh's growth stands at 5–6 percent. This means that if our GDP grows by 3 percent while population grows by 2 percent, real GDP growth is only 1 percent. At this rate, it is unclear when we will reach an acceptable level. At present, there is stability, but growth remains stagnant—not only in the construction industry but in other sectors as well.

Some people point to the stock exchange as a positive sign. For example, when Nawaz Sharif's government ended, the stock index was around 55,000 points and the dollar was at Rs100. Now the dollar is around Rs300, so in real value terms the index is effectively the same. Over the past 7–8 years, nothing substantial has changed. If we look at market capitalization in dollar terms, there has been no significant increase.

Construction Industry as a Barometer

This sector must be closely examined by looking at the number of projects and their value. It can also be judged through cement and steel consumption. There has been some improvement, but there is no marked difference. In other words, there is no significant growth in this sector.

How to Create a Boom in the Construction Industry: Constraints

First of all, the government must take the initiative. In the past, our economy leaned heavily toward speculation. For instance, investing in plots yielded higher returns than investing in industry, where profits were around 15–20 percent annually. That situation has now slowed, largely due to taxation, and plots are mostly being purchased only by those with real need. Investment in real estate has declined.

During a major depression in the United States, when growth had fallen to zero, the government took the initiative to build interstate highways. Government spending revived industry, with both direct and indirect impacts across the economy. At the time, a British journalist wrote that while Britain built roads from one city to another, Americans "built roads from nowhere to nowhere." As a result, roads were constructed, transportation expanded, and economic activity took off.

Will Punjab's New Housing Projects Help? What About Similar Projects?

Unfortunately, the situation in Sindh is far worse than in Punjab. The output here is extremely poor. If Punjab invests Rs100 billion, the results are visible; investing the same amount in Sindh yields very different outcomes. Corruption is higher in Sindh. Look at projects in Karachi—for example, the University Road project. It is a bus corridor project, yet only about 30 percent has been completed in five years. In Punjab, similar projects are completed within 18 months.

There is clearly a driving force there that is missing here. I have full confidence in Chief Minister Murad Ali Shah—he is educated and capable—but implementation is not visible. Contractors are the same everywhere. In Lahore, underpasses are built in a matter of weeks—18, 24, or 30 weeks. Here, projects simply drag on.

New Technologies, Faster Communication, and Our Engineering Firms

In my view, the quality of engineering companies is deteriorating. Twenty years ago, and even earlier during the Bhutto or Zia-ul-Haq eras, Pakistani companies used to secure projects in Saudi Arabia, Iran, and the UAE. Pakistanis built airports and executed many major projects. Today, companies from those countries come here to take work. This means we have not kept pace with global developments.

We no longer have the capacity to go abroad and secure construction projects. One major reason is that government-owned companies such as FWO and NLC have been given a free hand. For example, when a private contractor bids for a Rs1 billion project, they must provide a 2 percent bid bond and a 10 percent performance bond, amounting to Rs100 million. Banks provide guarantees with great difficulty. Additionally, for a 10–15 percent mobilization advance, another bank guarantee is required. In total, around Rs270 million is needed before work even begins.

In contrast, organizations like FWO can arrange everything with a single letter. These entities do not operate on the same financial footing as private companies. As a result, only well-established private firms survive, while smaller ones fall behind.

During discussions on CPEC projects, joint ventures were often mentioned. A Chinese company once explained that the Multan–Sukkur Motorway was worth Rs400 billion. If a Pakistani company were involved, it would need to contribute Rs120 billion, along with a performance bond of Rs12 billion. No Pakistani company can provide such a bond. Consequently, large projects go either to foreign companies or to government-owned companies. These government entities then subcontract work to local firms, which prevents local private companies from growing.

Is There Any Way Out?

These issues have been discussed at various forums. However, nothing will change unless the government takes firm decisions. FWO was originally established to work in frontier areas, yet now it operates across all sectors. NLC was created for transportation purposes, but its role has expanded far beyond that.

There is also deterioration in the consulting sector, largely due to brain drain. When I graduated in the 1980s, out of a batch of 180 students, only 18–20 went abroad for master's degrees. Of those, 6–7 stayed abroad and 10–12 returned. Today, if 20–25 graduates go abroad, 24 stay there, and perhaps one returns due to personal constraints.

The young workforce is leaving Pakistan, and the boom in the Middle East further attracts talented individuals abroad. As a result, the consulting sector is also being affected, and I do not see any meaningful improvement. – **By Manzoor Shaikh**

PAKISTAN ENGINEERING COUNCIL

LEADING THE ENGINEERING EVOLUTION

“ Empowering the Future - Shaping a Better Pakistan ”

The Pakistan Engineering Council (PEC) is evolving from a traditional regulator into a dynamic facilitator of excellence. By embracing a "regulation plus facilitation" model, PEC is streamlining industry processes, driving digital innovation, and aligning Pakistan's engineering ecosystem with global standards to power national growth.

STAKEHOLDER ENGAGEMENT

Consultative Approach:
Identifying practical bottlenecks through structured workshops with constructors and consultants to agree on workable reforms.

Accountability & Ethics:
Promoting a culture of professional responsibility and ethics across the entire construction ecosystem.

REFORMING THE CONSTRUCTION SECTOR

- **Regulation + Facilitation:**
  Shifting focus to reduce friction for compliant firms and ensure fair competition.
- **Modernized Bidding:**
  Benchmarking standard bidding documents to global best practices for transparency and efficiency.
- **National ADR Centre:**
  Establishing a specialized dispute resolution mechanism for engineering and construction projects.
- **Ease of Doing Business:**
  Streamlining firm registration and renewal processes to support regional and international participation.

DRIVING THE FUTURE OF ENGINEERING

SMART PEC
- Digital Map
- PEC Live Mobile App
- E-Card
- Data Strategy
- Brain Gain Portal
- Pathway to Practice

GLOBAL MOBILITY & LINKAGES
- China MRA
- IPEA Membership
- Int.PE(Pak) Recognition
- BRI Engineer License
- MRAs with KSA, Kuwait, and Australia in pipeline

ACADEMIC EXCELLENCE
- Washington Accord (OBE) Standards
- University Liaison Desks
- Engineer's Starter Kit
- Program Evaluator (PEV) Training

PROFESSIONAL EMPOWERMENT
- Graduate Engineer Trainee (GET) Program
- Generative AI Training
- Modular CPD Framework

INSTITUTIONAL MODERNIZATION
- Functional Segregation (Regulations & Operations)
- ISO 9001:2015 QMS Certification
- Compliance Management Unit (CMU)

PROJECT LEADERSHIP & LEGAL REFORMS
- National ADR Centre
- Project Director (PD) Certification
- Service Structure Legislation
- Standard Bidding Document Benchmarking

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Insights from Sharjeel Ahmed

How Pyramid Automation Is Redefining Power Management with SCADA, AI

Power Solutions at Pyramid

The very first technology we introduced in Pakistan was Deep Sea Electronics–based generator synchronization. Through this system, multiple generator sets are synchronized in a multi-mains configuration, where the entire power network is demonstrated on a SCADA platform. The solution includes complete control systems, and generators are brought online according to load demand, resulting in significant fuel savings.

This technology has now become very common in Pakistan due to our efforts. In the early 2000s, it was completely new, and our CEO, Shafique Ahmad, had to work extremely hard to introduce it. Once implemented, engine life increased, generator synchronization improved, and overall generator utilization became far more efficient. Today, we are not only providing automation but also delivering complete power solutions.

Automation Software – SCADA

This is UK-based software through which the entire powerhouse can be controlled via mobile phones as well as computers. It also includes detailed reporting features, enabling troubleshooting whenever an industrial issue arises. Identifying the source of faults is critical, and we have strong expertise in this area.

AI in Action

We have continuously upgraded the SCADA system. The software allows us to store data and generate performance graphs. In the event of a fault, all relevant data is available in Excel format. Over time, the software has evolved significantly. Both our electrical engineers and OEM partners continuously review it, and with the help of AI, OEMs have further enhanced both the hardware and software. As a result, fault detection and diagnostics have become much easier and more accurate.

Harmonics and Cost Optimization

We are pioneers in harmonics awareness and solutions in Pakistan and have achieved highly effective results. There are two key components of harmonics: voltage harmonics and current harmonics, with current harmonics being the most damaging.

With increasing industrial loads, AC-to-DC conversions, and switching-based machinery, harmonic levels have risen substantially. We address this by first diagnosing harmonic levels and then designing appropriate filtration solutions. We manufacture hybrid harmonic filters, and we have strong expertise in both passive and active harmonic filters. We have achieved notable success, especially in the textile sector.

Power Factor Improvement

Wherever we go, we find that power factor panels are often the most neglected equipment in the LT rooms. Capacitors frequently burst, and since there are no clear indicators, the system is ignored and stops contributing effectively. We specialize in diagnosing and correcting such issues.

Generator Fuel Quality

Recently, we launched a new product designed to improve diesel quality through advanced filtration within the fuel tank. This new technology filters diesel at various stages. Fuel quality issues directly affect our systems, as engine mechanical faults impact performance—because our automation systems act as the "brain" of the entire setup.

Installation is very simple: the filter is inserted directly into the tank. It can be used for automobiles as well as generator sets, and the filter life is approximately six months.

Solar Power and Pyramid

We provide integrated solutions combining solar power with generator systems. Normally, on-grid inverters operating with WAPDA do not require limitation when connected to the grid, as full solar production can be utilized. However, challenges arise when integrating solar with generator systems.

When the grid fails, inverters initially stop producing power. Once generators start, solar generation resumes, but it must be synchronized with generator capacity. Generator systems must operate between a minimum of 30 percent and a maximum of 80 percent load.

We maintain generator load at 30 percent and control the remaining load through solar strings. This ensures that generators remain optimally loaded while most of the demand is met through solar energy. This solution is currently unique to Pyramid Automation. It delivers significant fuel savings, which we quantify and share with clients. For this purpose, we have developed our own software that provides detailed reporting.

More at Pyramid

In addition to this, our energy OEM partners have their own monitoring software and devices, and we also provide independent monitoring solutions. We have developed a comprehensive monitoring system that captures data at every level, offering complete operational visibility.

We operate across Pakistan, working closely with OEMs, generator manufacturers, and panel manufacturers as our partners. We are not just product suppliers—we also provide technical support and after-sales services.

We are highly regarded for our service quality. Most systems are monitored online, allowing us to diagnose issues remotely and provide immediate support. If a problem is related to our equipment, our team visits the client site to resolve it.■

PEC, KP Govt Sign MoU to Launch Graduate Engineer Trainee Program

Pakistan Engineering Council (PEC) and the Planning & Development (P&D) Department, Khyber Pakhtunkhwa, have signed a landmark Memorandum of Understanding (MoU) to formally implement the PEC Graduate Engineer Trainee (GET) Placement Program across major provincial departments.

The signing ceremony took place at the Civil Secretariat, Peshawar, and was attended by PEC Chairman Engr. Waseem Nazeer, Additional Chief Secretary (Development), P&D Department, Mr. Ikramullah Khan, Vice Chairman PEC KP Dr. Qaiser Ali, PEC Governing Body members, and officials from various engineering departments of the KP government.

Under the agreement, key technical departments, including Communication & Works (C&W), Energy & Power, Public Health Engineering, Irrigation, and Local Government, Elections & Rural Development (LGE&RD), will adopt the GET Program to provide structured, supervised, and hands-on practical training to fresh engineering graduates. The initiative aims to bridge the gap between academic education and real-world engineering practice by offering young engineers direct exposure to fieldwork and development projects.

Speaking at the ceremony, PEC Chairman Engr. Waseem Nazeer said the GET Program, modeled after the "house job" system for medical graduates, consists of a six-month training cycle, with five months of field-based learning and one month dedicated to soft skills development. He emphasized that the program is designed to enhance employability, strengthen technical capability, and prepare graduates to meet the dynamic demands of the engineering sector. He added that PEC has already partnered with multiple institutions nationwide to expand this flagship initiative.

Additional Chief Secretary (Development) Mr. Ikramullah Khan appreciated PEC's initiative, terming it a transformative step toward improving service delivery in engineering-related government departments. He said the program will not only empower young engineers but also support the province's development agenda by enhancing the technical capacity of public sector institutions and ensuring the availability of well-trained professionals.

The signing of the MoU is seen as a major milestone for the engineering community in Khyber Pakhtunkhwa. With strong collaboration between PEC and the provincial government, the GET Placement Program is expected to produce a more competent, confident, and industry-ready engineering workforce capable of contributing effectively to long-term development goals across the province. ■

Why Honest Consultants Are Disappearing in Pakistan

"The Mouth Is Moving, but the Stomach Is Empty": Asghar H. Siddiqui, Head of Eleken Associates, on Pakistan's Economic Reality

Is Pakistan's economy improving?

The short answer is no. As the saying goes, "the mouth is moving, but nothing is reaching the stomach." That is how our economy is functioning, and this is how I see it. In our office, we have an excessive workload—we are overloaded with work—but the outcomes that should follow are not there.

If we speak from our own profession as an example, the situation is clear. What is happening in other industries is well known and hardly needs explanation—industries are shutting down. If the country's economy were improving, why would people be leaving? Educated young people are frustrated and migrating because they see no future here. That alone is enough to show that the economy is not improving.

In the past, by completing 10 projects we earned what we needed; today, even after doing 50 projects, we do not earn the same. Clients who get work done from us are themselves distressed afterward. The message is very clear.

Better than the recent economic downturn?

You talk about money circulating, but that circulation is also increasing hardship. The people you mention—who say money is being spent and markets are active—who are they, and how many are they? If you divide society into three classes, the largest segment is the lower class. Look at their condition: survival has become difficult for them. Crime is rising—is that an indicator of a healthy economy?

Look at poor areas of all kinds—people are suffering. Even our lower-level staff cannot make ends meet. People used to go abroad before as well, but the difference now is stark. In my class of 150 students, perhaps 50 could afford to go abroad; the rest stayed and worked here after completing engineering. Today, almost 100 percent are ready to leave, trying to gather money from anywhere to get out. That change says everything.

Aren't global opportunities increasing compared to the past?

Many countries are eager to invite technical professionals. Opportunities are there globally.

What about consultants? How are they doing?

Now I will speak frankly. I told you earlier that when the economy is not healthy and cash flow is poor, corruption increases. This corruption existed earlier to some extent, but now it has spread widely. The number of dishonest people has surpassed the number of honest ones.

I say this responsibly: outside Karachi, it is difficult to find a truly clean consultant. Go to Balochistan, Peshawar, or Punjab—you will struggle to find consultants with real integrity, whose loyalty is to the client alone. Straightforward consultants can now be counted on one hand. Why does this happen? Because when the economy deteriorates, ethical standards also collapse.

Our income either comes directly from the end user or through architects. Earlier, architects used to give consultants their rightful share. Now everyone wants to keep all the money. Instead of engaging a proper company, they hire two individuals from one firm and two the other one, pay them a small amount, and get the work done.

Engineers working with us—despite what we consider good salaries—receive offers of double or triple pay from Saudi Arabia or Dubai. Naturally, they leave so their families can live a comfortable life. If people could live a decent life here and saw hope for a better future, they would not leave. But there is no hope, so they go.

Many so-called consultants exist today, but they are neither capable nor eligible to provide proper consultancy services.

What is ACEP doing? Have you spoken to them?

Yes, I have. Their response is, "What can we do? We cannot do anything." But we have PEC—the highest authority. It is their responsibility to take action against unqualified entities practicing consultancy. There must be a way.

I have raised this issue within ACEP. Our seniors who run ACEP and IEEEP must act. In IEEEP, people from our batch have become active, and over the last two years you have seen some programs. But if consultants are not working honestly, what can be achieved?

In Punjab, the situation has reached a point where clients know that consultants take money from vendors and others. The client says they take from vendors. When mindsets become like this, corruption becomes normalized. Except for one or two, it is hard to find clean consultants in Punjab.

Economic boom outside Pakistan and our consultants

Our consultants are working abroad—many of them are. The work we get is mostly by default; we do not even have time for marketing because we are too busy with existing work. Why do people look abroad? To earn foreign exchange.

Consultancy services are being exported by many, but largely without deliberate effort. We remain busy with work here—money or no money, the workload is heavy.

People go abroad to compensate for the deficiencies in their local business. Many companies have come here having their head offices overseas, keeping only liaison offices here. They hire local staff at good salaries and send the work abroad.

Our consultants often do not secure projects directly; instead, they associate with foreign firms. The major share of profit goes to those firms, and a smaller portion comes to us—but even that is often double what we earn locally. This should be done. We have worked abroad—in Dubai, Saudi Arabia, Qatar, and the USA—and we know all the norms. Whenever work comes, we will certainly do it. We should do it. The intention should be to bring money from outside. The problem is: once the money comes in, what happens to it?

Engineering universities and the engineers they produce

Some change has occurred. Computers, electronics, and AI have advanced significantly. In certain fields, universities are producing very good graduates. Many of our electrical engineering graduates are working in computers, electronics, and AI, but they are not as strong in core electrical engineering as earlier generations.

Previously, universities produced graduates with very strong analytical abilities. When I conducted interviews earlier, I never even took technical interviews—I could judge candidates by their conversation and vision. Now, after forming a partnership, we have introduced a proper interview process.

Engineering has lost its core somewhere along the way due to emerging technologies and AI. Many universities have emerged besides NED. Earlier, we could easily distinguish an NED graduate through conversation. Now, we can no longer tell the difference.

By Manzoor Shaikh

AI in Pakistan: Bridging the Technology Gap

Contd from page 22

AI and AI Engineers Pakistan's Work

AI has already been integrated into tasks such as letter drafting, report writing, and imaging, and we are actively using it. Beyond ChatGPT and Copilot, we have invested in customized software solutions as well. Engineering design, however, still lags behind—even internationally—due to licensing and professional liability issues.

Engineering drawings must be certified, stamped, and vetted by engineers. If drawings are produced by AI, the question of ownership arises. This is an issue the industry needs to address. In this regard, Pakistan is somewhat behind, but I believe these challenges are global. Until authorities responsible for approving drawings resolve these issues, AI-driven engineering design will not fully enter the mainstream. Even when AI is used as an assistance tool, liability ultimately rests with engineers.

Ownership issues also exist in reports, but the usefulness of AI depends on how and for what purpose it is used. For drafts, charts, rendered images, and 3D models, AI provides substantial assistance and significantly reduces time. However, for written deliverables, caution is exercised. AI plays a supporting role—ideas are taken from it, but the final content is written and reviewed by professionals. Blind submissions are not acceptable, and a proper review process is essential.

Export of Services

I am a strong advocate of exporting services. Even during my earlier career in Pakistan, remote services and service exports were a major focus—and they still are. Currently, around 40–45 percent of our revenue comes from export services. We have delivered and continue to deliver work in seven countries.

There are several benefits. First, local talent that cannot go abroad still gets exposure to international projects, which excites and motivates them. International deliverables require higher quality and stricter QA standards than local projects, pushing engineers to perform better and learn more. From a business perspective, international clients offer greater leverage and growth opportunities.

With the rise of the freelance ecosystem, this type of business has become more routine. Initially, many professionals started as freelancers, but now companies are engaging in structured collaborations and bidding processes. We bid jointly with local partners in the Middle East and other regions. Pakistan ranks among the top offshore markets globally due to its large, cost-competitive talent pool, making international markets eager to work with Pakistani firms. We are keen to further push this business.

Partnerships of Consultants Abroad

For contractors, arranging financial capital and bank guarantees from Pakistan is difficult, which is why Pakistani companies are often unable to take the lead role. Competition from other Asian countries—such as China, Turkey, and Korea—has also increased. Due to global risk perceptions, Pakistani firms often do not lead major projects.

In consultancy, only a few Pakistani firms operate at a large scale with the required pool of qualified experts. Our advantage as a multinational is that where Pakistan lacks capacity, we leverage our parent company by forming joint ventures with our US entity. Through this approach, we have bid on projects in the Middle East, Central Asia, and Pakistan.

Pakistan is now seeing an increase in technology-driven infrastructure projects. For example, we are working with the World Bank on a pilot project involving AI-based monitoring of housing developments in flood-affected areas of Sindh. Similarly, projects related to digital project management and carbon monitoring are growing. Since this expertise is limited in Pakistan, partnering with our parent company allows us to compete effectively. Over time, as local capacity increases, Pakistani firms will be able to participate directly.

AI Engineers' Business Model

We operate a self-sustained business model. We registered as a Pakistan private limited company to compete locally. Opportunities from abroad are executed from Pakistan in a cost-effective manner, while we maintain a strong local market presence. Currently, we work with multinationals, donors such as the World Bank and ADB, and also with selected public-sector organizations. Our approach is balanced between local and international markets.

Future Plans

In Pakistan, we have developed strong expertise in high-rise towers. We are currently involved in six to seven tower projects in Karachi and Islamabad. Additionally, we are working with the World Bank on technology-driven initiatives and on road projects with the ADB. In the public sector, we are engaged with the National Highway Authority and the Pakistan Airports Authority.

Growth is currently evident in these sectors. There is increasing emphasis on technology-driven and smart infrastructure. High-rise towers are now incorporating IoT-based tools and devices. Our strategy is to continue growing in these areas.

– By Muhammad Salahuddin

Turkish Aerospace & Defence Delegation Visits Pakistan Engineering Council

A high-level delegation of leading Turkish aerospace, defence, and industrial manufacturers—representing the Bursa Aerospace and Defence Cluster Association (BASDEC) and the Defence Industry Agency of the Republic of Türkiye—visited the Pakistan Engineering Council (PEC) on 10 December 2025.

The visit, supported by Türkiye's Ministry of Trade, aimed to enhance bilateral engineering and industrial cooperation.

Chairman PEC, Engr Waseem Nazir, welcomed the delegation and briefed them on PEC's reforms, institutional strengthening, and modernization initiatives in quality assurance, international accreditation, and emerging technologies. He appreciated Türkiye's industrial advancements and highlighted PEC's commitment to expanding global engineering partnerships.

Representatives from fourteen major Turkish companies participated, including ERFA Torna, Bizpark (Uçaksan), FTS Tasarım, LEVKA, MFK, Milla Otomotiv, ONS Makine, Stamplast, Coşkunöz Metal Form, Defence Systems, Rena Mekatronik, ETKA-D Otomotiv, COMIT, and BASDEC. They shared their technical capabilities and expressed interest in joint ventures, R&D collaborations, technology transfer, and localized manufacturing opportunities in Pakistan. PEC also presented its regulatory framework and potential areas for engineering cooperation.

Both sides agreed to pursue structured collaboration through skill development, certification pathways, and joint innovation projects in aerospace and defence sectors. Chairman PEC and the Turkish delegation reaffirmed their commitment to strengthening institutional linkages and advancing mutually beneficial Pakistan–Türkiye engineering relations. ■

Hussain & Co.: Powering Pakistan's Industrial Future with World-Class Switchgear Solutions

For over five decades, Hussain & Co. has stood as a hallmark of reliability, innovation, and quality in Pakistan's electrical industry.

Established in 1971 under the visionary leadership of Syed Farhat Hussain, the company has evolved from modest beginnings with manual machines into a cutting-edge manufacturer and distributor of medium and low-voltage electrical solutions. Today, guided by the commitment of Raza Hussain, the legacy continues as the firm scales new heights in technology and service excellence.

Blending Local Expertise with Global Standards

Hussain & Co. does more than manufacture switchgear; it engineers reliability, efficiency, and safety into every product it delivers. With a strong presence across Sindh and Balochistan, the company has built an enduring reputation among designers, consultants, and industrial clients for its top-quality, type-tested solutions.

As an authorized licensee of ABB, a global leader in electrification and automation, Hussain & Co. leverages exclusive access to ABB's advanced technologies. This enables it to offer state-of-the-art Medium Voltage (Unisafe 2.0) and Low Voltage (System Pro E Power) switchboards that meet the highest international standards, including AFLR internal arc classification and IEC Form 1–4 designs.

Pioneers in the Utility Sector with New Technology

Hussain & Co. has taken a leading step in the utility sector by delivering fixed-type panels designed to meet K-Electric's latest specifications. This innovation is setting a new benchmark for performance and reliability in Pakistan's power sector, positioning the company as a true pioneer in bringing world-class technology to the country's utility infrastructure.

Expanding into New Dimensions

Hussain & Co. has also established itself as a leading name in kiosk-type substations, delivering integrated and dependable power solutions for diverse industrial and utility applications. Now, taking a step further, the company is venturing into new dimensions of switchgear technology, broadening its portfolio and redefining the standards of power distribution in Pakistan.

Comprehensive Product Portfolio

- Medium Voltage Panels (11 kV to 132 kV)
- Low Voltage Panels
- Synchronizing & Motor Control Centers (MCCs)
- Automatic Transfer/AMF Panels
- Process Control (PCC) and Distribution Boards
- LT Power Factor Improvement (PFI) Panels

In addition to switchboards, the company offers allied accessories such as:

- Cast Resin Dry Type Transformers up to 15 MVA/36 kV
- Insulated Busbar Trunking Systems from Gersan
- Power Quality Solutions including Active Power Filters, Static VAR Generators, LV Capacitors, and Harmonic Filter Reactors
- Automatic Voltage Regulators up to 6300 kVA

This comprehensive range positions Hussain & Co. as a one-stop solution provider for industries looking to enhance energy efficiency, power quality, and operational safety.

Driving Growth through Partnerships and Innovation

Hussain & Co.'s robust affiliate network and proactive approach enable it to handle projects of all sizes while optimizing inventory, minimizing waste, and prioritizing customer satisfaction. Its team of skilled engineers and technicians combines human expertise with technological advancement to deliver solutions that are both innovative and cost-effective.

Looking ahead, the company aims to expand its footprint nationwide, particularly into Punjab, Khyber Pakhtunkhwa, and Islamabad, to serve Pakistan's largest industrial hubs. Its long-term vision is to emerge as a global player in the switchgear market, providing sustainable and cutting-edge electrical solutions to customers worldwide.

A Legacy Built on Trust

As Chairman Syed Farhat Hussain reflects on over 50 years of excellence, he credits the company's loyal customers and dedicated workforce for shaping its journey. "Our unwavering commitment to innovation, quality, and customer satisfaction has been the cornerstone of our success," he says.

With a solid foundation and forward-looking vision, Hussain & Co. is poised to remain a trusted name in Pakistan's industrial landscape—delivering world-class switchgear solutions where innovation and excellence converge.

Tel: +92-21-36341930, 36367002 | Email: info@hussain-co.com

PM Shehbaz Champions AI and Emerging Technologies

Prime Minister Shehbaz Sharif inaugurated the Prime Minister's Laptop Scheme 2025 the other day at the University of Haripur, emphasizing that the initiative is far more than distributing laptops—it is about creating an ecosystem where Pakistan's youth can harness emerging technologies, including Artificial Intelligence (AI), to unlock their potential and achieve global excellence.

The event was attended by government officials, youth leaders, and numerous beneficiaries, many of whom shared stories of how the scheme has already transformed over a million students' lives across the country. A special documentary presented at the ceremony showcased the scheme's journey since its inception in 2013, highlighting the government's ambitious vision for 2025: empowering Pakistan's youth through education, technology, and innovation.

Prime Minister Shehbaz Sharif underscored the critical role of technology in national development. "The future of this nation lies in the hands of students who are not just talented but capable of competing globally. By providing access to modern tools and AI-enabled learning resources, we are preparing them to solve complex challenges and drive innovation," he said. Reflecting on his long-standing commitment to youth empowerment dating back to 1997, the PM emphasized that opportunities must be merit-based and available across all provinces.

Highlighting the government's broader strategy for technology-driven development, he announced plans to send delegations from all provinces to China and Europe for training in Artificial Intelligence and other cutting-edge technologies, enabling Pakistani youth to gain expertise in emerging sectors and contribute to national progress.

The PM also responded to local development needs, pledging the establishment of a Daanish School in Haripur, a women's campus at the University of Haripur, and the construction of the Haripur Bridge to improve connectivity to educational institutions. "These initiatives will ensure equitable access to education and technology for all students," he said.

Addressing the nation's challenges, particularly the

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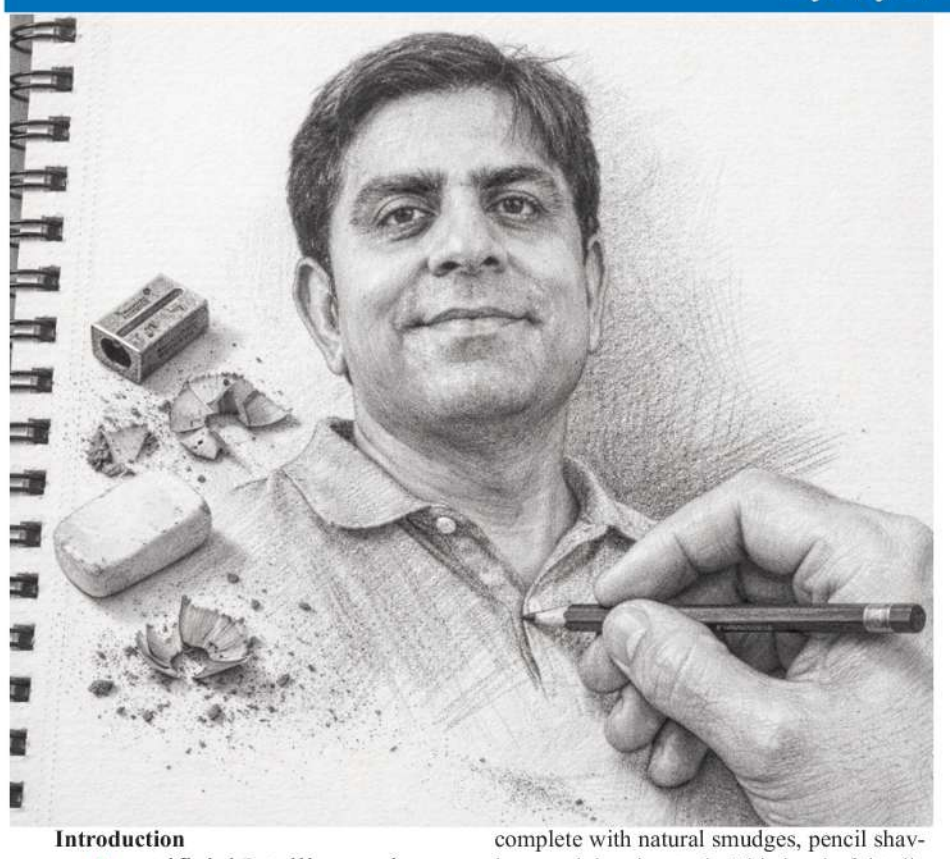
From Imagination to Impact: ChatGPT's Free AI Sketching & Image Generation Revolution

By: Syed Umair Ali



Introduction

Artificial Intelligence has entered a new creative era—and for the first time, advanced AI image generation and sketching tools are now available to free ChatGPT users. This democratization of creativity marks a turning point in how ideas, identities, and concepts are visualized.

ChatGPT's image generation and sketching feature represents a major leap in creative and professional capability. By transforming simple photographs or text descriptions into highly detailed artistic visuals, this feature bridges creativity, productivity, and strategic communication—without requiring paid design software or advanced technical skills.

The cover image accompanying this article is a compelling example: a realistic graphite pencil sketch on textured notebook paper, reimagined from a real photograph, complete with natural smudges, pencil shavings, and drawing tools. This level of detail demonstrates how AI can now emulate human artistic techniques with remarkable precision.

When Was This Feature Launched?

ChatGPT's native image generation and sketching feature was first launched in March 2025, when OpenAI integrated image creation directly into ChatGPT using its advanced GPT 4o–based image model. This milestone removed the need for external tools and enabled users to generate, edit, and reimagine images seamlessly within the ChatGPT interface.

Subsequent updates expanded availability to more users and improved realism, speed, and editing capabilities. By late 2025, enhanced versions of the image model further refined artistic detail, making high-quality sketching, photorealism, and creative rendering accessible to students, professionals, and executives alike.

What Is ChatGPT's Image Generation & Sketching Feature?

This feature allows users to:

- Generate original images from text descriptions
- Reimagine uploaded photos into artistic or professional styles
- Create realistic sketches, diagrams, and illustrations
- Edit, enhance, or restyle visuals using natural language instructions

Unlike traditional graphic design software, ChatGPT understands intent, mood, texture, and context, enabling high-quality visual output without advanced design skills.

Types of Image Generations Available

ChatGPT currently supports a wide range of image styles and formats, including:

1. Pencil & Sketch Styles
   - Graphite pencil sketches
   - Charcoal drawings
   - Ink and pen illustrations
   - Hand-drawn notebook aesthetics
2. Photorealistic Images
   - Studio-quality portraits
   - Realistic environments
   - Product mock-ups
   - Architectural and interior visuals
3. Artistic & Creative Styles
   - Watercolour and oil paintings
   - Digital illustrations
   - Abstract and minimalist art
   - Conceptual and surreal visuals
4. Academic & Educational Visuals
   - Diagrams and flowcharts
   - Scientific and engineering illustrations
   - Medical and anatomical visuals
   - Concept maps and learning aids
5. Business & Branding Visuals
   - Presentation graphics
   - Report and book covers
   - Marketing and campaign creatives
   - Executive and thought-leadership imagery

Benefits for University Students

1. Enhanced Learning & Conceptual Clarity

Students can convert complex theories and ideas into visual explanations, improving understanding across disciplines such as engineering, medicine, business, and social sciences.

2. Academic Creativity & Presentation Quality
   - Assignment illustrations
   - Research posters and slides
   - Project and thesis cover images
   - Creative portfolios
3. Skill Development for the Future

Students gain exposure to:
   - Visual communication
   - AI-assisted creativity
   - Design thinking and storytelling
4. Time & Cost Efficiency

High-quality visuals can be produced without expensive software or professional designers, saving both time and resources.

Benefits for High-Performance CEOs & Executives

1. Strategic Communication & Vision Sharing

Executives can visually express:
   - Corporate vision and mission
   - Business and operating models
   - Strategy roadmaps
   - Transformation narratives
2. Personal Branding & Executive Pres-

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AI in Engineering: Top Use Cases You Need To Know

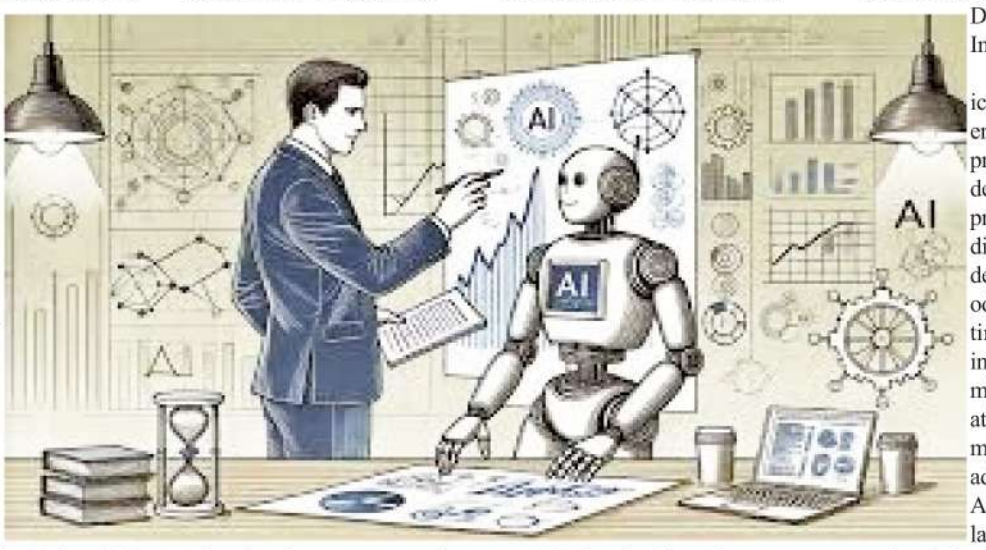
The engineering industry is under increasing pressure to improve efficiency, reduce costs, and innovate faster. Traditional methods are no longer sufficient to meet the rising demand for precision, speed, and sustainability in engineering projects.

Artificial Intelligence (AI) is emerging as a transformative force, offering solutions that enhance design, manufacturing, and maintenance processes. In this guide, we explore how AI is revolutionizing engineering, from optimizing product design to predictive maintenance and automated quality control, unlocking substantial value for businesses.

Definition of AI and Its Core Technologies

AI involves the use of computer systems to simulate human-like intelligence, such as learning, problem-solving, and decision-making. The core technologies driving AI in engineering include machine learning (ML), computer vision, and natural language processing (NLP). These technologies empower machines to analyze vast datasets, recognize patterns, and make decisions that traditionally required human expertise.

In the context of engineering, AI can be applied in various ways, from automating repetitive design tasks to optimizing production processes and enabling predictive maintenance of complex machinery. AI helps engineers tackle the increasing complexity of modern projects while improving accuracy, efficiency, and overall performance.



The Growing Role of AI in Transforming Engineering

AI is gradually reshaping engineering by automating time-consuming tasks and enabling more sophisticated design, manufacturing, and maintenance processes. In product design, AI accelerates innovation by using generative design, where algorithms create multiple design alternatives that meet predefined constraints, allowing engineers to explore new possibilities and reduce material costs. This can drastically shorten product development timelines and create more efficient designs.

In manufacturing, AI integrates into smart factories, using data from sensors and machines to optimize production lines and prevent bottlenecks. AI models analyze production data in real-time to predict failures before they happen, making it possible to reduce downtime and improve operational efficiency.

For maintenance, AI is enabling predictive maintenance, where AI systems monitor the health of equipment, predict failures, and recommend the most optimal maintenance schedule. This helps organizations avoid costly repairs, extend equipment life, and improve the reliability of critical systems.

Key Statistics and Trends in AI Adoption in Engineering

AI adoption in engineering is rapidly increasing as companies seek to optimize operations, reduce costs, and foster innovation. According to a 2023 report from McKinsey & Company, 70% of engineering firms have already integrated AI into their operations, with manufacturing being the leading sector for AI applications. This adoption is expected to rise, with 90% of firms planning to use AI-driven tools by 2027.

The 2024 Industry 4.0 report by PwC highlights that AI-powered predictive maintenance solutions have already helped reduce downtime by 30-40% in industries like oil and gas and automotive manufacturing. Additionally, AI-based quality control systems are reducing defect rates by 20%, improving both production efficiency and product quality.

AI in engineering design is also growing, with a 2023 Deloitte survey finding that 60% of engineers in the aerospace sector are utilizing AI-powered generative design tools to reduce design time by 40% and material costs by 15%. This trend is expected to continue, as generative design is becoming a core component of innovation in engineering processes.

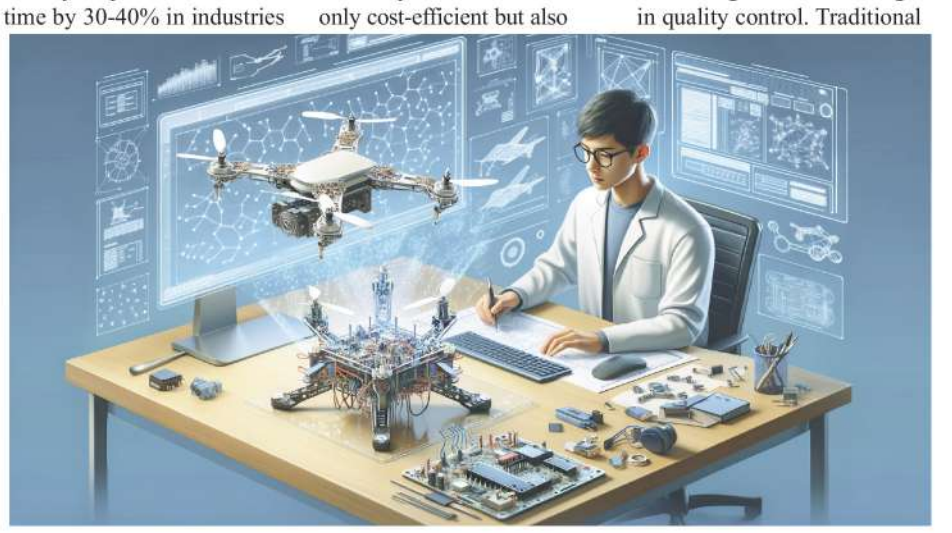
Business Benefits of AI in Engineering

AI is delivering measurable value in the engineering industry by solving key challenges such as inefficiencies in design, high operational costs, equipment downtime, and slow innovation cycles. Below are five key benefits that demonstrate how AI is creating tangible improvements across various engineering functions.

1. Accelerated Product Design and Innovation

AI significantly accelerates the product design process. Traditional design methods can be time-consuming, requiring multiple iterations and manual adjustments. AI, particularly through generative design algorithms, allows engineers to input design parameters (such as materials, weight, strength, and budget), and then generate a multitude of optimized design alternatives in a fraction of the time.

This shift from a manual to an AI-driven design process promotes faster iteration and encourages more innovative solutions. With generative design, engineers can explore unconventional and highly optimized designs that they might not have considered using traditional methods. This leads to faster time-to-market and the development of products that are not only cost-efficient but also innovative in terms of functionality and performance.



2. Improved Maintenance and Reduced Downtime

AI-powered predictive maintenance transforms how engineering teams approach the maintenance of machinery and equipment. In traditional setups, maintenance is often reactive, equipment is serviced only after a failure or breakdown occurs. AI shifts this model to a predictive approach, where machine performance is continuously monitored, and potential failures are identified before they occur.

Through the analysis of real-time data from sensors embedded in machines, AI can detect subtle patterns or anomalies that might indicate an impending issue. By acting proactively, companies can reduce unplanned downtime, avoid costly repairs, and extend the lifespan of their equipment. Predictive maintenance not only reduces operational costs but also enhances productivity by ensuring that equipment runs optimally without unexpected interruptions.

3. Optimized Production and Resource Efficiency

AI plays a critical role in optimizing production schedules and resource allocation within engineering and manufacturing environments. Traditional production systems rely on historical data and human input to determine workflows, but AI goes a step further by analyzing real-time production data and identifying inefficiencies or bottlenecks in the system.

By leveraging machine learning and optimization algorithms, AI can recommend adjustments to workflows, predict demand, and ensure that resources such as raw materials, labor, and machinery are allocated where they're needed most. This dynamic optimization helps businesses reduce waste, maximize the use of resources, and enhance the overall efficiency of their production lines. As a result, engineering firms can lower costs, speed up production, and improve their ability to meet customer demand.

4. Enhanced Quality Control and Defect Detection

AI's ability to monitor and inspect production processes in real time provides a significant advantage in quality control. Traditional manual inspection methods can be slow, error-prone, and inconsistent, especially when dealing with high volumes of products or intricate designs. AI, particularly computer vision systems, can rapidly analyze images and sensor data, detecting defects or inconsistencies with high accuracy.

By automatically identifying faulty products or deviations from quality standards, AI improves the consistency and precision of quality control processes. This results in fewer defective products reaching customers, reducing scrap rates, and minimizing the need for rework. Enhanced quality control through AI also reduces operational costs and

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AI in Engineering: Top Use Cases

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strengthens customer satisfaction by ensuring that only products of the highest quality are delivered.

5. Data-Driven Decision Making and Operational Insights

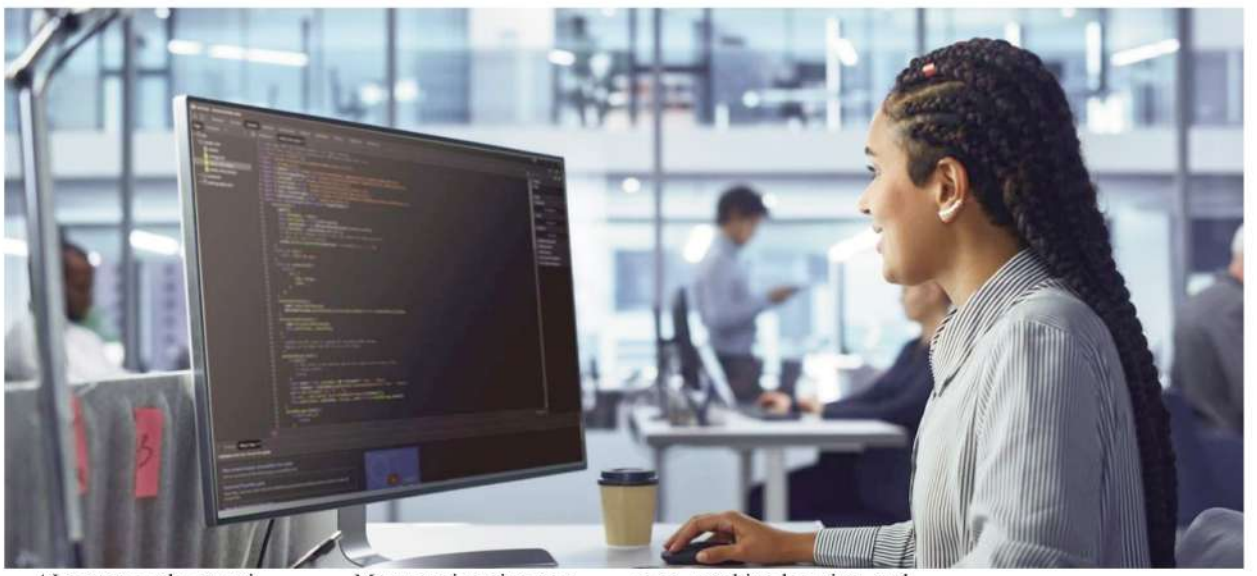
AI empowers engineers with actionable insights drawn from vast amounts of data, which they can use to make more informed decisions. In engineering projects, there is often an overwhelming amount of data coming from multiple sources, such as performance metrics, sensor data, market trends, and historical performance. AI algorithms can process and analyze this data at scale, revealing patterns, correlations, and insights that might otherwise go unnoticed.

This data-driven approach allows engineering teams to make decisions based on real-time information rather than relying solely on intuition or past experience. AI helps engineers optimize designs, predict potential issues, and identify opportunities for process improvements. Ultimately, this leads to more effective decision-making, reducing errors, enhancing operational efficiency, and driving better business outcomes.

Challenges Facing AI Adoption in Engineering

While AI offers immense benefits to the engineering sector, its adoption comes with several challenges that organizations must overcome to successfully integrate this technology. From data integration issues to the complexities of changing organizational structures, these barriers can impact the seamless implementation of AI solutions.

1. Fragmented and Inconsistent Data



AI systems rely on unified, high-quality data to function effectively. However, many engineering firms have data spread across various systems, making it difficult for AI to create a complete picture. Fragmented data reduces the accuracy and effectiveness of AI models, hindering their ability to generate reliable insights.

To address this, organizations must invest in data centralization and ensure that departments collaborate and share consistent information. Building a unified data infrastructure is key to enabling AI to operate effectively across all systems. This requires a commitment to improving data management practices across the business.

2. Integration with Legacy Systems

Many engineering companies rely on legacy systems that aren't compatible with AI technologies. Integrating AI with outdated systems can be complex, expensive, and disruptive to operations. This makes it challenging to leverage AI's full potential within established infrastructures.

To overcome this challenge, firms need to modernize legacy systems or ensure that new AI tools can be integrated seamlessly. Upgrading systems and implementing clear integration strategies will ensure that AI can work effectively with existing tools. Careful planning is essential to avoid disrupting ongoing projects.

3. Skill Gaps and Talent Shortages

AI in engineering requires expertise in data science, machine learning, and AI technologies. However, there is a shortage of skilled professionals in these areas, which makes AI implementation difficult. Engineering firms must compete to attract and retain the necessary talent to drive AI initiatives forward.

Addressing this requires a focus on upskilling existing employees and investing in training programs. Companies may also need to partner with educational institutions or hire external experts to fill the skill gap. Building a talent pipeline is crucial for sustaining long-term AI adoption.

4. Ethical and Regulatory Concerns

AI's role in decision-making can raise ethical questions, particularly regarding worker safety, product design, and environmental impact. Additionally, AI adoption in engineering must comply with industry regulations, which are often evolving. Missteps in addressing these concerns can result in legal issues or damage to a company's reputation.

To mitigate these risks, firms must ensure transparency and ethical decision-making in AI systems. Implementing governance frameworks and staying up-to-date with regulations will help organizations navigate potential challenges. Ethical AI practices are critical for maintaining trust and compliance.

5. Organizational Readiness and Change Management

Introducing AI requires significant organizational change, which can be met with resistance from employees. Concerns about job displacement or unfamiliar technologies can hinder AI adoption. Overcoming resistance requires effective change management, clear communication, and ongoing support.

Companies must focus on creating a culture that embraces AI and offers training to help staff adapt. Engaging employees early and addressing their concerns can lead to smoother implementation. Successful AI adoption relies on strong leadership and commitment to workforce development.

Specific Applications of AI in Engineering

1. Predictive Maintenance

Predictive maintenance uses AI algorithms to analyze real-time data from sensors embedded in machines, equipment, or structures to predict when a failure might occur. In engineering, this application helps avoid the costly and disruptive impact of unexpected machine downtime. The AI model processes historical performance data, usage patterns, and

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AI in Engineering: Top Use Cases

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environmental conditions to identify patterns that suggest imminent failures.

The machine learning models used in predictive maintenance are typically trained on large datasets that include sensor data, equipment performance records, and environmental conditions. Once deployed, these models can continually analyze data streams and flag potential issues before they become critical. As a result, predictive maintenance can extend equipment lifespans, reduce maintenance costs, and optimize the scheduling of repairs.

General Electric (GE) employs AI for predictive maintenance in its aviation and energy sectors. By analyzing sensor data from turbines and other machinery, GE predicts potential malfunctions before they happen, improving equipment reliability. This predictive approach has led to a reduction in maintenance costs by 10-15% and increased machine availability for critical applications.

2. Generative Design and Optimization

Generative design powered by AI is revolutionizing how engineering companies approach the design process. Instead of manually designing parts or structures, engineers input design goals and constraints into an AI system, which then generates numerous design alternatives. These designs are optimized for performance, material use, and manufacturability, resulting in faster design cycles and more efficient products.

AI-driven generative design uses algorithms like topology optimization and evolutionary design to explore design spaces that would be time-prohibitive for humans to manually investigate. The AI models optimize every element of the design, from shape to material usage, considering factors like weight, strength, and environmental impact. This approach has been widely adopted in aerospace, automotive, and construction industries, where performance and material efficiency are critical.

Tesla uses AI-powered generative design to create lightweight, high-performance vehicle components. By using AI to optimize parts like chassis and brackets, Tesla reduces both material waste and manufacturing time. This approach has led to reduced production costs and a faster time-to-market for new vehicle models.

3. Autonomous Construction Equipment

Autonomous construction equipment is changing the way heavy machinery operates on construction sites. AI-powered machines such as bulldozers, excavators, and cranes use sensors, cameras, and GPS to navigate and perform tasks without human intervention. These machines are designed to increase efficiency, reduce the risk of human error, and enhance safety by operating in hazardous or hard-to-reach areas.

Autonomous construction equipment relies on AI systems that combine computer vision, machine learning, and sensor fusion to understand the environment and make real-time decisions. These systems help the equipment adapt to changing construction site conditions, like uneven terrain or shifting weather patterns. The machines can operate continuously, without needing breaks, which significantly improves project timelines.

Caterpillar has deployed autonomous mining trucks equipped with AI to transport materials without human drivers. The trucks use GPS and sensor data to navigate and deliver materials autonomously, improving safety and productivity on mining sites. This has resulted in a 15% increase in productivity and a 30% reduction in fuel consumption.

4. AI-Driven Quality Control

AI-powered quality control solutions are enhancing the manufacturing and production processes within engineering. Traditional manual inspections are often time-consuming and prone to human error, but AI systems can analyze visual data and identify defects more accurately and rapidly. This technology utilizes computer vision, deep learning, and neural networks to detect defects in materials or products during the production process.

These AI systems can be integrated into production lines, using cameras and sensors to continuously monitor products as they move through the assembly process. The AI models are trained to identify specific types of defects, such as surface cracks, dimensional inconsistencies, or material flaws. Once a defect is detected, the system can trigger automated responses, such as halting the production line or marking a product for further inspection.

BMW employs AI-powered visual inspection systems in its production lines to detect defects in car parts. Using high-resolution cameras and deep learning algorithms, the system inspects thousands of parts during production, ensuring high-quality standards are met. This has resulted in a reduction in defect rates and improved overall product quality.

5. Structural Health Monitoring (SHM)

Structural health monitoring (SHM) involves using AI to continuously monitor the condition of infrastructure such as bridges, buildings, and dams. AI systems process data from sensors embedded in these structures to identify signs of wear, stress, or potential failure. This proactive approach allows engineers to intervene before catastrophic failures occur, ensuring safety and extending the lifespan of critical infrastructure.

Machine learning and data analytics are employed to detect patterns in the sensor data, such as vibrations or stress, that indicate a decline in structural integrity. The AI model can generate real-time alerts, helping engineers to identify specific areas that require maintenance or further inspection. SHM is particularly valuable for aging infrastructure or in locations prone to natural disasters, where early detection can prevent major damage.

The San Francisco-Oakland Bay Bridge uses an AI-powered SHM system to monitor the health of its structure in real-time. Sensors track various indicators, such as vibrations and stress levels, and AI analyzes the data to predict maintenance needs. This system has helped extend the bridge's lifespan and reduced the risk of unexpected failures.

6. AI-Powered Supply Chain Optimization

AI plays a pivotal role in optimizing supply chain operations, especially in complex engineering industries. AI-driven systems use machine learning algorithms to analyze demand patterns, production schedules, and inventory levels to ensure that materials are sourced and delivered efficiently. By predicting demand fluctuations and optimizing routes, AI can reduce costs, improve delivery timelines, and enhance resource management.

Machine learning models trained on historical data forecast demand, enabling engineers to make better decisions about inventory management, procurement, and production. These AI systems can also detect inefficiencies or bottlenecks in the supply chain, providing actionable insights for process improvement. The strategic benefits include reduced operational costs, more accurate forecasting, and improved customer satisfaction.

Siemens uses AI to optimize its global supply chain, predicting demand fluctuations and adjusting production schedules accordingly. The AI-powered system helps minimize stockouts and ensures more efficient use of resources. This has led to improved lead times and product availability across Siemens' operations. - By Ngoc Nguyen – Courtesy SmartDev ■

From Imagination to Impact:

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ence

AI-generated sketches and visuals offer:

- Distinctive professional portraits
- Book, article, and keynote cover
- Enhanced digital and media presence

3. Faster Ideation & Decision-Making

Visual prototypes help leaders:

- Clarify ideas quickly
- Align teams effectively
- Reduce ambiguity in communication

4. Innovation Signalling & Thought Leadership

Using AI-generated visuals reflects:

- Forward-thinking leadership
- Technological adaptability
- Creative and strategic intelligence

Why This Feature Matters

In an increasingly visual world, ideas that can be seen are more likely to be understood, remembered, and acted upon. ChatGPT's image generation feature empowers users to move from thought to visualization instantly, removing traditional barriers of skill, time, and cost.

For universities, it enhances learning outcomes and academic creativity. For CEOs and organizations, it strengthens clarity, influence, and execution.

Conclusion

ChatGPT's sketching and image generation feature is not merely a creative add-on—it is a strategic and educational breakthrough. Since its launch in March 2025 and its recent availability to free users, this capability has reshaped how individuals visualize ideas, communicate insights, and present themselves professionally.

By removing cost and skill barriers, OpenAI has enabled millions of students, educators, and leaders to access professional-grade visual intelligence at no charge.

Whether you are a university student building your academic future or a high-performance CEO driving organizational impact, this technology empowers you to turn imagination into influence—with clarity, creativity, and confidence.

The future of communication is no longer only written. It is drawn, designed, and intelligently imagined—now accessible to everyone.

Why Pakistan's Engineering Consultancy Model Is Unsustainable

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who have left are gone. Anyone coming from outside comes to earn money; leaving one's country to set up a new operation is not easy, and doing business in Pakistan is especially difficult due to numerous issues.

I recently heard a clip of the Lahore Chamber president saying, "I have 36 wives"—meaning there are 36 departments demanding money. Ultimately, everything comes down to governance.

Frankly, I expected the IMF to enforce discipline. Only when people are pressured does change happen. I often wonder why the IMF does not question the billions of rupees of free electricity, free travel, and overseas medical treatment provided to parliamentarians. The judiciary and the army enjoy privileges that do not exist elsewhere in the world. This country has been left open to plunder.

Why Don't Professionals Raise Their Voice?

Destroying a country is easy—just destroy its institutions. Look at any institution today; can you honestly say we are proud of it?

I believe change is extremely difficult. Some may disagree with me, but I think we have become a dead nation—dead due to consuming the forbidden. My teachers at NED used to say you cannot imagine how far-reaching the effects of ill-gotten earnings are. Reflect on how many people consume halal earnings today. Even vegetable sellers cheat. Life-saving drugs are adulterated. These things have consequences.

Our character has deteriorated; our moral strength has vanished. A judge's son can drive recklessly, kill people, without a license or even an identity card—and nothing happens. This reflects the level of our society. If this were a living society, there would have been a massive public outcry.

– **By Manzoor Shaikh**

The Changing Landscape of Civil Engineering

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Council (PEC).

Another issue is related to teaching methodology. It must be seriously looked into. Books have disappeared from universities. Teachers provide only notes, and thus the creativity of students has been severely affected. You still find outstanding candidates, but that is due to their own effort.

We should bring books back into institutions and connect them with online libraries. Examinations should be made creative so that students are tested in real terms. To achieve this, teachers should be improved. But not only that — the overall standard of education must be enhanced.

The government spends 0.8 percent of GDP on education, whereas elsewhere it is between 4 and 6 percent. Research and development should receive priority, at least at the master's level. Research should focus on our own problems and remain connected with society. Looking at the international ratings of our universities, very few fall within the top thousand. If our curriculum is good, then where is the problem? Because we don't spend on education and don't enhance faculty standards.

Engr. Tahir Sultan and Civil Society

We conceived the Pakistan Society of Civil Engineers (PSCE) in 2018 and got it registered in 2020. Until now, we have organized 85 monthly online lectures. Each lecture contains half a CPD point — meaning six points a year for engineers. Many well-known engineers who serve internationally have been our resource persons.

Unfortunately, we are still unable to open a bank account for the last five years, as it is a non-profit organization and the government places many restrictions. We, the founding members, are putting in our efforts to run it. All the lectures are available on our website and YouTube channel.

We have also set up a WhatsApp group with around 350 members. It has greatly helped young engineers who seek expert advice in the group.

Firm DECON

We are working on the 765 kV line from Dasu to Mansehra and then to Islamabad, which is linked with the grid. It is the first of its kind. We have completed the topographic survey. Now we are working on a warehouse for the project — a large undertaking.

Moreover, we are also working on the Lyari Expressway subsoil investigation; it is a small project. Besides that, there are other projects on which we are at the final stages of negotiation.■

PEL's Global Footprint

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absence of a structured government system that facilitates exports comprehensively. In some specific cases, when a company creates momentum, financial institutions offer financing support, and certain preferential rates are provided for import, export, and customs matters. However, operational support remains limited.

Despite this, PEL has a presence on every continent, including the Middle East, South Asia, Southeast Asia, Europe, and America.

What PEL Deals In

In major categories, we manufacture power transformers up to 1,032,000 volts, including 132 kV transformers used at grid stations. We produce around 100 such units annually, representing a business of approximately Rs. 30 billion.

We also manufacture distribution transformers, commonly seen mounted on poles, operating at 11,000 volts. These are supplied to all utilities, industries, and housing societies, representing equipment worth Rs. 25–30 billion.

In addition, we produce MV panels used for distribution and control purposes, providing system protection. We supply between 1,000 and 2,000 panels annually.

Energy meters are another category, with annual production ranging from 12,000 to 15,000 units, supplied mainly to utilities. Besides these, we manufacture several smaller and other related products.

Future Plans

PEL is setting up a brand-new Greenfield project in the form of a new switchgear factory. The facility is currently under construction and is expected to become operational in the first quarter of 2026.

We are expanding our capacity. While PEL already operates Pakistan's largest transformer factory, this new facility will be the country's largest switchgear factory. Our Ferozepur Road factory complex houses all manufacturing units at a single location. - ER

Economy and Engineering

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There is no shortage of capability among us.

I have traveled to around 45–50 countries, met many people, and I enjoy interacting with them. The Pakistani nation is one of the smartest in the world. If our capabilities are properly utilized, if the government supports us, and if our population of 250 million—our biggest asset—is properly channeled, we can achieve a great deal. Our people are technically very strong. Whether engineers, doctors, actors, or singers—wherever they have gone, they have made a name for themselves. Pakistanis are recognized and respected across the world.

By Manzoor Shaikh

PM Shehbaz Champions AI and Emerging Technologies

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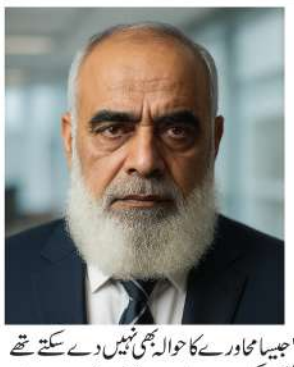
economy and industry needs, the PM stressed that modern skills in IT, AI, agriculture, and mining are essential for Pakistan's growth. He noted that bridging the gap between youth capabilities and industry demands is key to sustainable development: "We have pulled the economy back from the brink of default. Now, it is time to boost growth through innovation, technology, and AI-driven solutions, led by our youth."

Students attending the ceremony shared inspiring stories of how the laptops and access to technology have transformed their education and career prospects. Ghalib Hassan, son of a martyr from Peshawar, said, "This laptop is not just a machine; it's a gateway to my future. I have been able to work on freelancing projects and develop skills in AI and digital technologies." Maham Batool from Karak highlighted how access to digital tools helped her secure a position in Grade 17 at Askari Bank. Wareesha Eman of Lakki Marwat credited the scheme for enabling her to pursue higher education opportunities, including scholarships that support technology-based learning.

Prime Minister Shehbaz Sharif also honored the resilience and sacrifices of the people of Khyber Pakhtunkhwa and Hazara Division, praising law enforcement and armed forces for ensuring national security. He highlighted that the youth, equipped with AI skills and modern technologies, are the guarantors of Pakistan's prosperity.

The event concluded with a message of unity, technological empowerment, and national pride. "We must embrace the challenges ahead with innovation, collaboration, and AI-driven solutions. The youth will lead Pakistan to unprecedented heights," the PM stated, reiterating his commitment to fostering a generation of technologically skilled, globally competitive leaders. - ERMD



بندر کی بلا، طویلہ کے سر

تحریر: طاہر محمود

اردو کے دو ملتے جلتے محاورے ہیں

طویلہ کی بلا، بندر کے سر

اور

بندر کی بلا، طویلہ کے سر۔

زمانہ طالب علمی میں اساتذہ کرام اپنی پوری کوششوں کے باوجود ہمیں ان محاوروں کا مطلب اور ان کے درمیان فرق نہ سمجھا سکے۔ اس میں قصور اساتذہ کرام کا نہیں بلکہ ہماری نالائقی کا تھا اور نظام تعلیم کا تھا کہ جب رٹا لگا کر پاس ہوا جا سکتا ہے تو سمجھنے کی کاوش کیونکر کی جائے۔

ثانی الذکر محاورے کا مطلب جو ہمارے ایک اردو دان دوست نے جو کے معلم، پرنسپل اور شاعر بھی ہیں، سمجھایا کہ جب کسی ایک کے جرم کی سزا کسی دوسرے کو دی جائے۔ نہ جانے اردو میں ایسے کتنے فضول محاورے مل جائیں گے۔ یہ کیسے ممکن ہے کہ جرم ایک کرے اور سزا کسی دوسرے کو۔ یہ تو مہذب معاشرے کا اصول نہیں۔ اور اگر ایسا ہے تو وہ معاشرہ ایک مہذب معاشرہ نہیں۔

ہم اپنے کتابی اصولوں پر قائم و دائم تھے کہ ہمیں یاد آیا کہ بچپن میں ہمیں ایک سگ محلّہ نے اور موجودہ زمانے میں ایک خدمات فراہم کرنے والے ادارے نے، ہم پر اس محاورے کا عملی اطلاق کر دیا۔ جس کی وجہ سے ہم نہایت پریشانی کا شکار رہے۔

جب انسان پریشان ہو تو عقل و فہم چھٹی پر چلی جاتی ہیں اور خیالات منتشر، تسلسل برقرار نہیں رکھ سکتے۔ دیکھیے نا۔ محاورہ شروع کیا تھا، تو مطلب معلوم کرنے کے لیے دوست یاد آ گئے۔ دوست سے یاد آیا اُن کا اسکول۔ اُس سے یاد آئے ہمارے ننھے شہزادے جنہیں ہم انگلی پکڑ کر اچھا شہری بنانے بھیجا کرتے تھے۔

اسکول کا ذکر ہوا اور کتے یاد نہ آئیں؟ گھر سے اسکول تک ہر دس قدم پر ایک عدد کتا گارڈ ڈیوٹی سرانجام دے رہا ہوتا بچے ہمارے ساتھ جانا پسند کرتے، کیونکہ شائد وراثت میں ایک ہی شے ملی۔ کتوں سے خوف! کتے بھی دو اقسام کے، ایک وہ دم والے جو سڑک کے درمیان پاؤں پھیلائے سو رہے ہوتے اور کسی اجنبی دیکھ کر بھونکتے تھے۔ دوسرے دم کے بغیر جو اسکول کی چھٹی کے وقت سڑک کنارے براجمان، اور ہر آتی جاتی صنفِ نازک پر بھونک بھونک کر اخلاقیات کی پامالی کرتے۔ ہمیں تو بچپن سے ہی کتوں کے ''کتہ پن'' سے خوف آتا تھا، ان کے دانت، ان کا ہمارے پیچھے بھاگنا، ان کا بھونکنا۔

استاد محترم تسلی دیتے: جو بھونکتے ہیں وہ کاٹتے نہیں! ہم معصوم سوچتے کہ استاد ٹھیک کہتے ہونگے، مگر محلے کا کتا تو کبھی اسکول نہیں گیا! اسے یہ کہاوت کون سمجھائے؟ ہمارے گلی کا ایک کتا تو ایسا جیسا کہ کوئی شیر ہو۔ گردن کے اوپر بڑے بڑے بال۔ بالکل ایک شیر کی مانند۔ اگر آج کل شیر کو کتا سمجھا جا رہا ہے تو یہ کتا ہوتے ہوئے بھی شیر لگتا۔ صاحب چونکہ پالتو تھے، بھاگ دوڑ اور معاشی فکروں سے آزاد۔ پورا دن پنجوں پر سر رکھ کر خواب خرگوش کے مزے اور کوئی خلل ڈالے تو غصہ آتش فشاں۔ قریب سے ہم دبے پاؤں گزرتے مبادا ہماری قدموں کی آواز سے جہان پناہ کی نیند میں خلل واقع ہو اور ہم قابل سرزنش قرار پائیں لیکن اکثر ہم ناکام ہی رہتے ہمارا قصور؟ کچھ بھی نہیں جناب۔

سارا فساد کا جڑ ہمارا ایک شیطان دوست ٹارزن تھا! نام نہ جانے کیا تھا لیکن اس کی پھرتی کی وجہ سے بنام ٹارزن مشہور تھا۔ کتے کے پاس سے گزرتے ہوئے ایک عدد پتھر مار کر بندر کی پھرتی سے غائب! اور بیچارے ہم کتے کے آگے آگے اگلے اولمپکس کی تیاری میں مصروف! کتا ٹارزن کا تو کچھ نہ بگاڑ سکتا، اس کا زور ہم پر ہی چلتا چنانچہ وہ ہمارے پیچھے اپنے ''آلاتِ حرب'' کی نمائش کرتا دوڑتا۔ صد شکر کہ سزا صرف زبانی سرزنش تک محدود رہتی۔ لیکن آلات حرب دیکھ کر ہمارے اوسان خطا ہو جاتے۔ اوسان کا لفظ تو شرمندگی سے بچنے کے لیے استعمال کیا ورنہ جو کچھ خطا ہوتا اسے دیکھ کر کتا ترس کھا کر واپس جا کر سو رہتا۔

ٹارزن کی شرارتوں کی سزا ہم جیسے ڈرپوک کو یعنی ہم پر محاورے کا عملی اطلاق۔ لیکن یہ سوچ کر اپنے آپ کو تسلی دے لیتے کہ یہ تو اس کا کتہ پن ہے۔ اشرف المخلوقات ہوتا تو سوچ سمجھ کر فیصلہ کرتا اور محاورے کا اطلاق ہم پر نہ کرتا۔ پھر ایک دن خبر ملی کہ کتا ہمیشہ کی نیند سو گیا۔ مالک رو رو کے بدحال، اور ہم، خوشی کے مارے ہماری باچھیں کھلی مگر یہ خوشی بھی مستقل نہیں رہی۔ بڑے ہو کر معلوم ہوا کہ دم والے کتے سے تو جان چھوٹ گئی لیکن اس محاورے سے نہیں جا بجا آپ کو ایسے افراد ملیں گے جو آپ پر اس محاورے کا عملی اطلاق کرتے نظر آئیں گے کیونکہ اپنے دور کے ٹارزنوں پر ان کا بس نہیں چلتا۔ ایسا کوئی فرد آپ کو سڑک کے کنارے کھڑا بھی مل سکتا ہے یا کسی ادارے میں کرسی پر بیٹھا۔

اب دیکھیے پریشانی میں ہم کیا سے کیا لکھے جا رہے ہیں۔ نہ ربط، نہ سیدھا مطلب تو سوال یہ کہ ہم پریشان کیوں ہیں؟ جمعہ کی صبح، سویرے اٹھے، شاور کھولا۔ پانی غائب موٹر چلانے گئے۔ برقی رو غائب باہر نکلے تو معلوم ہوا محلے بھر میں بجلی غائب! کیوں پورے محلے کی برقی رو منقطع کر دی گئی ہے۔ قصوروار کون؟

ایک صاحب جو بل جمع نہ کروانے کی قسم کھائے بیٹھے ہیں کمپنی کے بھیجے ہوئے بلوں کا وہی حال کرتے ہیں جو انسان کچھ کھانے کے بعد چند گھنٹوں میں کرتا ہے اب دیکھیے... قصوران کا، سزا ہم سب کو۔ محاورہ سچ ثابت! دل نے کہا، کمپنی کی غلط فہمی ہوگی۔ انصاف پر بھروسہ کر کے دفتر جا پہنچے۔ افسر صاحب سے مل کر سمجھ آیا کہ قصور ہمارا ہی ہے کہ ہم باقاعدگی سے بل بھرتے ہیں۔ اور دھمکیاں بھی ہمارے لیے ہی ہیں؟ کیونکہ ہم ٹارزن نہیں ہیں عرض کی کہ اصل مجرم کے خلاف کاروائی کریں۔

فرمایا: ''قانونی کاروائی؟ لمبا جھنجھٹ۔ ہماری قابلیت تو صرف غیر قانونی کاروائی تک محدود ہے۔ آپ اس بندے کو پکڑ کر ہمارے حضور پیش کریں۔ ورنہ خاموشی سے سزا بھگتیں'' مزید منطق یہ کہ: قانون وہی، جو ہم چاہیں! ہمارے تمام دلائل، قوانین کے حوالے ردی کی ٹوکری کے سپرد۔ "چکنے گھڑے" کہ منت سماجت بھی کام نہ آئے۔"

خدا گنجے کو ناخن نہ دے" جیسا محاورے کا حوالہ بھی نہیں دے سکتے تھے کہ تمام افسران ماتھے پر زلفیں بکھرائے بیٹھے تھے۔ لگھ بھگ ایک ہفتے بعد اہل اختیار کو ترس آیا۔ لیکن اس ایک ہفتہ جب برقی رو ندارد۔ رات کو آنکھ لگتی ہے تو خواب میں ٹارزن آ جاتا! جو پتھر مار کر بھاگ گیا اور... ہمیں طویلے میں چھوڑ گیا۔ اور اس مرتبہ کتا ہماری ٹانگ۔۔۔۔۔۔

دعا کیجیے کہ اللہ تعالیٰ مستقبل میں ہمیں اس ''محاوراتی پریشانی'' کو دور رکھے۔

نوٹ: ہماری حالتِ زار کی محاورے سے مطابقت تو عین ممکن ہے، مگر کہانی کے باقی حصے کا ادارے یا افسران سے دور دور تک تعلق نہیں۔ یہ سب پریشانی میں ذہن کے بگڑے ہوئے حالات اور ڈراؤنے خوابوں کا شاخسانہ ہے۔ ادارے میں موجود افسران سے بھی مؤدبانہ گزارش ہے کہ آپ کے ادارے کی معاشی مجبوریاں اپنی جگہ لیکن ٹارزن کی شرارتوں کی سزا بے قصوروں کو نہ دیں کہ مہذب معاشروں کا یہ دستور نہیں یہ نہ ہو کہ شرفاء بھی ٹارزن بننے کے متعلق سوچنے لگ جائیں۔

موجودہ صورت حال میں تو فیض صاحب کا یہ شعر ہی گنگنا سکتے ہیں۔

ہے اہل دل کے لیے یہ نظم بست و کشاد
کہ سنگ و خشت مقید ہیں اور سگ آزاد۔ ■

تعارف:

طاہر محمود تعلیم اور پیشے کے لحاظ سے الیکٹریکل انجینئر ہیں۔ جامعہ کراچی سے ایم اے سیاسیات اور NED سے M.ENG کی سند حاصل کر چکے ہیں۔ زندگی کے ابتدائی ادوار ایئر فورس میں گزارے اور بعد از ریٹائرمنٹ عرصہ پچیس سال سے صنعتی اداروں کو خدمات فراہم کرنے کے ساتھ ساتھ تدریس سے وابستہ رہ چکے ہیں۔ فارغ اوقات میں دل کا غبار قلم سے نکالنے کی کوشش کرتے ہیں۔

Clean Energy Solutions: Balancing Cost Efficiency and Environmental Responsibility

Power Vision Systems is a leading Pakistani power solutions company specializing in the manufacturing, integration, and supply of diesel generators and engine systems, with a strong focus on efficiency, reliability, and environmental compliance. Since 2008, Power Vision has been manufacturing its own engines, making it the only company in Pakistan to produce diesel engines of up to 250 kVA locally.

Operating under the ATS (Automotive Tractor Space) brand, Power Vision meets European standards and exports its products to international markets, including Europe. The company is ISO-certified and represents one of the UK's oldest diesel engine brand, Lister Petter, established in 1865, known globally for its emission-controlled and environmentally friendly technology.

Backed by the legacy of the Wazir Pak Group (founded in 1954), Power Vision also manufactures diesel engine parts for 22 international brands and exports components to 136 countries worldwide. With a nationwide network of nearly 1,100 dealers, strong after-sales service, and a growing portfolio of strategic clients—including banks, the Pakistan Army, and national infrastructure projects—Power Vision continues to play a vital role in Pakistan's energy and industrial landscape.

Sohail Rana, Chief Operating Officer of the company, speaks to Engineering Review in a special interview.

Pakistan and Energy Costs

How can customers in Pakistan benefit from reduced energy costs?

Pakistan has four to five sources of energy generation. One is hydropower, which produces cheap electricity. However, most dams were built during the era of Ayub Khan, and no major dams were constructed afterward.

After that, we introduced IPPs (Independent Power Producers), and many parties benefited unfairly from them—something the country is still paying for today. Many IPPs never even operated, yet they continued to receive capacity payments. Due to these factors, the situation deteriorated so badly that today, even high-quality diesel generators produce electricity cheaper than government-supplied power.

However, one very important point is that today the crisis is not just about energy—it is even more about the environment. Look at Lahore's smog. The Air Quality Index has reached extremely dangerous levels; last year it crossed 600. This is why we must encourage energy sources that do not pollute the environment.

Fossil fuels damage the environment. Factories burn tyres, old brick kilns emit excessive smoke, and vehicle emissions worsen air quality. We need to introduce environmentally friendly products—such as solar systems, batteries, and generators that are eco-friendly and do not produce carbon emissions. Euro-5 emission generators are essential.

We provide such generators from the UK's oldest brand, Lister Petter, established in 1865. All models are environmentally friendly and equipped with emission control systems. These generators are EPA-certified, which aligns well with Punjab's environmental regulations.

Three key features make these generators unique:

1. EPA certification
2. A three-year unlimited-hours warranty (due to an excellent engine)
3. All engines—large or small—are equipped with ECM (Electronic Control Modules), making them fuel-efficient

New Technologies

Electronic control systems in generators regulate not only fuel consumption but also emissions. Even small generators can be synchronized with each other, which is a major advantage.

Industry and Environmental Awareness

The problem is that people focus only on price and usually think it doesn't make much difference. But now people's lungs are badly affected, breathing problems are increasing, and children are being born with compromised lung health. This is a slow killer. Health is being destroyed, and dust pollution has increased significantly.

Now awareness is emerging. In today's world, we must choose products that are environmentally friendly but not excessively expensive.

Do Your Generators Benefit Exporters?

Absolutely. When you use emission-controlled generators, exports of tractors increase, and machinery manufacturing also grows.

Power Vision and Manufacturing

It is a matter of pride for us that Power Vision has been manufacturing its own engines since 2008. It is Pakistan's only company producing diesel engines up to 250 kVA locally. We export to Europe under the ATS brand and meet European standards. We are an ISO-certified company.

Pakistan Tractor Manufacturing Co.

The Wazir Pak Group was founded in 1954. Initially, our expertise was tractor parts. Our ATS brand stands for Automotive Tractor Space. We have been distributors of Massey Ferguson parts for over 20 years, a contribution greatly strengthened by our late Chairman, Amjad Wazir.

Our ATS brand manufactures diesel engine parts for 22 different brands. These parts are used in vehicles, tractors, and generators, and we export them to 136 countries worldwide.

I recall when I first went out to sell these products, people discouraged me because they were made in Pakistan. Interestingly, foreign buyers trust our parts, but our own people often fail to recognize their value.

After-Sales Services

Companies like ours cannot function without strong after-sales service—and this is our biggest strength. We have nearly 1,100 dealers across Pakistan. Our condition is that dealers receive generator parts only if they train at least one technician through us.

This means I don't have to send my own staff anywhere—if an issue arises, the dealer's trained technician provides service. This is a major strength that no other company has.

Our main corporate clients include banks and the Pakistan Army. Many bank branches are located in remote areas. Bank of Punjab first purchased generators from us, followed by Bank Al Habib. Bank Al Habib even assigned us a branch in Darra Adam Khel. We installed a 50 kVA generator there, which ran nonstop for 10 hours daily—and, by the grace of God, it is still operating today.

Later, more banks joined us, and the primary reason was our reliable after-sales service.

Future Plans

Currently, we are manufacturing ATS generators and tractor parts, and we also represent one of the UK's oldest and finest diesel engine brands available in the market. Recently, we supplied 16 generators to FWO for the Reko Diq Project in Balochistan. ■

Economy Shows Signs of Recovery, but Structural Challenges Persist: Sohail Bashir

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international consultants and trained manpower executing projects.

We also need to bring our contractors in line with these standards. One contractor once said that HSE is a "problem." Anyone who sees HSE as a problem cannot function in today's environment. Practices have changed—earlier, workers might have worked barefoot with tar on their feet, but that is no longer acceptable.

No new technologies, no skills—no work

That is correct. Without upgrading skills and technology, the scope of work becomes limited. Many well-established companies are now adapting and moving toward AI. New engineering graduates are being taught modern technologies, which is helping companies evolve.

There is also a large consulting sector in Pakistan that handles work outsourced from the United States—performed here at lower cost but to international standards. Another major emerging area over the next four to five years is data centers, with projects worth billions of dollars worldwide. Data centers require large amounts of energy, which is why many are being established in the Gulf, where electricity is cheaper.

If we train our people in data center development, this could become a major source of jobs and business. AI will permeate every field—medicine, arts, and engineering alike. Engineering bodies such as ACEP, PEC, and IEP are making efforts to train engineers in these areas and create more opportunities.

Many Pakistani engineers are already delivering results across the world—in the USA, the Middle East, Japan, and Germany. There is no reason why we cannot continue to do so.

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