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The Monthly Bulletin of The Institution of Engineers, Malaysia

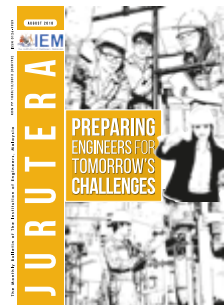
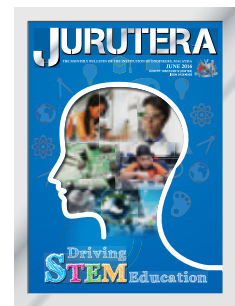
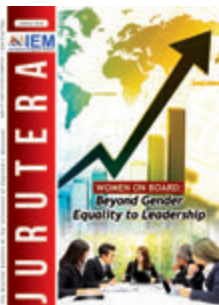
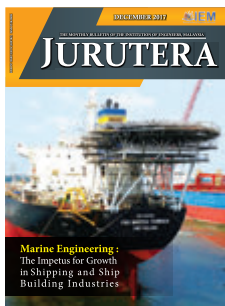
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Message from the Editor:

Leadership in a Changing World

Today, engineering projects are characterised by volatility, uncertainty, complexity, and ambiguity. Economic fluctuations, supply chain disruptions, threats caused by climate change, emerging technologies, and shifting stakeholder

expectations require more than technical skills. These call for disciplined project management and agile leadership.

Here, we examine the challenges engineers are facing as today, project management is also about proactive risk management, effective stakeholder communication, organisational agility, and the capacity for timely and sound decision-making. Structured governance, resilient planning, data-informed decision-making, and continuous learning are key elements which engineers can leverage on to turn disruption into opportunities for innovation and long-term value creation.

We hope this issue will encourage the engineering profession to strengthen project leadership capabilities and promote resilience in project delivery. In future, those who can adapt and lead through change with confidence, professionalism, and purpose will be best positioned to manage projects and deliver lasting value. ■

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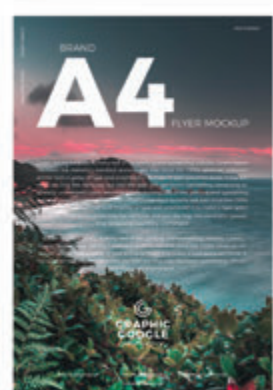


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COVER Note

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Project Management in a Volatile World

Engineering today operates in an environment defined by volatility, uncertainty and accelerating change, as geopolitical tensions, climate risks, regulatory reforms, technological disruption, and stakeholder expectations redefine how projects must be delivered. This issue of *JURUTERA* explores these challenges from diverse perspectives such as maritime infrastructure reform, stakeholder coordination, and heritage restoration, where engineering progress must coexist with conservation and cultural value. It also examines integrity and governance as pillars of project success, alongside young engineers navigating rapidly evolving professional expectations. "Engineers and the Fear of Missing Out (FOMO)" further raises a timely question: Does being constantly active and visible translate into meaningful professional value?

Collectively, project management is no longer confined to time, cost, and scope, but must become an integrator of uncertainty by connecting engineering, governance, people, technology, and strategy. We at the Project Management Technical Division (PMTD) invite engineers to rethink project success, not merely as delivering what is planned, but as having the agility, judgement, and leadership to deliver value when circumstances refuse to follow the plan. May this issue inspire new perspectives on engineering through disruption! ■



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Change,

The New Constant in Project Management

The engineering and construction landscape is rapidly evolving, driven by technological advancement, economic uncertainty, changing stakeholder expectations and the growing emphasis on sustainability. Major Malaysian developments such as KLCC, Putrajaya and the Merdeka 118 Precinct demonstrate how engineering can create lasting economic, social and national value. The experience of Dato' Ir. (Dr.) Izwan Hasli Mohd Ibrahim, Chief Executive Officer of PNB Merdeka Ventures Sdn. Berhad, offers valuable insights into leading complex, nationally significant projects, with perspectives on leadership, resilience, governance and long-term value creation. From navigating economic crises and the COVID-19 pandemic to embracing BIM, IoT and smart building technologies, the industry continues to evolve. This interview explores these challenges and opportunities, offering practical reflections for engineers and valuable lessons for the next generation of engineering leaders.



Dato', having witnessed multiple periods of global and national disruption throughout your career, how has project management evolved in dealing with uncertainty?

Dato' Izwan: One thing I have learnt over the years is that uncertainty is something every project leader will face but what's important is how we prepare for and respond to it. I have been fortunate to have worked on several national developments throughout my career, from KLCC and Putrajaya to the Merdeka 118 Precinct.

One thing these projects have in common is that they are much bigger than the buildings themselves. They are catalytic developments which create opportunities for businesses, generate jobs, attract investment, and uplift the surrounding area. This is why, when you are managing projects of this scale, you cannot afford to look at them in isolation. For me, that has always been the most important lesson and that is to never lose sight of the bigger picture.

At the Merdeka 118 Precinct, for example, our ambition was never to just build the world's second tallest tower. The bigger vision had always been to create a vibrant global precinct which celebrated Malaysian heritage while contributing to Kuala Lumpur's growth and the country's economy for many years to come.

When uncertainty happens, people often think you need to change direction but I actually think it's the opposite. You need to stay true to your master plan because that is what gives everyone confidence. Of course, you must be prepared to adapt along the way because no project ever goes exactly as planned. Adapting does not mean compromising the vision; it means making the right adjustments while keeping everyone aligned to the same long-term objective.

For me, project management today is really about finding that balance. You need discipline to stay focused on the vision, but you also need the flexibility to respond

to changing circumstances. If you can do both well, projects will continue moving forward despite the challenges that come your way.

Leadership Philosophy

Having played key leadership roles in landmark developments such as the Petronas Twin Towers and Menara Merdeka Maybank or formerly known as Menara Merdeka 118, how has your leadership philosophy evolved in managing nationally significant mega projects?

Dato' Izwan: Every project I had been involved in taught me something different, and each one helped shape the way I lead today. KLCC was really about understanding what it took to sustain a world class business district. When I joined in, the development was already 20 years old. The challenge was no longer about building. Instead, it was about making sure it remained relevant. We had to continuously introduce new ideas and to keep raising standards while preserving what made KLCC an icon in the first place.

Putrajaya gave me a very different perspective as it was no longer thinking about a single development but an entire city. Every decision had a ripple effect, whether it was infrastructure, mobility, sustainability or how people experienced the city. That really reinforced the importance of having a strong master plan and staying disciplined to that long-term vision.

Then came the Merdeka 118 Precinct which, to me, was most special because we were entrusted with a site that held such an important place in Malaysian history. That came with a huge sense of responsibility. From the very beginning, we knew this would not be about just delivering another iconic building. The tower was only part of a much bigger vision. We wanted to create a global precinct anchored on Malaysian heritage, where business, culture, tourism, and the community came together.

If I could share one example, it would be the restoration of Stadium Merdeka. We restored it because we wanted to preserve an important part of Malaysian history and, at the same time, we wanted it to be a place that people could continue to enjoy. Today, it's not just a heritage building but is also a venue for concerts, sporting events, cultural programmes, and community activities. Earlier this year, we hosted BAZRAM Merdeka, which brought together more than 80 local vendors and attracted over 250,000 visitors. That is the kind of impact we want to create.

That is how my leadership philosophy has evolved over the years. Delivering a project on time and within budget may be important, but the real success is in whether what we have built continues to create value long after construction is completed.

In today's volatile environment, what qualities are most important for engineering and project management leaders?

Dato' Izwan: I always tell young engineers that before you aspire to become project managers, you must first become good engineers. You must spend time on site, understand

how things work and learn from people around you. That's how you can build a good foundation.

These days, I see many young people wanting to move into management very quickly. Personally, I don't think there's a shortcut. You need to develop technical skills first because that's what gives you credibility. When the team members know you understand the work and the challenges they face, they will naturally have confidence in your leadership.

As your career progresses, your role becomes much bigger than just engineering. Projects such as Merdeka 118 Precinct involve architects, engineers, contractors, consultants, government agencies, and many other stakeholders. Everyone comes with different priorities, so one of the most important roles of a project leader is to bring everyone together and keep them focused on the same objective.

I also believe you don't have to know everything. That's impossible. But you should have one area where people know they can rely on you. Build that expertise first, then continue learning from there.

What inspired the vision of delivering projects which are not only iconic, but are also meaningful to national development?

Dato' Izwan: For me, it is really about the amanah that comes with projects like these. When you are entrusted with developments that become part of the country's landscape, you know you are building something that people will live with for generations.

This is why I have always believed we should not focus only on completing the project. We should also think about the impact it creates afterwards. Will it attract businesses? Will it create jobs? Will it encourage people to visit? Will it continue adding value to the city?

That was the mindset we had adopted for the Merdeka 118 Precinct. The tower is important, but it is only one part of a much bigger vision to create a vibrant, world-class precinct that continues to evolve over time.

Major Crises & Lessons Learnt

The 1997 Asian Financial Crisis significantly impacted infrastructure and development projects across the region. From your experience, how did project leaders maintain momentum and stakeholder confidence amid financial uncertainty?

Dato' Izwan: The first thing is to recognise that there will always be cycles. There will be good times and there will be challenging times. That is something every project leader has to accept, especially when you are managing developments which take years to complete.



National Take the Stairs Day at the Spire led by Dato' Ir. (Dr.) Izwan Ibrahim alongside world champion tower runner Soh Wai Ching

The Asian Financial Crisis reminded everyone how quickly external conditions could change. While you cannot control those external factors, you can control how you respond to them.

For me, it always comes back to having a strong master plan and good governance. These are the fundamentals that give people confidence. When the vision is clear, it becomes much easier to keep the team focused and to continue moving in the same direction, even during uncertain times.



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Merdeka 118 achieved international recognition by securing two World Gold Awards at the 2026 FIABCI World Prix d'Excellence Awards in Vienna, Austria — one of the industry's most prestigious international recognitions

I also think communication becomes even more important during difficult periods. As project leaders, we have a responsibility to keep everyone informed, to explain why certain decisions are made and to make sure everyone remains aligned to the same objective.

Looking back, I think the biggest lesson was to not overreact to every challenge. Projects of this scale will always have unexpected situations, whether it is an economic crisis, a pandemic or changes in the market. You have to adapt but, at the same time, you cannot lose sight of the long-term vision.

After GE14, Malaysia experienced shifts in governance approaches, policies, and development priorities. How important is adaptability when managing long-term projects amid changing stakeholder expectations and external directions?

Dato' Izwan: Part of delivering long-term developments is accepting that such projects take years to complete. Along the way, governments and policies may change and stakeholder expectations may also shift. The important thing is to not be distracted by every external change. You need to stay focused on why the project exists in the first place. If the project

has a strong masterplan, as I have shared earlier, these fundamentals should not change.

Of course, we also have to adapt. We listen to stakeholders, understand new priorities and make adjustments where necessary. But adapting does not mean changing the vision.

At Merdeka 118 Precinct for instance, our focus had always been to deliver a development which created long-term value. That objective had never changed throughout the project.

As long as we continue to make decisions based on good governance and strong execution, I believe projects such as this will continue to succeed regardless of changes in the external environment.

Looking back at the COVID-19 pandemic, what separated projects which adapted successfully from those which struggled?

Dato' Izwan: The COVID-19 pandemic was probably one of the biggest tests our industry had ever faced. Almost overnight, the way we delivered projects changed.

In Malaysia, we went through several phases of the Movement Control Order (MCO) when construction activities were suspended and later resumed under strict SOPs. It was a situation none of us had experienced before. What

I learnt from that period was that projects succeeded because the people involved were able to adapt when things didn't go according to plan.

For us, the first priority was always our people. We had to make sure everyone on site was safe and, once that was in place, the focus shifted to finding practical ways to keep the project moving while complying with all the necessary requirements.

The other thing that COVID-19 reinforced was the importance of collaboration. A development such as Merdeka 118 Precinct involved many different parties. During that period, everyone had to work much more closely together. Decisions had to be made faster and communication became even more important.

Looking back, I think the pandemic reminded us that resilience was not about avoiding disruption because that was not always possible. It was about having the right team, making timely decisions and staying committed to the long-term vision, even when the environment kept changing.

Current Global Challenges

With today's geopolitical tensions, supply chain volatility, and energy transition pressures, what are the biggest project risks that organisations must prepare for?

Dato' Izwan: What I have noticed over the years is that project risks are becoming much more interconnected. A geopolitical issue can quickly become a supply chain issue and that eventually affects costs and project delivery. That is the reality we are operating in today.

Because of that, I think project leaders have to spend more time planning for uncertainties. It is no longer enough to have just one plan. You need to think about different scenarios, understand where the risks are and be ready to adapt when circumstances change.

The other shift is that sustainability is now part of good project planning. At Merdeka 118 Precinct, for example, we integrated energy

efficient systems and smart building technologies into the design from day one because we knew expectations would continue to evolve. Our recent WELL Platinum Certification is one example of how these early decisions have helped create a healthier, more sustainable and future ready workplace.

For me, good project management has always been about looking ahead. You cannot predict every challenge but you can prepare for it. That is probably more important today than ever before.

What were some of the biggest challenges encountered during the development of the Merdeka 118 Precinct and how were these addressed?

Dato' Izwan: I think one of the biggest challenges was making sure the Merdeka 118 Precinct would remain relevant long after construction was completed.

It is relatively straightforward to build an office tower, but creating a precinct that people continue to visit and enjoy for years to come is much more challenging. That was why we spent a lot of time getting the Master Plan right. We wanted different components within the precinct to complement one another rather than to operate independently.

One concept I often talk about is what I call the "The Three Catalytic Ingredients". The office tower brings in the working population on weekdays and Stadium Merdeka attracts people through concerts, sporting events and community programmes while The View at 118 will become a major tourism attraction. Together, they create activity throughout the day, week and year. Supporting attractions such as the Merdeka Textile Museum (MTM), Look at 118, 118 Mall and Park Hyatt Kuala Lumpur further strengthens that ecosystem.

Today, the challenge has evolved yet again. Our focus is no longer just on completing the development but is on making the precinct a



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success. This means attracting the right tenants, creating compelling visitor experiences and ensuring the surrounding community benefits from the opportunities that the precinct creates.

Completing the tower is an important milestone but the real success is whether the precinct will continue creating value for people, businesses and Kuala Lumpur for many years to come.

Innovation & Sustainability

How has digital transformation influenced engineering management and project delivery of large-scale developments over the years?

Dato' Izwan: It has improved the way we deliver projects and it has changed the way we operate buildings after they are completed. During the delivery of Merdeka 118 Precinct, we made extensive use of Building Information Modelling (BIM). The tower was virtually constructed before work even began on site,

allowing us to identify clashes involving the mechanical and electrical systems early. This improved coordination across the project and helped resolve potential issues before construction.

During the project, the lift control system was upgraded from analogue to digital technology. Today, all 89 lifts in the tower can be monitored and tracked in real time, 24 hours a day, improving operational efficiency, performance monitoring and maintenance.

The same applies to the mechanical systems. Our HVAC and chilled water systems are supported by digital technologies, including an intelligent Building Management System and IoT-enabled smart sensors. Together with the District Cooling System and Underfloor Air Distribution system, these technologies help optimise temperature, humidity,

ventilation, carbon dioxide levels, and overall energy efficiency, creating a healthier and more sustainable workplace. Digital technology continues adding value throughout the entire life-cycle of the building.

How was sustainability integrated into the planning and execution of the Merdeka 118 Precinct, and what role should engineers play in building future-ready cities?

Dato' Izwan: Sustainability has to start at the planning stage. It cannot be something you add on at the end of a project. If you want a building to perform well for the next 50-100 years, decisions have to be made from the very beginning.

That was very much our approach for the Merdeka 118 Precinct. Sustainability was embedded into how we designed, built and now operated the development. Today, we are seeing the outcome of those decisions. The tower has already achieved LEED Platinum Certification and WELL Core Platinum Certification, making

Menara Merdeka Maybank the tallest WELL Certified building in the world. We are also progressing towards GreenRE and Green Building Index Platinum certifications.

At the end of the day, sustainability is about people. It is about creating buildings which are healthier, more resilient and better prepared for the future. Whether it is better indoor air quality, energy-efficient building systems or creating a more comfortable workplace, these are the things that make a real difference to the people who use the building every day.

I also think engineers have an important role to play because the decisions we make today will shape our cities for decades to come. It is no longer just about delivering a building that is safe and functional. We now have a responsibility to create developments that remain relevant, sustainable and will continue to serve the community for generations to come.

Advice to Young Engineers

How can The Institution of Engineers, Malaysia (IEM) support young engineers in building resilience and staying relevant in a rapidly changing industry?

Dato' Izwan: One of the biggest things IEM can do is to create more opportunities for young engineers to learn from those who have been through the journey.

When I started my career, a lot of what I learnt came from working alongside experienced engineers. You learn things on site and from real projects that you simply cannot get from textbooks.

The other thing is not to rush. Build your technical capability, understand the fundamentals and gain experience. Once you have done that, leadership will come naturally.

Engineering is also changing very quickly. Digital technology, AI and sustainability are becoming part of

the way we work every day. IEM can continue to expose young engineers to these new developments through training, industry sharing and engagement with practitioners.

Looking ahead, what are your thoughts on emerging trends which will redefine project management and engineering practices in the next decade?

Dato' Izwan: I have actually seen the industry evolve quite a bit in the course of my career. Today, digital technology has become part of the entire project life-cycle. Digital systems continue to help us manage the operations of a building in real time. I think we will continue to see technologies such as AI and data analytics becoming part of everyday engineering practice.

The other big change is sustainability. Today we are expected to think much further ahead. It is about designing buildings which continue to perform well over the long-term, remain relevant as needs evolve and do not become obsolete after a few decades.

Good engineering is about creating assets which can adapt and continue to serve people and communities as well as withstand the test of time.

Closing Legacy

Having navigated multiple crises and transformative projects across different decades, do you believe disruption has now become the "new normal" for project management? If so, how should future engineers prepare themselves for that reality?

Dato' Izwan: Every generation of engineers faces its own set of challenges. The difference today is the pace of change. Technology is evolving rapidly, market expectations continue to shift, and projects are becoming increasingly complex. As

engineers, we need to be comfortable operating in an environment where change is constant.

My advice to young engineers is to not spend too much time trying to anticipate every challenge. Instead, invest in building a strong foundation. Develop your technical capability, understand the fundamentals and remain curious throughout your career. A strong foundation gives you the confidence and ability to adapt, regardless of how the industry evolves.

Looking back, one thing I have learnt is that while the challenges continue to change, the fundamentals will remain the same. Good planning, sound engineering, strong teamwork and staying focused on the long-term objective have guided me throughout my career. I believe these principles will continue to serve the next generation of engineers, no matter how the profession evolves. ■



Interviewee's Profile

Dato' Ir. (Dr.) Izwan Hasli Mohd Ibrahim, the Chief Executive Officer of PNB Merdeka Ventures Sdn. Berhad, leads the continued development and strategic direction of the Merdeka 118 Precinct as a global destination rooted in Malaysian heritage. Prior to this, he was the CEO of Putrajaya Holdings Sdn. Bhd. (PJH) and held key leadership roles in PETRONAS, including Executive Director of KLCC Urusharta Sdn. Bhd. (KLCCUH) in 2019, Acting CEO and COO of PETRONAS ICT Sdn. Bhd., and CEO of Virtus IP Sdn. Bhd. He also serves as a member of the Board of Directors of Perbadanan Wakaf Selangor and the Board of Trustees of Yayasan Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA).

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Managing Port Reception Facility Reform in a Volatile Maritime World

by:



Mr. Rashdan Baharum

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Ports are, by nature, operational systems, and their success depends on continuity, reliability and repeatability. In other words, their efficiency depends on the vessels that arrive, berth, discharge, load, refuel, report, pay, and depart through routines that must work every day.

In this case, Port Reception Facilities (PRFs) are part of the port operating environment, where ship-generated waste must be received, handled, treated, and documented as part of normal port functioning.

Nevertheless, when a country seeks to redesign the way PRFs are regulated, financed, coordinated, digitized, and enforced, the issue moves beyond routine operation and becomes a reform programme instead. The project is not the port itself but the transformation of the governance system which enables PRFs to work effectively under regulatory, environmental, and commercial disruption. This distinction is important because it avoids the conceptual error of treating port operation as project management while still recognising that reforming port systems requires project and programme discipline.

Therefore, Malaysia's PRF challenge should be understood as an operational system that needs governance reform, where it is insufficient merely to ask whether reception facilities exist. The more demanding engineering question is whether the surrounding legal, financial, institutional, and data systems can make vessels use those facilities properly, without undue delay and with traceable environmental outcomes.

Nonetheless, the next question is, why does PRF matter? It is because shipping remains the backbone of global trade, which carries about 80% of international

trade by volume. This not only makes ports economically indispensable but also places them at the centre of pollution-prevention responsibilities. This is because ships generate oily residues, noxious liquid substances, sewage, garbage, and exhaust-gas-cleaning residues; under MARPOL 73/78, contracting parties must ensure that adequate PRFs are available at ports and terminals to receive these wastes without causing undue delay.

In principle, the logic is straightforward because waste should be delivered from ship to shore, handled through proper systems and disposed of in an environmentally sound manner. In practice, the matter is more complex, as a ship will use a PRF only when the legal requirement is clear, the facility is accessible, the charge is reasonable, the process is efficient, and the risk of non-compliance is real. On the other hand, a port may have physical capacity, but poor tariff design, weak inspection, unclear agency mandates or missing waste records can still undermine compliance.

Therefore, PRFs should not be reduced to a tank, a reception point or a waste contractor since they are operational functions embedded in a wider governance chain. The chain begins before a vessel arrives, continues through notification, reception, transport and treatment, and ends only when final disposal can be verified. If any link is weak, the environmental outcome becomes uncertain and, in a volatile maritime world, this uncertainty is no longer acceptable.

A useful way to clarify the issue is to separate routine port operation from reform delivery. While the daily receipt of ship-generated waste is an operation, the redesign of the system that governs that receipt is a reform programme.

Although Malaysia has ratified MARPOL 73/78 and the United Nations Convention on the Law of the Sea, systemic challenges persist. Domestically, relevant instruments exist, including the Merchant Shipping Ordinance 1952, Environmental Quality Act 1974 and Exclusive Economic Zone Act 1984. Yet, the presence of legal instruments does not automatically produce a coherent delivery system as previous Malaysian maritime governance studies have highlighted recurring weaknesses in legislative alignment, overlapping institutional mandates, and enforcement consistency.

Therefore, the operational chain is institutionally complex as the Malaysia Marine Department, Malaysian Maritime Enforcement Agency, port authorities, the Department of Environment, state bodies, and private waste contractors each have partial roles. Such complexity is not unusual in port governance, but it becomes risky when no single mechanism integrates the whole chain. This is because each actor may perform a narrow duty while the overall system remains weak.

This is where engineering judgement is needed, as a PRF reform programme must define the system boundary. It must identify who owns the waste data, who verifies delivery, who inspects non-compliance, who approves treatment, who pays, and who reports performance. Without such clarity, the facility may exist but the system remains difficult to audit.

A critical success factor assessment of Malaysian PRF governance has identified nine factors which determine whether PRF reform can be delivered effectively. The assessment combines documentary evidence from international PRF guidance, comparative studies and Malaysian maritime governance literature with expert input from 10 specialist respondents representing implementation, port authority, regulatory, and maritime policy perspectives.

The highest-ranked factor was regulatory harmonisation, with a priority weight of 20%. This is significant because it shows that the first reform question is not whether to buy more equipment, build more facilities or appoint more contractors. Rather, it is whether the statutory framework is coherent enough to make PRF obligations enforceable and consistent across ports, agencies, and waste streams.

The second factor is the economic and pricing mechanism, weighted at 17.78%. This reflects a practical truth where, if lawful waste delivery is made costly, unclear or inconvenient, the system creates a behavioural disincentive. International experience has shown that indirect charging through port dues can encourage facility use by reducing the marginal cost of disposal. Malaysia therefore needs a transparent tariff philosophy that finances PRF services without punishing compliance.

The third factor is institutional integration, weighted at 15.56%, which means PRF reform is fundamentally about coordination. Port authorities, marine regulators, enforcement agencies, environmental regulators, waste transporters, and treatment facilities must work as one chain. Without a lead authority or formal inter-agency mechanism, PRF governance risks becoming everyone's responsibility but nobody's system. Other prioritised success factors for PRF governance reform are summarised in Table 1.

The three highest factors account for 53.34% of the total priority weight and they form the governance foundation. Enforcement capability, jurisdictional clarity, and facility adequacy form a second tier of implementation enablers. On the other hand, operational coordination, traceability, and sustainability integration form a third tier of performance and outcome support. This hierarchy carries a powerful reform message as the work performed should be sequenced. Hence, a country should not digitise confusion, enforce ambiguity or expand facilities before the legal, financial, and institutional foundations are properly aligned.

Table 1: Prioritised success factors for PRF governance reform

Rank	Critical Success Factor	Weight	Reform Meaning
1	Regulatory harmonisation	20.00%	Align MARPOL, national law, port rules and enforcement powers
2	Economic and pricing mechanism	17.78%	Create tariffs that support, not discourage, lawful delivery
3	Institutional integration	15.56%	Coordinate agencies, ports and operators as one delivery system
4	Enforcement capability	13.33%	Inspect, verify, sanction and deter illegal discharge
5	Jurisdictional clarity	11.11%	Clarify authority across federal, state, port and environmental actors
6	PRF adequacy and accessibility	8.89%	Ensure facilities meet vessel needs without undue delay
7	Operational coordination	6.67%	Coordinate ships, agents, ports and contractors efficiently
8	Data transparency and traceability	4.44%	Trace waste from notification to final disposal
9	Sustainability integration	2.22%	Embed waste hierarchy, recycling and climate objectives



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The next question is what does project management add to this perspective? It is clear that project management does not replace port operations, but it helps reform the operating system. In PRF reform, project management contributes at least five practical disciplines.

1. It provides scope control as PRF reform must define exactly which waste streams, ports, agencies, contractors, reporting obligations, tariffs, and enforcement processes are included. Without scope control, reform becomes a collection of good intentions rather than a deliverable programme.
2. It provides stakeholder integration because PRF governance involves parties with different mandates and incentives. The port wants efficiency, the vessel wants quick turnaround, the regulator wants compliance, the contractor wants viable cost recovery, and the public expects environmental protection. Project governance is needed to align these interests around a measurable outcome.
3. It provides risk allocation since illegal discharge, false notification, untreated waste, poor contractor performance, vessel delay, and data loss are not isolated incidents. Instead, they are project risks which must be assigned to owners, controls, and response mechanisms. A PRF reform programme should therefore maintain a risk register, escalation process, and compliance dashboard.
4. It provides cost and incentive design since engineers often think of cost as budget, where in contrast, cost is also behaviour in PRF governance since the wrong fee structure may make non-compliance attractive while the right tariff structure can make compliance routine. This is not merely accounting as it is design of behaviour within an engineered system.
5. It provides performance measurement. So PRF reform should not be judged by meetings held or circulars issued but by utilisation, compliance, traceability, reduction in unidentified waste, inspection coverage, contractor compliance, and average vessel delay for waste delivery. These are the indicators that convert policy ambition into engineering accountability.

Therefore, the short-term agenda should focus on the governance foundation as Malaysia should harmonise PRF obligations across MARPOL annexes, environmental law, port authority duties, and scheduled-waste licencing. It should establish a national indirect tariff framework or equivalent pricing principle that removes disincentives for lawful delivery. It should also designate a lead PRF governance authority or formal inter-agency committee with responsibility for end-to-end coordination.

The medium-term agenda should translate this foundation into operational compliance, including a PRF compliance inspection protocol linked to port-state control, clearer federal-state and agency mandates, PRF adequacy assessments at major ports using IMO criteria, and standardised 24-hour advance notification procedures. These are practical controls that make the system more predictable for ships, agents, ports, and enforcement bodies.

Also, the long-term agenda should integrate traceability and sustainability. A national digital PRF platform should link pre-arrival notification, reception records, transport manifests, treatment certification, and final disposal documentation. Waste hierarchy principles, recycling incentives, and shipping decarbonisation objectives should also be embedded into PRF planning and tariff structures. This would move PRF governance from basic pollution control towards circular, transparent and climate-aligned port management.

The reform agenda should be measured through clear indicators, namely percentage of major ports covered by harmonised procedures, percentage of waste movements recorded digitally, PRF utilisation rate, compliance inspection rate, average delay for waste delivery, proportion of compliant waste contractors, and reduction in unidentified or untreated ship-generated waste streams. Engineers know that what is not measured is usually not managed. PRF reform should therefore be governed through outcomes, not announcements.

Therefore, for the engineering profession, PRF reform is more than a maritime waste issue, where instead it is a case study in how engineering practice is changing. Many national challenges are no longer purely technical. Flood mitigation, rail delivery, renewable energy, low-carbon cities, coastal protection, and digital infrastructure all require technical assets to work inside legal, financial, institutional, and social systems. The asset may be technically sound, but the outcome may still fail if governance is weak.

This is why engineers must be comfortable asking governance questions, such as who is accountable for the whole system, what incentives shape user behaviour, what data proves compliance, which agency owns the risk, and which indicator shows success. These questions do not dilute engineering; instead they strengthen it because public engineering projects exist to deliver societal outcomes, not merely physical outputs.

The PRF case also shows the need for interdisciplinary engineering leadership. Marine, civil, environmental, chemical, mechanical, digital and project management engineers each hold part of the solution. For example, marine and civil engineers understand the port interface, environmental engineers understand pollution pathways and treatment standards, chemical engineers understand hazardous residues, digital engineers enable traceability, and project managers integrate scope, stakeholders, risks, cost, and schedule. No single discipline can deliver the reform alone.

This is precisely where professional engineering leadership matters. Malaysia needs engineers who can connect infrastructure with governance intelligence, and technical compliance with public value. In a strategic maritime region, credible PRF governance strengthens Malaysia's position as a responsible maritime nation and supports cleaner, more competitive ports.

Therefore, it is crucial to highlight that disruption does not only arrive as technology, geopolitics, climate change or global trade shocks as it also exposes weaknesses that

already exist inside systems. PRFs show that infrastructure can appear complete while the delivery system remains unfinished. A facility may exist, a contractor may be appointed and a regulation may be in place, yet pollution-prevention outcomes may still fall short if the reform has not integrated law, incentives, institutions and data.

Engineering through disruption therefore requires a sharper professional mindset, where engineers must ask whether system boundaries are clear, whether mandates are aligned, whether incentives encourage the desired behaviour, whether institutions can act together, whether data can prove compliance, and whether outcomes remain robust under pressure. These may sound like management questions, but they are also engineering questions because they determine whether engineered systems actually serve society.

Managing Port Reception Facility reform in a volatile maritime world is therefore not about calling port operations a project but instead it is about recognising that resilient port operations depend on disciplined reform delivery. The future engineer will not only design assets, but will also integrate rules, risks, incentives, institutions, data, and public value. That is the engineering challenge behind PRF reform and it is exactly the kind of thinking required when the world becomes more volatile, not less. ■

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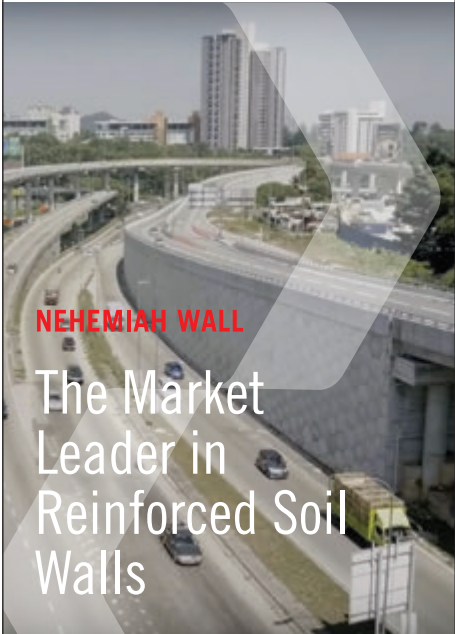
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Engineering Amid Disruption: Integrity & Governance as the New Pillars of Project Success

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Engineering has always been central to economic development and societal progress. Nevertheless, today's engineering projects are being delivered in an environment characterised by continuous disruption, caused by geopolitical uncertainty, climate change, rapid technological advances, cybersecurity threats, evolving regulations, and heightened stakeholders' expectations.

While technical excellence and effective project management remain essential, these are no longer sufficient to ensure project success. Increasingly, successful projects depend on the quality of engineering decisions, the integrity of those who make them, and the governance systems which guide organisational actions. This article argues that integrity and governance have become strategic capabilities which strengthen resilience, reinforce public trust, and enable engineering organisations to deliver sustainable outcomes amid an increasingly volatile and complex operating environment.

Amid Continuous Disruption

Engineering has never been more technologically advanced and yet, engineering projects have never faced greater uncertainty. Across the globe, projects are increasingly influenced by interconnected forces that are fundamentally reshaping how engineering projects are planned, delivered, and managed.

The profession has traditionally relied on structured planning and disciplined control of cost, schedule, scope, and quality. While these fundamentals remain essential, they are no longer sufficient to ensure project success. Today's projects operate in a dynamic environment where risks emerge rapidly, assumptions change unexpectedly, and engineering decisions carry significant technical, commercial, environmental, and societal implications.

Digitalisation has further increased project complexity, where AI is transforming engineering design, construction planning, predictive maintenance, and asset management, while connected infrastructure has introduced new cybersecurity challenges. At the same time, Environmental, Social and Governance (ESG) expectations and greater public scrutiny demand higher standards of transparency and accountability.



Therefore, engineers must do more than deliver technically-sound solutions. They are expected to lead multidisciplinary teams, manage uncertainty, balance stakeholder interests, and make decisions that safeguard the public interest. In this environment, project success depends on not only technical competence but also on the integration of integrity, governance, and organisational resilience throughout the project life-cycle.

Redefining Project Success

For decades, engineering projects have been measured against the Iron Triangle of project management by delivering the agreed scope on time, within budget, and to the required quality standards. These measures remain fundamental because they reflect effective planning, execution, and control. Yet, in today's complex and rapidly changing environment, they no longer provide a complete measure of project success.

Experience has shown that projects can satisfy technical and contractual requirements and yet still fail to deliver lasting value. Governance failures, ethical lapses, weak risk oversight, inadequate stakeholders' engagement, and loss of public confidence have undermined many technically-successful projects, resulting in reputational damage, legal disputes, regulatory intervention, and diminished public trust.

Project success must therefore be viewed more holistically, where beyond technical performance, engineering projects should demonstrate responsible governance, ethical decision-making, effective risk management, sustainability, and accountability to stakeholders. Increasingly, clients, investors, regulators, and communities expect projects to create long-term economic, environmental, and social value.

This broader perspective recognises that successful engineering depends on not only technical excellence but also on the quality of decisions throughout the project life-cycle. Cost, time, quality, and scope remain essential, but they must now be complemented by integrity and governance to achieve resilient organisations, trusted engineering practices, and sustainable project outcomes.

Integrity as the Foundation of Engineering

Engineering is a profession founded on public trust as every engineering decision, from planning and design to construction, operation, and maintenance, affects public safety, environmental sustainability, economic development, and societal well-being. While technical competence enables engineers to solve complex problems, integrity ensures that these solutions are delivered ethically, responsibly, and in the public interest.

Integrity extends far beyond preventing corruption or complying with professional codes. It is the consistent application of honesty, accountability, transparency, fairness, and sound professional judgement. Engineers must base decisions on evidence, uphold technical standards despite commercial or political pressures, declare conflicts of interest, and communicate risks openly, even when doing so is difficult.

In today's disrupted environment, these responsibilities are more critical than ever. Compressed schedules, constrained budgets, rapid technological change, and competing stakeholders' interests can create pressure to compromise standards or overlook emerging risks. Integrity provides the discipline to resist such pressures, ensuring that decisions prioritise safety, quality, and long-term public value over short-term expediency.

This is where the Board of Engineers Malaysia's (BEM) Code of Professional Conduct and The Institution of Engineers Malaysia's (IEM) Code of Ethics reinforce these obligations by requiring engineers to place the safety, health, welfare, and interests of the public above all other considerations.



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Ultimately, integrity is not merely an individual virtue but an organisational capability. Engineering organisations which embed integrity into their culture, strengthen stakeholders' confidence, improve decision-making, and reduce the risk of project failure. In an era of continuous disruption, integrity remains the foundation of engineering excellence and sustainable project success.

Governance as a Strategic Capability

If integrity is the foundation of professional engineering, governance is the organisational framework which translates integrity into consistent action. Integrity shapes individual behaviour, while governance shapes organisational behaviour. Together, they enable engineering organisations to make sound decisions, manage uncertainty, and deliver projects that create sustainable value.

Governance is often perceived as policies, procedures, or compliance requirements. In reality, it is a strategic capability that guides decision-making, manages risk, and ensures accountability. ISO 37000:2021 defines governance as the framework through which organisations achieve their purpose by balancing performance, ethical conduct, accountability, and stakeholders' expectations.

The distinction between compliance and governance is equally important. Compliance questions whether rules have been followed, while governance questions whether the right decisions are being made for the right reasons. Compliance establishes the minimum acceptable standard, whereas governance drives organisational excellence.

Ultimately, governance institutionalises integrity. It transforms ethical behaviour from an individual responsibility into an organisational capability that strengthens resilience, improves decision-making, and delivers sustainable engineering outcomes amid continuous disruption.

Emerging Risks in Engineering: Governance in Age of Complexity

Rapid technological and societal change is reshaping engineering practice. Artificial intelligence (AI), digital engineering, connected infrastructure, cybersecurity threats, ESG expectations, and increasingly complex global supply chains are transforming how engineering projects are planned, delivered, and managed. While these developments create new opportunities, they also introduce risks which cannot be addressed through technical solutions alone.

Engineering projects today are more interconnected and subjected to greater stakeholder's scrutiny than ever before. Decisions made during design, procurement, construction, and operations can have significant technical, financial, environmental, and reputational consequences. As technology advances, governance must evolve to ensure that innovation is supported by accountability, transparency, and sound professional judgement.

AI illustrates this challenge, where applications such as design optimisation, predictive maintenance, digital twins, and project analytics can enhance productivity and

decision-making. However, they also raise concerns about accountability, transparency, intellectual property, and the validation of AI-generated recommendations. Regardless of technological advances, professional engineers remain responsible for engineering decisions, making human oversight and ethical AI governance essential.

Digitalisation has also made cybersecurity an engineering concern. Modern infrastructure relies on interconnected systems where failure or compromise can affect safety, reliability, and operational resilience. Similarly, ESG expectations now influence investment decisions, regulatory approvals, and public confidence, requiring engineering organisations to balance technical performance with environmental and social responsibility. Supply chain disruptions further highlight the need for stronger due diligence, contractor oversight, and third-party risk management.

In engineering, governance extends beyond boardroom oversight. It encompasses leadership, organisational culture, risk management, project assurance, internal controls, and performance monitoring. Embedded throughout the project life-cycle, governance helps ensure that engineering decisions are technically sound, ethically responsible, and aligned with organisational objectives. It also promotes transparency, strengthens stakeholder's confidence, and enables organisations to respond effectively to changing circumstances.

Governance should not be viewed as bureaucracy which delays decisions. On the contrary, organisations with mature governance often make better and faster decisions because responsibilities are clearly defined, information flows efficiently, and risks are identified early. Effective governance therefore enhances organisational agility while maintaining accountability and public trust.



Although these risks differ in nature, they share a common requirement: Robust governance. Technology cannot replace professional judgement or resolve ethical dilemmas. Engineering resilience depends on organisations integrating technological capability with integrity, adaptive governance, and effective risk management. Those that do will be better positioned to deliver projects that are resilient, sustainable, and worthy of public trust.

Five Pillars of Modern Engineering Project Success

The preceding discussion has shown that engineering projects are increasingly shaped by uncertainty, technological disruption, evolving stakeholders' expectations, and interconnected risks. While the traditional measures of project success, namely cost, time, scope, and quality, remain fundamental, they no longer provide a complete assessment of project performance.

To address this challenge, the Five Pillars of Modern Engineering Project Success framework has been proposed. The framework recognises that sustainable project success depends on not only technical delivery but also on the organisational capabilities which support sound decision-making, ethical leadership, and resilience. Together, these five pillars provide a practical framework for engineering organisations operating in an increasingly volatile environment.

1. The first pillar is technical excellence which remains the cornerstone of engineering practice, where projects must continue to satisfy recognised engineering standards for safety, functionality, reliability, and quality. Beyond technical competence, engineers must embrace innovation, systems thinking, digital technologies, and continuous improvement to meet evolving societal and industry needs.
2. The second pillar is project management excellence which transforms engineering concepts into successful outcomes. Effective planning, scheduling, budgeting, procurement, communication, stakeholders' engagement, quality management, and risk management remain essential. Increasingly, project managers must also demonstrate agility, adaptability, and leadership to deliver projects successfully in dynamic and uncertain environments.
3. Integrity is the third pillar which underpins every engineering decision, which requires honesty, accountability, transparency, fairness, and independent professional judgement. By promoting ethical decision-making, objective procurement, and responsible stewardship of resources, integrity strengthens public trust and protects the credibility of the engineering profession.
4. The fourth pillar is governance which transforms individual integrity into organisational capability. Through effective leadership, accountability, risk management, project assurance, and transparent decision-making, governance enables organisations to respond confidently to uncertainty while maintaining

stakeholders' confidence. Rather than constraining innovation, good governance supports informed and timely decisions.

5. The last pillar is organisational resilience. In an era of continuous disruption, organisations must anticipate change, adapt to emerging risks, recover from unforeseen events, and continuously improve. Organisational resilience integrates enterprise risk management, business continuity, cybersecurity, supply chain resilience, and organisational learning to ensure long-term operational sustainability.

The five pillars are mutually reinforcing and should not be viewed in isolation. Technical excellence and project management excellence provide the foundation for successful project delivery, while integrity and governance ensure engineering decisions remain ethical, transparent, and accountable. Organisational resilience enables engineering organisations to adapt and thrive despite uncertainty.

Leading with Integrity

Integrity and governance are realised through leadership. In engineering organisations, leaders shape not only strategic direction but also the values, behaviours, and decision-making culture that influence project outcomes. In an era of continuous disruption, leadership is no longer about managing change alone as it is also about leading with integrity.

Engineering leaders must make decisions amid technical uncertainty, commercial pressures, regulatory requirements, and diverse stakeholders' expectations. Technical expertise, while essential, must be complemented by sound judgement, ethical courage, and accountability. Decisions should consistently uphold public interest while supporting long-term organisational sustainability.

This begins with establishing the "tone at the top", where leaders who demonstrate honesty, transparency, fairness and professionalism, foster a culture in which integrity becomes embedded throughout the organisation. Equally important is creating an environment where engineers are encouraged to exercise independent professional judgement and raise concerns without fear of reprisal. Open communication and psychological safety enable risks to be identified and addressed before they escalate into major failures.

Leading with integrity also means embedding ethical principles into procurement, contractor management, digital transformation, cybersecurity, environmental stewardship, and stakeholder engagement. Organisations which promote continuous learning, accountability, and ethical reflection are better equipped to adapt to change and strengthen resilience.

Ultimately, engineering excellence is measured by not only the infrastructure delivered but also by the quality of the decisions behind it. Leaders who consistently act with integrity, build organisations that are trusted, resilient, and capable of delivering sustainable value in an increasingly complex world.



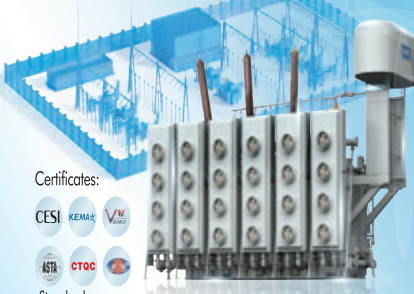
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Conclusion

Engineering has always been a profession founded on public trust. While technical competence remains fundamental, today's engineering environment demands far more. Continuous disruption, driven by technological advances, geopolitical uncertainty, climate change, cybersecurity threats, and evolving stakeholders' expectations, requires engineers to make decisions which are not only technically sound but also ethical, transparent, and accountable.

The Five Pillars of Modern Engineering Project Success proposed in this article provide a practical framework for responding to this new reality. By integrating technical excellence, project management excellence, integrity, governance, and organisational resilience, engineering organisations can strengthen decision-making, enhance stakeholder confidence, and deliver sustainable value. Rather than replacing the traditional measures of project performance, these pillars reinforce them by addressing the challenges of an increasingly complex operating environment.

For engineers and engineering organisations alike, integrity and governance should no longer be viewed as compliance obligations but as strategic capabilities which underpin resilience, innovation, and long-term success. Embedding these principles into leadership, organisational culture, and project delivery will strengthen public confidence and improve the profession's ability to respond to future challenges.

Ultimately, engineering the future is not only about developing innovative solutions but also about ensuring they are delivered responsibly. By leading with integrity and governing with purpose, engineers will continue to create lasting value for society. ■

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Leading Through Change: A Young Engineer's Perspective on Project Management



by:

**Mr. Muhammad Ashiq Marecan
Hamid Marecan**

The engineering profession is changing faster than ever before. Today's projects are becoming increasingly complex due to rapid technological advancements, evolving client expectations, sustainability goals, and global uncertainties. As highlighted by this year's PMTD theme, Engineering Through Disruption: Project Management in a Volatile World, the ability to adapt has become just as important as technical expertise.

For young engineers, this changing environment presents both challenges and opportunities. While technical knowledge remains the foundation of engineering, it is no longer the only factor that determines success. Young engineers are now expected to communicate effectively, manage risks, collaborate with multidisciplinary teams, and contribute to project decisions from the early stages.

In general, project management is often misunderstood as simply preparing schedules, monitoring budgets, or tracking project progress. In reality, it is about bringing together people, processes, and technology to achieve a common goal, where every project involves change and where every change introduces uncertainty. This is where project management plays a critical role.

It is important for young engineers working in project delivery to learn that not everything goes according to plan. Design changes, resource limitations, unexpected site conditions, and changes in client requirements can occur at any stage of a project. While these situations may seem challenging, they also provide valuable learning experiences.

One of the most important lessons is the importance of adaptability. Engineers who are willing to learn, embrace new technologies, and adjust to changing circumstances are better prepared to overcome project challenges. Rather than viewing disruption as a setback, it should be seen as an opportunity to improve processes, introduce innovation, and create better project outcomes.

Technology is also transforming the way projects are managed. Digital tools such as Building Information Modelling (BIM), Artificial Intelligence (AI), cloud-based collaboration platforms, and data analytics are helping project teams work more efficiently and make better decisions. These technologies reduce repetitive tasks and improve communication, allowing engineers to focus on solving complex problems.

Yet, technology alone cannot guarantee project success; successful projects still depend on people. Good communication, teamwork, leadership, and mutual trust remain essential. Even with the best digital tools available,

projects can still fail if stakeholders are not aligned or if communication breaks down.

On the other hand, another important quality for young engineers is continuous learning. Engineering standards, project delivery methods, and digital technologies continue to evolve. Those who actively seek new knowledge and develop new skills will be better prepared for future challenges. Learning should not stop after graduation; instead, it should become part of every engineer's professional journey.

Looking ahead, the role of young engineers will continue to expand beyond technical responsibilities. They will be expected to contribute ideas, lead teams, manage stakeholders, and support strategic project decisions. Project management provides the platform to develop these capabilities while creating value for clients, organisations, and society.

Ultimately, disruption should not be viewed as something to fear. Every challenge creates an opportunity to improve, innovate, and grow. By combining strong technical knowledge with project management skills, adaptability, and a willingness to learn, young engineers can become future leaders who are capable of delivering successful projects in an increasingly dynamic world.

Engineers are not only building infrastructure but are also building resilient communities, sustainable developments, and a better future. The sooner young engineers embrace this mindset, the better prepared they will be to lead projects through whatever challenges lie ahead. ■

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Navigating The Complexities of Heritage Restoration

by:



Mr. Ibrahim Khader
Bani Khaled



Dr. Khairul Zahreen
Mohd Arof

Reconstituting Istana Lama Seri Menanti combines heritage conservation with complex project management. Its traditional architectural elements introduce implementation risks and require specialised maintenance procedures. The four-storey timber structure is not only an architectural masterpiece as it also presents significant management challenges due to hidden works and high uncertainty^{3,8}. This duality necessitates a shift from conventional construction approaches to specialised heritage management frameworks.

Craftsmanship as a Delivery Risk

The nail-free timber joint system poses risks in procurement and quality control. Managing such specialised construction requires skilled craftsmanship, which is increasingly scarce, making labour availability a critical factor in project scheduling⁷. Proper dismantling and reassembly demand detailed documentation and sequential marking to maintain structural integrity⁵. Thus, craftsmanship management becomes a key risk mitigation strategy in the restoration life-cycle.



Vernacular Design as Sustainable Strategy

From a performance-based design perspective, the palace demonstrates climate-responsive features such as elevated floors and steep roofs which promote passive cooling, aligning with sustainable design principles¹. However, restoration efforts often lack quantitative thermal performance data. The integration of Historic Building Information Modelling (HBIM) and terrestrial laser scanning (TLS) can address this gap by enabling simulation and evaluation of these traditional systems^{4,2}.



preserving traditional craftsmanship practices such as the Roma Tokang³. A participatory approach ensures restoration efforts respect both cultural authenticity and community expectations¹.

Stakeholder & Identity Management

The palace reflects a hybrid identity influenced by Minangkabau and Negeri Sembilan traditions, making stakeholder alignment and regulatory compliance essential. Conservation must adhere to the National Heritage Act 2005 while

Research Gaps & Managerial Implications

Gaps remain in applying standardised risk management frameworks for Malaysian timber heritage. Studies highlight recurring maintenance failures, emphasising the need to shift from reactive repairs to life-cycle-based management^{7,6}. The absence of codified maintenance standards for nail-free timber structures continues to contribute to post-restoration cost overruns.

Conclusion

The conservation of Istana Lama Seri Menanti extends beyond architectural restoration into complex project management. Sustainable outcomes depend on advanced risk mitigation, life-cycle maintenance strategies, and digital tools such as HBIM. Addressing skill shortages and standardising management practices will enhance delivery while preserving Malaysia's cultural identity. Future research should explore the economic value of traditional passive design systems in sustainable development. ■

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Driving Engineering Excellence Through Quality Systems

Quality is the degree of excellence, superiority, or conformance to the requirements of a product, service, or process. In engineering environments, excellence is strongly influenced by the effectiveness of quality practices. Engineering excellence is commonly associated with technical mastery, innovation, and reliability.

However, sustaining such excellence requires a structured management framework which integrates quality principles into every engineering decision. Most industries utilise International Organisation for Standardisation ISO 9001, the globally recognised Quality Management System (QMS) standard, to provide that foundation. This article discusses the relationship between quality improvement and engineering excellence, illustrating how they influence one another.

Engineering Excellence Gives Purpose to Quality Systems

Engineers design products and systems in accordance with client requirements, regulatory compliance and, most importantly, the ability to deliver the intended outcome or solution. In addition, engineers must consider other critical factors such as efficiency, reliability, cost-effectiveness, sustainability, and innovation. Collectively, these elements define engineering excellence.

In other words, engineers establish the technical parameters and performance expectations for the quality system, while the quality team serves as the eyes and ears of engineering by monitoring compliance, identifying gaps, and ensuring standards are consistently achieved. Without engineering excellence, quality systems can become merely administrative

by:



Ir. Teo Eu Jin

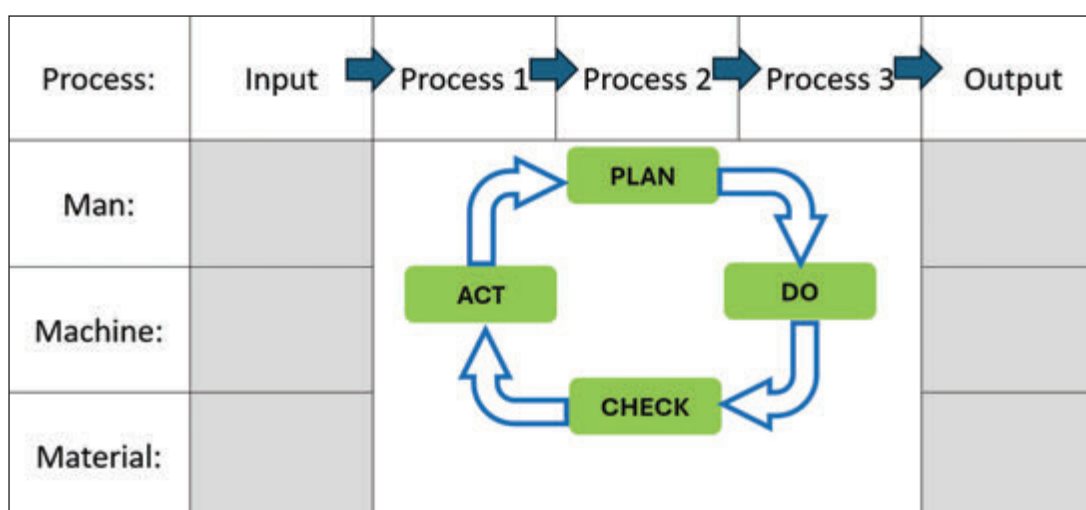


Mr. Ahmad Nazmi
Abd Rahman

paperwork. Effective quality processes should support technical excellence, not bureaucracy.

Quality Improvement Builds Engineering Excellence

Generally, quality management can be divided into Quality Assurance (QA) and Quality Control (QC). QA is a proactive process focused on establishing systems, procedures, checklists, and preventive measures to avoid defects. On the other hand, QC is a reactive process involving inspection and testing activities to identify defects or nonconformities. Both play vital roles within an effective quality system.



Process Improvement / Failure Identification Concept via Typical PDCA cycle

Note:

- Plan – Set the goal (opportunity / issue), collect data, and formulate a strategy.
- Do – Implement the plan (small scale prototype, not yet full-scale deployment).
- Check – Examine the result and compare the outcome with the predictive goal.
- Act – Full-scale deployment (if successful) or re-adjust the plan and repeat the cycle to attain the predictive goal (if unsuccessful).

Remark: The PDCA cycle can be repeated multiple times as part of continual improvement at different stages of the processes and on various aspect such as Man, Machine, and Material.



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Moreover, quality improvement emphasises the reduction of defects, variation, waste, and rework. When applied in engineering environments, it can lead to improved design accuracy, higher construction, and fabrication precision, enhanced product integrity, stronger compliance with applicable codes and standards, fewer failures during commissioning or operation, and higher client satisfaction.

Conclusion

Quality improvement is one of the key foundations of engineering excellence. A well-implemented quality management system such as ISO 9001 can serve as a catalyst for achieving engineering excellence. By embedding leadership, risk-based thinking, process integration, and continual improvement into daily engineering practices, organisations cultivate a culture in which technical integrity and quality coexist.

Ultimately, engineering excellence is achieved not by chance, but by design guided through structured discipline. In addition, quality audits, surveillance activities, and subsequent management reviews help organisations close identified gaps, strengthen systems and processes, and drive engineering excellence across multiple disciplines. ■

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Career Talk at Sekolah Sri Aman: Inspiring The Next Generation of Engineers



by:
Ir. Chia Ying Sim

“Why be content with just hoping for a better world when you can build one?” This simple yet powerful question set the tone for an inspiring career talk on a bright Friday morning which invited students to see engineering as not merely a profession but also as a pathway to shape lives, communities and the built environment around them.

On 14 August 2026, Sekolah Menengah Kebangsaan (P) Sri Aman held its annual Program Explorasi Kerjaya, aimed at exposing students to diverse career pathways and helping them understand the possibilities available beyond the classroom. It offered the students a valuable opportunity to hear first-hand from working professionals, to gain a clearer view of different industries, and to ask questions about the realities of various career choices.

During the 9.30 a.m. session, career talks were held across several fields, including engineering, medicine, dentistry, and law. In one classroom, around 40 female students gathered, curious to discover more about the world of engineering, a field where ideas, analysis, and innovation come together to solve real-world challenges.

Representing the IEM Women Engineers Section (IEM WE), Ir. Chia Ying Sim, a Senior Engineer at Arup Jururunding Sdn. Bhd., talked about her experiences as a practising civil and structural engineer. By sharing her personal journey towards becoming

a Professional Engineer with Practising Certificate (PEPC), she spoke about the choices, motivations, and milestones which led her to engineering, beginning with her decision to pursue engineering at university.

The students’ interest grew as Ir. Chia shared examples from her past projects, demonstrating the unique role engineers play in transforming concepts, calculations and drawings into physical spaces to serve society. One project in particular — a mixed-use development located just a stone’s throw from the school — made the message particularly relatable. It showed the students that engineering was not a distant or abstract profession, but one that quietly shaped the places they saw, used and moved through every day.



Ir. Chia sharing her career path with students of SMK (P) Sri Aman



Representatives from SMK (P) Sri Aman’s PIBG, Kol (Dr.) Siti Salmiah Awang (left) and Ms. Azizan (right) with Ir. Chia

Throughout the session, the students were encouraged to reflect on what engineering meant and what engineers did. They learnt that engineering was not only about formulas and calculations, but also about solving problems, serving the community and being responsible for the work we did. Most importantly, they were reminded that they too could become engineers who would make a positive difference in the world.

Drawing from her experiences in the building construction industry, Ir. Chia introduced the students to various engineering sectors and highlighted that these disciplines were often interconnected. Whether it was civil, structural, mechanical, electrical or environmental engineering, engineers frequently worked together to deliver safe, functional, sustainable and resilient solutions.

At the end of the presentation, the students learnt about the pathway to becoming a Graduate Engineer, from choosing an accredited engineering degree to registering with the Board of Engineers Malaysia (BEM). Ir. Chia also introduced the BEM as the statutory body for the engineering profession and The Institution of Engineers, Malaysia (IEM) as a learned society that supported professional development. She also told them that IEM WE provided encouragement, visibility and support for women pursuing careers in engineering.

The Q&A session revealed the students' genuine curiosity about the profession. Their questions touched on practical and important topics such as work-life balance, salary expectations and the challenges faced by women in a traditionally male-dominated field. These questions reflected not only their interest in engineering, but also their awareness of the realities and considerations involved in choosing a future career.

To conclude, Ir. Chia stressed on the importance of women in engineering and told the students that they should not be discouraged by perceptions that engineering was challenging or male-dominated. Instead, she urged them to remain curious, courageous and determined, to take the road less travelled, to carve their own paths, and to open doors for future generations of girls who may one day see themselves as engineers too. ■



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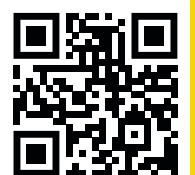
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Igniting STEM Curiosity Among Japanese Students



by:
Ir. Zainon Sharmila
Shamsuddin

The Engineering Education Technical Division (E2TD) of The Institution of Engineers Malaysia (IEM) and the School of Engineering, University of Wollongong Malaysia (UOW Malaysia), held a STEM Mobility Workshop for 120 visiting students from Yotsuba High School, Japan, on 14 July 2026 at the School of Engineering, UOW Malaysia.



Students from Yotsuba High School, Japan, at the welcome and safety briefing conducted by facilitators from E2TD and UOW Malaysia

The programme was aimed at enhancing the students' understanding of Science, Technology, Engineering, and Mathematics (STEM) through engaging, hands-on learning activities as well as promoting creativity, teamwork, critical thinking, and problem-solving. It also provided the students with the opportunity to experience STEM teaching approaches at UOW Malaysia and helped inspire them to explore engineering and technology-related fields.

The workshop began at 9.00 a.m. with a welcome and safety briefing before the participants were divided into three groups of 40 students each. Each group rotated through three interactive STEM stations facilitated by members of the Engineering Education Technical Division and facilitators from the School of Engineering, UOW Malaysia.

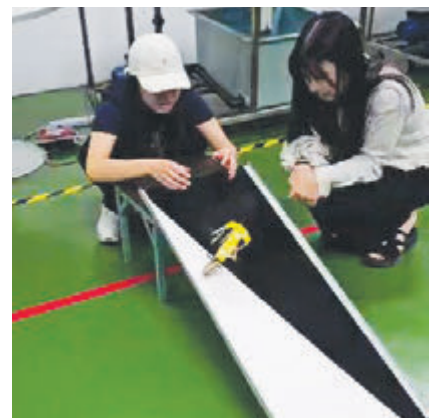
At Station 1, students participated in interactive engineering challenges which encouraged logical thinking, collaboration, and creativity. At Station 2, participants designed, constructed, and tested model vehicles in a hands-on engineering activity that demonstrated engineering design principles. At Station 3, students completed a STEM clue-hunting challenge consisting of four interactive games which tested their problem-solving, observation, communication, and teamwork skills.

Throughout the three-hour workshop, the students showed great enthusiasm and actively participated in every task. The interactive learning environment enabled them to gain practical exposure to engineering concepts while developing communication, teamwork, and analytical skills.



Students participating in the interactive engineering challenges at Station 1

The programme successfully achieved its objective to promote STEM education through experiential learning. The collaboration between E2TD and the School of Engineering, UOW Malaysia demonstrated a shared commitment to inspire future generations through meaningful and engaging STEM education initiatives. The event ended at 12.30 p.m. ■



Students designing, constructing, and testing their model vehicles at Station 2



Students completing the STEM clue-hunting challenge at Station 3

IEM Celebrates Naming of Persiaran Chin Fung Kee



by:
Ir. Paul Phor Chi Wei

On 30 April 2026, IEM celebrated a historical milestone with the official naming of Persiaran Chin Fung Kee at The Light City, Penang, in honour of the late Tan Sri Ir. Prof. Chin Fung Kee, one of Malaysia's most respected engineering pioneers and a former President of IEM.

More than the naming of a road, the occasion also represented a lasting tribute to an engineer whose vision, leadership and technical excellence helped shape the country's engineering landscape. The recognition marked the successful conclusion of a journey spanning over 15 years.

Since 2010, IEM Penang Branch had continuously pursued the proposal to honour Tan Sri Ir. Prof. Chin Fung Kee with the naming of a public road. Through the commitment of successive Branch Chairmen, Council Members and volunteers, the proposal eventually received the approval of the Penang State Government. The official naming of an 800m stretch of road, therefore, represented both recognition of an outstanding individual and IEM's commitment to preserving the legacy of our engineering pioneers.

The ceremony was officiated by Y.A.B. Chow Kon Yeow, Chief Minister of Penang, together with Y.B. Zairil Khir Johari, Penang State Executive Councillor for Infrastructure, Transport & Digital. Also present were IEM President Ir. Yau Chau Fong, IEM Penang Branch Chairman Ir. Lee Choo Yong, members of the IEM Council, representatives of IEM Penang Branch,



The official unveiling of Persiaran Chin Fung Kee at The Light Waterfront, Glugor, Penang, to commemorate the legacy of the late Tan Sri Ir. Prof. Chin Fung Kee

government agencies and invited guests from the engineering profession. Their presence reflected the strong partnership between the engineering profession and the state government in recognising individuals whose contributions have made a lasting impact on society.

The location of Persiaran Chin Fung Kee is particularly meaningful. Situated within The Light Waterfront development, the road overlooks the iconic first Penang Bridge, one of Malaysia's most recognisable engineering landmarks. The setting provides a symbolic connection to Tan Sri Ir. Prof. Chin Fung Kee's contribution to the bridge project and his lifelong dedication to infrastructure development. It serves as a reminder of how engineering can transform communities and contribute to national progress.

Tan Sri Ir. Prof. Chin Fung Kee was widely recognised as one of Malaysia's foremost civil engineers, with expertise spanning geotechnical, structural and hydraulic engineering. His contributions extended beyond engineering design to infrastructure



Members of IEM and guests gather at Persiaran Chin Fung Kee following the official road-naming ceremony



Ceremony was officiated by Y.A.B. Chow Kon Yeow, the Chief Minister of Penang

development, engineering education, research and professional leadership. Throughout his career, he demonstrated a commitment to technical excellence and helped establish standards that continue to influence engineering practice.

Among his many achievements was a pivotal role in the planning and construction of the first Penang Bridge, which transformed transportation and economic connectivity between the island and the mainland. He also contributed to the foundation work of KOMTAR, one of Penang's most prominent landmarks. In academia, he was instrumental in establishing and developing the Faculty of Engineering at Universiti Malaya, helping to educate generations of engineers who contributed to our country's development.

His influence also extended internationally through the development of "Chin's Method", a geotechnical method for predicting the ultimate load-bearing capacity of piles from static pile load test results without requiring the pile to be loaded to failure. His research demonstrated the ability of Malaysian engineering expertise to contribute solutions of international significance.

Born in 1923, Tan Sri Ir. Prof. Chin Fung Kee received his early education at Bukit Mertajam High School before continuing at Raffles College, Singapore. He subsequently obtained his bachelor's and master's degrees in civil engineering from Queen's University Belfast, United Kingdom. From 1966 to 1968, he served as the fourth President of The Institution of Engineers, Malaysia, where he

championed professional standards and continuous development within the engineering community. His achievements earned him numerous national and international honours, including recognition as an Honorary Fellow of the Institution of Civil Engineers, United Kingdom.

The decision by the Penang State Executive Council on 25 February 2026 to rename the road represented more than a change of address. It acknowledged a lifetime of dedication to engineering and highlighted the important role engineers play in nation-building. Public recognition of engineering

pioneers can also help raise awareness of the profession and inspire young Malaysians to pursue careers in science, technology and engineering.

Today, Persiaran Chin Fung Kee stands as a lasting symbol of professional excellence, visionary leadership and service to the nation. More than a scenic coastal boulevard, it represents the enduring connection between Malaysia's engineering heritage and its future. Every journey along the road offers a reminder of an engineer whose contributions helped shape modern Malaysia.



IEM representatives and dignitaries commemorate the naming of Persiaran Chin Fung Kee

For IEM, the naming of Persiaran Chin Fung Kee is a meaningful milestone in preserving the legacy of one of the profession's distinguished pioneers. His contributions continue to inspire engineers, students and the wider community, while the road that now bears his name will ensure his remarkable legacy remains visible for generations to come. ■

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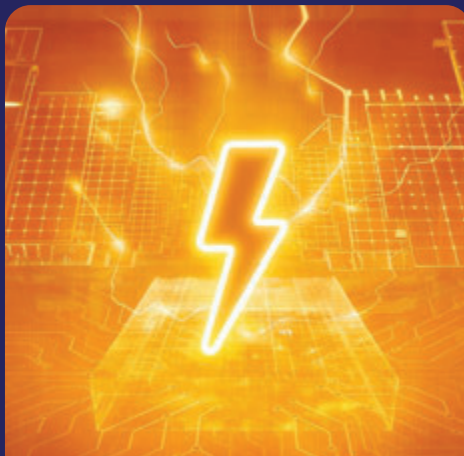
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Engineers and The Fear of Missing Out



by:

Ir. Dr. Harris Abd Rahman Sabri

Somewhere between a LinkedIn post announcing someone's third career pivot into AI and a WhatsApp group discussion about a "must-attend" webinar happening in 20 minutes, every engineer today feels a familiar tug. It does not announce itself loudly, yet it is quietly insinuating that *"everyone else seems to be moving faster than you"*. This phenomenon has given rise to a buzzword which is haunting some of our engineers nowadays: The Fear of Missing Out or FOMO. It has quietly crept into the engineering profession and it deserves an honest discussion among IEM members.

It is tempting to regard FOMO as a Gen Z phenomenon i.e. a side effect of growing up with a smartphone in hand. Nonetheless, if any senior engineer will speak honestly, they will likely admit to their own version of it, including the fear of being the last person in the office still drawing by hand while colleagues have moved on to CAD, of performing manual calculations instead of using Artificial Intelligence (AI) tools, the anxiety of not having attained a Professional Engineer status while a peer three years younger already has and of the nagging sense that not pursuing an MBA or an overseas posting means falling behind.

What has changed is not the emotion, but its intensity and speed as previous generations too have experienced FOMO at staff meetings and annual dinners. Today's engineers feel it every few minutes, through social media feeds designed to make comparisons effortless and continuous. Hence, it is important to address the elephant in the room where, broadly speaking, there are three manifestations of engineering FOMO surrounding the engineering community.

First is technology FOMO, where digital twins, AI-driven predictive maintenance, generative design and Industry 4.0 dashboards can make even a five-year-old skillset feel outdated. Young engineers scroll past demonstrations of tools they've never used and begin to wonder whether their engineering degrees have already reached the expiry date.

Second is career FOMO, where certifications, chartership, postgraduate studies, and career transitions into technology or sustainability that are showcased online can resemble a silent scoreboard. The question today is not "am I doing well?" but rather "am I doing as well as everyone else?"

Finally, there is belonging FOMO. This is when site engineers observe peers securing prestigious consultancy roles and consultancy engineers look with envy at those delivering headline mega-projects. Many find themselves believing that opportunities elsewhere are always better, even though the reality is often far less glamorous than it appears.

So why does FOMO matter in the engineering profession? If left unchecked, engineering FOMO can result in two dangerous outcomes. The first is burnout, with young engineers attempting to pursue every certification, tool and emerging trend without developing genuine depth in any of them. The second, and perhaps the more insidious, is the erosion of engineering judgement itself. Good engineering has always demanded patience by first understanding the principles, respecting site conditions and validating assumptions before taking action. Nevertheless, FOMO encourages engineers to skip essential steps, adopt tools and technology prematurely or pursue credentials without developing genuine competency. These are precisely the conditions that lead to design errors, safety lapses, and professional misconduct cases that the IEM's Disciplinary Committee encounters all too often.

An engineer who signs off on a design because "everyone is already using this AI tool" without independently verifying the results, has allowed FOMO to override professional responsibility. That is not a hypothetical risk, instead it illustrates where unmanaged anxiety can eventually lead.

The antidote is not to disengage from change as engineering has never rewarded stagnation but to replace anxious comparison with deliberate curiosity. A few practical steps can help, such as practising depth over breadth through mastering one emerging tool or domain thoroughly rather than sampling 10 superficially. Employers and clients trust demonstrated competence and that a conversation with a senior engineer who has experienced several technology cycles is worth more than speeding hours scrolling other people's career milestones.

This is where IEM's Technical Divisions, Young Engineers Section, and CPD programmes can help enable members to learn together rather than compete in isolation. Active engagement will transform FOMO into shared growth.

Finally, there is professional grounding, as the professional engineering status, CPD hours, and disciplined adherence to codes of practice are not just bureaucratic hurdles. Instead, they are the anchor that keeps engineering judgement steady while everything else evolves rapidly.

Gen Z engineers are entering a profession at its most exciting turning point where AI, digital twins, decarbonisation, smart infrastructure are all unfolding within the career, not after it. That is genuinely rare. However, the engineers who endure are seldom those who chase every emerging trend. Instead they are the ones who build unshakeable fundamentals and then apply new tools with judgement, not urgency. FOMO will always remain in the background of every notification. Yet the measure of a good engineer, whether Gen Z or otherwise, is not how fast one reacts to it but rather, how deliberately one chooses what is actually worth not missing. ■

Date: 22 August 2026

To all Members,

**LIST OF CANDIDATES ELIGIBLE TO SIT FOR
THE PROFESSIONAL INTERVIEW FOR THE YEAR 2026**

The following is a list of candidates who are eligible to sit for the Professional Interview for the year 2026.

According to the IEM Bylaws, Section 3.8, the names listed below are published as eligible candidates to become Institution Members, provided that they pass the Professional Interview in 2026.

If there are any Corporate Members who have objections against any candidate deemed unsuitable to sit for the Professional Interview, a letter of objection can be submitted to the Honorary Secretary, IEM. A letter of objection must be submitted within one month from the date of publication.

Ir. Alex Looi Tink Huey
IEM Honorary Secretary

NEW APPLICATION

NAME	QUALIFICATION
ELECTRICAL ENGINEERING	
SITI NUR AFISZAH BINTI ADNAN	BE HONS (UTM) (ELECTRICAL, 2010)
SITI ZUBAIDAH BINTI ZULKIFLI	BE HONS (UTM) (ELECTRICAL, 2017)

MECHANICAL ENGINEERING	
YAP SUN FU	BE HONS (MMU) (MECHANICAL, 2016)

APPLICATION FOR CORPORATE MEMBER

NAME	QUALIFICATION
AGRICULTURAL ENGINEERING	
SURESH A/L VAITHILINGAM	BE HONS (UPM) (AGRICULTURAL, 1996)

CIVIL ENGINEERING	
FAZRUN BIN ZAINI	BE HONS (USM) (CIVIL, 1999)
GAN HONG QING	BE HONS (INTI) (CIVIL, 2017)
MOHD SOBRIE BIN ABDUL HAN	BE HONS (UMS) (CIVIL, 2011)
OOI KHAI YAW	BE HONS (UTM) (CIVIL, 2002)
SHAHARUL AZRI BIN MOHD SAFEAI	BE HONS (UTM) (CIVIL, 2012)

MECHANICAL ENGINEERING	
LING YI XIN	BSc (YONSEI UNI.) (MECHANICAL, 2017)

MEMBER TRANSFER

M'SHIP NO.	NAME	QUALIFICATION
CHEMICAL ENGINEERING		
93916	CHIAH YOKE YI	BE HONS (UTP) (CHEMICAL, 2014) MSc (UTP) (CHEMICAL, 2017)

CIVIL ENGINEERING		
108174	KHOR HAI CHUAN	BE HONS (UPM) (CIVIL, 2003)
135479	LAI JIA YING, JULIA	BE HONS (SWINBURNE UNI. OF TECHNOLOGY) (CIVIL, 2017)
104309	LEE TZE YEI	BE HONS (THE UNI. OF NOTTINGHAM) (CIVIL, 2015) MSc (HERIOT-WATT) (CIVIL & CONSTRUCTION MANAGEMENT, 2017)
59282	NURUL FATYHAH BINTI BAHARUDDIN	BE HONS (UMP) (CIVIL, 2016)
49257	RAIMOND MIKI	BE HONS (USM) (CIVIL, 2004)
119961	WONG KHAI SEEN	BE HONS (UKM) (CIVIL, 2021)
90055	WU TUAN REN	BE HONS (UTAR) (CIVIL, 2016)

ELECTRICAL ENGINEERING		
95958	CHOO YERN SYN, CYNTHIA	BE HONS (UCSI) (ELECTRICAL & ELECTRONIC, 2016) ME (UNITEN) (ELECTRICAL, 2025)
114986	MOHAMAD HAZIQ SYAMEER BIN MOHD SHUHAIMI	BE HONS (UNITEN) (ELECTRICAL POWER, 2018)
63106	MUHD IZWAN IKHMAL BIN ROSLI	BE HONS (UTeM) (ELECTRICAL - CONTROL, INSTRUMENTATION & AUTOMATION, 2016)
96543	VASUDEVAN A/L NADARAJAN	BE HONS (UTeM) (ELECTRICAL, 2021)
35591	YEW WENG KEAN	BE HONS (UNITEN) (ELECTRICAL POWER, 2013) PhD (UNITEN) (2019)
121110	EIZZUDDIN BIN NAWAWI	BE HONS (UMP) (ELECTRICAL - ELECTRONICS, 2022)

ELECTRONIC ENGINEERING		
132781	NUR NADIA BINTI MUSLIM	BE HONS (UNIMAP) (COMMUNICATION, 2018) ME (UTM) (COMPUTER & MICROELECTRONIC, 2022)

MECHANICAL ENGINEERING		
127538	DINISH MUTU A/L KATHIRAVAN	BE HONS (UTP) (MECHANICAL, 2022)
76845	MUHAMAD SHAZARIZUL HAZIQ BIN MOHD SAMSURI	BE HONS (UTP) (MECHANICAL, 2017) ME (UNITEN) (MECHANICAL, 2022)
103010	WONG CHEE KHOON	BE HONS (USM) (MECHANICAL, 2007) MSc (USM) (MECHANICAL, 2012)

102612	LOO QAI WEI	BE HONS (UTeM) (MECHANICAL, 2022)
118455	LOW SAINT YOUNG	BE HONS (UPM) (MECHANICAL, 2002)
54259	OOI SHAO YIN	BE HONS (UNIMAS) (MECHANICAL & MANUFACTURING, 2011)

MECHATRONICS ENGINEERING		
53716	ANATI AQILAH BINTI ABDUL RAHMAN	BE HONS (IIUM) (MECHATRONICS, 2011)

TRANSFER TO CORPORATE MEMBER

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CHEMICAL ENGINEERING		
86898	AFFAN BIN RUSLAN	BE (MC MASTER UNI) (CHEMICAL, 2014)
47139	HII YIK MING	BE HONS (UNIMAS) (CHEMICAL, 2013)

CIVIL ENGINEERING		
84715	CHAN LI YANG	BE HONS (UM) (CIVIL, 2018)
24927	CHUNG CHING YING	BE HONS (THE QUEEN'S UNI. OF BELFAST) (CIVIL, 1999)
26752	HAWA BT ABU HASSAN NABAWI	BE HONS (UTM) (CIVIL, 2000)
108190	LENG YEE HUI	BE HONS (UMP) (CIVIL, 2018)
112841	TAN EE LENG	BE HONS (UNITEN) (CIVIL, 2012)
49785	VIMAL A/L RATHAKRISHNAN	BE HONS (UNITEN) (CIVIL, 2014)

ELECTRICAL ENGINEERING		
79021	KOK SIEN EE	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2009)
114773	LIEW YEW SHENG	BE HONS (UNI. OF SUNDERLAND, 2010)
87625	WONG YEW HUNG, JULIE	BE HONS (CURTIN UNI. OF TECH) (ELECTRICAL, 2006)

MECHANICAL ENGINEERING		
118141	DASHVINDER SINGH A/L DALGIT SINGH	BSc (LEHIGH UNI.) (MECHANICAL, 2014)
45105	LAU KAI REN	ME HONS (THE UNI. OF NOTTINGHAM) (MECHANICAL, 2013)
89538	SIOH PING CHUAN	BE HONS (UMS) (MECHANICAL, 2007)

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