ASPACNEWS

QUARTERLY NEWSLETTER OF FIDIC ASIA PACIFIC

ISSUE 4 | April *2023*

INSIDE STORIES

- FAP Annual Conference 2023
- Bespoke Head contract Obligations
- Development potential of Asia Pacific Countries
- Future Leaders
- Women in Engineering Movement

and more….

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EDITORIAL

Amitabha Ghoshal

Chairperson-Editorial Board

Dear Friends,

The editorial board feels happy and proud that our Newsletter has successfully completed the first year of its existence.

In the second issue of our Newsletter, we expressed the hope that this Newsletter will become a tool for coordination among the development-oriented populace in this region, and today we can say that we are nearing that goal with every successive issue. We are receiving support from MAs of FIDIC Asia Pacific increasingly. This issue contains valuable input from CECOPHIL, the MA of the Philippines, which has contributed one article identifying the contribution of the consultants for Post-Earthquake Damage Assessment and another reporting on their launching of the "Women in Engineering Movement". We repeat our request to each MA of the FAP to send their inputs for every issue.

With the pandemic receding from the countries in this region, travels across countries are growing vigorously and the travel and tourism industry are the first beneficiaries of this trend. As expected, development projects around the region are on a growth path and the demands on the consulting industry are on the rise.

FAP is organising its annual conference in Bangkok, Thailand from 26th to 28th November 2023. CEAT, MA from Thailand will host this event 4 years after the previous conference which was held in New Delhi in 2019. We expect enthusiastic participation in numbers from the member associations in this region.

We look forward to a warmer and larger gathering of FAP as a special feature of this annual event.

Warm Regards,

Amitabha Ghoshal

On behalf of the Editorial Board

NEWS ITEM

NEW CHAIR APPOINTED FOR FIDIC ASIA PACIFIC FUTURE LEADERS

DILINI GAMAGE

The board of FIDIC Asia Pacific has appointed Dilini Gamage from Sri Lanka as the chairman of FIDIC Asia Pacific Future Leader's executive committee. The board has made this decision because the previous chairman, Dinesh Manoharan is unable to fully dedicate himself to the responsibilities of the chair position due to his demanding professional commitments.

Dilini Gamage has been the chair for the committee for year 2021-2022 and has been actively engaging in both communication and editorial committees of FAP since 2021.

We congratulate her for the new position and we eagerly anticipate a productive year ahead as the AFLEC embark on a journey guided by her leadership.

Get to know Member ASSOCIATONS OF FIDIC ASIA PACIFIC

NEPAL

Society of Consulting Architectural & Engineering Firms, Nepal (SCAEF) was registered as a national body on August 1996 under the purview of Government of Nepal. SCAEF as a non-government organization aims to develop and promote Consulting industry in Nepal, thereby providing pivotal contribution for the noble cause of nation building.

SCAEF seeks to achieve its objectives by ensuring provision of skillful and Professional services by the member firms, and also by safeguarding the professional rights, ethics, interest, privileges and duties of the Consulting profession.

S.N.	Name	Designation	Associated Firm
1.	Er. Tuk Lal Adhikari	President	ITECO Nepal (P) Ltd.
2.	Er. Thakur P Sharma	Vice President	Full Bright Consultancy (P) Ltd.
3.	Er. Prakash Adhikaree	General Secretary	ECoCoDE Nepal (P) Ltd.
4.	Er. Kamal Karki	Joint Secretary	SLATE Consultants (P) Ltd.
5.	Er. Shrawan Kumar Thapa	Treasurer	North Star Engineering Consultant (P) Ltd.
6.	Er. Narayan Hari Rijal	Member	Paragon Engineering Consultancy and Research Center (P) Ltd.
7.	Ar. Ujjwal Man Shakya	Member	Innovative Createers (P) Ltd.
8.	Dr. Sudeep Adhikari	Member	CMS Engineering Consult (P) Ltd.
9.	Er. Mandakini Karki	Member	Soil Test (P) Ltd.
10.	Er. Rupak Bastola	Member	Civil Engineering Research and Consultancy (P) Ltd.
11.	Er. Bharat Prasad Banjara	Member	Civil Link Engineering Consultant

* Advisory: Immediate Past President Ar. Rajesh Thapa

Key Activities

In order to sync the organization with the current order, SCAEF has identified 3 dimensions which provide overall framework to achieve its purpose.

Communication: An alert know-how of the ongoing paradigm shifts: technological and associated policies further facilitated by constant interaction between various stakeholders; public and private entities. It also entails a necessity of joint communication between the various professional entities such as Society of Nepalese Architect (SONA) and Nepal Engineers Association (NEA).

Capacity-Building: On the backdrop of constantly evolving technological and social frameworks, SCAEF has a liability to develop the capacity of its member firms and the associated professionals with regard to procurement procedures, project management and design methodologies. SCAEF is also aware of the fact that capacity-building of its member firms delicately hinges on their international exposure. Therefore, SCAEF seeks to explore its further role for the constructive intervention on associated policies during the tenure of this current Executive Committee. For instance, the 11th amendment on the Public Procurement Act, 2063 which was issued on 17th May, 2022 was a prime example of how the coordinated effort between SCAEF and the relevant public entity (PPMO, in this particular case) can result in the policies that may have a greater role to play for the capacity-building of the national firms.

Commitment to Professional Ethics and Integrity: In the present context, the size of the consulting industry in Nepal as compared to other service-providing entities is still a nominal one. This has further implication on the evolution of business practices which may not be wholly ethical to our liking. However, SCAEF is fully committed to promulgate the values among its member firms which seek to promote their commitment to professional ethics and integrity.

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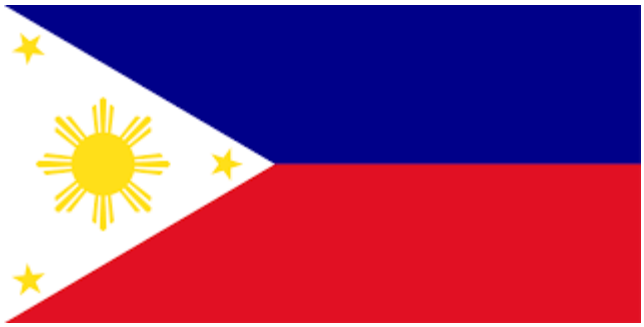
PHILIPPINES



Founded in October 1976, the **Council of Engineering Consultants of the Philippines (CECOPHIL)** is considered as one of the leading organizations of its kind in the local consulting industry, consisting of very active and well-established Filipino and multi-national engineering firms doing various technical consulting work for both the government and private sectors in the Philippines and overseas. CECOPHIL is the accredited Member Association of the International Federation of Consulting Engineers (FIDIC) in the Philippines and as such, CECOPHIL continues to serve as a proactive advocate of FIDIC's professional and ethical requirements of independent engineering consultancy. CECOPHIL is also a member and the current president of the Federation of ASEAN Consulting Engineers (FACE) – the regional federation of FIDIC member associations in Southeast Asia.

EXECUTIVE COMMITTEE (YEAR 2022-2023

S No	Name	Designation	Associated Firm
1	Roy Anthony Luna	President	AMH Philippines, Inc
2	Ernesto De Castro	Vice President	ESCA Incorporated
3	Patrick John Ramos	Secretary	Philkoei International, Inc.
4	Joel Cruz	Treasurer	SRDP Consulting, Inc.
5	Nathalyn Jose	Director	SMDI Consultants, Inc.
6	Luis Mallonga	Director	TCGI Engineers, Inc.
7	Thelma Mauricio	Director	SPACEM Design & Associates
8	Henry Muallil	Director	Multi-Infra Konsult, Inc.
9	Michael Roberto Reyes	Director	DCCD Engineering Corporation
10	Manolo Dador	Immediate Past President	Schema Konsult, Inc.

Objectives	▪ To promote the advancement of the consulting engineering profession in the Philippines; ▪ To assist in promoting satisfactory relations among its members and their clients; ▪ To unite and promote cordial relations among the various consulting engineering firms in the Philippines; ▪ To foster interchange of professional and management experience and information; ▪ To safeguard and protect the interests of consulting engineering firms in the Philippines; ▪ To further the maintenance of high professional standards in the consulting engineering profession; and ▪ To participate and contribute in the promotion and growth of the Philippine economy.
Contact Details	**Postal Address:** Council of Engineering Consultants of the Philippines (CECOPHIL) Room 207 UP Ang Bahay ng Alumni, Magsaysay Ave., University of the Philippines, Diliman, Quezon City 1101 **Phone No:** +632-8-927-0655 **Email:** cecophil@gmail.com, pjrramos@philkoei.com.ph **President :** Roy Anthony C. Luna Mobile No: +63-917-814-1282 Email racluna@amhphil.com

Events from Last Quarter

FAP / China	CNAEC hosted a free webinar on “New Infrastructure Construction and Digital Transformation" on 12th January 2023. It was successfully conducted under three major session sharing knowledge and experience of experts.
India	CEAI organized a workshop under the topic “Steel-for sustainable development” on 4th February 2023.
Hongkong	ACEHK organized an annual awards session among all companies within Hong Kong, with the objectives of; promoting awareness and enhance presence of the engineering industry, showcasing and giving due recognition to truly excellent projects to share and highlight practices and management of successful project.
New Zealand	ACE-New Zealand organized following webinars during last quarter: - New requirements for climate and sustainability reporting and assurance - Contract and insurance claims with Emily Walton and Hannah Bryce - B-Corp with Tim Jones and MRCagney - Top 10 tips for bid responses with Ben Paul
Singapore	ACES organized couple of webinars during last quarter: - Autodesk-ACES Workshop Exploring Structural BIM to Analysis Workflows & Model Automation Procedures - Transformation & The Future

Development Potential of ASIA-PACIFIC Countries

Jitendra Kumar Singh

India

This article attempts to bring upon an overview of the development gaps, potential and key initiatives from individual governments of few of the Asia Pacific countries.

SOUTH KOREA

Key Development Gaps and Potential

"South Korea has transformed from an agricultural country to a highly industrialized one over the past 60 years and is now recognized as the largest semiconductor producer in the world. To foster growth, the country emphasized technology development and innovation.

The service sector has become the largest and fastest economic sector in South Korea, comprising almost 60% of the country's GDP while employing 70% of the active population. The leading industries in this sector are department stores, store chains and supermarkets. One of the fastest-growing industries is tourism but it was impacted by the global pandemic.

The manufacturing sector comes next, accounting for 38% of the GDP and providing jobs to 25% of the workforce. The main industries in this sector are textile, steel, automobile manufacturing, shipbuilding and electronics.

Meanwhile, the agricultural sector has lagged behind, only contributing 2% of the nation's GDP while employing around 4% of the active population. The main agricultural products in South Korea are barley, wheat, corn, soybeans and sorghum. Large-scale livestock farming also plays a big part in this sector.

In 2020, trade represented about 70% of South Korea's GDP. The country is currently the seventh biggest exporter in the world. Its main export products are integrated circuits, automobiles, refined petroleum, vehicle parts, and passenger and cargo ships."

- *Source:South Korean Economy I Outlook 2022/2023 (asiafundmanagers.com)*

Government Strategy

South Korea has been known for its impressive infrastructure development over the years. Here are some potential areas for further infrastructure development in the country:

- Transportation: South Korea has a well-developed transportation system, including an extensive network of highways, railways, and airports. However, there is still potential for further expansion and improvement, especially in terms of connecting different regions, enhancing intercity transportation, and increasing capacity to accommodate growing demands.
- Smart Cities: South Korea has been at the forefront of developing smart cities that leverage technology and data to improve the quality of life for residents. There is ongoing potential to expand and refine smart city initiatives, incorporating advanced technologies like the Internet of Things (IoT), artificial intelligence (AI), and big data analytics to optimize urban planning, energy efficiency, transportation systems, and public services.
- Renewable Energy: South Korea has set ambitious targets for renewable energy development, aiming to increase the share of renewable sources in the energy mix. There is potential for further infrastructure development in areas such as solar and wind power generation, energy storage systems, and smart grid technologies to support the transition towards a greener and more sustainable energy sector.

- Water Management: South Korea faces challenges related to water scarcity and quality. To address these issues, there is potential for infrastructure development in areas such as water treatment and purification systems, water storage and distribution networks, and innovative solutions for efficient water management and conservation.
- Telecommunications and 5G: South Korea is known for its advanced telecommunications infrastructure, and it was one of the early adopters of 5G technology. However, there is still room for further expansion and improvement in terms of 5G network coverage, capacity, and applications, as well as the development of infrastructure to support emerging technologies like the Internet of Things (IoT) and autonomous vehicles.
- Public Housing: South Korea has been focusing on providing affordable housing for its citizens, especially in urban areas. There is potential for further infrastructure development in the form of public housing projects, including the construction of high-quality and affordable apartments, mixed-use developments, and sustainable housing solutions.
- Industrial Infrastructure: South Korea has a strong manufacturing sector, and there is potential for infrastructure development to support the growth of industries such as electronics, automotive, shipbuilding, and petrochemicals. This includes the expansion of industrial parks, logistics and transportation networks, research, and development facilities, and supporting infrastructure for innovation and technology clusters.

It's important to note that these areas represent potential opportunities for infrastructure development, but specific projects and priorities may vary depending on government policies, market demands, and other factors.

SINGAPORE

Key Development Gaps and Potential

“Singapore is a high-income economy with a gross national income of US$54,530 per capita, as of 2017. The country provides one of the world’s most business-friendly regulatory environment for local entrepreneurs and is ranked among the world’s most competitive economies.

In the decades after independence, Singapore rapidly developed from a low-income country to a high-income country. GDP growth in the city-state has been amongst the world’s highest, at an average of 7.7% since independence and topping 9.2% in the first 25 years.

After rapid industrialization in the 1960s catapulted the island nation’s development trajectory, manufacturing became the main driver of growth. In the early 1970s, Singapore reached full employment and joined the ranks of Hong Kong SAR, Republic of Korea, and Taiwan a decade later as Asia’s newly industrializing economies. The manufacturing and services sectors remain the twin pillars of Singapore’s high value-added economy.

The overall growth of the Singapore economy was 3.2% in 2018. Value-added manufacturing, particularly in the electronics and precision engineering sectors, remain key drivers of growth, as are the services sector, particularly the information and communications industries, which grew 6.0% year-on-year, and the finance & insurance industries, which grew 5.9% year-on-year. Economic growth is expected to moderate in 2019, with the government forecasting a range of 1.5% to 3.5%, projecting the rate to be slightly below the middle of the forecast range.

In 2017, Singapore launched the regional finance hub 'Asia's Infrastructure Exchange': "the go-to place where infrastructure demand and supply can connect, where infrastructure expertise and financing can be obtained and infrastructure needs are met." In its announcement, the government highlighted the country's strong ecosystem, one that integrates infrastructure players along the whole value chain – multilateral banks, private financiers, lawyers, accountants, engineers and other professional services.

In the most recent World Bank Human Capital Index, Singapore ranks the best country in the world in human capital development. This means that a child born today in Singapore will be 88% as productive when she grows up, as if she enjoyed complete education and full health. Together with strong financial support from the government, the country continues to strengthen the nimbleness and flexibility of its workforce by providing continuing education such as the *Skillsfuture* initiative. Government spending on continuing education will nearly double, to more than S$1 billion yearly."

- *Source: Singapore Overview: Development news, research, data | World Bank*

Government Strategy

Singapore has always been recognized for its efficient and well-developed infrastructure. However, there are several ongoing and potential infrastructure development projects in Singapore to further enhance its connectivity, sustainability, and quality of life. Some of these developments include:

- Changi Airport Terminal 5: Singapore is expanding Changi Airport with the construction of Terminal 5, which will significantly increase the airport's capacity to handle more passengers and accommodate larger aircraft.
- High-Speed Rail (HSR) Link to Kuala Lumpur: Singapore is working on a high-speed rail project that will connect the city-state to Kuala Lumpur, Malaysia. This rail link will improve travel between the two countries and boost economic integration.
- Cross Island Line (CRL): The CRL is a new MRT (Mass Rapid Transit) line in Singapore that will connect the eastern and western parts of the island. It will enhance connectivity and accessibility for residents, reducing travel times and congestion.
- Jurong Lake District: The Jurong Lake District is Singapore's second central business district and an upcoming commercial hub. It aims to create jobs and reduce the need for commuting to the existing central area, promoting regional development.
- Tuas Mega Port: Singapore is constructing a new mega port in Tuas, which will consolidate all existing container port operations into one location. The Tuas Mega Port will increase Singapore's capacity to handle larger vessels and boost its status as a global maritime hub.
- Smart Nation Initiatives: Singapore is continually investing in smart city technologies and infrastructure, leveraging data and technology to enhance the quality of life for its residents. This includes initiatives in areas such as digital connectivity, transportation, utilities, and public services.
- Sustainable and Green Buildings: Singapore places a strong emphasis on sustainability and green building practices. The country encourages the development of energy-efficient buildings and the adoption of renewable energy sources to reduce its carbon footprint.
- Active Mobility: Singapore is expanding its cycling and pedestrian infrastructure, promoting active mobility options for residents. This includes the development of dedicated cycling paths, shared paths, and park connectors to encourage walking, cycling, and other forms of sustainable transportation.
- Underground Spaces and Utilities: Singapore is exploring the development of underground spaces to optimize land use and free up surface space. This includes underground storage facilities, data centers, and utility tunnels to house services like power lines and water pipelines.

These are just a few examples of the infrastructure development potential in Singapore. The government's proactive approach to infrastructure planning and investment ensures that the city-state remains at the forefront of urban development, connectivity, and sustainability.

CECOPHIL Assists in Post-earthquake Damage Assessment in Northern Philippines

Vigan City in Ilocos Sur, located in the northwesternmost region of the Philippines, is arguably the most well-maintained model of a Spanish grid-type colonial city in Asia. Established during the 16th century, Vigan City comprises of more than 220 historical Spanish-style buildings (still in use as of 2022)—garnering a spot on the UNESCO World Heritage List in 1999 and gaining recognition as a model of best practice in heritage site management in 2012.

These historical buildings are mostly one to two storeys high, and their framing systems are either straight-up stone/brick masonry or a composite wood and stone/brick masonry frame. Although found to be generally stable and suitable for everyday use, Structural Engineers recognize these framing systems to be weak against tensile and lateral loads brought about by earthquakes due to the lack of steel reinforcement typical of modern structures.

On July 27, 2022, at 8:43 AM, a catastrophic (moment) magnitude (M_w) 7.0 earthquake occurred with an epicenter in Lagangilang, Abra, as reported by the Philippine Institute of Volcanology and Seismology (PHIVOLCS, 2022).

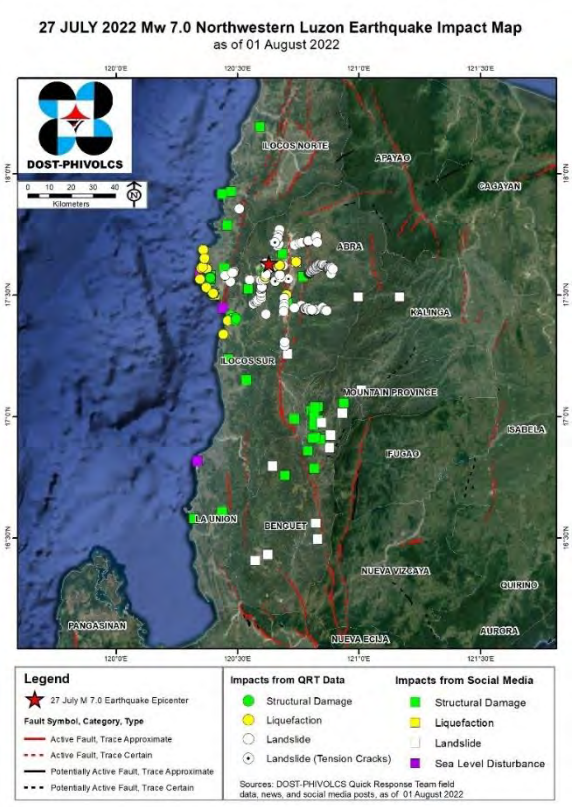
The Abra River Fault was deemed to be the source of the earthquake. There were relatively few casualties due to the sparse population in the area. However, damages and earthquake-induced geohazards to the surrounding areas were observed/reported—especially in Abra. In Vigan City, the churches and multiple historical buildings were also reported to have been damaged. Fortunately, most buildings only suffered minor damages, but some were brought to the brink of collapse. Figure 1 presents the distribution of earthquake-induced damages and geohazards mapped out by PHIVOLCS.

As part of its commitment to social responsibility and contribution towards risk reduction and preservation of historical sites, the Council of Engineering Consultants of the Philippines (CECOPHIL)dispatched a multi-disciplinary team (Figure 2) of engineers, surveyors, and geologists from member firms to conduct a post-earthquake assessment of Vigan City in cooperation with the Vigan City Local Government Unit (LGU).

SRDP Consulting, Inc. (SRDP) conducted Light Detection and Ranging (LiDAR)drone surveys to map out the existing layout of Vigan City as well as to get updated aerial and street views of the vicinity in light of the landslides and structural damages. On the other hand, ESCA, Incorporated (ESCA)performed structural inspections of the historical buildings and carried out post-earthquake (rapid) safety evaluations in order to determine which structures needed to be immediately evacuated and cordoned. The significance of doing such an activity cannot be overstated as aftershocks may further lead the identified critical structures to collapse.

Finally, AMH Philippines, Inc. (AMH) visited the sites with reported cases of liquefaction (in the form of sand boils) and prepared an Engineering Geological and Geohazard Assessment (EGGA) report. The objective of the EGGA report is to obtain better understanding of the nature of the earthquake event and its corresponding geohazards, to identify the elements that are vulnerable to said geohazards, and to determine the risks that can be expected upon further exposure.

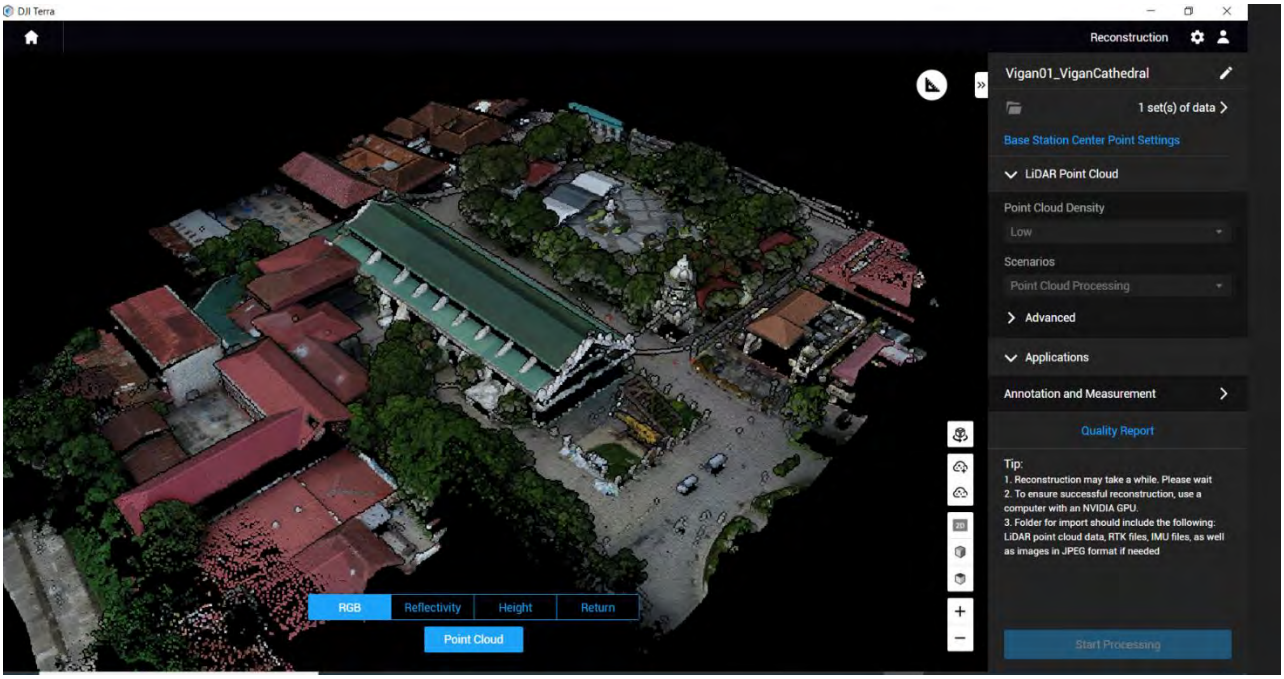
CECOPHIL Volunteers (First Batch) with Vigan City Local Government Unit



Mw7.0 July 2022 Northwestern Luzon Earthquake Impact Map (Source: PHIVOLCS, 2022)

The CECOPHIL Team presented the findings to the Vigan City LGU and discussed possible mitigation measures.

In doing so, the Vigan City LGU will have a better grasp of the situation thereby assisting in policy making (e.g., strictly requiring the conduct of liquefaction analysis when constructing new buildings) and the development of prevention measures (e.g., cordoning certain areas within the city). The CECOPHIL Team also recommended conducting a more detailed structural evaluation of the damaged buildings—not only to supplement the rapid assessment, but also to determine the most feasible and viable retrofitting measures. Furthermore, the CECOPHIL Team suggested the Vigan City LGU to request PHIVOLCS to do a seismic risk analysis and vulnerability assessment of Vigan City using the survey data provided by SRDP.



Bespoke head contract obligations

by Anthony Barry
President of FIDIC

Bespoke head contracts and requests for tender documents for major infrastructure projects are often hundreds of pages underpinned by complex strategies to manage the client's exposure. Understanding how the clauses work both individually and together is vital to understanding total risk exposure on a project.

Bespoke head contract obligations

Bespoke head contracts and requests for tender documents for major infrastructure projects are often hundreds of pages underpinned by complex strategies to manage the client's risk exposure and in some cases to eliminate it.

In preparing tenders for projects to be delivered under such contracts and tender documents, sophisticated contractors undertake complex legal and project risk analysis to understand their own exposures. The complexity of these documents is such that there are contractual risks spelled out in single clauses and many others which involve combinations and permutations of multiple clauses.

Analysing and understanding how the clauses work both individually and together is vital to understanding total risk exposure on a project.

Contractors' risk strategies

Having understood their risk exposures, sophisticated contractors will develop strategies to accept and manage risk themselves and, in many cases, laying some or all of it, separately or together, off to subcontractors and consultants.

The latter may involve, referring to or including head contract clauses in subcontracts and consulting agreements as well as clauses which may make subcontractors and design consultants mutually responsible for all collaboration, coordination, information supply, programme dependencies and compatibility of design documentation.

This may occur without the subcontractors and design consultants being aware of the other parties' identities, their role, their capacity or the terms of their contract, thus creating multiple avenues for the head contractor to make claims against subcontractors and consultants, without them being aware of the risks they are assuming.

Contractor – Design Consultant Agreements

In recent years, this approach has become more complex with head contractors and design consultants entering into one agreement for the provision of design services during the tender phase and a separate agreement for the contract phase. This may result in causation being established for the same claim under both contracts or, situations in which the contract phase agreement embodies and carries forward the obligations or increases the exposure in the tender phase.

Contractors may seek to pass down head contract obligations either by general head contract compliance clauses, by reference to the head contract in the agreement with the design consultant or by duplicating clauses from the head contract in the agreement with the design consultant. All methods expose the design consultant to risk.

By passing down an obligation in the head contract and in some cases expanding it through the inclusion of warranties and liability clauses in the agreement with a design consultant, a contractor may succeed in making design consultant's liable for the whole of a loss arising from a default in that obligation.

Such an approach, will extend a consultant's liability well beyond a reasonable standard of care, potentially making the design consultant liable for all direct costs and consequential losses arising from the breach.

Design consultants are often required to execute "certificates" of adequacy and compliance which may include terms which extend the design consultant's liability beyond what is contained in the agreement with the design consultant. Great care must be taken with the wording of such certificates to ensure they do not expose the consultant to unnecessary risk.

How do we manage these risks?

To better manage these risks at a project level, design consultants must:

- Develop their own understanding of these risks and have access to, advice and support from contract lawyers to negotiate balanced terms in the agreements
- Charge fees which cover the services required and all the effort required to manage and deal with the risks
- Engage staff with the capacity, capability and experience to handle these projects in a way which ensures their health, safety and wellbeing is looked after
- Work with contractor clients to be transparent and collaborative in managing project, design and contractual risk

- Work with their professional indemnity insurer to be transparent and collaborative as to the risk to which the design consultant is exposed and how they are managed
- Establish a clear project governance regime to ensure the design consultant's team acts in accordance with the agreement at all times
- Induct project teams into the risk and governance frameworks on the project
- Administer the contractor – design consultant agreement rigorously
- Implement reporting mechanisms which record achievement and facilitate early identification of any risks or departures from the requirements of the agreement

Understanding the agreements and the implications for their business and their people, many design consultants would be well advised to refuse to enter into such agreements, if necessary, walking away from the opportunity to avoid the negative impacts which may arise.

For the most part, the design consultant's fee will be a small portion of the project value. Where head contract provisions are passed down to the design consultant, the claims which may arise against the design consultant may be many times the total value of the fees to be paid to the design consultant.

It is therefore also appropriate that a design consultant negotiate clear limit of liability provisions which limit the design consultant's liability to that:

- caused directly by the design consultant
- where there are multiple parties at fault, liability is proportionate
- within an aggregate limit of liability applying to all claims which may be made by the contractor under the agreement
- within a reasonable aggregate amount of professional liability insurance required under the agreement.

Further, it may be appropriate in certain circumstances, to exclude a design consultant's liability for:

- specific technologies supplied by other parties which the consultant is directed to include in the design
- specific conditions, which may be unknown or uninvestigated or under investigated
- designs and documents supplied by the client, the contractor or other parties
- matters where the design consultant is directed by the contractor.

It may be prudent, depending on the extent of reliance and risk, to negotiate to have the contractor to indemnify the design consultant in such circumstances.

Consultant's enterprise risk

Of course, there are many aspects of major design agreements and the projects to which they apply that need to be taken into account in considering one's participation in contracts involving significant risk. It is not proposed to address this here but it is important that any business has a view as to its capacity to handle major projects, major project risk, contractual risk, regulatory risk, wellbeing, health and safety risk for people, reputational risk and of course financial risk, to name a few.

The level of financial net assets required to support the operation of a design consultancy is relatively small and, in many cases, unlikely to be able to cover the losses behind claims made by a head contractor. Hence, design consultants purchase professional indemnity insurance.

In recent years, claims by contractors against their design consultants have been very significant in some markets in terms of both the frequency of claims and the size of those claims. It is less likely that they arise from physical failures and breaches of a reasonable standard of care, and, more likely that they are contractual claims which have their genesis in onerous contract terms.

If we consider that professional indemnity insurance premiums are a small proportion of a design consultants total costs and its fees are a small proportion of project costs, it is clear that exposures in which we call on professional indemnity insurance must be limited and well managed, if we are to have a sustainable professional indemnity insurance market.

A way forward

Maintaining a vibrant healthy industry requires that we encourage and support innovation, delivery quality, sustainable infrastructure safely with consulting engineers, designers, project managers and staff who can contribute to the best of their ability and are rewarded appropriately.

We need consulting firms to be financially sound, to act with integrity and be driven by sound values. We need professional indemnity and other insurances to be available on reasonable terms. Lastly, we need our clients to benefit from and enjoy the experience of working with the consulting firms in our industry.

From an integrity viewpoint, one might reasonably contend that we should not enter into contracts, in which we cannot meet all of the obligations for which we sign up.

This is clearly an area where we need more discussion with governments, the head contract clients, the head contractors, industry partners and insurers, to develop contractual models that are sustainable for all parties and will more efficiently deliver better outcomes.

Nonetheless, there are also many opportunities and methods by which design consultants can manage obligations, they accept under contracts and it is incumbent on the firms to develop their capability further in this area. The effective management and communication of risk by design consultants will reduce the risks to which contractor clients are exposed under head contracts and hence increase the return on investment in infrastructure.

FIDIC will continue to work with its member associations and their member firms to address this key issue.

© VIEWPOINT

02

Role of Consulting Engineers in Transforming Current Linear Economy to a Sustainable Circular Economy

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Vice President

Luqman Ummer
Consultant
Engineering & Project Management

TATA Consulting Engineers Limited

Abstract

The two terminologies - Circular Economy (CE) and Sustainability are used interchangeably, but they are not quite synonymous. The thought process in current engineering disciplines is largely driven by Linear Economy (LE) principles resulting into efficiency and efficacy without proper holistic consideration to Ecology. This paper provides an understanding of the need for combining ecological perspectives with engineering disciplines to realize the dream of CE. This paper discusses the pivotal role that Consulting Engineering community can play in transforming LE to CE.

Introduction

The Industrial Revolution of the late 18th and early 19th centuries, has thus far exerted unprecedented impact on the global economy. It was driven by adoption of radically new manufacturing processes in a few countries which controlled the global trade routes and had access to seemingly unlimited low-cost resources and captive markets. The mantra was to produce more and more. That mantra spawned the Linear Economy (LE) which survived recessions and world wars and the economic booms thereafter. It led to the emergence of the consumer society. It was well into the 20th century before the finiteness of resources started becoming evident and the consumption driven model was challenged by emerging concepts of sustainability. The folly of depending solely on fossil fuel and causing irreparable damage to the environment in terms of pollution and climate change, was as clear as the proverbial writing on the wall. Nations and governments started framing policies and setting common Sustainable Development Goals. The most affected party, the Generations Next, became assertive and vociferous. The stage was set for the emergence and global acceptance of the concept of Circular Economy (CE).

Although the terminologies CE and Sustainability are used interchangeably, these two concepts are not one and the same. Geissdoerfer et al. (2017) researched the similarities and differences in these terminologies and found that there are more than 300 definitions in circulation for sustainability itself. For this paper, the definition of sustainability considered is as provided by ISO 15392, 2008 - *"a situation in which human activity is conducted in a way that conserves the functions of the earth's ecosystem"*. Geissdoerfer et al. (2017) also provided the definition of CE as *"a regenerative system in which resource input and waste, emission*

and energy leakage are minimized by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing and recycling". CE necessitates rethinking of entire product life cycle starting from design, engineering, sourcing, manufacturing, distribution, consumption up to disposal / recycling.

These two concepts are depicted in Figure-1.

Figure-1: A Simple Illustration of Linear Economy and Circular Economy
Courtesy: www.entrepreneurship-campus.org/

This paper discusses the roles and contribution of Consulting Engineering in the transformational journey from LE to CE.

Role of Consulting Engineers in Asset Creation and Asset Operationalization – in a Linear Economy

A Linear Economy is characterized by its focus on driving growth through increasing consumption. Manufacturing processes traditionally take raw materials from nature, which are then processed into products for consumption. At the end of their useful life, the major portion of the products go back into nature as waste. Such a relation between earth resources and waste is a major concern to the entire ecology. More the consumption in LE, the greater the ecological degradation. It thus necessitates careful thought of the ecological impact at the design stage itself. In their study of the role of process engineering in CE, Londoño et al. (2021) cite the study conducted by The Sustainable Europe Research Institute (SERI). As per its estimate, each year Economic Co-operation and Development (OEDC) countries reuse, recycle, compost or digest just 55% of the extracted material and products while 45% or so ends up in the land fill. That is a very huge amount of mass and energy wastage.

Under the LE environment, the Consulting Engineers are mandated to continuously improve efficiencies of the systems, processes, procedures, plant & equipment, with the objective of increasing production and driving consumption.

The services such as safety assessments, value engineering, risk analysis, time study, energy audit etc. are now standard items in the repertoire of Consulting Engineers. Such services help to drive down unit production cost, enhance operation predictability and repeatability by reducing or eliminating or mitigating risks, thereby driving production with consistent product quality, leading to enhanced consumption. In all that, the crucial aspect of ecological considerations at each stage of product creation, usage and retirement after useful service life, is missed altogether.

In a LE eco-system, Consulting Engineers ensure that efficiencies and economies of scale are built into the systems and processes from conceptual stage, through design and engineering, procurement to execution. Redundancies are evaluated and captured at the design stage itself so that unplanned down times can be avoided. Reliability studies and preventive maintenance techniques help to develop robust standard operating procedures. Ergonomic studies help to improve employee productivity and user experience. Code compliances, statutory certifications and disaster management systems contribute to reducing insurance costs.

As technologies evolved, Consulting Engineers were uniquely positioned to advice customers regarding economies of scale and capacity finalization. Debottlenecking studies helped to unlock capacities with minimal investments. Almost all services were aimed at increasing production and consumption for the present, without any significant consideration of its impact on the future.

Role of Consulting Engineers in Asset Creation and Asset Operationalization – in a Circular Economy

A Linear Economy becomes Circular when businesses cease to prioritize profit over ecological sustainability. Manufacturers are mandated by government policies and trade policies such that the needs of the future are a consideration in their business growth policy, in recognition of the finiteness of global resources.

Reh, L. (2013) emphasized the critical role played by process engineering experts in the CE journey. The process engineers work in various aspects of production set up, safety, mass and heat balance, energy recovery, reduction of harmful exhausts etc. Thus, the engineering stream becomes very vital to ensure that production processes and manufacturing plants are set up in such a way that 4R (Reduce, Reuse, Recycle and Restore) of CE get adequately addressed. Thought through process design can have significant impact on raw material extraction, mass transportation, energy conversion and production of end products without having any harmful affluent as a byproduct.

There again, like in a LE, Consulting Engineers find themselves best positioned to bring a positive impact. The demands of the CE are such that Consulting Engineers only need to make incremental changes to their services portfolio, while at the same time draw synergies from those already existing in their menu. After all, Consulting Engineers by the very nature of their business, not only keep abreast of the demands of the industry in a broad-based manner but tend to be usually ahead of the curve.

Schönborn et al. (2021) proposed the concept of redefined Ecological Engineering. They argue that the last couple of centuries have witnessed unprecedented technology led advancements in the quality of lives of human beings. The engineering disciplines played a key role in those advancements. However, in hindsight, the linear thinking approach has resulted into environmental degradation and has had a negative impact on the ecology. It is time to combine the ecology-based systems thinking as part of engineering discipline. As most of the material flow, energy conversion, product creation and usage are driven by engineering disciplines, it is imperative that the ecology-based thinking during the conceptual and design phases can have a positive impact on the path of CE.

Demestichas et. al (2020) studied the role of engineering especially that of ICT (Information and Communication Technologies) on the journey towards CE. The authors studied various ICT technologies like Communication, Computing Technologies, Cyber-Physical Systems, Data Analysis & AI, Data collection & IoT, Data Management & Storage, Software & Simulation Technologies, Other smart technologies, etc. They further analyzed the impact of these technologies on the 4 important pillars of CE viz. Reduce, Reuse, Recycle and Restore. The research comprehensively establishes the positive impact of engineering and technology in making CE a reality.

Innovative elements of waste management in terms of reduction, reuse and recycling need to be built into the DNA of a product lifecycle from design and sourcing to use and discarding/recycling. The portfolio of Consulting Engineers in that scenario may typically include system elements that are restorative and regenerative by design, such as:

- Renewable energy options
- Extending product life
- Concepts of use and reuse
- Use of bio degradable materials
- Recycling options
- Additive manufacturing techniques
- Less harmful plastics
- Energy, utilities & consumables optimization techniques
- Debottlenecking studies
- Technology upgrades
- Energy recovery from waste disposal/ incineration

Discussion

a. **Changes due to the Move from 'Linear' to 'Circular' Thinking**

Whereas "sustainability" came into vogue in the latter half of the last century, the more comprehensive concept of CE is recognized and accepted globally

as our best bet for "*meeting current needs without compromising the ability of future generations to meet their needs*", only in this century. Though the concept is still in the nascent stage, it is evolving rapidly as the necessary frameworks and guidelines are getting established at global and national levels. Those may be followed by revisions or updates of applicable legal statutes in the local, national and international arena.

The Consulting Engineers can exert far reaching impact on tender documents in terms of contractual scope, guarantees, warranties, penalties and other terms & conditions. Even the text of standard supporting documents such as Bank Guarantees, etc. may be affected.

New codes and standards may come into existence in the domain of materials, design, engineering & execution. Scope of procurement and sourcing due diligence and supply chain boundaries may get enlarged. Established norms of cost and schedule may cease to be applicable.

New quality standards and certifications may come into existence. Audit procedures and expectations may change. Prevailing Safety, Health & Environment policies may get rewritten. New local and national environment regulations and emission targets may become applicable.

Modified costing standards and procedures may come into existence which would change the way projects are evaluated and IRR is determined. Opportunity costs may play a larger role in calculating the lifecycle cost.

As new metrics emerge and get established, the Consulting Engineers would be forced to adapt quickly by re-thinking, re-learning and re-training. Deliverables would be impacted in terms of changes to existing ones or addition of new ones.

Nikolaou et al. (2021) studied large volume of literature related to both sustainability and circular economy and suggested that instead of research in isolation, the interdisciplinary research in the areas of engineering and management is the need of the hour.

Prof. Roger H.W. Sargent pioneered the concept of Process System Engineering (PSE) in the mid-20th century. Avraamidou et al. (2020) provide a detailed illustration and analysis of how the objectives of PSE and CE significantly overlap as depicted in Figure-2. The authors in this article have further explained how the progress made in the field of PSE can help CE aggressively leapfrog.

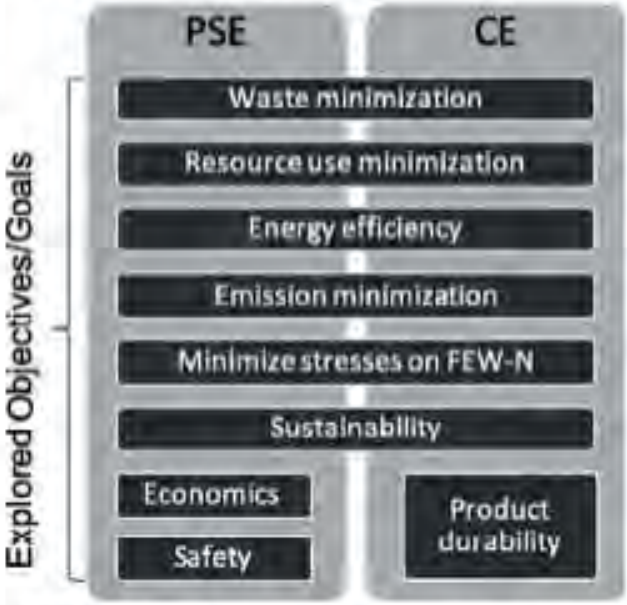

Figure_2: Explored Objectives in Process Systems Engineering and set Goals of Circular Economy.
Figure Credit: *S. Avraamidou, S.G. Baratsas and Y. Tian et al. Computers and Chemical Engineering 133 (2020) 106629*

The plastic industry is taken as an illustration for the role of consulting engineers in CE.

b. Impact on Plastics Industry – A Micro View

One of the most maligned industries in the name of negative impact on environment is the plastics industry. It is an industry whose products have found worldwide acceptance due to the versatility of the material - in varied sectors from household to aviation, from healthcare to automobiles, from packaging to beauty products. Plastics enjoy tremendous advantage in terms of strength to weight

ratio, ease of manufacturing, durability, aesthetics, customizable compositions, etc.

However, the near indestructibility of plastics, [illegible] industries in the field of waste management. Adoption of innovative practices will get a stimulus.

- Creation of new job roles and job opportunities. For e.g., when recycling becomes a formally recognized industry, many unorganized workers can come under the umbrella of a formal job and get the opportunity to enjoy better working conditions leading to a safer and more secure lifestyle.

Risks

On the other hand, there are risks or downsides too:

- The global economy is interconnected between almost all the industries in the world in terms of feedstock, supply chain, etc. One raw material can be the feedstock for many industries, the products of which could be feeding into many other industries. That means that whereas isolated circularities can exist, a systemic change to circular economy would happen only if a multiple number of interconnected industries would implement adequate transformation programs in a coordinated manner.
- Shifting to sustainable resources or raw materials in one industry may be at the expense of an increase in the demand and consumption of resources in another industry which may not be proportionate to the expected benefits. Such shifts would be meaningful only if the other industry is also operating in a sustainable manner.
- CE is likely to see investment and employment opportunities shifting from the earlier stages of the value chain to the later stages such as repair, resale, recycling, etc. at the cost of opportunities in production and manufacturing. That could have a negative impact on social wellbeing and equity in lower income countries where production and manufacturing facilities tend to be located.
- Not all forms of waste are recyclable. That can recycle containing compounds that can improve processability and end-use properties.
- Certified circular products – Virgin resins and [illegible] make the proposal to shift less appealing in some industries. Lack of awareness and technical skills in the workforce can also become a hurdle. The market is yet to reach maturity levels that can foster access to favorable financing.
- A final important factor in reaping the economic benefits of a Circular Economy are the changes that would be necessary in the customer behavior and consumption pattern. That would be in terms of extending the useful life of a product by means of repair and maintenance, responsible recycling or disposal etc.

Conclusions

Any economy, whether Linear or Circular, is characterized by production and consumption. In either model, any resource that is taken from nature, eventually finds its way back to nature. But the difference is, "HOW", "WHEN" and "WHAT".

"HOW" in terms of how much is taken from nature, "WHEN" in terms of at what all stages of the product life cycle is it going back to nature and "WHAT" in terms of what all forms is it being returned to nature.

All three of them are heavily determined by the elements which are built into the design, engineering and manufacturing of these products, either at basic engineering or FEED (Front End Engineering & Design) stage.

Consulting Engineers are a repository of data, knowledge, experience, best practices, lessons learned, cost analysis and case studies in project design and engineering in the capex space. They have the wherewithal to strengthen organizational executive management decision making process by providing data based strategic inputs and analytical support. They are also well positioned to work together with owners, authorities, construction & fabrication contractors, plant & equipment manufacturers and vendors, maintenance contractors, et al. to meet the stringent standards of the future.

Almost all the nations of the world under the aegis of various international organizations have pledged support to the cause of Circular Economy. All the leading

corporates in all the various industries are already on-board and have declared their intentions with clear objectives and targets. It is only a matter of time before the rest also follow.

CIRCULAR ECONOMY IS NO MORE A CHOICE BUT A NECESSITY

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Upcoming Events

ANNUAL CONFERENCE OF FIDIC ASIA PACIFIC

We are happy to announce that the dates have been fixed for the biggest event of the year organized by FAP!

Tentative Agenda

Day 1: Sunday, 26 November 2023	
1800 - 2100 hrs	**Welcome Cocktail Reception**
Day 2: Monday, 27 November 2023	
0800 - 0900 hrs	**Welcome Delegates and Registration**
0900 - 1030 hrs	**Inaugural Session**
	Opening Performances
	Welcome by President of CEAT
	Short Speech by President of FIDIC ASIA PACIFIC
	Conference Theme by Vice President – Technical of CEAT
	Address by Governor of Bangkok Metropolitan Administration
	Vote of Thanks by Vice President – International Affairs of CEAT
1030 - 1100 hrs	**Tea Break & Networking**
1100 - 1230 hrs	**Plenary Session : Prospects & Challenges of FIDIC**
	Keynote Address
	Prospects & Challenges of FIDIC Global
	Prospects & Challenges of FIDIC Asia Pacific
	Prospects & Challenges of FIDIC Future Leaders
	Prospects & Challenges for FIDIC Projects
1230 - 1330 hrs	**Lunch Break & Networking**
1330 - 1500 hrs	**Focus Session 1 : Engineering towards Net Zero – Government and**

	Infrastructure Perspectives
	Relevant Natural Resources and Environments Policy of Thailand
	Relevant National Policy of India
	Relevant National Policy of Indonesia
	Net Zero for a Mega Infrastructure Project
1500 - 1530 hrs	**TEA Break & Networking**
1530 - 1700 hrs	**Focus Session 2 : Engineering towards Net Zero – Private Development Perspectives**
	Net Zero for a Mixed use Project
	Net Zero for a Communication Project
	Net Zero for a Climate Change Project
	Net Zero for a Residential Project
18:00 - 2100 hrs	**Gala Dinner (Loykratong)**
Day 3: Tuesday, 28 November 2023	
0900 - 1030 hrs	**Focus Session 3 : Engineering towards Net Zero – FFL Perspectives**
	Experiences of a Net Zero Project – FFL Thai Perspectives
	Experiences of a Net Zero Project – FFL FACE Perspectives
	Experiences of a Net Zero Project – FFL FIDIC Perspectives
	Experiences of a Net Zero Project – FFL Special Perspectives (Country?)
1030 - 1100 hrs	TEA Break & Networking
1100 - 1230 hrs	**Focus Session 4 : Engineering towards Net Zero – Design Perspectives**
	Designs for a Net Zero Project – Thai Perspectives
	Designs for a Net Zero Project – FAP Perspectives
	Designs for a Net Zero Project – FIDIC Global Perspectives / FAP
	Designs for a Net Zero Project – Special Perspectives
1230 - 1330 hrs	**Lunch & Networking**
1330 - 1500 hrs	**Focus Session 5 : Engineering towards Net Zero – Material Perspectives**
	Engineering Materials for Net Zero – Steel and Alternative Materials
	Engineering Materials for Net Zero - Automotive
	Engineering Materials for Net Zero – Elevators and Escalators
	Engineering Materials for Net Zero – Cement & Concrete
1500 - 1530 hrs	**Tea Break**
1500 - 1700 hrs	**Focus Session 6: Engineering towards Net Zero – Energy Perspectives**
	An Energy Project for Net Zero - Solar
	An Energy Project for Net Zero - Smart Grid
	An Energy Project for Net Zero - Tourism
	An Energy Project for Net Zero - Hydrogen Fuel / LNG
1700 - 1800 hrs	**FAP GAM**

Upcoming events of next quarter

FIDIC/MA	Date	Event/Topic
FIDIC	6th June 2023	Making the most of FIDIC - how to get the best out of the industry's global representative body
	22nd June 2023	Navigating the digital journey to reducing carbon
	11th July 2023	The Golden Principles of Business Practice – are there such things and if there are, what are they?
Malaysia	June - August 2023	ACEM webinar series site supervision course discipline module: electrical
	6 / 7 / 13 / 14 June 2023	Luncheon webinar, theme: construction site supervisor
	15th June 2023	Special webinar: how to attain professional engineer status
Singapore	14th June 2023	ACES-Winston Training: New Age Booster Pump Technology
	6th June 2023	ACES-Trox Training: Type of ACMV Systems
India	10th June 2023	Construction Law Course
New Zealand	13rd June 2023	Healthy thinking techniques
	4th July	How to have successful client conversations workshop -Auckland
	11th July	How to have successful client conversations workshop - Wellington
	25th July	How to have successful client conversations workshop - Christchurch

WOMEN IN ENGINEERING MOVEMENT LAUNCHED

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In 2021, Atty. Jean de Castro, Immediate Past Chairperson of the **Council of Engineering Consultants of the Philippines Young Professionals Forum (CECOPHIL YPF)** spearheaded the Women in Engineering Baseline Study. The nationwide survey aimed to develop a baseline study regarding professional women working in the field of engineering in the Philippines. It focused on listening to women on how they are perceived in the workplace, key gender issues in engineering, and the adequacy of gender-related policies in the workplace. To ensure the quality and integrity of the results of the survey, they have engaged the services of a professional research group, the PHI Corporation to conduct the survey.

Aside from the Public Survey and the survey done among the firms and employees of the three identified sectors namely: Developers, Contractors, and Consultants, they have also conducted Focus Group Discussion (FGD) and Key Informant Interview (KII) to supplement and validate the survey result.

This project is in partnership with **Women in Infrastructure Foundation Inc. (WIFI) and Women's Leadership Initiative - Urban Land Institute Philippines** and endorsed by the **Construction Industry Authority of the Philippines (CIAP) and the Federation of ASEAN Consulting Engineers (FACE).** They have also partnered with **Geoladies PH** to provide geospatial information gathered from the survey. CECOPHIL YPF wishes the baseline data to serve as starting point in coming up with tangible programs and specific policies that will further elevate and improve the role of women in the engineering industry. The survey result will be shared to local and international stakeholders.

During the course of doing the survey and as they learned real stories from the people they interviewed, they realized that there is still much work to be done between the public and private sector to truly create an impact.

Hence, it was decided to create the **WOMEN IN ENGINEERING MOVEMENT** to have a core group of women and men who can continue the conversation and help plan and pave the way for changes that they want to happen in this lifetime and for the next generation.

Coinciding with Women's Month, **Women in Engineering Movement (WIE)** was launched on March 29, 2023 during the Urban Land Institute Philippine Conference at the Grand Hyatt Hotel, Manila.

Atty. Jean De Castro, ESCA Engineering CEO and Founder of WIE, were joined by the Construction Industry Authority of the Philippines (CIAP), Council of Engineering Consultants of the Philippines (CECOPHIL), Philippine Business Coalition for Women Empowerment (PBCWE), Datem, Inc. Corebilt and IPM Group of Companies. These organizations and companies will serve as the core group of the WIE Movement.

"We need to make the industry more conductive for women to thrive in because women need to be part of decision making as well as the planning, design and construction process for our infrastructure to truly cater to the needs of women and children" Atty. Jean de Castro's message.

MEET A FUTURE LEADER

CHARITHA HANDAGALA

We are happy to introduce Charitha Handagala, an enthusiastic Future Leader who has been a member of FIDIC Asia Pacific Future Leader's Executive Committee over 3 years and has become an active member of communication committee of FAP. Since 2018, Charitha has held the position of Chairman of the Young Professional Forum at the Association of Consulting Engineers, Sri Lanka.

Charitha Handagala is an International Professional Engineer (IntPE) and a Chartered Civil Engineer (CEng) currently employed as a Project Engineer at Ceylon Electricity Board in Sri Lanka. He obtained his Bachelor of Science in Engineering degree from the University of Peradeniya, Sri Lanka. He is also a Corporate Member of the Institution of Engineers Sri Lanka and a Graduate Member of the Institution of Civil Engineers, United Kingdom.

Throughout his 12-year professional career, Charitha has worked as a Project Engineer on various international construction projects. He is a highly experienced Construction Project Engineer, with notable involvements in landmark projects such as the Moragolla Hydropower Project and the Broadlands Hydropower Project in Sri Lanka, as well as the Mombasa Port Development Project in Kenya. His expertise primarily focuses on construction project management in buildings, infrastructure developments, and hydropower.

Outside of his professional career, Charitha pursues event management and wedding planning as a hobby. He has a deep love for nature and enjoys traveling extensively, seeking inspiration from diverse landscapes and cultures.

Charitha Handagala exemplifies a skilled engineer who effortlessly combines technical expertise with creative pursuits. With his leadership, industry involvement, and passion for nature, he continues to make a remarkable impact in the field of construction project management.

We invite our member associations to share their constructive feedbacks and inputs to incorporate in the next issue of the newsletter. The next issue will be published by the end of September 2023. The entries are welcome by 15th September 2023.

Member associations are requested to circulate this newsletter among their members and seek articles, news and information related to past and future events to enhance the network and to represent more parts of the region.

Thank you

Editorial board