August 2016

VIEWPOINT

OFFICIAL QUARTERLY MAGAZINE OF CEAI

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Consulting Engineers Association of India

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Message From President

National Register of Engineers

Dear Members,

As you know CEAI has been in the process of creating National Register of Engineers and to that effect we have received and evaluated a number of applications. The purpose of this National Register is to give recognition to members who can produce the certificate to the authorities as and when required.

In addition, we are in the process of creating a data base of experts which will be put on CEAI website. This may help consultancy companies looking for experts in a particular field to identify the relevant profile.

There is also a request from some members to have the data base of other experts in the field of social, economic and financial studies. In the new environment of consultancy assignments, the role of other experts is also important and required. Therefore, we plan to have a data base of experts other than that of engineers.

For the time being we are restricting the data base to consulting engineers but we also contemplating to add corporate members in the National Register. We strongly advise all experienced and qualified engineers and social, economic and financial experts to send their application to CEAI for inclusion in the National Register. The application form is available on website and for this year the registration is free of cost.

We invite you all to contribute in the View Point technical articles and other matters of interest to the profession. We have increased the circulation of View Point manifold which help in promotion of CEAI and its members.

We also request you to send names of your clients to whom we can circulate View Point.

With best Regards,

Sudhir Dhawan

Sustainable Energy - An Opportunity for Consultants

Pradeep Chaturvedi
Vice Chairman, Energy Committee,
World Federation of Engineering Organisation

Role of Engineering Consultancy Company in Global Development

The Prime Minister of India visit to four countries in Africa in July 2016 will help Indian businesses, financing companies and major infrastructure companies penetrate the African continent and help them in their country's growth. WAPCOS a Mini Ratna, Public Sector Company under the Water Resources Ministry has been recognized for its capabilities for evaluation of projects in 30 different countries in Africa, the projects that have been funded through international agencies. WAPCOS has established as to what a good consultancy company, with appropriate support from the government, can do in its overseas operations. The Prime Minister's visit will also provide a thrust for Indian companies to expand in the African continent. All such manufacturing and operational companies will need support from the leading engineering consultancy companies to guide them in planning and execution of their works in Africa. It is not only a case of Africa but also other Central Asian countries where the opportunities are emerging on a larger scale. So, what are CEAI's Members waiting for?

WAPCOS also established that in war torn Afghanistan it could design and construct Afghan-India Friendship – Salma Dam generating 42 MW of power and providing irrigation for 40,000 ha of land. The social engineering to conduct the project has been remarkable. WAPCOS completed the project as per schedule in spite of difficult conditions. How they did will be for someone from WAPCOS to describe; but, the lesson learnt is that Indian Engineering Consultancy Companies can execute projects in most trying conditions?

Business Potential in Sustainable Energy Sector

Energy is one sector where options are emerging on a large scale and therefore I decided to highlight the opportunities at the global level for the members of the Consulting Engineers Association of India. Revolutionary changes are taking place. USAhas planned to install more renewable energy based electricity than fossil energy based electricity generation systems. By year 2030, it is expected that global electricity generation from renewable sources will surpass that from fossil energy. Therefore, in my paper I take authentic data from the World Energy Council (where I am member of different study committees and have contributed in preparation of WEC report), International Energy Agency and the United Nations Development Programme to project the potential of global business that will emerge from now to year 2030 only in the sector of Sustainable Energy Supply.

Low Carbon Energy Perspective

The UN Secretary General, Ban Ki-Moon has called on advertising and creative communication professionals to create the "biggest-ever campaign for humanity" by supporting the 2030 Agenda for Sustainable Development and its Sustainable Development Goals. In his remarks during the 63rdInternational Festival of Creativity, Ban announced the launch of the "Common Ground" initiative by the six largest communications businesses in the world, to support the SDGs and address poverty, inequality and justice.

The International Festival of Creativity took place at the Palais des Festivals in Cannes, France where Ban spoke on 24 June, 2016.

Observing that advertising, marketing and innovative communications professionals "have tremendous power to shape opinions" and "are master story tellers," Ban called on them to make sure the SDGs become the business of all businesses and the business of all people by inspiring everyone to contribute to achieving the SDGs. He called on creative professionals to transform a complex and abstract agenda into "a personal and emotional story about how we can build a better world."

This is the latest effort of the UN Secretary General of involving the professionals into achieving sustainable development goals as a matter of business opportunity. He has been making appeals to different interest groups which include scientists, technologists, engineers, and most important engineering and management consultancy organizations, as they have an important role to transfer knowledge and know-how from one place to another.

The UN Secretary General has been appealing for support from professionals to achieve targets under all the 17 Goals defined as the Sustainable Development Goals. One important goal is that of the Sustainable Energy. This paper looks at the World Energy Perspective in catalysing the low-carbon economy through sustainable energy applications.

Important Issues that Impacted Energy Supply

The World Energy Council has observed that while the industry leaders in 2016 are most concerned about commodity prices, the ongoing effects of economic slow down and continued climate framework uncertainties, issues of new market design and electricity storage are rapidly gaining prominence.

The issues enumerated below were found to be specifically important:

1. *Commodity prices* and associated volatility has replaced energy prices as the number one critical uncertainty on the energy agenda of leaders and experts globally.

2. *Innovation, particular issues of storage,* market design and climate resilience, have become increasingly important drivers of change within the energy transition. This is reflected by the strong move of this group of issues of the energy agenda.

3. *Geopolitical concerns* are closely linked to the current emphasis on commodity prices. Uncertainty around Middle East Dynamics and a higher impact attributed to US policy has assumed increased importance in 2016.

4. *The effects of Global Recession,* which continue to be high on the agenda, are closely linked with the role of China and India and the impact of slowing demand. This is having an impact on the confidence for the energy sector as a whole.

5. *The risk from cyber threats* has moved up the agenda especially in North America and Europe. A clearer understanding of the nature of cyber risks and mitigation measures for energy infrastructure is necessary, in an environment of increasing interconnectivity and emerging technologies.

6. *The effects of exchange rate* fluctuations and currency risk on energy operations and investments show a clear divergence between OECD and non-OECD countries. Emerging markets are affected by the combination of falling commodity prices and export volumes at the same time as a surging US dollar which has put increasing pressure on corporate balance sheets.

7. *The impact of the Conference of Parties (COP 21)* agreement in Paris and the adoption of energy as a UN Sustainable Development Goal have reduced uncertainty associated with the issue of climate framework. However, energy leaders remain cautious about the words being translated into actions without clear price signals.

8. *The latest nationally determined contributions commitment* presented to the COP 21 meeting in December 2015 signal a clear indication of intent. This has increased the expectation for a significant scale up of renewable energies. It has also translated into a reduced level of uncertainty amongst energy leaders moving renewables calmly to the action priority space. Key regional disparities exist; most noticeably for issues of coal, corruption, large scale hydro and nuclear, but also resilience issues such as the energy-water nexus and cyber threats.

Sustainable Energy and Opportunity for Business

The World Energy Council, along with the International EnergyAgency has involved a large number of experts in identifying an approach for low-carbon technologies. The government of India has also conducted studies on low-carbon technologies. Whereas the efforts of the study groups has been to look at the transformation and the funding required for achieving such transformations; and funding required for the energy industry and indirectly to the consulting companies, the outcome of expert consultations creates future indicative scenarios for growth.

Sustainable energy is not only an opportunity to transform societies and grow economies, but also a necessity - a prerequisite to meet growing energy demand and reduce the carbon footprint. That is why it is so important to balance what the World Energy Council defines as the 'energy trilemma', a 21st century policy framework grounded in three critical elements that involve energy,namely:

1. Secure;
2. Affordable; and
3. Environmentally sensitive.

Balancing the three core dimensions of the energy trilemma is a strong basis for prosperity and competitiveness of individual countries. Secured energy is critical to fuelling economic growth. Energy must be accessible and affordable at all levels of society to ensure social stability. The impact of energy production and energy use on the environment needs to be minimised in order to combat climate change as well as local air and water pollution and its implications.

Addressing the energy trilemma presents extraordinary environmental, social, and economic challenges requiring national and international action by not only governments, but also the private sector and civil society. Robust and enabling environments will be required toward these ends, including appropriate technology mechanisms and a global trade and investment regime that encourages and leverages investment, innovation, and technology uptake. Consulting firms have a crucial role in turn-key projects and global trade.

Existing and new technologies are needed to meet post-2015 climate change and development goals and to do so at the lowest possible economic cost. Very often the operational companies and start-ups do not wish to invest in creating their own set-up and will be happy to hire services of a competent consultancy organization for a price directly linked to project cost.

The World Energy Council's 2013 Scenarios highlighted that without these robust and enabling environments electricity generation from renewable energy sources may grow slower and the global economy will be challenged to meet the 450ppm target. The degree to which low-GHG technologies will be used will be decisive in mitigating climate change.

As the world economy and population grow, global energy demand is predicted to increase and even double by 2050. To keep pace with this demand, cumulative investment requirements in electricity generation alone will be between US$ 19.3trn and US$25.7trn between now and 2050. Looking at the broader energy infrastructure, an estimated cumulative investment of US$40.2trn is required across the energy infrastructure supply chain over the period 2014 to 2035 with an additional US$8trn investment needed in energy efficiency. These investment requirements are likely to rise by a further 10% to a total of US$53trn in cumulative investment by 2035 if the goal is set to a 2°C emissions path (a target to limit the average global temperature increases and the resulting climate change). Energy sector has unique combination of many services that need integration of all faculties of engineering and science. The future course has to be climate resilient and therefore US$ 53trn will be spent over the next 20 years. A large amount of this funding will be allocated to projects executed on a turn-key operation. Even if 5% of this amount is assured for consultancy services, then over US$ 2.5 trn will be globally spent. All this will go to experienced companies. CEAI would do well to have a study done for the benefit of its members to understand the global market potential so that its members could transform themselves accordingly.

COP 21 and Support for Innovation

COP 21 has delivered a push for innovation. The Intended Nationally Determined Contributions (INDC) put forward by 185 countries in Paris will further promote the adoption of renewables and clean technologies. 20 of the world's largest economies have also committed to double their clean energy research and development investment over the next five years. This was matched by equally impressive commitment from industry leaders who announced an

intensive innovation drive. Therefore, even without a legally binding deal the necessity for companies to be part of the innovation frontier is a powerful imperative and also a massive opportunity. This climate of innovation is being heightened by attention given to storage and market design issues.

World - Entering Period of Triple Transition

WEC has projected that the world is entering a period of triple transition:

Firstly, the transition of de-carbonization.

Secondly, there is what you might call the "*market design transition*": increasing shares of zero marginal-cost energy from intermittent renewable in combination with the decentralization of systems; increasing use of smart data, and decreasing entry barriers for new suppliers. All of this will challenge the current market logic as the basis to deliver the investments that it takes to keep the lights on at all times. These new realities have impacts beyond electricity and also affect natural gas infrastructure, transport, and other sectors.

Thirdly, there is the *resilience transition*. The impact of extreme weather events, cyber security threats and the energy-water-food nexus on the energy sector are powerful drivers to adapt and innovate.

These transitions will result in different ways of thinking about infrastructure and critical system components. To navigate these transitions with limited resources defined by a sluggish growth context, investors and governments have to be very clear what their strengths and priorities are. In this climate of continued uncertainty and innovation, it is clear that investors around the world would place more emphasis on robust and balanced policy frameworks.

Conclusion

India's Consultancy sector has to step in if it is not to miss the best opportunity it has had in last 50 years, to become a global economic leader. It needs to explore new frontiers of market opportunities and prepare themselves through appropriate skills building to reach such markets before others can enter. Reviews and studies need to be done by on future market growth options and then draw up a perspective for five to ten years. Simultaneously there is also the need to develop reports on capabilities required and their development to be undertaken for making Indian consultancy ready to take up the challenge. The effort should be to widen the membership canvas to bring in larger consultancy organizations and senior domain experts into its fold.

CEAI and its members would need to explore new frontiers dealing with low carbon technology approaches. India has tremendous potential in the form of computing and communication technologies. Infrastructure deficit has been the main reason for inability to develop its economy in general and its human capital in particular. Rapid development in computing and communication technologies have changed the way business and learning can be done. Moreover, the new technology has brought down the cost of production and consumption dramatically. The growing digitization of economy has offered the country an opportunity to leapfrog many stages of development and get to the fore front of the emerging knowledge economy. Technology offers India youth and small enterprises the opportunity to access global knowledge, skills, capital, talent, and market easily and at a lesser cost.

The message is clear that such of the members of CEAI who are not exposed to modern forms of digitization need to be trained on various modern technologies of digitization, so that they are in a continuous dialogue with the global companies and global systems of transformation. They have to build linkages with international consultancy companies so as to bring in the latest operational and management practices and thereby become not only globally competitive but attain a position where they can provide better quality services at lower cost.

CEAI members have opportunity of growth in conventional sectors of operation in energy supply and management. However, the emerging scenario also opens consultancy opportunities in management of cyber threat; extreme weather risks; and energy-water nexus.

Intelligent Control and Monitoring of Electrical Power Systems

Ms D Geethalakshmi
Project Manager,
Tata Consulting Engineers Ltd

INTRODUCTION

The Electrical Power industry is growing at a fast pace all across the world to meet the ever increasing demand as a consequence of growth in population and economy. According to The World Bank statistics the present average per capita consumption of electrical energy per annum may have exceeded 3500 kWh, while in India it is about 950 kWh. The present total installed capacity in India is more than 300 GW, and the average growth in demand over the decades is in the order of 10% per annum. It is likely to increase further as the economy expands coupled with the increasing demand from digitisation and automation. Under this scenario, optimum management of power at all levels i.e. generation, transmission, distribution and utilization is very crucial, in order to realize the goals of economy, efficiency, reliability and quality. The operation and management of power systems can be envisaged at four levels, viz.

a) in the industries such as metal works, chemical industries, refineries, mills, and various other manufacturing plants,

b) power distribution systems for supplying power to domestic and commercial consumers,

c) power transmission systems which carry bulk power to the consumers from generating sources, and

d) power generation plants.

Control and monitoring of the electrical system in each of these constituents play a vital role in securing the aforementioned goals. This article focuses mainly on the intelligent control and monitoring of electrical power systems in generating stations and in plants using intelligent electronic devices (IEDs).

ELECTRICAL SYSTEM - OPERATION AND MANAGEMENT

Efficient management of the electrical system requires fast clearance of faults, as well as rapid and accurate acquisition & analysis of large amount of data and information about all the equipment and system parameters. Critical functions which are generally handled in electrical system are:

Protection – Protection to equipment and systems against short circuit faults by quickly isolating the faulty section from the rest of the system so that the fault causes minimum damage to equipment and disruption of services and the system is restored into stable regime.

Control – Commands from remote locations to switch ON/OFF generators, transformers, circuits, changing of transformer taps, changing of set points of governing systems and excitation systems. This function also include interlocks for safe operation of equipment, based on position of switching equipment such as circuit breakers, isolators, earth switches etc. or of rotating equipment based on temperature, flow and pressure of cooling fluids, speed, vibration, etc.

Monitoring – This function includes monitoring the state of equipment and annunciating the abnormalities. Some of the critical parameters that are monitored are i) wrong position of selection switches ii) trip circuits and trip relays, secondary circuits of voltage transformers, auxiliary power supplies powering protection and control circuits, iii) operation of protective devices and excursion of parameters like current, voltage, frequency, temperature, etc beyond permissible limits iv) failure of running fans and pumps which may be part of auxiliary system.

Metering – Measurement of electrical parameters which define the performance of the equipment/system. The common parameters which are generally measured are current, voltage, active power & reactive power and energy, range of fundamental and harmonic frequencies, power factor etc.

EVOLUTION OF ELECTRICAL SYSTEM CONTROL

Hardwired Control

In early days, all plant control & monitoring of electrical system were normally carried out manually through hardwired control panels which required several discrete devices for each function like, i) Control: Control Switches, Mimics, ii) Monitoring: Contactors, auxiliary and multiplication relays, Indicating lamps, hooters, annunciation windows, iii) Metering: Meters, transducers. Protection was also conventional through simple fuses for low voltage system and electromechanical or static relays for medium and high voltage system.

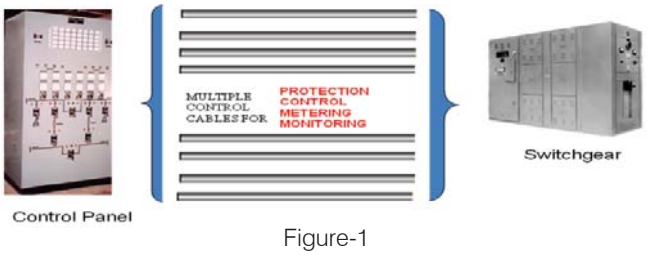


Figure-1

In addition to discrete devices used for control, monitoring, metering and protection this approach had other limitations such as i) Interconnection cabling between panels were large in number, the total length of which could run into several kilometers ii) Interlocks required to ensure safe operation was hardwired which required further cabling iii) Testing and trouble shooting was complicated and time consuming iv) Design and engineering time requirement was high.

SCADA/DCS Control

Later, the advent of digital and microprocessor technology brought about a shift in control system from hardwired control panel to Distributed Control System (DCS)/ Supervisory Control and Data Acquisition (SCADA). Control commands from DCS/SCADA were executed through Digital Output (DO) modules at DCS/SCADA and interposing relays at switchgear. Metering parameters were transmitted from the switchgears to the DCS/SCADA using transducers which converted analogue signal to 4-20mA, 0-5V signal suitable for DCS/SCADA. On the receiving end at DCS/SCADA these signal were received through Analogue Input (AI) modules. Similarly for monitoring, handshaking took place between switchgear and SCADA/ DCS using Digital Input (DI) modules at SCADA/DCS end and auxiliary relays at switchgear end. Thereafter, Microprocessor based Numerical relays took over the protection function of electromechanical relays and static relays.

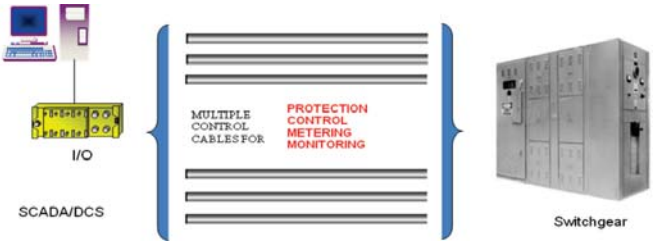


Figure-2

Though this system provided enhanced facility like easy diagnostic, event logging, storage of historical events and alarms, report generation, etc., it involved many digital and analogue modules and other discrete devices like auxiliary relays, meters, transducers and interposing relays. The amount of cabling involved in this system also was still considerably large.

Control using Communicable Intelligent Numerical relays

Continuous development of technology led to the electronic device utilizing digital signal processing technique culminating in the convergence of all four critical functions i.e. protection, control, metering and monitoring into one single device. Numerical relays which were hitherto addressing only protection as their key functionality, enhanced into an intelligent electronic devices making possible protection, control, metering and monitoring in single device. Communication capability of these Intelligent Electronic Devices (IEDs) made possible transmission of commands/signals between the IEDs to the Central DCS/SCADA through a pair of copper cable or fiber optic cable thus eliminating a large amount of cables.

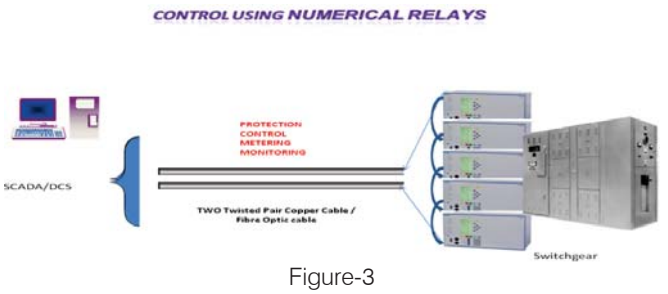


Figure-3

Control: Control commands from remote (DCS/SCADA) are transmitted to the breaker using the controller inbuilt in the numerical relay through data link. Discrete DO module and interposing relay which was required for a single command eliminated and binary output of Numerical relay used to convert soft command signal to electrical signal to the breaker.

Monitoring: The feedback status signals and all other monitoring parameters of the switchgear are transmitted to remote DCS/SCADA using binary input modules built in the numerical relays through the same data link.

Metering: Numerical relay built in with metering functions facilitates communication of the metering parameters of the feeder to DCS/SCADA through analogue input modules of the numerical relays.

BENEFITS OF INTELLIGENT NUMERICAL RELAY CONTROL AND MONITORING

This intelligent control through intelligent numerical relay termed as Intelligent Electronic Devices (IEDs) yields multi fold benefits such as savings in cost to owners and savings in time for execution of project. There is considerable savings in i) cost due to reduction in huge amount of control and instrumentation cables, reduction of bulk materials and discrete devices, ii) civil costs by obviating the need for building trenches, cable vaults, etc., iii) inventory cost savings and iv) O & M cost also gets reduced.

Likewise appreciable time reduction is possible in i) engineering time, ii) factory inspection time, and iii) site erection and commissioning time.

Operation and Maintenance costs reduce on account of i) lesser devices to be maintained, and ii) simplicity in operation and maintenance.

Other important advantages are adaptability, whereby the schemes relating to the four main functions permit easy modifications to suit changes in the primary system and scalability, which enables easy and seamless integration of future expansions with existing systems.

IMPLEMENTATION OF INTELLIGENT CONTROL AND MONITORING

Two key challenges in this intelligent control and monitoring are the protocols used for communication and architecture which decide the connection of numerical relays to DCS/ SCADA.

Protocol

Serial Protocols: Initially various manufacturers developed and used protocols which were proprietary in nature. Subsequently MODBUS and PROFIBUS, which were serial protocols, became popular for numerical relays. Though these protocols were meeting the basic functional requirement of communicating to remote SCADA/DCS and performing the control, metering and monitoring, there were many limitations like non-interoperability, low communication speed, time tagging message restrictions, etc. These limitations were a serious deterrent to the complete use of the capabilities of intelligent devices.

IEC Protocols : Later the International Electro technical Commission (IEC) began work on developing a protocol which enabled devices of different manufacturers to be linked together to form a common network and produced the 60870-103 protocol. Though this protocol met the requirements of electrical power industry and was used by all IED manufacturers, it being a serial protocol the speed was still a limitation with 19200 baud rate. Besides, when a series of IEDs are connected in a Local Area Network (LAN) to remote master i.e. SCADA/DCS, the master should poll the IEDs in a cyclic manner which ultimately increases the overall response time, while fast response is very critical in the control and monitoring of power systems.

IEC 61850: Subsequently the Electric Power Research Institute (EPRI), the Institute of Electrical and Electronic Engineers (IEEE) and IEC came together with the aim of developing a new protocol to address all the lingering issues that were present in the previous protocols. Thus was developed the latest IEC 61850 protocol, which is now used widely in Numerical Relays (IEDs) as well as in SCADA system. IEC 61850 is an Ethernet based network protocol which guarantees interoperability between devices offered by various manufacturers, high speed with enhanced

functionalities and features, and makes it fully possible to interconnect the IEDs in LAN network and utilise the control and monitoring functionalities effectively.

System Architecture:

The system architecture which is generally adopted is either ring or star configuration. With these configurations the signal exchange between IEDs and from IED to master Server, support simultaneous communication to master. LAN redundancy can be achieved by various methods. Rapid Spanning Tree Protocol (RSTP) was one such protocol which was generally followed by many manufacturers at the earlier stage.

In Star architecture, the signal exchange between IED and the Ethernet switch take place through one link, and in an event of failure of the link, it is detected by the Ethernet switch and changeover takes place immediately through another link.

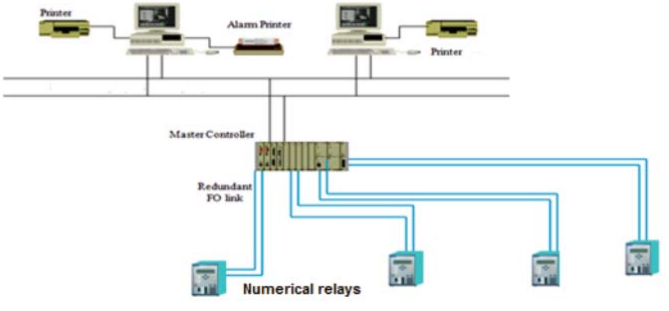


Figure-4

In ring architecture, the ring is kept open at one point which is called as a logical break; communication takes place over both sections of the ring up to logical break. The Ethernet switches will be active on either side of the break. When there is a cut in any part of the ring, the switch at the logical break will close and the communication is maintained without interruption over two sections on either side.

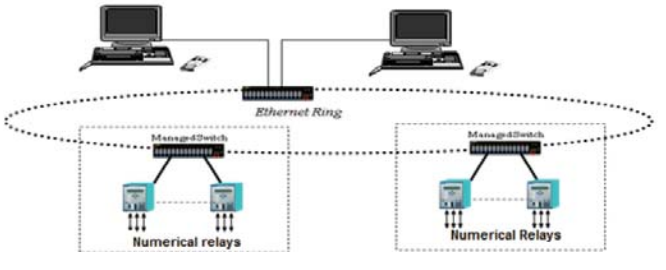


Figure-5

LATEST DEVELOPMENTS

Highly available and redundant network

As the requirements became stringent and warranted signal exchange within specific time window, it was recognised that the RSTP protocol may not meet the specific requirements for critical messages due to network recovery time after failure of network components. IEC 62439-3 which addresses this need was developed, through two protocols which are currently being adopted by IED manufacturers, Parallel Redundancy Protocol (PRP) and the Highly Available Seamless Redundancy Protocol (HSR).

These two protocols provide highly reliable network for mission critical messaging and redundancy to protect against failures.

PRP: Equipped with two redundant and independent networks. All IEDs and the master server are connected to both the networks and thus the messages are published to both the networks. The Server accepts the 1st message and discards the other mirrored message. If there is a failure in any one of the network, the message is seamlessly communicated to the server through the other network. Thus through PRP, zero data failure is achieved. PRP allows seamless switch over between networks with no loss of data.

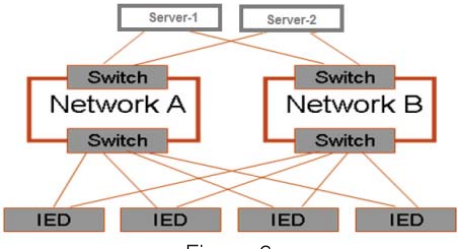


Figure-6

HSR: Unlike PRP, this protocol uses only one ring network wherein all IEDs are connected in a ring topology using two ports, without any Ethernet switches. Here the data is sent in both directions. Similar to PRP, the Server accepts the 1st message and discards the other mirrored message. If there is a link failure in the network, the message which travels on the other direction reaches the server, thereby ensuring the redundancy required. As LAN switches are not supported in HSR ring, an option is to connect LAN switch to the HSR ring is through RedBox which acts like a dual node on the HSR ring. Thus high availability is also achieved through HSR network which is simpler to install and manage.

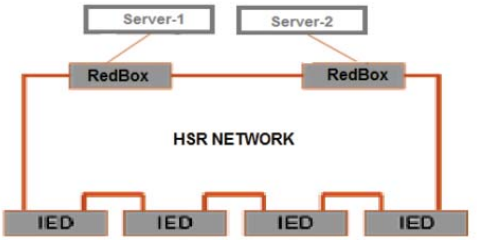


Figure-7

Both PRP and HSR are widely being applied in IEDs to achieve a high availability network. The selection between two, normally depends on the cost, size and complexity of the network. For small, simpler and low cost sub stations, industrial power system, power distribution networks, HSR may be the adoptable economic option as low cost and simpler network model are the key merits of this architecture.

PRP is generally employed in complex transmission and large substations as well large power system network where capital cost is not a limitation.

Process Bus Communication

Extending the intelligent control and monitoring to HV/EHV substations, conventional method of data exchange between the field equipments i.e. outdoor circuit breaker, isolator, current transformer & voltage transformer and the IEDs is through hardwired cables whereas upstream communication is through LAN network as discussed above by means of adopting any one of the network topology. Though upstream end cabling is substantially reduced in this, field end cables still remain a large amount in this approach.

With further technology advancement in SCADA and IEDs and also introduction of optical current and voltage transformers paved the path to extend the digitised data exchange up to the field. This has been addressed in IEC 61850-9-2 which is about Process Bus communication.

In Process Bus, digitization starts at the field level, Intelligent Interface Units located near the equipment in the field act as an interface for digitising the data from field and further transmitting to upper level IEDs in Control Room. Similarly metering interface units are used in the field which convert the current and voltage signal from conventional current and voltage transformer into digital signal and transmit to the IED and then the SCADA server. Further the latest evolution of optoelectronic technology in current and voltage transformer enhances the metering data exchange efficiently and precisely through optical sensors built in the optical current transformers and voltage transformers.

Conclusion

The IEC 61850 protocols, which govern the present state of art in station level communications between devices used in control and protection gear of electrical power systems, have gained wide acceptance among manufacturers and users. But its extension to switchyard equipment such as instrument transformers, circuit breakers and isolators is making some progress. Similarly replacement of electromagnetic instrument transformers and capacitor voltage transformers with optical instrument transformers may be some years away. The issues that need to be addressed in this regard are the transient behaviour and speed of the network, total end to end redundancy, monitoring of the entire network and all its constituents, which will ensure that a single failure in any one of them will not seriously cripple the systems of protection and control and reduce the level of safety of operation.

Golden Jubilee Celebration of Goa Engineering College

Mr. Mainak Ghosal
Consultant,
Banking & Construction Industry

Goa Engineering College was founded in 1967 and the year 2016-17 marks the Golden Jubilee year

The event to celebrate was supported by the International Conference on Advances in Concrete Technology, Materials and Construction Practices in collaboration with Government Polytechnic, Bicholim and University of Bath, UK. The event was also an outcome of United Kingdom India Education Research Initiatives (UKIERI) project on "Development of structural concrete with plastic waste as partial replacement of sand".

The event was inaugurated by Mr. Narayan V.Nayak, Principal Advisor, Gammon India Limited. The subsequent year long celebrations inaugurated by the Defence Minister Mr. Manohar Parrikar, in the presence of the Chief Minister Mr.LaxmikantParsekar, Minister for Public Works Department Mr. Ramakrishna 'Sudin' Dhavalikar, and the South Goa MP Mr. Narendra Sawaikar at the Kala Academy on July 9, 2016.IIT Goa, will commence from Goa Engineering College this year.

The International Conference was held in the presence of GEC Principal Dr.V N Shet,Director of Technical Education,Goa Sri VivekKamat plus dignitaries and experts from the industry,IITs and reputed institutes from India and abroad. Overall 65 Technical Papers were presented including the Keynotes, which were supported by Cultural programs.

For the first time in the history of international engineering conferences in India there was a session on "Nano-technology Applications in Concrete". The conference also had exhibition stalls where products were displayed by ACC, MC-Bauchemie, etc.

Release of Proceedings on Advances in Concrete Technology,
Materials and Construction Practices at Goa Engineering College,Farmagudi,Goa.

CEAI NEWS

TRAINING COURSE ON FIDIC CONDITIONS OF CONTRACT

CEAI is glad to announce its next **Training Course on "Practical Use and Administration of FIDIC Conditions of Contract"**on 23rd and 24thAugust, 2016 at the India International Centre, New Delhi.

The training willbe conducted by Mr. Bogdan Oprea, an accredited FIDIC trainer who is popular among the participants.

The two days training course is aimed at providing a broad insight into Project Contracting Strategy, Key Areas for Management of Projects, Financial Aspects, Risks, Claims and Management of Disputes as per FIDIC documents, 1999.

For more details about the training course please contact CEAI Secretariat or visit CEAI website www.ceai.org.in.

REPORT ON SEMINAR HELD BY EASTERN AND NORTH EASTERN REGIONAL CENTRE AT KOLKATA ON 3RDJUNE 2016

With the rapid widening of Road and Railway network across the country, under the intense drive to strengthen the infrastructure by the Government of India, the need for building grade separated crossings on a fast track are on the rise. Recently an important Rail Over Bridge (ROB) has been built, across avery busy and wide Railway Station and yard, at Burdwan on the Eastern Railway, about 100 km away from Kolkata. The project could be completed successfully, ahead of planned completion time, by adoption of a single span crossing, using Cable Stayed Bridge solution, without a single accident and safety breach. The project benefited from close effective cooperation between two Consultants, appointed separately by the client and the Construction agency, and excellent teamwork by the client, contractor, and the project management team.

The success of this project prompted the Eastern and North Eastern Regional Centre of CEAI to hold a half day Seminar on the theme "**Innovative Solutions for Bridging across wide spaces like a Railway Yard**", on the afternoon of Friday, June 3rd 2016 at The Taj Bengal Hotel, Kolkata. The Seminar was supported by GPT Infraprojects Ltd, the Construction agency appointed by the client RVNL who were the Lead Sponsor.

The event was immensely successful, with enthusiastic participation by the senior engineering officials from Railway and Roadway authorities, delegates from academic bodies and sister Institutions like IAStructE, IEI, Builders Association of India, working Consultants and Contractors in the Region and Members of CEAI.

Presentations were made by leaders of the stake holding teams from Clients, Contractors, Consultants appointed by both clients and contractors, Specialist International agency appointed for supply and stretching of cables and Monitoring agency.

The Inaugural Session was chaired by Mr Sudhir Dhawan, President CEAI, and addressed by Mr Satish Agnihotri, CMD, RVNL, Emeritus Professor Dr.Prem Krishna,Roorkee University, Mr R D Jaruhar, Member Engineering, Railway Board (Retd) and Mr. Amitabha Ghoshal, Chairman, ENERC, CEAI. It was anchored by Mr.SutanuGhosh , Secretary, ENERC. CEAI.

Inaugural Session

View of Audience

EMPANELMENT OF CONSULTANTS WITH MES

Members wishing to empanel with Military Engineering Services (MES) may do so through their website www.mes.gov.in under head 'General Information' and subhead 'Misc General Information'. The Standard Operating Procedure (SOP) for new empanelment are given on it's page 92.

AWARDS & ACCOLADES

The 9th IIT BHU Alumni Excellence Award Function was held on the 7thMay 2016 at the PHD Chamber of Commerce, HauzKhas, New Delhi. The Institute IIT BHU (earlierknown as IT BHU and BENCO) is a 99 year old institution of excellence.

Life Time Achievement Award was presented to Mr. Umesh Shrivastava, Governing Council Member of CEAI and Chairman of Holtec Consulting Pvt Ltd for his significant achievements in the field of Management and Entrepreneurship.

The Chief Guest and Guest of Honour was Professor Ved Prakash, Chairman UGC. The Award Ceremony comprised of 4 categories namely Life Time Achievement Awards, Distinguished Alumni Awards, Young Achievers Awards and Jury's Award.

TERMINATION OF MEMBERSHIP

The Governing Council of CEAI at its meeting held on 25th June 2016, decided to strike off the names of members who are in arrears for more than three years.

Accordinlgy a notice of Termination of Membership was issued to all such members through Registered Post. Many of the members responded and cleared their arrears and paid the subscription

The names of members who did not respond are being removed from the Register of CEAI membership.

BCC&I INFRASTRUCTURE SUMMIT 2016

TThe Bangal Chamber of Commerce and Industry is organizing above submit in association with Consulting Engineers Association of India on September 29, 2016 at Hyatt Regency, Kolkata.

PROPOSED FORMATION OF INDIA INFRASTRUCTURE INTERNATIONAL PRIVATE LIMITED (3i)

Introduction

Ministry of Road Transport and Highways (MORTH) proposes to form a new company known as 3i for export of consultancy services and for undertaking construction projects in foreign countries. The main field of operation will be roads, bridges and ports. CEAI is proposed to be one of the participants in this new venture.

Structure of Company

The company will be primarily run as a private enterprise with limited role of government.

The Authorised Capital of the new company will be Rs. 20 crores

The percentage equity for different promoter constituents envisaged will be as below:

- Government of India - 20%
- ASSOCHAM - 19%
- FICCI - 19%
- CII - 19%
- CEAI - 7.66%
- NHBF - 7.66%
- IPPTA - 7.66%

Participation of CEAI

There are few issues to be deliberated and resolved.

I. Memorandum of Articles (MOA)

- MOA of CEAI stipulates that CEAI is a non profitorganisation registered under the society act. In principle, CEAI cannot participate in any profitable business.

II. CEAI does not have its own fund to make contribution of Rs. 1.532 crores in the equity.

Although our members have been kept informed on this development from time to time through mail, a committee nominated for the purpose is looking into this issue and interacting with MORTH and other proposed partners.

The process is on going and any further development on the issue will be intimated to the members.

NATIONAL AWARD FOR YOUNG ENGINEERS 2016

The last date of submission of entries against above national award has been extended from original date of July 31, 2016 to August 31, 2016, to enable other contenders to participate. Please send your nominations.

This is for the information of members/ likely participants.

FIDIC NEWS

TRIP TO EXOTIC QUEENSTOWN, NEW ZEALAND

Amitabha Ghosal
Governing Council member, CEAI

(This is a brief report on the FIDIC ASPAC conference held in the month of May this year, that the Author attended, representing CEAI. Next year, 2017, FIDIC and ASPAC will jointly hold their Annual Conferences in INDONESIA. It will be desirable for CEAI to be well represented in this conference as ASPAC is a body where CEAI can have some controlling say, and Consultants from India can use this forum as a platform for spreading business to the ASPAC member countries.)

Queenstown is the most favorite tourist destination in New Zealand, with snow capped hill range, like the Alps in Switzerland, providing the backdrop and picturesque Fjords bordered with steep rocky hills in its immediate outskirt. Jetties on the TasmaniaBay, in the West, provide berthing facilities for Ferry boats going to Antarctica in December, that being the height of summer season. The town has a stable population of 22000, but hosts more than 40000 tourists during the Ski season.

This was the venue of the ASPAC FIDIC 2016 conference in the beginning of May (8th to 10th), organized by the Association of Consulting Engineers of New Zealand (ACENZ), and they made a roaring success of this event. This was the first time that ASPAC (Asia Pacific Countries of FIDIC) annual conference was being held outside Asia, and New Zealand, even though a small country with small population by Asian standards, proved to be grand hosts.

The theme of the conference, GLOBAL SHIFT, was itself intriguing and left delegates curious till the commencement of the event. The technical content was formatted differently from normal conferences, in that no general invitation was issued for submission of papers, and all presentations were by pre selected delegates, drawn from a wide spectrum of disciplines, many, other than Engineering. The presenters were allocated about half an hour time and were given freehand to chose their own subject, keeping in tune with the theme.

The Inaugural Session was graced by the Lady Mayor of Queenstown and the key note speaker was Ambassador of Japan at New Zealand, H. E. the Ambassador ToshihishaTakata. He made a video presentation highlighting the 'SHIFT's that are taking place in the Global field, affecting inter-relations between countries and people around the world.

Inaugural Session concluded with a live dance cum song program by Kiwi Haka, a cultural group of the Maori tribals, made more interesting by floor interaction.

The prestigious line up of speakers included three members of Parliament of New Zealand, from different political parties, including one minister; eight heads of Industry Associations form Canada, Australia and New Zealand, that covered Consultancy, Contracting, Transporters, and Real Estate developers; three business heads; two Academics; one each Motivational Business speaker, Business specialist and Comedian! It was quite a heterogeneous crowd, but linked by the thread of their vision for the SHIFT that is happening around us and that, perhaps, is going to happen in the future.

Deliberations moved around SHIFTS in Social Values, Professional Ethics, Leadership Challenges, Human Resource and their optimum use, Academic Atmosphere, Global Energy scenario, Cyber Security and other related topics.

Way forward was attempted to be charted on how to grapple with Global Shift of Technology and Internet of Things.

The Concluding Session was attended by Jaewan Lee, President of FIDIC, Liu Luobing, Chairman ASPAC and KerynKliskey, ACENZ President.

FIDIC ONLINE TRAINING COURSES

FIDIC is launching, in September 2016, a complete *Online Training Programme*, starting from the basic Module 1 and moving on to modules 2, 3 and 4. Each of thethe four modulesmay be attended separately. However, a 15% Discount willapplyif a personRegister'sforthe entire Programme.

The September 2016 proposed online modules are: the Module 1 on Practical Use of the FIDIC Contracts, Module 2: Claims and Disputes Resolution course, Module 3: Understanding DABs and Module 4: FIDIC Contracts Management and Administration course.

During 2017 additional online courses will be offered by FIDIC:

Training Course Advanced – Red and Yellow Book in February 2017:An advanced training programme especially designed for Consulting Engineers, Contractors, Quantity Surveyors, Public Contract Administrators or other professionals involved in construction work and contracts administration. The course programme is based on case story of a large WB financed construction project; the various contract clauses are illustrated through their application, ensuing conflicts and disputes and the possible solutions.

Young Professional Management Training Programme

The**Young Professionals Management Training Programme**is an intensive management training programme based on case studies and discussions of management issues within an international team of participants and mentors. The programme provides international networking and active participation in the annual FIDIC conference meeting key representatives of the world wide consulting industry.

The YPMTP training programme consists of lectures, case work, classroom sessions and 5 days face-to-face sessions prior to the FIDIC Conference. The programme is divided into three main subjects:

- Case 1 Organization and Human Resources Development
- Case 2 Business Development Framework
- Case 3 Business Development Instruments

The programme also includes two lectures on White Book: Client/Consultant Model Services Agreement. For each case FIDIC has appointed a Mentor who will follow the work and comment on your findings. Fluency in written and spoken English is a condition for successful participation.

The next course will start in February 2017. See more details at:http://fidic.org/ypmtp2016

MALITH S. MENDIS – FIDIC ACCREDITED TRAINER

Mr Malith S. Mendis is the first FIDIC Accredited Trainer from the sub continent.

CEAI is in touch with him to see if his services can be utilised to conduct training program on FIDIC Conditions of Contract at Chennai and Bangaluru at economical cost to benefit larger spectrum of users.

Mr Mandis is M.Sc (Engg.) from UK, member of many associations/ committees and is

- FIDIC Accredited Trainer
- FIDIC Trained Adjudicator
- Member of Dispute Resolution Boards
- Country Representative – Dispute Resolution Board Foundation
- Consultant Project Manager & Contract Administrator

He has conducted Contracts Workshops in Sri Lanka, Maldives, Timor Leste, Brunei, Fiji, Seychelles, Samoa, Solomon Islands.

OTHER NEWS, VIEWS & NOTES

AFGHAN –INDIA FRIENDSHIP DAM

(The success storey of Afghan Indo Friendship Dam has been compiled by WAPCOS Ltd (a Govt. of India undertaking). M/s WAPCOS is a Member of CEAI)

June 4, 2016 is a redletter day in the annals of India's brotherly relations with Afghanistan. On this day, the President of Afghanistan, Dr. Mohammad Ashraf Ghani and the Prime Minister of India, Shri Narendra Modi jointly inaugurated the Afghan-India Friendship Dam at Herat.

The significance of this event, marking the completion and commissioning of what was earlier known as Salma Dam, since renamed by the Afghan President, goes much beyond simply building a dam for irrigation and electricity purposes.

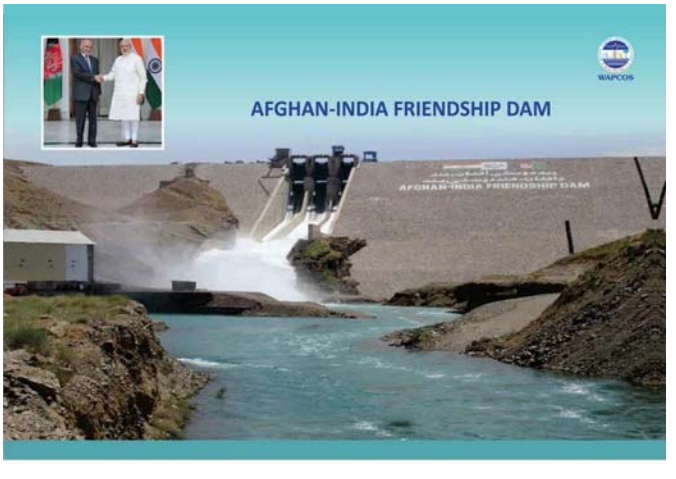
It encompasses the entire gamut of India's historical, cultural, strategic and people to people ties with Afghanistan.

The story of the Dam started about 40 years ago during the tenure of the late Afghan President, Mohammad Daud Khan. In 1976 at the request of the Afghan Government, a team of water resources experts from India had been deployed to the Salma Dam site. Planning work for building a storage dam and hydro power plant at this site, started after this visit. However not much could be achieved on ground following the Soviet intervention in the country. The deteriorating security situation in Afghanistan following the massive opposition to the Soviet presence, and subsequent Taliban takeover of the country, ensured that no further progress could take place on this project in the rest of the twentieth century.

With the installation of an independent, secular and democratic government in Afghanistan in the early part of this century, India was again invited to renew its work on the project. The public sector firm, WAPCOS Limited was assigned this massive dam project by the Ministry of External Affairs on a turn –key basis. WAPCOS deployed manpower and equipment on the ground in 2004. However, it took a little over a decade to complete this unique infrastructure. To begin with, the project site was located in remote area, about a hundred and sixty kms from Herat, connected only by a unpaved road. Secondly, all equipment necessary for construction and installation of the dam, the powerhouse and electricity distribution system had to be sourced from India and/or neighbouring countries, and transported through a circuitous route to the site. Since Pakistan does not allow transportation of goods from India through its territory to Afghanistan, equipment manufactured in India had to shipped firstly to Bandar Abbas port in southern Iran, and from there by road to the Iran-Afghanistan border, almost 1200kms away, and then again to Herat, which is another 200kms from the border, before reaching its final destination at the project site east of Herat city. The dam site on the Harirud River also presented several engineering challenges to be overcome.

As if, these problems were not sufficient by themselves, the WAPCOS team had to face grave security issues too. To start with, areas around the project site were dangerous as they had been mined during the civil war period. Moreover, forces opposed to the Afghanistan Government, mainly consisting of Taliban and other extremist groups, who are

against any form of development for the country, were hell bent on preventing the project to be completed. Such disruptive elements consistently made attempts to destroy and disrupt the project work, including kidnapping, extortion and killing of workers and security personnel. In 2013, Afghan security forces discovered 1300kgs of explosives in the vicinity, apparently to blow up the dam. Fortunately, preventive action by the security personnel prevented any damage to the structure. The security situation was so bad, that since early 2011, the Afghan authorities stopped Indian personnel travelling to and from the project site to travel by road. Instead Indian personnel were transported to and from the project site once a month by helicopter from Herat. Added to these challenges was the fact of unprecedented floods, snowfall and a cloud burst, which setback work already done on the project by several months at a time. Given the above scenario, it is no wonder that it took an unusually long time for completion of the project. It is a tribute to the selfless work done by engineers, experts and technical personnel deployed by WAPCOS, both from India and some recruited locally, despite the dangers and hardships at a remote site, that the Afghan-India Friendship Dam stands today in defiance of all those who tried to curb its construction. The Dam also owes its presence to the brave Afghan soldiers and security personnel who, at great personal risk and loss, ensured that not a single Indian brethren was harmed during this tumultuous period.



The Afghan President, Dr Ghani in his address at the inaugural ceremony conveyed the profound gratefulness of the people of Afghanistan, of Herat, and of the residents of Chist-e- Sharif, to India for overcoming several hurdles and bringing to reality the 40-year dream project, to illuminate Afghan homes and to water their lands. He noted that with the inauguration of the Afghan-India Friendship Dam, the first generation of large India-assisted projects is complete, Afghanistan hopes to launch the second generation of such large and sustainable projects. He also noted India's continuing assistance in other iconic projects like the Parliament Building in Kabul, the Delaram- Zeranj Highway, over 200 other small and big projects, and education scholarships which have benefitted over 17,000 Afghan youth.

The Dam in the Chist-e-Sharif Province of Afghanistan signifies another major historical, cultural and religious connection with India. Sufism, propounded by KhwajaQutubuddinMawdudChisti and other masters like him, travelled from this region to India over 600 years ago. Ultimately, Sufism which propounds peace, tranquillity and brotherliness among people of all faiths found its way to India, with major centres at Agra, Delhi and Ajmer, attracting thousands of followers in India and from the region. In building the Dam, India has honoured its historical debt to the Afghan people.

Herat, where the inauguration ceremony took place, was destroyed eight times in its long and chequered history. Each time it has risen above the ruins, proudly standing before mankind with unwavering determination. Similarly, while there are certain evil forces determined to stop and destroy projects like the Afghan- India Friendship Dam, which signifies progress and prosperity, equally, the people of Afghanistan are determined to rise above such narrow considerations. India has shown that it will stand shoulder to shoulder with its Afghan brethren and deliver what it has committed, no matter what the cost.

NEW SEMINAR / CONFERENCES

CEAI is the Supporting Partner for the following events.

1. WORLDBUILD-India event at Mumbai Exhibition Ground, Mumbai to be held on April 20 to 22, 2017.
2. Indian Cement Review magazine and Cement Manufacturers Association arehosting CEMENT EXPO - 9th International Exhibition and Seminar on 8 &9 December 2016at Nehru Centre, Mumbai.

3. Municipalika Smart and Sustainable Cities, 14th International Exhibition and Conference on Smart and Sustainable City Solutions, from 18th to 20th May 2017, at CIDCO Exhibition Centre, Navi Mumbai.

4. 10th World Aqua Congress being organized by AQUA Foundation on 24th – 25th November 2016 at India Habitat Centre, New Delhi.

5. ET-ACETECH hosting Pan India shows in Bangaluru, Mumbai, New Delhi & Ahmedabad between October 2016 to January 2017

6. 4th Annual South Asia Transport Infrastructure Conference on September 19-20, 2016 at Shangri-La's Eros Hotel, New Delhi.

7. Powder and Bulk Solids India 2016 Exhibition and Conference for Material Handling and Processing on October 13 – 15, 2016 at Bombay Convention and Exhibition Centre, Mumbai.

8. The Big 5 Construct India for 4th Annual edition of International Exhibition on Construction Industry to be held at Bombay Exhibition Centre, Goregaon, Mumbai on 28 to 30 September 2016.

IBC AWARDS FOR EXCELLENT IN BUILT ENVIRONMENT

Indian Buildings Congress (IBC) invites entries for 'IBC Awards for Excellence in Built Environment 2014-2015 in the categories (i) Buildings including individual residential units (ii) Institutional Campuses (iii) Industrial Structures (iv) Rehabilitation/ Retrofittings of Buildings (v) Infrastructure Projects. These awards will be presented during IBC's 21st Annual Convention to be held in September 2016 at New Delhi.

Entries are invited from members of IBC, professional bodies, Building Departments of Central/ State Government Departments, Housing Boards, Architects, Public and Private Sector organizations, etc. who have completed such projects during last five years (i.e. from July 2010 to June 2015) or developed /adopted innovative technologies during that period in the above categories.

Entries will be accepted only for structures which have been built and for Technologies developed/ adopted by organisations/ institutions/ individuals in India. An organization/ individual may submit only one entry in one category.

One award in any of the above categories will be given to a young professional below the age of 35 years.

Entry fee of Rs 10,000/- per entry plus Service Tax @ 15% is payable through DD or Multicity Cheque in favour of 'Indian Buildings Congress'.

For more details, please contact Mr Pradeep Mittal, Honorary Secretary, Indian Buildings Congress, Sector VI, R K Puram, New Delhi 110022. Ph: 91 11 26169531, 26170197. Email: info@ibc.org.in.

OBITUARY

Mr. K.P. Pradeep, Founder, Editor-in-Chief & Publisher, The Masterbuilderleft for his heavenly abode on 11th June 2016.

The Governing Council of CEAI at its meeting held on 25th June 2016 expressed its deep regret at the sudden and untimely passing away of Mr. K P Pradeep,They observed a 2 minute silence in homage and honour to the departed soul and prayed that his soul rests in peace.The Members present recalled the role of Mr. Pradeep in promoting the activities not only of CEAI but other associations as well,bybeing media partner for various events and also supporting them through his interactions with various persons, agencies and bodies.

VIEW POINT

Input from Members

The next issue of the View Point will be published in November 2016. Members are requested to send articles and other material for incorporation in the next issue of View Point by 15th November 2016. The material could inter alia comprise:

- Technical articles
- Photographs of current or completed projects (completed in last one year)
- Awards received by an individual/ organization

CONSULTING ENGINEERS ASSOCIATION OF INDIA

CODE OF ETHICS

PREAMBLE

Engineering Consultancy Services make significant contribution to Sustainable Development of the Nation, and in safeguarding health, happiness and safety of the Society.

For the Nation and the Society to derive maximum benefits from the Engineering Services, it is essential that, in addition to being of high technical standard, these services are of the highest universally accepted moral and ethical standards.

With a view to achieve this objective Consulting Engineers Association of India (CEAI) has framed a "Code of Ethics" which is mandatory for all members of the Association to follow.

This Code presupposes that every member of CEAI is basically a law abiding, truthful, honest, fair and just citizen of the Society. In addition, the member must follow directives of the Code in his/her Professional Practice.

THE CODE

Each CEAI Member shall:

Responsibility to Society	1. ensure that his/her professional service safeguards and enhances health, happiness and safety of the Society. 2. ensure that his/her professional service upholds the principles of environmentally sustainable development. 3. refrain from expressing in Public an opinion on a professional subject unless he/she is sufficiently informed on the facts relating to the subject.
Responsibility to Profession	4. at all times, uphold the dignity, standing and reputation of the Profession.
Competence	5. maintain knowledge and skills at levels consistent with development in technology, legislation and management, and apply due skill, care and diligence in the services rendered to the client. 6. refrain from performing any services unless competent to perform the same.
Integrity	7. act at all times in the legitimate interest of the client and perform professional services with integrity and faithfulness. 8. act with fairness and justice between his/her client and the vendor in all matters pertaining to contracts.
Impartiality	9. be impartial in his/her professional advice, judgement or design. 10. not accept remuneration which prejudices independent judgement. 11. inform the client of any potential conflict of interest that might arise in the performance of the commission.
Relation with Other Consultants	12. not directly or indirectly injure or attempt to injure the professional reputation or practice or prospects of another fellow professional.

	13. not associate in work with a professional who does not conform to the ethical practices laid down in this Code. 14. not try to supplant another CEAI member in any particular employment nor attempt to intervene in work of any kind which to his/her knowledge has already been entrusted to another professional. 15. not review or take over the work of another CEAI member for the same client, except with the consent of the second member, unless he/she has been notified in writing by the client that such engagement or the work which is the subject of review has been terminated.
Relation with Clients	16. not disclose confidential information concerning assignments or technical process of client without his/her consent.
Relation with Employees	17. endeavour to provide opportunity for the professional development and advancement of professionals in his/her employment.

NATIONAL REGISTER OF ENGINEERS

by

CEAI in collaboration with other professional associations

1. OBJECTIVE

- To establish discipline wise data base of Engineers.
- Registering those engineers who provide quality services to their clients

2. ELIGIBILITY

- Individual Engineers
- Engineering Companies

Members of other engineering professional bodies qualify automatically.

3. MEMBERSHIP FORM

- Membership form available with CEAI.

For details: Please contact CEAI Secretariat.

COPY OF NRE CERTIFICATE ISSUED BY CEAI - A SAMPLE

Sl. No. 01 Date 03-08-2016

CONSULTING ENGINEERS ASSOCIATION OF INDIA

This is to certify that

S C Mehrotra

has been registered under the National Register of Engineers

for quality professional services

Membership No.. CEAI/NRE/CAT-01/00001

Discipline: Civil Engineering

Somenath Ghosh
Honorary Secretary

S.C. Mehrotra
Chairman, National Register of Engineers

Sudhir Dhawan
President

INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS

FIDIC PUBLICATIONS

(Available from CEAI Secretariat)

1	**FIDIC Contracts Guide** (1st Ed. 2000) (Construction, Plant & Design- Build and EPC/Turnkey Contracts)
2	**Short form of Contract** (1st. Ed.1999) Agreement, General Conditions, Rules for Adjudication and Notes for Guidance
3	**Form of Contract for Dredging & Reclamation work (1st Ed 2006)**
4	**Design- Build- Operate (DBO) Contract** (1st Ed 2008)
5	**Guide to Design-Build-Operate Contract** (1st Ed. 2011)
6	**Plant & Design-Build Contract** (1st Ed:1999).Conditions of Contract for Plant & Design-Build for Electrical & Mech. Plant & for Building & Engg. Works Designed by the Contractor. Gen. Conds; Guidance for the Preparation of Conditions of Particular Application; Forms of Tender.
7	**EPC/Turnkey Contract** (1st Ed. 1999) Conditions of Contract for EPC Turnkey Projects. General Conditions; Guidance for the Preparation of Conditions of Particular Application; Forms of Tender and Agreement etc.
8	**Construction Contract (1st Ed.1999) (RED BOOK)** Conditions of Contract for Construction for Building and Engineering Works designed by the Employer. General Conditions; Guidance for Preparation of Particular Conditions; Forms of Tender, etc.
9	**Construction Contract MDB Harmonised Ed, for Building & Engg. Works Designed by the Employer.**
10	**Construction Subcontract, 1st Ed 2011. For Building and Engineering works designed by the Employer**
11	**Understanding the New FIDIC Red Book,** (2006)
12	**Design-Build and Turnkey (Orange Book) 1st Ed 1995. Reprinted 2011.**
13	**Operation, Maintenance and Training (OMT) - FIDIC Guidelines for the provision of OMT services**
14	**Works of Civil Engineering Construction (Red Book) Part I & II and Supplement (4th Ed. 1987 Reprinted 2011)**
15	**RED Book GUIDE :** Gude to the use of FIDIC Conditions of Contract for Works of Civil Engg. Construction 4th Ed. 1989.
16	**Risk & Insurance in Construction, 2nd Ed 2003,** by N G Bunni
17	**Electrical and Mechanical Works 3rd Ed.(Yellow Book):** Conditions of Contract for Electrical and Mechanical Works (3rd Edition 1987; Reprinted 1988)
18	**Electrical and Mechanical Works (Yellow Book): Supplement 1st Ed. :** Supplement to the 3rd Ed. 1987 of Conditions of Contract for Electrical Mechanical Works (1st Ed. 1997)
19	**Electrical and Mechanical Works (Yellow Book) Guide 3rd Ed.** Guide to the use of the FIDIC Contract for Electrical and Mechanical Works (1988), includes Yellow Book conditions
20	**Client - Consultant Agreement (White Book) 4th Ed. 2006.**
21	**Client-Consultant Agreement (White Book) Guide 2nd Ed. 2001**
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23	**FIDIC Guidelines for Selection of Consultants 1st Ed 2003**
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31	**Standard Prequalification Form for Contractors** 3rd Ed 2008.
32	**FIDICIntegrity Management Guidelines (1st Ed. 2011)**
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34	**FIDIC Procurement Procedures Guide 1st Ed 2011**

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