SEPTEMBER 2014

VIEW POINT...

CONSULTING ENGINEER

NEWSLETTER OF CONSULTING ENGINEERS ASSOCIATION OF INDIA

Contents

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

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President's Message

Dear fellow Consulting Engineers,

Greetings from your Association.

The monsoons will soon be over and festivals are around the corner for many but not for many others. **Why?**

There have been torrential rainfalls in some regions but draughts in others. Both these regions, because of nature's unpredictability are in a state of disarray and economic collapse. They need an external prop to support them and help them tide over their predicament.

As engineers we can help by accounting for the consequences of either a deluge with accompanied disasters or scanty rainfall resulting in parched landscapes. The former causes infrastructure damage as well as affects the economy. The latter in most cases affects only the economy. Engineers need to be sensitive to both the issues and account for them in the 'What if' scenarios when planning a project in regions susceptible to either condition.

A deluge brings in its wake - floods, either overflowing of or large quantum of discharge from dams, landslides, destruction of vast areas, be they urban or rural, and consequent health issues. The question arises - cannot these be foreseen and their effects minimised if not avoided altogether? A valid query, to which the answer could in all probability be that to some extent that could be possible. However, in all such cases where safety, health and environment are going to be affected, the engineering solution should take precedence and not the cost or time or any other factor. The consequences of disasters are life wrenching and far more costlier in terms of resources than any increased capital expenditure to properly address and provide for the consequences of changes that would be caused to the topography, flora, fauna and the environment at large on account of any project.

The disasters in Uttarakhand in 2013 and Jammu & Kashmir in 2014 poignantly tell as to what happens when the natural watercourses or water bodies are tampered with indiscriminately. Before touching any of them, detailed studies must be undertaken to study the effects of any change to be made and how to safeguard against the impact created by those changes. We have living examples of these disasters on smaller scales in all our metropolis and large cities where natural drainages and water bodies have been tampered with. Year in and year out, large areas in all these get flooded, settlements on hill slopes get carried away in landslides and life becomes a misery. All these are shrugged off as acts of nature when in fact they are all manmade.

Engineers should have the authority and independence to be able to put forth their considered reports which should not be overlooked for the sake of expediency. This can only be possible when the engineering profession is brought under a legislation and the engineers made accountable and responsible for their reports.

The engineers should be responsible and accountable onlyto the regulatory body formed under a legislation. It must be a common body for the country, as for other professions. Once any engineer is registered under that national regulatory body, no further registration should be necessary with another body, anywhere else in the country.

With best regards

A. P. Mull

A. P. Mull

LEGISLATION FOR ENGINEERS

A P Mull

Earlier the issues of *"Responsibilities and Accountabilities of Engineers" [1]* have been discussed in these columns and it concluded that "Regulation of the engineering profession has become a dire necessity for the ***'safety, health and welfare of the society'***. It has always been a necessity and with mega size projects whose impacts are enormous, the requirement of legislation is all the more essential. Let us explore this further.

The first written laws for the strength of structures and soundness of construction were perhaps embodied in the *Code of Hammurabi*, around 1762 BC. Initially all engineering was covered under the term 'civil engineering' as opposed to 'military engineering'. However, over the years, with increasing size and complexity of projects, other disciplines of engineering emerged. With them their codes of practice also developed to cover the new materials and technologies.

As engineering principles were discovered and better methods of design and construction evolved from them, the local bye laws or manuals were no more considered adequate to meet the requirements. Today the projects are extremely, complex and these cannot be left to be performed by persons who are not suitably qualified and experienced. In not doing so the safety and the welfare of the society at large is jeopardised.

Can any society continue to wait and watch manmade disasters occurring time and again? Surely the answer is NO.

The engineering profession is still not a legally recognised profession in the country, whereas other professions such as Advocates, Architects, Chartered Accountants, Doctors, et al are, since they are all governed by legislations. In the absence of such a legislation there is no association or institution which is authorised to take up legal issues on behalf of the engineers; have a uniform policy for deciding the educational qualifications and competency requirements for a work; monitor that all the engineers are continuously updating their knowledge, capabilities & skills and also mentoring others; bring in discipline by defining and monitoring an ethical code of conduct duly brining out the responsibilities and accountabilities of an engineer, regulate the entry and practice of the profession by engineers from other countries, and above all restrict the use of the tile and style 'engineer'.

Engineering associations concerned with the wellbeing of the professional engineers have been pursing with the Government of India to bring about a legislation for engineers which would address all the above and more.

The capability of Indian engineers is being recognised in many countries for being able to provide affordable, adaptable and appropriate engineering solutions which can be serviced and maintained by ordinarily skilled personnel. The technology adopted is such that it is suitable for that locale. The Indian engineers are capable of designing all needs right from rural to that for a space odyssey. Their hands need to be strengthened by an appropriate legislation so that they can perform without any let or hindrance and give their best.

Campaigns have been started to show the solidarity of engineers for such legislation. Please support the same by visiting the CEAI website **www.ceai.org.in** and going to "Engineering Colloquy" where more information is given for engineers. Also drill down to "Support the Campaign" and 'Be a Supporter'.

[1] "Responsibilities and Accountabilities of Engineers" by *A P Mull & Jeffrey Nambiar, CEAI Viewpoint, October 2013*

NATIONAL GRID- AVAILABILITY AND CHALLENGES

Mr. Ajit Kumar, ED (Commercial) and Ms. Shilpa Agarwal, Manager (Commercial)
NTPC Limited

NEW Grid has been synchronized with Southern Grid on 31.12.2013 through Raichur-Solapur 765 kV S/C Transmission Line by PGCIL. The line has a power carrying capacity of approximately 2100 MW thus enhancing the NEW –South Grid power carrying capacity to 7250 MW post synchronization. The total interregional capacity with commissioning of new Raichur-Solapur line is now 33950 MW. However the available capacity is yet to be released which may enable carrying surplus power from NEW to power deficit states of Southern Grid.

1. Southern Region Deficit

All India Energy deficit for the year 2013-14 stands at 4.3%. Southern Region energy deficit which was 15.5% in 2012-13 has declined to 6.8% for the year 2013-14 but is still the highest among all regions of India being closely followed by North-Eastern region (6.5 %) & Northern Region (6%). The price of electricity for Southern Region has remained more than double the prices for other regions and have touched ~ Rs. 12/kwh also. CERC Market monitoring report for the years 2012 & 2013 provides for price of electricity as transacted through power exchange as indicated at Figure1 below.

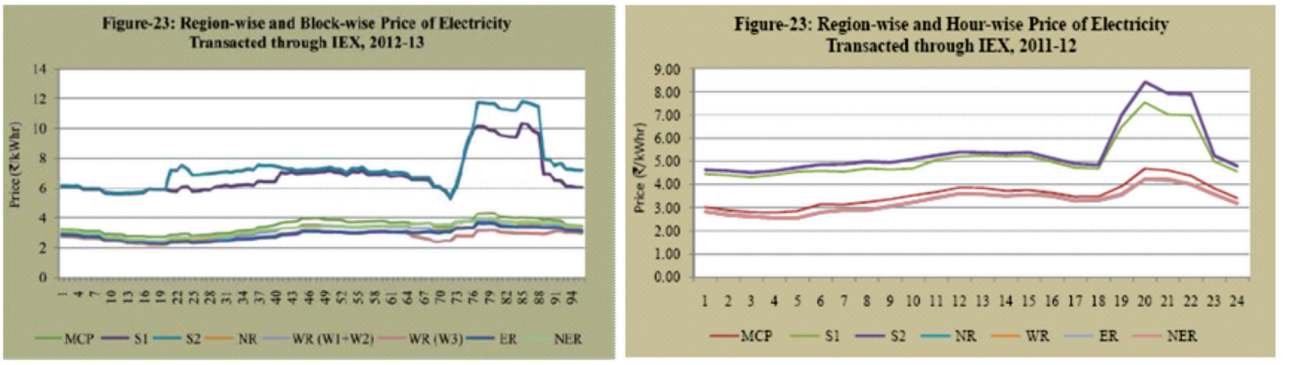

Figure1: Regionwise&Blockwise price of electricity transacted through Indian Energy Exchange in year 2012-13 & 2013-14

On one hand there has been high prices in Southern region due to market splitting which is primarily due to transmission congestion and on the other hand electricity remained surplus &undespatched in other regions. The dispatch of such cheaper electricity requires adequate transmission capacity so that congestion is minimized and end consumers are able to avail uninterrupted economic power.

2. Growth of Transmission capacity vis a vis Generation Capacity

The growth in Transmission capacity has always been ahead of generation capacity for all plan periods as detailed below at Figure 2.

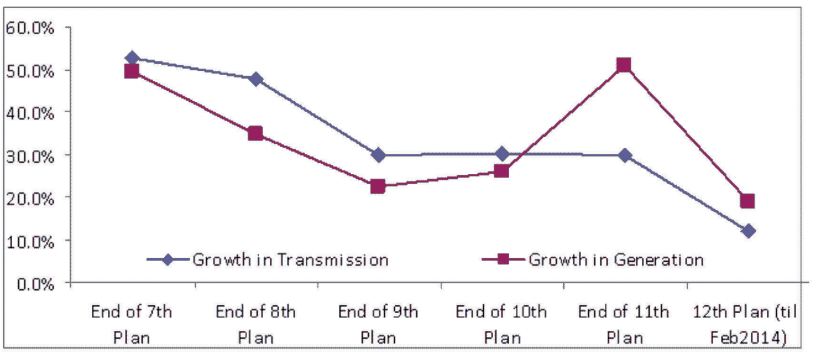

Figure 2: Growth in Transmission capacity and Generation capacity over different plan periods

However the growth in generation capacity for 11th plan period was ~50% over existing capacity whereas growth in Transmission capacity was just 30%. But a closer look indicates that the transmission capacity enhanced in the Country vis a vis the targets is more than 100% as indicated in Figure 3 below:

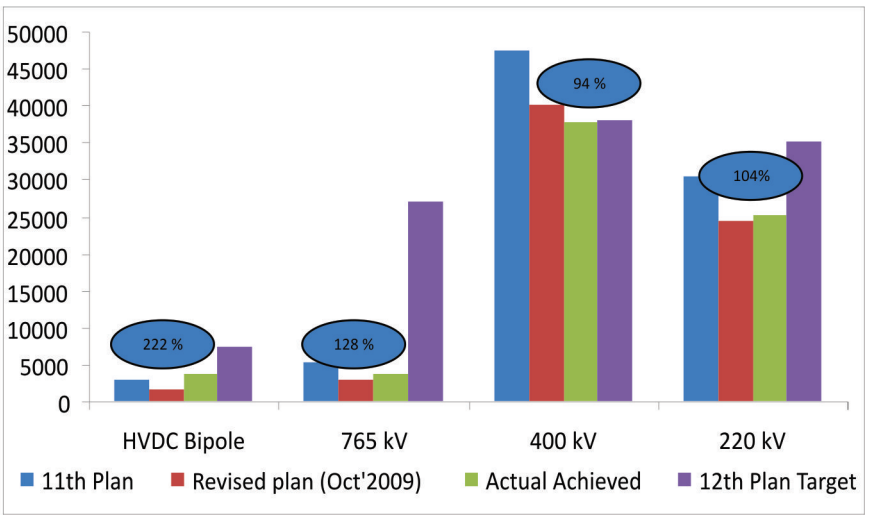

Figure 3: Transmission capacity: Plan vs achievement

It is clear that the planned targets have been achieved but congestion has not improved. Figure 4 indicates congestion pattern in the Power Exchange.

	N			Y		
Month	2012	2013	2014	2012	2013	2014
January		108	15		2,608	2,901
February		4	19		2,684	2,669
March			63		2,976	2,913
April				2,880	2,880	
May	1	22		2,975	2,954	
June	673	124		2,207	2,756	
July	602	11		2,374	2,965	
August	30	116		2,850	2,860	
September	36	633		2,844	2,247	
October	129	197		2,847	2,779	
November		131		2,880	2,749	
December	21	633		2,955	2,343	

N: No. of blocks during the month in which there was no congestion/market splitting
Y: No. of blocks during the month in which there was congestion/market splitting.

Figure: 4 Number of blocks which faced congestion / no congestion

Due to congestion a large volume of power remained unscheduled. The volume unscheduled on power exchange for the year 2013-14 is 5591.42 MU. The details for IEX & PXIL Is given below at Figure 5:

Details of Congestion in Power Exchanges, 2013-14			
	Details of Congestion	IEX	PXIL
A	Unconstrained Cleared Volume* (MU)	34230.41	1390.62
B	Actual Cleared Volume and hence scheduled (MU)	28923.23	1106.39
C	Volume of electricity that could not be cleared and hence not scheduledbecause of congestion (MU) (A-B)	5307.18	284.24
D	Volume of electricity that could not be cleared as % to UnconstrainedCleared Volume	15.50%	20.44%

** This power would have been scheduled had there been no congestion.*

Figure 5: Congestion in Power Exchange for year 2013-14

3. Transmission Capacity vis a vis Transfer Capability

Total Interregional transmission capacity all over India as on March 2014 is 33950 MW. But this is not the capacity for which power can be scheduled over interregional links. As per NLDC Report the Total Transfer Capability for March 2014 was 12180 MW out of which Available Transmission Capability (which is an indication of power which can be scheduled) was 11130 MW only. Hence only 33% of total available capacity (33950 MW) could only be utilized for power transfer. We need to relook this grossly underutilization of total interregional transmission capacity.

4. The New Raichur-Solapur Link

The synchronization of NEW with Southern Grid had brought hopes for Southern region beneficiaries who were waiting to avail available cheaper power from Generators of other regions which have been idling due to unexplained less demand in NEW Grid. However the dreams are yet to be realized as there are still few issues which needs to be resolved with the link.

Post synchronisation of NEW &Sourthern Grid with Raichur-Solapur link there have been cancellation of STOA transactions w.e.f 1.01.2014 thereby curtailing a few generators in Western region. Various System Protection Schemes (SPS) have been installed to sustain Raichur-Solapur S/C Link, which have

Transmission System Strengthening	Feasible Transfer of Power (MW)
Raichur – Solapur 765kV 2xS/c line without any system Strengthening in WR and SR	Upto 800 MW
• Strengthening in WR & SR o Aurangabad–Pune & Parli-Pune 400kV D/c lines in WR o Gooty – Madhugiri – Yelahanka 400 kV D/c lines in SR	Upto 1200 MW *
• Strengthening in WR & SR o Aurangabad–Pune & Parli-Pune 400kV D/c lines in WR o Raipur-Wardha-Aurangabad 765 D/c line in WR o Pune-Solapur 765 kV S/c line (Charged at 400 kV) in WR o Gooty – Madhugiri – Yelahanka 400 kV D/c lines in SR o Raichur – Kurnool 765kV S/c line & Kurnool – Thiruvalem 765kV D/c lines in SR	Upto 1600 MW
• Strengthening in WR & SR o Aurangabad–Pune & Parli-Pune 400kV D/c lines in WR o Raipur-Wardha-Aurangabad 765 D/c line in WR o Pune-Solapur 765 kV S/c line in WR Gooty – Madhugiri – Yelahanka 400 kV D/c lines in SR o Raichur – Kurnool 765kV S/c line & Kurnool – Thiruvalem 765kV D/c lines in SR o Vijayawada-Nellore-Thiruvalem-Malekottaiyur 400kV D/c line in SR	Upto 2000 MW

been operating frequently (22 operations in January 2014). The SPS schemes have been installed for various situations such as

- Total flow on Raichur –Solapur Line exceeding 800 MW in Solapur-Raichur direction
- Rate of change of flow crossing 400 MW/sec in Solapur-Raichur direction
- Loss of import on 765 kV Solapur-Raichur by more than 800 MW due to tripping of line.

Due to frequent operation of SPS there have been load shedding in Southern Region and Generation back down in Western Region. Southern Region constituents raised their concerns on load shedding during SRPC meeting held on 15.3.2014. The constituents discussed on the benefit of keeping the link synchronized or keeping the line open till other supporting lines in both Western and Southern regions are in place. During various meetings held by CEA, POSOCO & PGCIL it has been indicated that regular scheduling of power over the link shall commence only after other lines as indicated below are in place.

The second Raichur-Solapur circuit which is under construction by JV of Patel Engg. & Simplex is yet to be commissioned so as to unleash increased capacity through both the circuits which are designed to carry upto 4200 MW. Till this new transmission capacity alongwith associated transmission lines on both sides of NEW & Southern grid are available for scheduling power, it cannot be effectively utilized for planning for sending surplus power of NEW regions to Southern Region.

5. Conclusion

There is a need for proper transmission planning & execution to ensure reliability of transmission system. In few cases, transmission capability requirements have been misjudged thereby leading to inadequate transfer capacity as the case of severe limitation in Vijaywada-Nellore section, within SR thereby leaving SR starving for power from NEW even after synchronous tie of 765kV Raichur-Solapur Line. Further System Protection Schemes are being insisted in real time operation to manage single contingency outages which again points towards inadequacy of transmission system.Grid operation with various System Protection Schemes needs to be reconsidered whereas the role had been to plan and design transmission system with n-1 contingency & more recently with n-1-1 contingency. Therefore a robust transmission which is the backbone of Grid to ensure reliable power transfer from surplus to deficit areas are not only to be planned & executed but made available for free flow of power between regions of the Country.

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About Authors

Mr. Ajit Kumar is presently working as Executive Director (Commercial) in NTPC. His responsibilities includes generating avenues for growth of NTPC on all fronts and realizing revenue of Rs 70,000 Crores per annum from different utilities buying power from NTPC.

After graduating in Electrical Engineering from Delhi college of Engineering , he joined NTPC in 1980 as Executive Trainee. He was awarded Gold Medal by University of Delhi for his excellence in academics. He has also completed his MBA in Finance while working in NTPC and is now pursuing PhD in management for IGNOU.

He has been associated in finalizing agreements for initiating power projects in Bangladesh and Sri Lanka in joint venture with local power utilities.

He has presented many technical papers in National and International Seminars and has visited countries such as France, Italy, Germany, South Africa, Japan, Thailand etc. for training, vendor development and testing of various equipments.

Shilpa Agarwal graduated from Delhi College of Engineering in Electrical Engg. in 2002. Joined NTPC as Executive trainee at Dadri Power Station. Later shifted to Project Design Engineering department in Switchyard group. In an endeavour of excellence did MBA in Finance and Marketing from IIM Lucknow Noida Campus in 2009 Presently responsible for Policy making for NTPC stations and handling Regulatory affairs in respect of transmission / open access/ Grid code. Deputed to CERC in August 2014 as Dy. Chief (Engg).

BEST PRACTICES FOR ENSURING WORKMANSHIP IN THE CONSTRUCTION OF BORED CAST -IN-SITU PILING WORK

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1. In the construction of major industrial projects, piling work is a common important activity where rocky strata are not encountered at shallow depth. The rate of installation of piling work is increased by the use of rotary hydraulic rigs. With the use of hydraulic rigs, high capacity bored cast-in-situ piles of upto 2.4 dia. and length upto 60-70 meter are executed in currently in India. In our country, of late a large number of piling rigs are available in the construction industry, compared with the numbers with the available ten years back.
2. All the activities of bored cast-in-situ piles are mostly taking place below ground level, also the quality of piling work and workmanship are to be ensured to achieve the capacity of the pile. As workmanship and soil parameters play a key role in ensuring the pile capacity, the do's and don'ts prepared based on the problems encountered at different projects and remedial measured are suggested.

The tips given below are prepared based on the field observation, interaction with piling foreman, engineers, rig operators, geotechnical engineers and rig manufacturers.

Dos and Don'ts in bored cast-in-situ piling works	
Dos	**Don't**
A. SURVEY	
1 Ensure adequate nos. of surveyors are available at site to fix the location of piles.	1. If surveyor is on leave, piling location should not be fixed by a person not having experience of using total station instrument.
2. Check the total station instrument about its accuracy.	2. Don't use total station without any calibration certificate.
3. Ensure marking of pile in the drawing in the field once concreting is completed. Don't leave it to memory. As piles are below ground, later on very difficult to locate and verify the installed pile. After excavation of pile cap only missed piles will be known, which is to be installed at a higher cost for the human error in failing to mark in time in the drawing. Backfilling to be done for bringing piling rig for boring & re-execution.	3. Never mark the completed pile in the office at later. You may forget pile no. pile location, date etc. Better to mark in a small drawing attached in a diary of the foreman of that area and later transfer in a big drawing at office.
B. REINFORCEMENT	
4. Check cover blocks are made of mortar of required strength. (rich mix)	4. Poor strength cover blocks made with leaner mix will break while handling reinforcement cage, recurring expenditure in making more cover blocks due to poor strength.

Dos	Don't
5. Spacing of cover blocks to be checked. It should not be more than 1.5 m c/c in the longitudinal direction. Minimum 3 cover blocks should be at one level at about 120 deg apart.	5. Cover blocks spacing should not be more than 1.5m, as it will reduce the cover to main reinforcement. Cover blocks to be inserted into the helical rings. It should not be tied later to the main R/F by wire.
6. Stack sufficient quantity of Reinforcement cage, segment wise in advance, so that piling progress is not affected for want of reinforcement cage.	6. If pile bore is left for long time for want of making reinforcement cage, soil may collapse and also rigs and crane may be idle.
7. Engage trailer to bring many R/F cages from fabrication yard to piling location.	7. Using Hydra for shifting the R/F cage is costly, as it can't lift more cages at a time.
8. L-shape bend at the bottom of R/F cage shall not be more than 10cm. Straight bars (without L shape) may scrap the surface of pile bore and earth may fall into the bore.	8. More than 10 cm long bend in L-shape come in the way of cleaning of pile bore, better placement of concrete with tremie pipe. It is costing more.
9. Two 12mm dia. hanger bars shall be welded (diametrically opposite) with top segment bars of cage to hand the complete cage from guide casing pipe at the required level (to keep the cage at correct level w.r.t. cut off level of pile). The hanger bars shall be tack welded with guide casing pipe to prevent the cage slipping into pile bore due to its self wt. or moving of cage upward while pouring concrete through tremie pipe.	9. If hanger bars are not provided or if it is not welded properly with the guide casing, the R/F cage will not be kept at the required level & it will touch the bottom of bore and required development length of bars above cut-off-level may not be available to connect with the pile cap.After pile break, don't leave the hanger bars and try to re-use.
10. Top level of top segment bars shall be kept at one level (Extra projection of alternate bars if any due to staggering may be cut & used as lifting hooks in R/F cage).	10.
11. Two welders can be positioned diametrically opposite side and can carry out welding of lapped bars while connecting lower segment with upper segment.	11. One welder doing the lapping of all the bars will take more time (double) & may lead to increase in cycle time of piling.
12. Some stretch of helical reinforcement may be kept in compressed condition at top & bottom segment of cage and after the welding of lapped bars, the compressed helical bars may be pulled towards mid-point of lapping & binding wires may be wound quickly.	12. Bending & binding the helical R/F at lapping portion in vertical position will take more time. Further binding wires may be kept (tied) in the R/F cage and bar bender should take it for winding it, instead of one labour feeding the wires to the bar bender.
13. R/F cage must always be lowered with 2 hooks to ensure verticality while lowering the cage. All the segments should be brought to boring location before completion of boring to avoid delay in lowering the cage.	13. If R/F cage lowered with single hook, cage may tilt due to eccentricity and scrap the sides of pile bore and earth will fall / collapse into pile bore.

Dos	Don't
14. At the lapping location of helical reinforcement, the helical bars shall be bent inward of the cage and welded.	14. If end of helical reinforcement at the lapping location bends outward, it will scrap the side surface of pile bore and earth will fall inside the bore.
15. While cutting the standard length of bars, it shall be cut in such a way that 50% laps at a joint of segments are staggered at a distance of 1.3 times the development length (c/c of laps).	15. As lapping of all bars at one level will develop stress concentration, if is to be avoided.
C. BORING	
16. Ensure rig is positioned on levelled ground to have vertical boring. Check kelly in vertical alignment with the plumb bob. Also check the condition of the kelly for any damage or crack in the pin connecting the bucket / auger with the Kelly bar	16. If rig is standing over undulating ground, boring may not be vertical. If pin sheared while boring or lifting bucket / auger may struck up in the pile bore and may not be able to retrieve and will affect the progress of work.
17. Suitable accessories (either bucket or auger) shall be selected, to suit the type of soil strata and to ensure removal of maximum volume of soil in one lift of auger / bucket.For clayey type of soil, auger is more suitable than bucket. For sandy type soil, bucket is more suitable than auger. Suitability of auger / bucket can be decided by trials in the field.	17. Wrong selection of accessories (auger / bucket) will lead to less removal of soil in one lift, leading more cycle time in completing the boring.- Without spare bucket / auger boring operation to be avoided, as rigs may be idle for want of replacement of bucket / auger whenever repair is required for them.- Length of kelly should not be less than the depth of boring plus 10m, so that required depth of boring can be done with the rig.
18. Guide casing pipe diameter to be about 50mm more than bucket / auger size to prevent disturbance of guide casing due to the movement of bucket / auger during its up & down movement.	18. If less clearance is there between guide casing pipe and O.D. of bucket / auger, the casing pipe may move up and down by hitting of the teeth of bucket and guide casing pipe will fall into the pile bore and affect the progress of work.
19. An inlet and outlet stub connection of min. 50 mm pipe may be welded with guide casing pipe at top, to allow bentonite slurry to pump into pile bore through a hose pipe and flushed slurry to come out to connect with settling sump through return hose pipe. Bentonite slurry shall be above water table level, but slightly below the top level of guide casing pipe, to avoid over flow of slurry while bucket is lowered in to the pile bore.	19. - Never dump bentonite powder directly into pile bore. It will not help in preventing collapse of soil.- Trench used for inlet & outlet of bentonite slurry will lead to slushy & slippery (with poor) working condition.- When slurry level in the pile bore is below Ground water table, the soil may collapse due to differential water pressure.
20. Record the complete boring time w.r.t. machine, operator and accessories used (bucket or auger). This will help in identifying the efficient and non-efficient or non performing machine & operator.	

Dos	Don't
21. If depth (of boring) indicator is not working properly or faulty, then chain with marking in meters may be used to measure the depth of boring manually. To avoid excess depth of boring, check the depth one meter or two meter before reaching the final depth and instruct the rig operator to bore the balance depth of boring.	21. Excess boring is a waste, which will consume time and material like concrete etc. for which no payment will be made.
22. Muck collected while boring shall be removed periodically and disposed away from the piling area. This will help in more production of piles and also easy access to piling area.	22. Pile muck generated around pile bore will hinder the movement of cranes and transit mixers to piling area.
23. Check the density of bentonite slurry from the bottom of pile bore by a sampler to meet the specification requirement.	23. Do not take the sample from the over flowing slurry for checking the density. It will not reflect the density of the slurry at the bottom of pile bore.
24. If auger is used for boring, at the end of boring, cleaning bucket shall be used to remove loose material from pile bore.	24. If loose material is not removed, settlement of pile may be more during testing & pile may be rejected.
25. While withdrawing bucket / auger, instruct the operators to lift it slowly in the beginning by rotating to avoid suction below the bucket.	25. If bucket is not lifted slowly in the beginning after boring, vacuum will be created below the bucket, this may lead to collapse of pile bore.
26. Air lift flushing shall be carried out before & after lowering the reinforcement cage to remove all muck and check the slurry density as per specifications.	26 Proper air pressure shall be used for air flushing.
27. If bentonite flushing is done (without using cleaning bucket at the completion of boring) for cleaning muck, it shall be done for about 45 minutes. If cleaning bucket is used, flushing can be done for about 20 minutes and the density of slurry shall be checked at the end of flushing.	
28. SPT in pile bore at the termination level shall be carried out for every 50 to 70 no piles to check the termination criteria of pile as given in the specifications.	
D. BENTONITE SLURRY	
29. Check the test certificate of bentonite brought to site regarding minerals, liquid limit etc as per the approved Field Quality Plan.	29. Without test certificate, don't allow to use for making bentonite slurry for piling works.
30. Always 2 tanks / sumps of sufficient volume shall be made. One for making fresh bentonite slurry and another one for settling recirculated slurry. After settlement of used slurry, decanted slurry can be allowed to overflow to fresh bentonite slurry sump.	

Dos	Don't
31. Fresh bentonite shall be kept in soaked condition for minimum 24 hours before its use. Slurry shall be checked for its density (not more than 1.05 gm/cc) liquid limit (not less than 300%).	
32. As the boring progresses, slurry to be pumped into bore as and when the level of slurry falls, so as to maintain the slurry level always above Ground Water table.	
E. CONCRETING	
33. Check sufficient quantity of tremie pipe is available at site, to cater for the depth of boring & no. of rigs deployed. Joints of tremie pipe to be made water tight with grease & jute yarn.	-
34. Tremie pipe shall be kept closure to the bottom of bore while pouring the surge concrete. Further, tremie pipe shall always be kept minimum 2.0m below the top level of concrete. For example, if 5.0 cum concrete from a transit mixer is poured within the pile bore, the length of withdrawal / lifting of tremie pipe shall be limited to 9 m to 760 mm dia pile and 16 m for 600 mm dia pile.	- If tremie pipe is withdrawn / lifted above the fresh concrete level, then bentonite / muck will be mixed concrete at the intermediate level, where pipe is withdrawn. Quality of concrete & strength will be affected leading to rejection of pile.
35. While pouring the first (surge) concrete through the funnel, the cover / charge plate provided at the bottom of funnel (mouth of funnel) shall be suddenly removed, so that concrete will suddenly rush through the tremie pipe, hit the bottom of pile bore and displace the muck. When the concrete receeds in the funnel, ensure concrete is fed from Transit mixer continuously so that atleast about 1.0 cum surge concrete is fed inside the pile bore.	-
36. While pouring concrete into the funnel, ensure vent pipe of about 2.5 cm dia is kept in funnel extending about 0.5m below the funnel mouth, to allow the air in the tremie pipe to escape, while concrete is poured in the pipe.	- If air is not allowed to escape from tremie pipe, pipe may get choked.
37. Check the total quantity of concrete poured into the pile bore w.r.t. the theoretical quantity required for each pile.	If the actual quantity in the pile is less than theoretical quantity, check the dia. of guide casing pipe, auger / bucket dia. and boring dia. below guide casing. If required, they are to be increased.
38. Take concrete sample for slump test & cube testing from the transit mixer concrete at the pile site. Pile no is to be recorded in the above tests samples.	Slump test to be done at the time of pouring and not later, which will lead to lesser slump value. Also slump to be measured at piling site, not at the batching plant.

Dos	Don't
39. As soon as concrete is completed mark the pile no in the drawing in the field.	If it is not marked immediately, it may be forgotten and lead to problems to install missed piles while carrying out pile cap.
40. The time taken from completion of boring to start of concreting shall be less than 6 hours.	If it takes more than 6 hours, then it may allow the soil to loose on the surface of pile bore and lead to collapse of pile bore.
41. While lifting the guide casing pipe after completing the concreting (before initial setting of concrete), it should be lifted with 2 hooks (min) so as to lift vertically.	Single hook lifting is to be avoided as it will tilt the guide casing and leading to bulging of concrete.
F. PILE BREAKING	
42. Before pile breaking is carried out, the cut off level(C.O.L.) should be marked in the exposed pile by the supervisor / surveyor with the help of total station, so that labour will break the concrete above C.O.L only.	If C.O.L. is not marked on the exposed pile, labour will break the pile as per his will, leading over break or under break of pile w.r.t. cut off level leading to pile built up or second time break results in wasting of time and money.
43. First circumferential groove shall be made at C.O.L. and ensure cracks are not propagated below the C.O.L. Once the above groove is made longitudinal (main) bars of pile above C.O.L. shall be exposed by Jack hammer and the concrete above C.O.L. may be knocked off.	
44. Pile breaking concrete shall be removed and disposed in the locations as directed by engineer so that pile cap can be done without difficulty and delay. (easy access)	
45. Pile concrete should project by 75 mm into the pile cap. If any built up of pile is done due to over break, it should be done with one grade higher than the piling concrete and also to be compacted to ensure dense concrete.	Building up of pile with mortar or lean concrete should not be allowed.
46. Pile head preparation to be done properly as per the requirement of PIT agency and print out results of PIT to be handed over at site immediately after completion of tests.	
47. Ensure the exposed length of main bars of pile above C.O.L. is 50 times the dia of main bar. They shall be bent into the pile cap as shown in the pile cap drawings. Heating of bars to bend shall be avoided.	In no case length of main longitudinal bars above COL of pile shall be less than the development length. Wherever, length of main bar above COL is less than development length, then it shall be overlapped by development length of bar by proper welding and checking by FQA.
G. GENERAL	
48 Cranes shall be used for lowering the R/F cage & holding tremie pipe during concreting, while installing regular piles to reduce cycle time.	Using piling rig for lowering the R/F cage or tremie pipe will delay the piling works and reduce the output of rigs.

About Authors

Mr. A. Vijayaraman graduated in Civil Engineering from Thiagarajar College of Engg , Madurai in 1977 and acquired M.Tech(Building Technology) from IIT, Madras in 1979.

He has worked in NTPC, a Maharatna Company, for more than thirty years in the design of power plant structures and retired as GM(Project Engg-Civil) in Nov 2013.

He was involved in the design of Simhadri TPP sea water system and associated with the site in the execution of one of the biggest sea water intake well in the open sea. He was also associated in the design of foundation of power plants with maximum number of piles in the country and in solving associated problems at site.

Currently, he is working as Senior Vice President(Civil Engg), POWERTEC ENGG PVT LTD, Chennai , a multi- disciplinary consultancy company.

CEAI NEWS

CEAI in association with CEAI-Western Region Centre, successfully conducted FIDIC Training Courses on "***Practical Use, Management and Administration of FIDIC Conditions of Contract***" at New Delhi and Mumbai on the following dates:

New Delhi	4th& 5th August 2014
Mumbai	7th& 8th August 2014

During the inaugural session at New Delhi, Mr. Sudhir Dhawan, Vice President CEAI accorded a warm welcome to all the dignitaries and the participants while inaugurated the training course. Mr. Jeffrey Nambiar, Hon. Secretary cum Treasurer, CEAI Western Region Centre, briefed the participants about the training course.

In Mumbai, Mr. A P Mull, President CEAI inaugurated the training course. Dr. H Subbarao and Mr. Uttam Sengupta introduced the subject and stressed on the need in view of new terminologies being used in contracts.

Around 70 delegates from around 30 different organisations comprising Consulting firms/ individuals, Government Departments, Public Sector Undertakings and Manufacturers of Plant & Equipment attended the courses at each venue.

Mr. Bogdan Oprea, a FIDIC accredited trainer was the main faculty. He very lucidly explained the basic provisions and how to use the FIDIC Conditions of Contract, Administer and Manage them so that the risks are properly defined, addressed and monitored. The course dealt with practical issues on the FIDIC 1999 Conditions of Contract as per the new Red Book but also compared it with the Yellow Book, Silver Book and the Pink Book where necessary.

Special issues and topics based on Indian Case Studies and also International contracts were aptly covered by Mr. O P Goel, Dr. P V Amarnadha Prasad and Mr. Uttam Sengupta.

All the sessions generated intense discussions and the interactions carried on during the tea and lunch breaks. The feedback received from the participants is very encouraging and they have suggested that such training courses be organised at regular intervals.

The feedback as summarised based on weighted ratings is given in the chart below. It reports on 5 parameters-

Quality of Course Material,

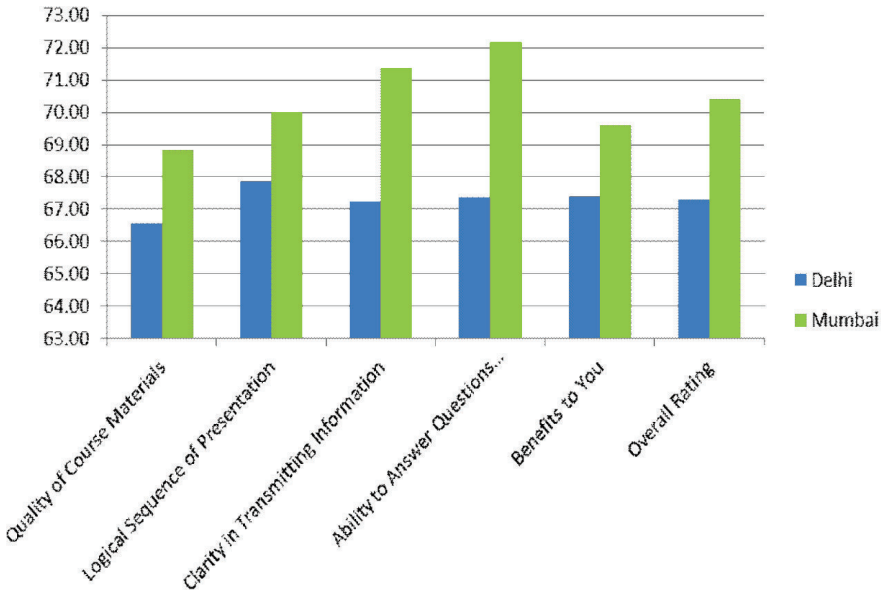
Logical Sequence of Presentation,

Clarity in Transmitting Information,

Ability to Answer Questions Authoritatively,

Benefits to You, plus the

Overall Rating.



Many of the participants in Mumbai have been using the FIDIC conditions of contract or were aware of them and hence they have shown a better appreciation of the course.

FIDIC Training Course - 4th& 5th August 2014, New Delhi

Mr. Sudhir Dhawan, Vice President CEAI addressing the participants.
L to R: Mr. Bogdan Oprea, Mr. Sudhir Dhawan, Mr. Jeffrey Nambiar and Mr. L D Gupta

Mr. Bogdan Oprea conducting the FIDIC Training Course and interacting with the participants

Ms. Sheena Gladstone & Mr. T A Benny of CEAI helping participants with registration

View of the participants absorbed in the course

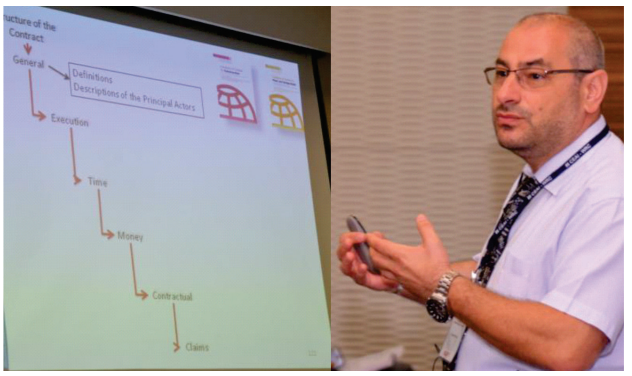
Mr. Uttam Sengupta making his presentation on current contractual issues

Mr. Sudhir Dhawan & Mr. Jeffrey Nambiar awarding the FIDIC Training Course Certificates

Faculty Members, Participants & Organisers of the FIDIC Training Course, New Delhi

FIDIC Training Course - 7th&8thAugust 2014, Mumbai

Mr. A P Mull, President, CEAI welcoming the faculty and participants. L to R: Mr. Jeffrey Nambiar, Mr. A P Mull, Mr. Bogdan Oprea, Mr. Uttam Sengupta & Dr. H Subbarao

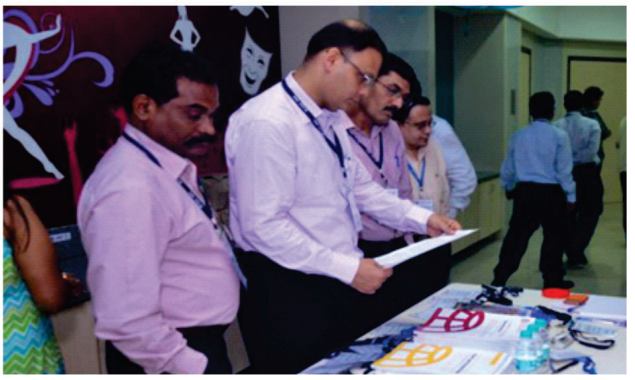


Mr. Bogdan Oprea tuning the participants to the structure of FIDIC Contracts

Participants engrossed in the lecture

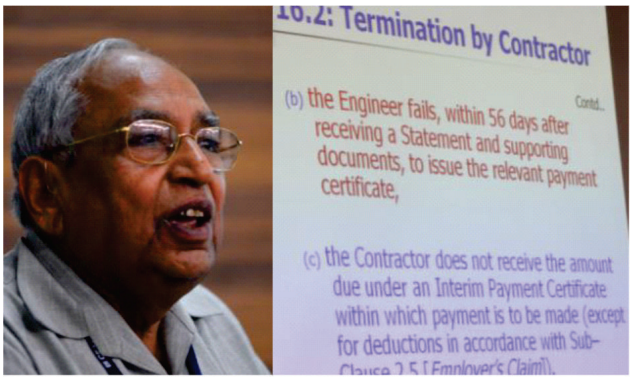
Mr. Bogdan Oprea clarifying the issues of risks in contracts

Ms. LiberataFernandes of CEAI-WRC & volunteers from College of Law helping participants to register



The Reception Desk

Dr. P V Amarnadha Prasad discussing contracts in the Indian Scenario



Mr. O P Goel clarifying subtle contractual issues

Mr. Uttam Sengupta clarifying on new contractual phraseology such as buildability

Mr. Bogdan Oprea and Mr. A P Mull awarding the FIDIC Training Course Certificates

CEAI ANNUAL SEMINAR ON*"ROLE OF CONSULTING ENGINEERS, CONTRACTORS, DEVELOPERS AND AUTHORITIES IN INFRASTRUCTURE DEVELOPMENT"*

CEAI is organizing its Annual Seminar on *"**Role of Consulting Engineers, Contractors, Developers and Authorities in Infrastructure Development**"* on 28th and 29th November 2014 in New Delhi. The venue will be the Multi Purpose Hall of India International Centre.

Safety, stability and speed for sustained growth of a country are dependent on its infrastructure. To spur its development a country needs good, high speed, reliable and secure connectivity - physically (roads, highways, airways, railways, inland waterways and seaways) and virtually (telephone and IT backbone), assured quality electrical power and lastly but not the least affordable habitats for all.

For all these to fructify the government policies and procedures must be shaped to promote participation from all the stake holders and make the development truly inclusive.

The main discussion will be focused on the major sectors which are essential for development of the nation - Highways, Airports, Power, Real Estate & Buildings, Railways, Ports and Financing which is so essential for all of them to take off.

Registration Fees:

CEAI Members	**Rs. 6,000/- plus Service Tax @ 12.36%**
Non CEAI Members	**Rs. 8,000/- plus Service Tax @ 12.36%**

On the occasion of the Seminar, a special Souvenir shall be published containing messages from dignitaries, articles on the theme topic and advertisements.

Souvenir Advertisement Tariff:

Back Cover	**Rs. 50,000/- plus Service Tax @ 12.36%**
Inside Front & Back Cover	**Rs. 40,000/- plus Service Tax @ 12.36%**
Inside Full Page	**Rs. 25,000/- plus Service Tax @ 12.36%**

Members are requested to register their interest with the CEAI Secretariat and furnish their contact details.

CEAI WEBSITE

The new website of CEAI is here. Please visit www.ceai.org.in to explore the features of this dynamic website which we can modify as we go along and when we desire a change.

Members Portal: A dedicated space has been created for members called "Members Portal". The Organisational members can upload their company's profile, while the Individual members can give a description of their professional background and interests and their track record, all of which can be updated periodically.

It is important to note that this space is for the members and is to be managed by the member. The member can display their professional profile and achievements, post photographs of projects, upload news about recent activities, blog on topics of interest and interact with other co-professionals.

To enable a member to access the personal page in the Member Portal, the CEAI Secretariat has intimated the necessary details and instructions as to how to update/edit the profile. In case any member has not received the details or requires assistance in updating the profile, please contact CEAI staff at the Secretariat at support@ceai.org.in, or call Mr. Benny at Tel: +91-11-26139658.

All Members – Individuals and Organisations are requested to please assist in populating the site and update their profiles periodically.

Display of Photographs of Projects on CEAI's Home Page

Members are requested to send high resolution, clear and bright photographs (in JPEG format) of the projects executed by them. Each photograph must be accompanied by Name of Project, Owner of the Project, Location of Project, Caption for the photograph, Year of Completion or Commencement (if project is in progress). Members should obtain the necessary approval from the owner for putting the photograph in the public domain.

New email addresses:

In consonance with the new website CEAI has also activated new email ids as given below:

president@ceai.org.in	for sending messages to the President, CEAI
chairman.apc@ceai.org.in	for sending messages to the Vice President & Chairman of Action Plan Committee, CEAI
hon.secretary@ceai.org.in	for sending messages to the Honorary Secretary, CEAI
director@ceai.org.in	for sending messages to the Director, CEAI
info@ceai.org.in	for seeking information from the CEAI Secretariat
support@ceai.org.in	for support services other than that related to Events, e.g., Membership
events@ceai.org.in	for communicating with Event Manager for events in Northern region
submission@ceai.org.in	for receiving articles, PowerPoint presentations, etc. required for Events and Publications
events.ene@ceai.org.in	for communicating with Event Manager for events in East & North East region
events.wrc@ceai.org.in	for communicating with Event Manager for events in Western region

Engineers Colloquy

The CEAI website has a section dedicated to the Engineers Colloquy to inform the large community of engineers of the initiatives taken by the leaders in our profession in the past 3 to 4 decades in pursuit of a legislation for engineers. The need for legislation has never been felt more acutely as of now, as the country embarks on even more ambitious plans for investment in mega projects - infrastructure, power, steel, nuclear, etc. Only those complying with the appropriate credentials should be able to use the title "Éngineer".

This is a platform to reach out to members of all Associations of Engineers to inform and sensitise them of the urgency and to seek their support in signing a petition for the legislation.

Matters relating to Council of Architecture, et al

A note on the issues created by the COA and others is given in a link in the website. The various court judgments issued on the subject are also listed for the benefit of all engineers.

Please visit the website and also keep us informed of any judgment (together with a full copy of it) which may not have been included.

OTHER NEWS, VIEWS & NOTES

MAJ GEN HARKIRAT SINGH MEMORIAL SCHOLARSHIP

Maj. Gen. Harkirat Singh Memorial Scholarship has been instituted jointly by Mrs. Harkirat Singh and the Association of Consulting Engineers (India) (predecessor of CEAI) in memory of Maj. Gen. Harkirat Singh, the dynamic Past President of ACE(I), who did pioneering work in the development of engineering consultancy profession in India. The scholarship is awarded to the final year student of B.Tech., Civil Engineering at the Indian Institute of Technology, Delhi, who scores the highest marks.

The Scholarship for the Session 2013-2014 was awarded to Mr. Aaditya Agarwal (Entry No.2010CE10981)

CEAI is grieved to announce the passing away of Mr. Shyam Najmi on 2nd August 2014.

Mr. Shyam Najmi served the CEAI for over a decade. He had started his career with the Institution of Engineers (India), Kolkata. Later, he became the officer In-charge of the IEI Delhi Centre. After his retirement from IEI in 2000, he joined CEAI and served in various capacities till he stepped down in 2012 as the Executive Director.

We at CEAI are very much indebted to Mr. ShyamNajmi for his dedicated service to CEAI and the Engineering Fraternity in India.

Mr. ShyamNajmi was instrumental in garnering support for CEAI from the government departments, semi-government & private organisations and by activating and mentoring the Regional Centers to fulfill CEAI's objectives.

He conducted a number of programmes for CEAI in India and travelled all over India to ensure that they were held in a befitting manner. He was known in many organisations and lived for the programmes he undertook. Though Mr. Najmi is no more he will be remembered as one who was always ready to help others.

He is survived by his daughter Ms. Nilanjana Rao.

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