

VIEWPOINT

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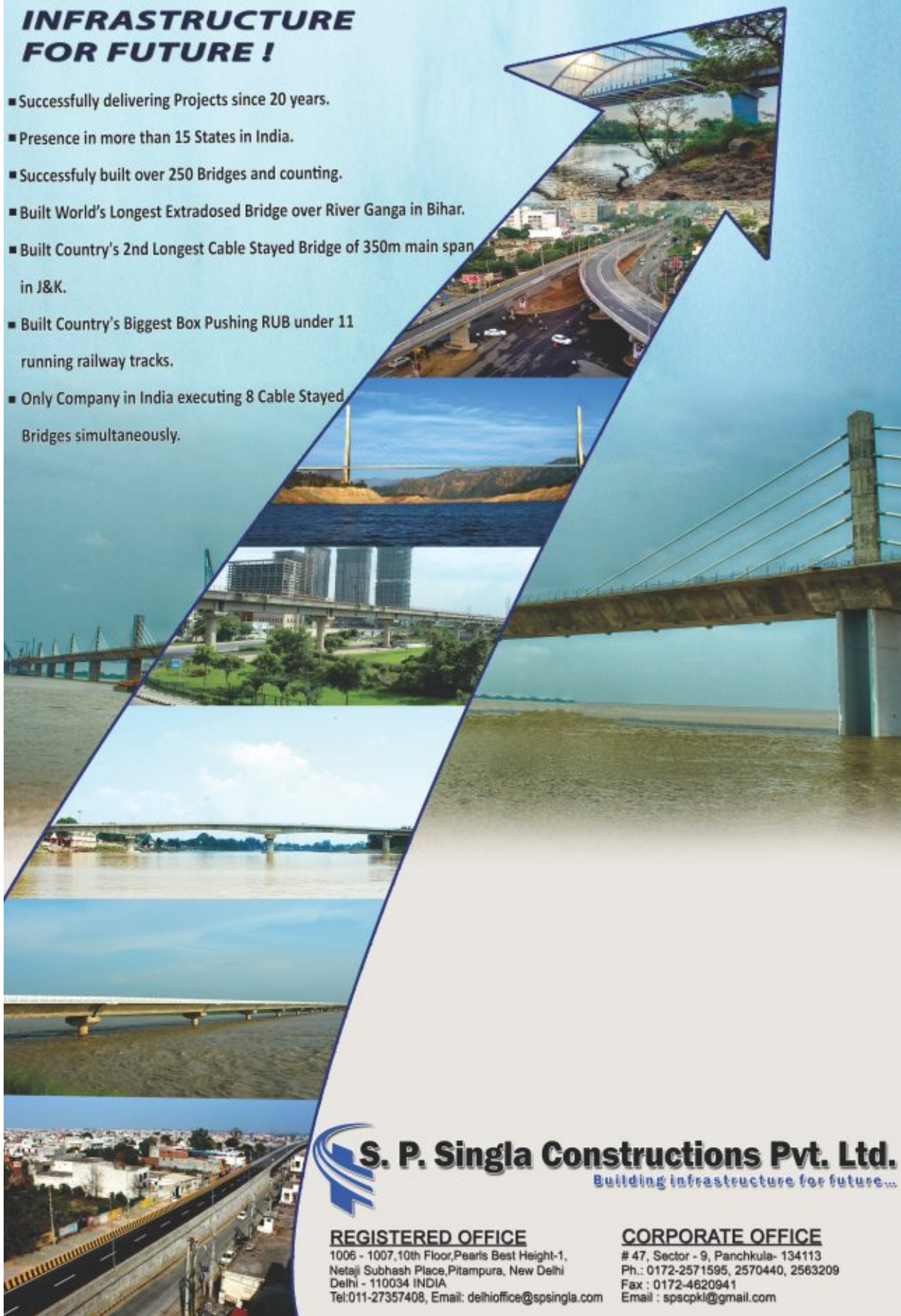


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MESSAGE FROM CHIEF EDITOR

Dear Fellow Consulting Engineers,

This issue of Viewpoint deals with the Safety, Signalling & Telecommunication Systems for Railways & Metros.

Safe, Secure and Reliable Mass Transportation Systems are key for the sustained development and growth of the country. The Indian urban landscape is changing fast with the railway track length increasing every year, high speed trains being added, Bullet Trains in the offing and Rapid Transit Systems such as Metro Rail, Light Rail & Monorails operating or being built at, above and below grade level plus underground in many cities. They are all welcome and essential additions for providing environmentally clean and rapid transportation for passenger and freight traffic.

The spate of rail accidents due to equipment failures, poor maintenance of track, equipment, structures and essential facilities, human errors, sabotage, etc. have resulted in a clarion call for tightening up the Safety and Security measures of the Railway operations and infrastructure. At one hand, there is a need to bring modern signaling systems with fail safe modes and in-built safety features and gradually replace the legacy signaling systems. At the same time, there is a need instill in the staff, at all levels, the non-negotiable necessity for Safety & Security in all spheres at every step. They need to be trained in the process and procedures for the selection of the Safety & Security means, techniques, procedures, equipment, implementation and operation with round the clock monitoring also needs to be explained to them. Later on their knowledge and capabilities must be updated periodically on a continuous basis. With the advances in science, technology and engineering Safety & Security are not dependant only on human checks and control which could be invasive. Non invasive remote checks, controls and monitoring are now possible and very often more reliable. AI developments are adding to their increased efficacy. Encroachments ought to be peacefully but firmly dealt with and no quarters given. Remote monitoring and alarm systems could provide the necessary trigger for this.

Reliable Signalling & Telecommunication systems are the sine qua non for these to function efficiently with a high degree of safety, security and reliability.

Signalling has evolved over the years from fixed mechanically operated Semaphores to power signaling, with electrical light signals, interlocking, block signalling, electronic signaling, cab signaling, centralized traffic control through wired medium and so on. Electric telegraph lines have given way to the current wireless and mobile communications. All this has enabled direct real-time communication between the stations and control centers with the staff onboard the trains. Safety is of operations has been enhanced by audible and/or visual indications inside the driver's cabin to

supplement the lineside signals. Automatic brake application is another feature that occurs if the driver fails to acknowledge a warning. Most current systems provide continuous supervision. Low visibility issues especially in the northern regions of the country could also be addressed with suitable systems in the driver's cabin.

The papers in this issue, based on experience, learning and reported data, are interesting which the readers will find thought provoking. They dwell on the present and also give some suggestions for the future, which the engineers of tomorrow can consider implementing after due trials. Let them not wait for others to implement first and then they follow; they must evaluate the risks and have the courage to be the first to put into successful practice.

CEAI held some important events in the past few months. A seminar on “Managing Physical Assets to Deliver Business Outcomes Cost Effectively” was held in Mumbai. It was organized with the aim of raising awareness and accelerating the adoption of the ISO 55000 standards and best practices in India in all sectors. For the buildings sector, the National Building Code of India, 2016, released this year gives the requirements for Asset Management and also Sustainability requirements. The seminar drove home the point “**Our Biggest and Essential Asset is Our Earth**”. The seminar on “Kolkata East West Metro-Unique Construction Challenges”, in Kolkata dealt with the experiences of the first Metro Project in India and the Planning, Design and Construction of the present Metro system. The third was the “NBC 2016 & Recently Revised Seismic Codes – Impact on Structural Design, Construction & Safety of Buildings”, also in Kolkata. It helped drive the message of proper design, detailing and construction to the engineering fraternity and the constructors. The “FIDIC International Infrastructure Conference 2017” was also held in this period in Jakarta. All these are reported in this issue.

It was heartening to note that as per a report in the Times of India, in November 2017 that an Expert Committee has recommended that Panchayats should have a “full-time CEO” and “engineer” to discharge administrative and technical work since they handle multi-million schemes. That's just what CEAI has been advocating. All projects must have qualified engineers with appropriate experience so that the development of the Nation progresses as planned.

It is with that in mind it is once again emphasised that legislation for Engineers is of utmost importance.

Happy Reading and Learning



A P Mull



MESSAGE FROM GUEST EDITOR RAILWAYS & METROS -SAFETY, SIGNALLING & TELECOMMUNICATION

Dear Readers of Viewpoint and Consulting Engineers Fraternity,

I am extremely honoured to be the Guest Editor of the Viewpoint's December 2017 issue themed on, "**Railways & Metros - Safety, Signalling & Telecommunication**". Viewpoint, the flagship magazine of CEAI, has been doing a commendable job at covering different sectors and bringing out focussed quarterly editions on specific sectors. When approached, I took the opportunity to be associated with CEAI's Viewpoint with open arms. In the last several years, my passion and love for Railways and Metros has increased exponentially.

In my travels across different countries, I have been mesmerized by experiencing how transportation modes have amalgamated into the daily lives of the citizens. Be it cities or the farfetched suburban areas, trains have always fascinated and drawn the masses to them. They have been bringing people closer and are an integral part of our lives now.

Today, the Railways & Metros in India are standing at a crucial juncture. There is a massive spurt of new metro projects coming up. Moreover, several gigantic initiatives are being taken to modernize Indian Railways and the technologies involved with them. The need of the hour is to synergize such initiatives and aim to bring effective results. Organizations such as CEAI can play a crucial role in this direction. It is befitting to dedicate this edition to the theme of Railways & Metros.

Safety of Metros and Railways is of utmost importance considering the fact these are mass transportation modes and any perturbations in their operation have an unprecedented impact on the safety of users and the operation staff. Safety is a vast subject and as such, in this edition, some of the articles focus on the in-built safety concepts in Signalling systems and operations of the metros and railways. Considering the vastness of the subject, another issue of Viewpoint would be needed to do justice to it.

There are a series of interesting technical articles on different topics lined up in this issue of Viewpoint. I hope you will like all of them.

I would like to sincerely thank the entire team of CEAI-Viewpoint for their concerted effort in shaping up this edition the way it is now. They are a great bunch of people who value the spirit of expression and exchange of ideas. Working in close co-ordination with all of them has been an enriching experience. I wish them all great luck in their future endeavours.

I hope the readers will find valuable information and learning in these articles.

Please spread a word about this issue of the magazine as countless hours have been spent by all concerned to bring it out in this form.

In case you would like to write to me, please feel free to email at: emailnswami@gmail.com

Thanks

Nikhil Swami

Independent Safety Assurance Activities for Metro Projects in India



Nikhil Swami
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 Kolkata Metro Rail Corporation Ltd. (A Govt. of India Undertaking)*

1. INTRODUCTION

Safety Assurance is defined in IRSE (Institute of Railway Signaling Engineers, Headquarter, London) Safety Assurance guidelines as “all planned and systematic actions necessary to afford adequate confidence that a product, service, an organization or a functional system achieve acceptable or tolerable safety” (IRSE News 2010). A typical Safety Assessment in Metros involves reviewing of the formal proofs of safety presented by the S&T (Signalling and Telecommunications) ‘design and build’ contractor involving RAMS analyses, hazard logs, Safety Audits, FMEA, FMECA, auditing of the software development process, etc. In Indian Metro projects like elsewhere in the world, an ISA also supports the client organization to attain safety approvals and certifications from statutory bodies before the Metro line can be opened for public use and revenue.

2. THE ROLE OF AN ISA

A Signalling Safety Assessor’s work closely follows the timeline and progress of the signalling system supplier’s work in the project. Papers written in the past have recommended for bringing an independent safety assessor in the initial stages and essentially by the start of detailed design phase of the signalling project. This allows an independent review of documents and the technical interface to start from the early stages of the signalling design. In Indian Metros, the relevant Indian Standards for opening of Metro railway line and latest general rules have been kept in consideration for deployment of ISA in Metros. The guidance document, “Application of Safety Assurance Processes in the Signalling Industry,” published by IRSE (in July 2010), should be taken as reference standard to improve the safety assurance processes being used in the specific Metro projects in India. One of the key guideline is, “design and build safe systems, don’t build systems and then check that they are safe.” This should be the core philosophy on which the whole signalling design and Metro planning should be based.

3. BASELINE STANDARDS USED BY THE ISA

ISA assessment in Metro projects is in reference to following CENELAC standards which are used as the base for the major principals and processes:

Standard	Version	Details
EN50126 & EN50126-2	September 1999, February 2007	Specification and Demonstration of RAMS- Part 2- Guide to application of EN50126-1 for Safety.
EN50128	July 2011	Railway Applications- Communication, Signalling and Processing Systems- Software for Railway Control and Protection Systems
EN50129	February 2003	Railway Applications- Communication, Signalling and Processing Systems-Safety related electronic systems for Signalling.

Table 1: Baseline CENELAC Standards used by ISA for Assessment

4. BROAD FOCUS AREAS OF ISA

Broadly the ISA consultant hired for the Signalling System in any Metro project focuses on following aspects:

- a. Assessment of Signalling supplier's development process of the system and the interfaces. This assessment is carried out at every stage of the process.
- b. Assessment of the system based on Signalling suppliers' design approach. The ISA consultant thus does not do any new development for documents or design but assesses the specifications and in-built safety principles, safety demonstrations and safety analysis conducted by the supplier.
- c. Ensure that all risks and consequent hazards are mitigated.

Generally, the SIL Levels recommended for different sub-systems of Signalling across different projects are as shown in the figure below:

SIL 4	<ul style="list-style-type: none"> • Train Control and Signalling System • Interlocking System
SIL 4	<ul style="list-style-type: none"> • Onboard Train Control System • Train Detection System (Track Circuited/ Radio Based CBTC) • Axle counters
SIL 2/ SIL 0	<ul style="list-style-type: none"> • Automatic Train Supervision (Automatic Route Setting) • TMS/ TMS

Figure 1: SIL Levels of Major Sub-systems of Signalling.

5. SAFETY ASSESSMENT PROCESS IN INDIA

Independent Safety Assessment as a process has evolved in India since the start of the first modern Metro project by Delhi Metro. The specific role of a Safety Assessor in a project varies for each project and is dependent on the following broad factors:

- (1) Type of financing and Ownership of the project.
- (2) Use of Proven technologies or otherwise
- (3) Specific guidelines for the safety assurance by governmental bodies of the land.

Apart from the above factors, the Independent Safety Assessment is broadly conducted at two levels in Indian Metro Project:

- (a) At the Suppliers level (Signalling System provider)
- (b) At the Customer level (Agency responsible for project execution)

While no Indian Metro project is planned without the provision of the ISA at Customer's level, in almost all of the Indian Metro projects, there is no specific emphasis for using the experience of an ISA at the supplier level. Many a times, it is seen, suppliers save the cost of an ISA by using their past assessment reports for another

project. Moreover, suppliers also tend to show that assessment activities for the project will be conducted by their RAMS team.

6. MAJOR CHALLENGES FACED BY ISA'S DURING ASSESSMENTS

The ISA face many challenges which vary depending on the complexities of the project. Some of the major challenges faced by ISA on any Greenfield Metro project are highlighted below based on the experience of the author:

- (a). Signalling system suppliers provide a system which has been used as a baseline in other Metro projects. With global tendering process, all the signalling system suppliers presently being selected have prior experience of different operational Metros and hence the systems have a proven track record. Thus, for almost all the major suppliers, there are certificates available for Safety Integrity Level. However, this does not limit the role of ISA or make it less significant in any way. The ISA has to specifically focus on the Signalling supplier's product's integration into the Command Control System and also need to ensure that the system achieves the SIL 4 objective. To ensure this the ISA have to assess the different redundancies used at different sub-system level. The ISA have to carefully assess the communication links securing the different components to see if the SIL levels are not being deteriorated or compromised by interaction between two systems/sub-systems.
- (b). The role of the ISA remains valid and critical all along the V Cycle of the System and the ISA should ensure that all requisite Quality and Safety processes are implemented to achieve the SIL 4 objectives.
- (c). ISA has the challenge of assessing the interlocking data and its preparation methods. The application of this data is also assessed by the ISA.
- (d). Interfaces of Command Control System to other sub-systems like Rolling Stock, PSD, E&M, etc.
- (e). With advanced Signalling systems, more and more intelligence is now available onboard the Rolling Stock. Hence, the challenge is to assess the integration of the onboard Signalling and Control System with Rolling Stock functionalities and control lines.
- (f). All safety related issues are to be identified by the ISA and the required clarification needs to be sought from the stakeholders on how the related risk is being mitigated. This process of seeking the correct technical solution, organizational changes and calculations needs to continue until the risk is considered as mitigated.
- (g). Operation and Maintenance procedures are to be assessed in order to review if the safety level is not being compromised. Staff trainings program are also to be assessed by ISA.

7. MAXIMIZING THE BENEFIT OF ISA FOR THE CUSTOMER

Based on the experience of the author, some aspects have been reviewed so that the role of the ISA could be improved. These aspects would provide benefits to all the stakeholders and specifically the customer and/ or the end user of the system.

- (a). ISA to review Generic Applications/Products of the Supplier: Here, the ISA refers to the one hired by the Customer (Project Executing Agency). The Customer's Terms of Reference/ specifications for the ISA should clearly tell what specific activities would be part of the ISA scope of services. For instance, the

generic application of products and software by the signalling supplier may not always need to be assessed. But in many cases, they need to be. These aspects need to be clearly spelt out at the start of the ISA role.

- (b). ISA and General Consultants are not mutually exclusive. There are overlaps in the assessment and review of documents. From experience of different Metro projects, it is seen that the scope of two stakeholders tends to create overlaps between their specific roles in regard to assessment and review of safety related documents. It is best to establish clear boundaries by the Customer between the roles of General Consultants and the ISA. The two could assess separately and put forth their views/ suggestions. The decision could then be based on the Risk involved and the probability of its occurrence.

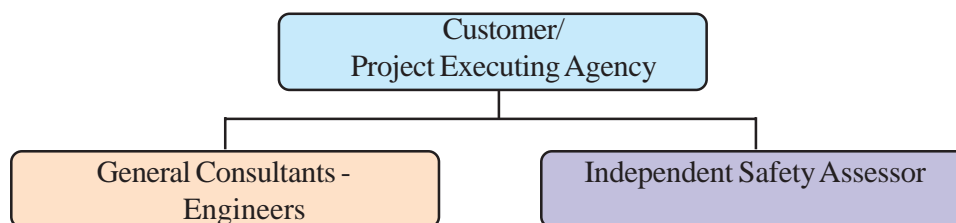


Figure 2: Defining the role of ISA and General Consultants -Engineers

- (c). There needs to be independence in the role of Engineers of the project and ISA. There would be several safety related documents which would be reviewed by the ISA and Engineers. The customer has to clearly establish the line of demarcation or clearly elaborate the communication process. For example, several Metros get their Safety related documents reviewed by the ISA after the same have been reviewed and commented by their Engineers. Here also as in the above point the decision could then be based on the Risk involved and the probability of its occurrence.
- (d). Clarity in scope definition for the ISA and dispute resolutions-Assessment of Generic Products and Applications. In general, the conventional ISA contracts for Metros do not specify what levels of products and applications will be assessed as part of ISA scope. This aspect creates confusion and lack of clarity during assessment. The ISA scope of services, in general are small value contracts compared to those of other systems, hence lack of clarity in their scope makes the execution prone to disputes. In general, many statutory bodies accept cross acceptance, which is a way of acknowledging and accepting the safety assurance activities, safety and test certificates of a similar project or system, as a practical assessment process. In Indian projects also, cross-acceptance is used with specific guidelines. ISA service show ever, should specify that assessment of generic products and applications are not part of the assessment so that there is clarity from the start of the assessment.

8. FUTURE OF INDEPENDENT SAFETY ASSURANCE IN INDIA

Safety Assurance companies have slowly and steadily made inroads in Indian Metro and Railway projects. There is a renewed intention from the Indian Government for technological upgrade of the Indian Railways with emphasis on Safety and on development of green-field Metro projects in different cities in India. With leading economic powers like Japan and China coming forward to fund Indian Metro/Railway projects through multilateral institutions, the prowess of European companies, rich in signalling and control technology and safety assessment experience, will be best used and tested in the projects in India. Supportive government policy framework and the precise intention of stakeholders in understanding the complexity of projects will give a new dimension to Safety Assurance work in India. The recent empanelment of Safety Assurance companies for ISA works by the Research

Design and Standards Organization (RDSO), a government body, in India is a promising step in the right direction. India presents a giant market for System Engineering and Safety Assurance companies. The climate is right for these companies to form strategic collaborations with government bodies and research institutions to make a deeper footprint in India. This would be a win-win situation in the real sense of the phrase. Safety Assurance companies would benefit from working closely with the regulators and decision makers in the Indian Railway and Metro industry thereby triggering necessary changes in improving the spread and effectiveness of the ISAs.

9. CONCLUSION

The role of the ISA in Metro projects has evolved over the years. Over the last decade, Indian Metro organizations have become mature in dealing with the ISA and defining their scope more explicitly and with

less ambiguity. However, as mentioned above, the role of ISA remains restrictive and the same needs to be broadened. There is lesser emphasis given on assessment of interfaces between systems which needs to be changed and added as a specific requirement. If there are cost implications for this addition, the customer should be willing to pay for it as substantial value addition is being gained by this addition and would result in greater overall Safety & Security.

10. REFERENCE LIST

- (1) Guidance on the Application of Safety Assurance Processes in the Signalling Industry published by IRSE May 2010- Published in IRSE News Magazine July/August 2010
- (2) International Engineering Safety Management (iESM)- URL <http://www.intesm.org/download.html>

DMRC will work on automated metro network

Recently, the Delhi Metro Rail Corporation (DMRC) along with experts of nine countries discussed various issues related to automated metro network in coming days in National Capital and shared experiences with stakeholders at a seminar held in Delhi Metro Bhawan.

The need for a reliable public transport and the economic growth has resulted in a rise in demand for time travel. Urban transportation infrastructure in India needs big investment and a massive upgradation.

According to WHO Report-2016, half of the world's 20 most polluted cities are in India. It is, therefore, necessary to make public transport attractive so as to retain existing commuters and lure others from private modes, with commuters looking for timely services, convenient journey, easy payment methods and value for money.

India has become the second largest metro market in the world, second only to China.

Presently, 10 metro systems are operational and Greater Noida, Navi Mumbai, Nagpur, Ahmedabad and Pune lines are in various stages of construction.

The experts also stated, it is estimated that by the year 2050, 60% per cent of Indians (590 million by 2030) will be living in urban areas. Metro is emerging as a key to fulfilling the demand for urban transportation in India.

Experts from Vienna, Belgium, France, Spain, Japan, Russia, Malaysia, Hong Kong and Germany took part.



Urban News Digest, December 27, 2017

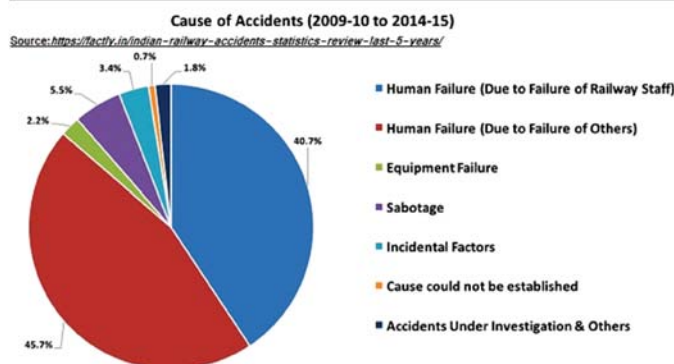
Suggestions to Reduce Railway Accidents in India



Mr. Mainak Ghosal
Consultant, MBA (HR)

INTRODUCTION

Safety remains one of the biggest concerns in the Indian Railways system despite technological advancements. While the number of rail accidents have declined from 325 in 2003-04 to 106 in 2015-16, the death toll from train derailments in 2016-17 is now the highest in a decade, according to an analysis of the data tabled in the Rajya Sabha (the Upper House of the Parliament), on 31st March, 2017 and 11th August, 2017. Though there is some initial decline, railway accidents are still a cause for concern specially accidents relating to maintenance of infrastructure and staff. Railway traffic is increasing due to introduction of more trains but repairs of tracks as well as increase in the staff numbers are not commensurate with the increase in traffic. The additional burden on the Drivers and Guards is causing work related problems leading them to adopting shortcuts or not observing safety rules and guidelines thereby resulting in disastrous consequences with more than 85% of railway accidents due to human error



The human resources in the Indian Railways are divided into four groups, i.e. Groups A to D. Under Group A and B gazetted officers are recruited and in Group C and D non-gazetted employees are recruited through various techniques by Union Public Service Commission (UPSC) and Railway Recruitment Boards (RRBs). The Human Resource (HR) policy of the railways ought to be revisited as most often wrong people have been assigned jobs. Hence, Human Resources (HR) department in the railways should be addressed first to reduce the number of accidents. Though classification of railway accidents, in terms of cause or effect, is a valuable aid in studying rail (and other) accidents to help to prevent similar ones occurring in the future, the employees should be taught how to cope with and manage their work related stresses and operational demands.

BRIEF DISCUSSION

A study carried out by *IndiaSpend* website had claimed that “excessive traffic” and “underinvestment in rail infrastructure” were the main factors for derailments. While accidents have been decreasing, the number still remains fairly high. The Standing Committee on Railways noted that the slow expansion of rail networks has put undue burden on the existing infrastructure, leading to severe congestion and safety compromises. Since independence, while the railways’ route kilometers

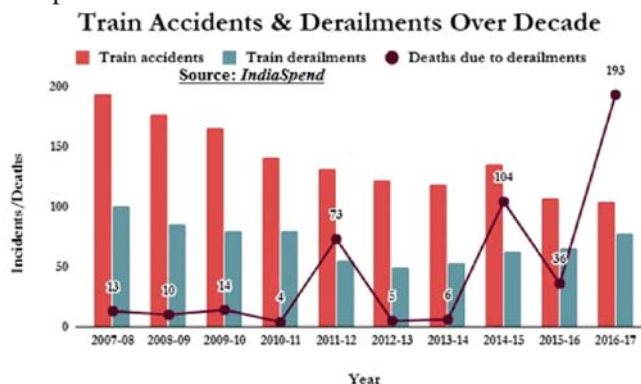


Figure: Chart showing Train Accidents/Derailments/Deaths in a Decade

have increased by 23%, passenger and freight traffic over the railways network has increased by 1,344% and 1,642% respectively. This suggests that the railway lines are severely congested. Further, under-investment in the railways has resulted in congested routes, inability to add new trains, reduction of train speeds and more rail accidents. Therefore, avoiding such accidents in the future would also require significant investments towards capital and maintenance of railways infrastructure.

Accidents due to Failure of Railway Staff

The Standing Committee on Railways, while examining the safety and security in the railways, had noted that more than half of the accidents were due to lapses on the part of railway staff. The lapses were carelessness in working, poor maintenance work, adoption of short-cuts and non-observance of laid down safety rules and procedures. The Committee had recommended that a regular refresher course for every category of railway staff be conducted.

Under-Investment in the Railways Leading to Accidents

Various Committees such as the High Level Safety Review Committee in 2012 (chaired by Anil Kakodkar) and the Standing Committee on Railways have looked at the aspect of safety in the Indian Railways and made certain recommendations. According to the Kakodkar Committee, the total financial implication of the safety measures over the five-year period (2012-17) was likely to be around Rs 1 lakh crore. In the Railway Budget, 2016-17, the Mission Zero Accident was also announced. It comprises two sub-missions:

- (1) The elimination of Unmanned Level Crossings (UMLC) along broad gauge tracks in the next three-four years, and
- (2) The Train Collision Avoidance System (TCAS).

There are 27,181 level crossings in India of which 19,480 are manned and 7,701 are unmanned. It is planned to eliminate unmanned level crossings along broad gauge tracks by 2020. The allocation of fund for track renewal has been almost doubled from the last five years average of Rs 5,548 crore to Rs 9,961 crore in the Budget Estimate of 2017-18. Railways are embarking on a mission to provide upgraded safety features on coaching stock. The coaches of the trains are not all new. Some of them have been made at the Integral Coach Factory (ICF) and are infamous for piling up on collision. Stainless steel Linke Hoffman Busch (LHB) coaches are more efficient for shock absorption and can reduce incidents of derailment. The Anil Kakodkar Committee on Railway Safety has recommended switching to LHB, but lack of funds is an issue. It has been decided that only Linke Hofmann Busch (LHB) coaches will be manufactured from 2018-19 as they are of a superior design that reduces the chances of derailment and mitigates the chances of grievous injury or death in case of accidents. It has been decided to carry out improvement in safety features in the existing Integral Coach Factory (ICF) designed coaches which have a residual life of over 10 years. About 40,000 coaches will be provided with these features in the next five years. In the Union Budget for 2017-18, the creation of a Rashtriya Rail Sanraksha Kosh was proposed for passenger safety. It will have a corpus of Rs 1 lakh crore over a period of five years (Rs 20,000 crore per year).

SUGGESTIONS TO REDUCE ACCIDENTS

- (a) Two of the three recommendations of the Debroy Committee, which would have been instrumental in operationalising the Kakodkar Committee recommendations in the first place - have bitten the dust. Instead, the Indian Railways has diverted its attention to promoting more comfortable and faster transport in the form of Tejas and Humsafar Express, Bullet trains, etc. Considering the extensive length of the rail tracks and their age, the number of trains running and the number of passengers killed or injured is a small percentage and a good Actuary could calculate their probability. In most cases the persons concerned directly for

negligence including the officer concerned can be pin pointed. The Railways pays a bonus every year despite not making any profit. It is suggested that the Railways incentivizes good and faultless work including punctuality and also penalize those for negligence. Productivity linked bonus benefits could be extended to the Group A and B officers in Indian Railways.

- (b) A systematic Human Resource Audit had been introduced in the Railway Budget for 2015-16 and an independent Human Resource (HR) consultant selected to conduct Indian Railways' HR Audit to identify gaps in HR related policies and the lacunae faced in their implementation. The Human Resource per kilometer during the year remained in the region of 20-22 while the number of Railway Stations in the Indian Railways increased significantly. Planned recruitment needs to be done in conjunction with those for expansion.
- (c) The number of Railway Recruitment Boards be reviewed; they could perhaps be reduced to five and the recruitment and selection be done on the lines of the UPSC.
- (d) Every Division should have a unit for safety observance and another unit for punctuality. They should send daily reports on track maintenance and punctuality of trains.
- (e) Digitize the flow of all reporting through suitable mobile applications from the location where the work is being done.
- (f) The reports to be supported with videos/ photographs so that monitoring can be easily done. All reporting should be checked by seniors on their mobile/ PC/ Laptop/ Pad within a given time frame.
- (g) Attendance of personnel to be also done through biometrics.
- (h) All records to be digitized and report of a Work Order and Material Issue for work related to tracks should automatically go online to the Station Master and the Signaling Incharge so that they are aware that work is going to be done on the tracks. Necessary audio-visual alarms should be raised when the Work Order and Material Issue is done for the recipient of the online message. Acknowledgement and Acceptance of the message would be proof that the other person is aware and has taken further steps to regulate rail traffic accordingly.
- (i) All trains to be equipped with sensors to spot an obstacle on the tracks plus a defined zone of say 5 m on either side of the tracks to prevent collisions.
- (j) Vibration level of tracks and the sounds emanating from the running train to be also monitored and used as a feedback for rail crack, rupture, etc.
- (k) Two way communication with audio-visual alarms to be provided at all level crossings so that the on board train Driver and Guard as well as the drivers of vehicles and pedestrians approaching the crossing get warned in time.
- (l) Use of Drones to capture visuals of accident sites in order to collect evidence and also for surveillance.

To conclude, the Indian Railways ecosystem can create a million jobs within the next 12 months, as Railway Minister Mr. Piyush Goyal remarked in the opening session of the 33rd India Economic Summit in October, 2017. That would be good for the country but safety and security need to be fully provided for so that accidents attributable to human error are minimized.

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METRO RAIL HVAC EQUIPMENT



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Most of India has a tropical climate with hot summer and warm, humid monsoon. With most long distance and suburban trains running packed with passengers, the car interior conditions become unbearable in non-air conditioned coaches. The congestion is more intense in Sub-urban/ Metro trains in view of very high passenger density, especially during peak hours. Under such circumstances, air conditioning in the car becomes a necessity rather than a luxury. Hence Delhi Metro, a pioneer in Metro Rails in India, when starting the first line way back in 2009, had all the cars air conditioned. Delhi Metro is a bench mark for all other Metros in India. Following Delhi Metro, all Metros have gone for air conditioned cars. Until this time, all sub-urban trains in India, including the overcrowded Mumbai local trains were without air conditioning. Now, whether it is the dry hot summer of Delhi or the warm humid conditions of Kolkata, the passengers are ensured of a comfortable environment inside the car, defined by the following parameters:

1. Temperature – 25 Deg.C in summer and 20 Deg.C in winter.
2. Relative Humidity – less than 60%.
3. Air distribution – ensured by a Heating, Ventilation & Air Conditioning (HVAC) unit, car duct & diffuser system to achieve uniform temperature conditions through the length of the car without hot or cold spots.
4. Fresh air – Based on the passenger load, fresh air intake occurs to maintain the level of CO₂ in the car which dramatically helps in reducing energy costs compared to a standard HVAC unit.
5. Filtration – Both the streams of air - fresh air from outside and the return air from the car are filtered before delivering to the car duct system.

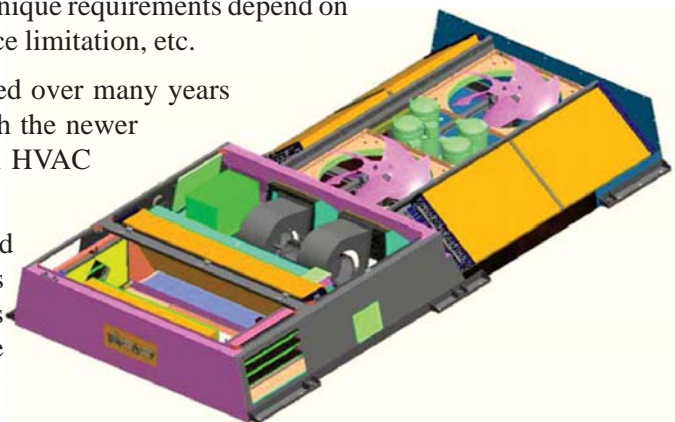
Even though the HVAC unit (pictureshows a typical inside view) used in Metro cars is basically the same as packaged HVAC units used elsewhere, there are many very unique requirements which are critical for reliable and safe performance. These unique requirements depend on the operation environment, safety of passengers, space limitation, etc.

The science of rolling stock HVAC units has evolved over many years learning from the experience as well as to cope with the newer requirements. Some of the key features of a typical HVAC system of the present day are described below.

Single Packaged Unit – The HVAC units are installed on the roof of the car, one at each end. All components required are packaged in one assembly. Split type units with Air Handling Unit and Condensing Unit in separate assemblies are rarely used.

Compact Design – Space availability is generally very tight as the HVAC units are placed at the two ends of the metro car, on the roof. All parts are packaged tightly within the envelope provided by car builder and this requires some innovative thinking.

Light Weight – The car builder provides limits for the mass HVAC unit. There is in fact a constant demand for lower weight.



Shock & Vibration – The metro car is subject to constant vibrations even though the levels are less in metro cars. Hence, all sub-systems that go on the car are subjected to stringent shock & vibration tests as per relevant standards. For a HVAC unit the standard followed is EN 61373.

Structure Borne Noise Requirements – Limits are specified by the car builder to limit the vibrations transferred from HVAC unit to the car body.

Smoke & Fire Compliance – Safety is of paramount importance especially on a mobile car. All non-metallic parts (cables, switch-gears, insulation material, etc.) have to comply to stringent smoke and fire standards. The EN 45545 standard has now become a norm for Metros.

Energy Efficiency – HVAC unit is second only to car propulsion system and hence certain minimum energy efficiency norms for HVAC specified by Metros in India, issued by the Ministry of Urban Affairs, Government of India.

HVAC being the second most energy consumer onboard a train after the propulsion system itself, lots of innovations have arisen in order to reduce by up to 50% the electricity consumption compared to standard units.

Train Management System – A unique requirement of rolling stock HVAC unit is the interface with the Train Management System. This network interfaces all sub systems of the train like HVAC, doors, lighting, Smoke & Fire, etc. and all operations, safety, faults, etc. are made available at the driver's desk.

Noise Requirements – The HVAC equipment consists of compressors, condenser fans, etc. which are a source of noise. Limits are generally specified for external and internal sound levels.

Environment Friendly – For some projects, compliance to standards like REACH in EU, though in India this is not demanded for all projects. The objective of such compliance is to ensure protection of human health and environment. Apart from this, the refrigerant used is non CFC.

The passenger travel experience has changed for good to continuous enhancement of various sub-systems by active involvement of Metro end operators, car builders, sub-system suppliers, Industry associations and even the non-governmental organizations. This is an on-going process and even though progress has been made to attain the present state of HVAC systems, there are some challenges, some of which are given below:

1. **Energy efficiency** – Since HVAC unit is second only to the propulsion system in terms of energy consumed, there is always demand to lower its energy consumption. New ideas like VFD compressors, use of braking energy, smart management of parked trains, etc. are being implemented for some projects.
2. **New Refrigerants** – The refrigerants used at present, the HFCs have to be phased out, even though for countries like India, it is still over a decade away. But in EU, the change may happen as early as from 2020. Alternate refrigerants like CO₂, air cycle and others, etc. are being explored
3. **Shorter Project Timelines** – Speedier project implementation has multiple advantages like keeping costs within budgets, revenue operations start generating cash earlier, relief to common man on account of faster, convenient connectivity, less traffic on road, less environmental pollution, etc. Hence the time-lines for project implementation are getting squeezed, which in turn requires faster development times for all sub-systems including the HVAC unit.

Conclusion

This article provides a brief introduction to rolling stock HVAC systems of Metro and Suburban trains which are the backbone of Mass Rapid Transport Systems globally and have helped people to live far away from work places and commute to work in a comfortable environment sans travel fatigue. The MRTS also helps keep thousands of vehicles off road thus helping in preserving the environment and public health. HVAC systems play a key role in providing a comfortable environment whether it is a freezing cold winter or a baking hot summer.

Future Road Map – Modern Control, Command Signalling Systems



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Control and Command Signalling System (CCS System) describes the technical procedures and systems for communication between the responsible trackside and on-board participants as well as systems for the safe control of trains. With Railway traffic across the Globe becoming extremely complex with customers imposing their needs on Railway operators and authorities, safe reception and dispatch at stations and into block sections is not the only function of modern day Signalling systems, but it has become more complex.

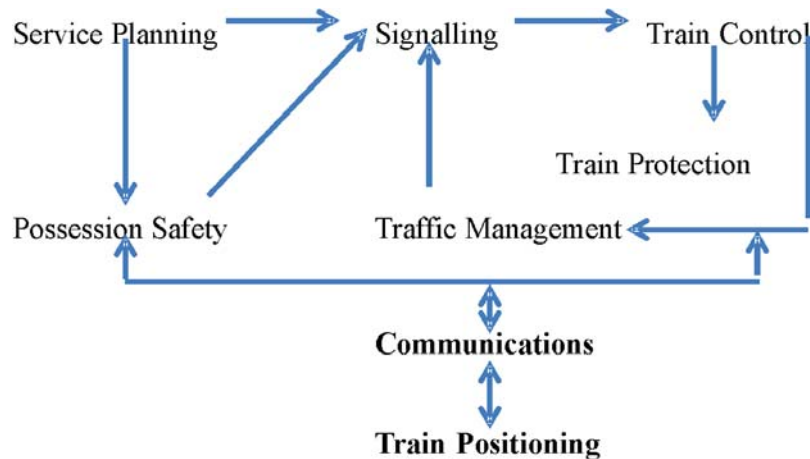


Figure 1 – CCS - System Architecture

Control, Command & Signalling is defined as that set of functions and their implementation, which allow the safe and predictable movement of rail traffic in order to meet the desired operational activities. It is also concerned with communication networks and systems in the wider railway context. Figure 1, above describes the entirety of the CCS.

On Indian Railways the need for introduction of modern Control, Command & Signalling System is paramount. This is basically to take care of:

- (a) Enhancing safety levels by adopting and introducing train protection and modern system or automatic train control system.
- (b) Adoption of Railway Train Traffic Management system for commanding the operations of coaching and freight trains as well as to improve through put.



Leading Causes of Collisions
Signal passed at danger,
Collisions at Manned and Unmanned LC gates

Figure 2 – Causes of Derailment

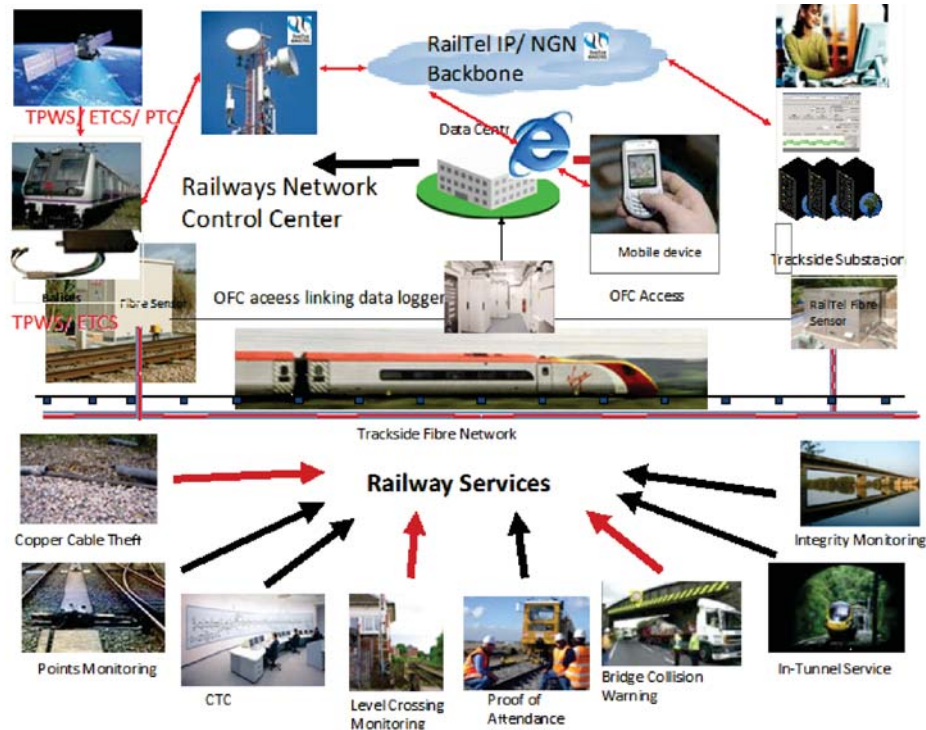


Figure 3 – CCS – Integrated Intelligent Control and Command Structure

- (c) A command system for freight operations especially to optimize terminal detentions and monitoring/commanding loading/unloading of important commodities.
- (d) Providing integrated Rail Road safety system of eliminating accident cases involving road vehicles dashing with level crossing gates as well as moving trains.

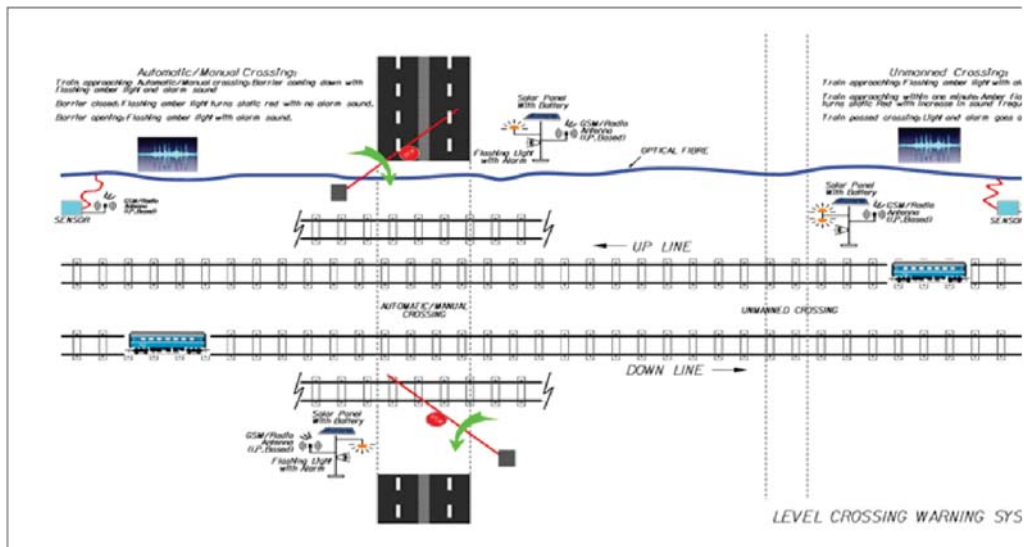


Figure 4 – OFC sensor based LC Gate Control & Command System

- (e) Developing ecology for safer and faster train movement. Like adoption of Driver Advisory System

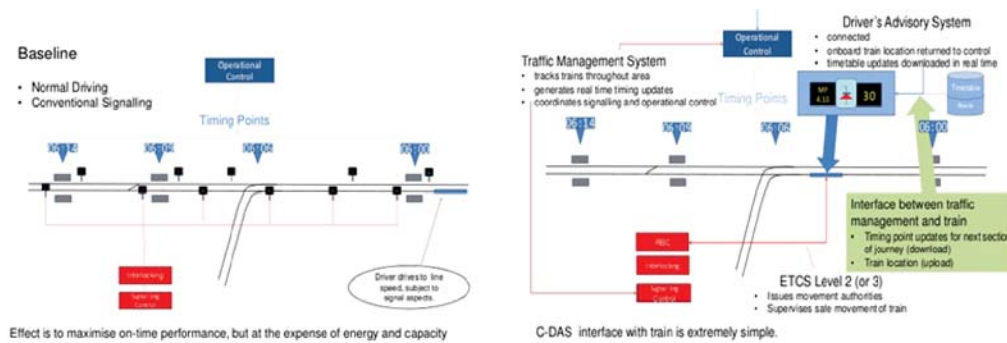


Figure 5 – Adoption of Driver Advisory System: Existing vs. Future CCS

Radio based train control and command, with the transmission of the signal state to the vehicle, track state to the vehicle and vehicle state to the signal control room, leads to a new situation for all participants in the railway system. All areas outside the train control and command system are also to be adapted and harmonised. Like ERTMS, ETCS or TPWS (in India) is a solution for the interface between driver and traffic controller. ETCS level 3 being the latest entrant in this direction, a level replacing wayside train detection with on-board localisation, allowing elimination of much of the trackside train detection equipment. This needs not only interoperability but standardisation of technology also. The radio communication within this system is based on the digital standard GSM-R. Additionally the voice communication GSM-R is used for data transfer of the European Train Control System (ETCS) and similar systems. ETCS level 3 promises significant benefits for the Infrastructure owners, but adds extra systems and complexity to the train-borne equipment. ETCS Level – 3 based Traffic Management System is characterised by the fact that a train in level 3 determines its own location, using position references transmitted by fixed *balises* and its on-board odometry. It transmits this location data to the radio Block Centre, which issues movement authorities to the trains under its control.

Such systems are split into the trackside and on-board intelligent subsystems, which are themselves divided into interoperable constituents. The advantage of this solution is that a subsystem can be assembled with constituents built by different manufacturers. But it is mandatory that each constituent exactly fulfills the specified requirements.

The needs of Indian Railways are different than those for European Railways where the need for modern Control, Command Signalling system is to integrate various locally optimized control systems. On Indian Railways the need is to have an unified Control, Command and Communication Signalling system for increasing safety and throughput with high reliability and availability of the modules. The only way out is to build intelligence in various elements of train control and operations like:

- a) Integrating all aspects of train traffic management to take care of high passenger demand for running more trains which are made to stop at shorter distances unlike European Railway Systems.
- b) Raising effective capacity and improve asset utilization in both coaching and freight traffic transportation.
- c) Forecasting about the trains movement including those moving into and out of freight sidings and freight depots.
- d) Allow maintainers to see and select best block periods for doing integrated maintenance.

Thus Indian scenario needs an intelligent Control, Command Signalling System which has to be a networked system in conjunction with train protection and train management system allowing re-planning as necessary at systematic level rather than local optimization.

Intelligent network elements comprising of field elements like; signals, switches, OHE, fouling marks, gates, rolling stock locations, track, bridges, Train examination points, weigh bridges, etc. need to interact on real time

basis. These should be IP enabled elements at an integrated platform with fool proof safety, security and to ensure enhanced levels of customer comfort. The block diagram in Figure 6 shows the integration of such a system.

Modern Control, Command and Signalling System is for:

- Improving performance in terms of health and safety, reliability, and punctuality,
- Increasing capacity and availability, thus reducing cost,
- Integrating all of these to compete effectively with other transport modes (or complement them as appropriate), and
- Delivering a sustainable future for the railway

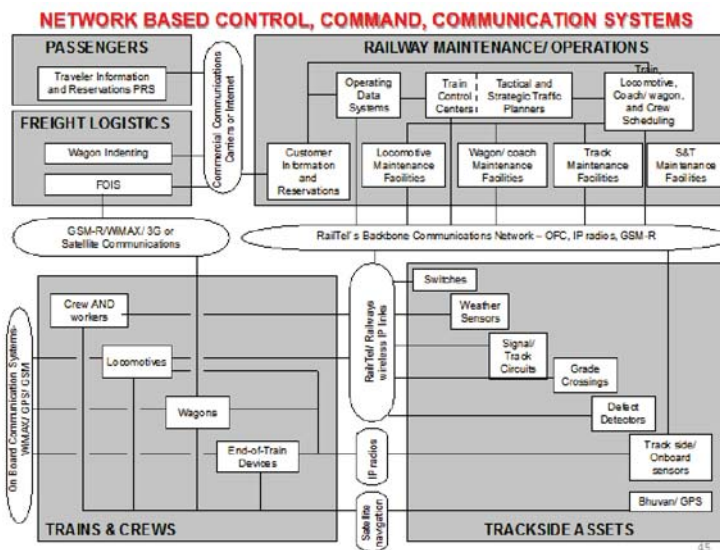


Figure 6 – CCS – Networked Based Approach for Main Line

Implementation of CCS on Indian Railways would need adoption of the following:

1. Defining a standard train control interface for Indian Railways.
2. Adopting and Managing Rail Traffic Management System for automating the functions of Loco Pilot as well as provide Automatic Train Control Feature in the cab.
3. Adopting Train Control Systems for Yard Operations as well to reduce Terminal detentions.
4. Evaluation of hybrid satellite navigation overlaid on GSM-R or LTE-R for Train Detection & Introduction of Satellite Navigation for train detection.
5. Application of Satellite Communications & Low Cost Train Control using Global Positioning System technology.
6. Human-centered junction signaling.
7. A strategy to develop future railway communications, assessing and fulfilling the bandwidth demand for future communications needs.
8. Rationalisation of Drivers' Warnings in the cab and Analysis of Drivers response to Conventional Signalling system.
9. Introduction of Driver Advisory System in the Cab.
10. Failure Management of the Rail Traffic Control System.
11. Electromagnetic compatibility at the infrastructure/ train interface.
12. Investigating the design of a display to repeat signal aspects, wherever the CCS is overlaid on legacy systems.
13. Development of an Incubation industry defect reporting analysis and corrective action system for Control, Command & Signalling Equipment.
14. Proof of concept trial for wireless internet protocol connectivity as a contender to deliver an operational wireless lineside.
15. Development of Automatic Warning System infrastructure
16. CCS Driver Machine Interface options for future train cab design.
17. Improving track circuit actuation performance at the wheel/rail interface.
18. Development of OFC sensing technology for track circuit application, and
19. Development of a costed Business Model for CCS for IR.

Salient Improvements adopted for Phase-III OHE in DMRC



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Abstract: DMRC is operating a modern MRTS system in Delhi and NCR region since 2002. At present the DMRC Network consists of 166 km OHE and further 84 km of OHE work is in the construction stage. With this the Total OHE network will be of 250 km by end of 2017. In the last 15 years of operation, the OHE system faced various issues and few breakdowns occurred which resulted in halting the lifeline of Delhi. A number of measures were taken to enhance the reliability, availability and maintainability of the system. These advancements were triggered by past experiences and the infusion of new technology available at the global scale. This paper briefly describes the developments adopted by DMRC to ensure a world class OHE system incorporating the new advancements and the lessons learnt from various hurdles/ bottlenecks faced during revenue operation in the past years.

1. Introduction

Delhi Metro Rail Corporation (DMRC) has become a major Mass Rapid Transit System (MRTS) system to provide urban transport solution for the Delhi city and the National Capital Region (NCR). Over a period of 15 years a massive network of 200 kms with 160 stations has been made operational with daily ridership of 3 million passengers. The total network under revenue operation is 221 km out of which 166 km is elevated.

Further, under present phase of expansion (Phase-III) DMRC is in the process of constructing 127 kms of network out of which 84 km is elevated. After the expansion planned in Phase-III, the total network will reach 348 kms out of which 100 kms will be underground/ tunnel section and balance 250 kms on elevated/ at grade.

DMRC is the first MRTS system in the world to adopt 25 kV AC traction system as against 750/1500 V DC system adopted elsewhere. The 25kV Over Head Equipment (OHE) provided in Phase-I and Phase-II had various failures due to internal or external reasons. This paper briefly highlights the precautionary measures taken to avoid failures and focuses on improvement measures being taken up for better reliability, environmental and technological consideration in the execution of the ongoing Phase III project, based on experience of the previous projects and their operation over 13 years.

2. Consideration for Change or Improvements.

2.1. Reliability and Safety related issues of Phase-I and Phase-II:

DMRC network is under heavy stress. The average current level in the system is much higher as compared to the conventional railways system or high speed system. Further due to very small headways i.e. of 2.5 mins during peak time, the numbers of panto passages are also very high. Every 2.5 minutes, 4 pantographs pass. Since the system is for urban mass rapid transit and stays operational from 5.00am in the morning till 12.00 midnight. The effective window available for maintenance is also very small- only 2-3 hours effectively.

With such huge electrical and mechanical stress and limited maintenance window, maintaining reliability and availability of the system is a challenge. In the DMRC Phase-I and Phase-II corridors, there were a large

number of OHE failures due to internal and external reasons. A comprehensive audit report on those failures had been made and a number of suggestions were made to improve the reliability of the OHE system. Few modifications were made based on the findings of those failures.

2.2. Higher pollution level:

In the wake of failures of OHE equipments due to pollution, it was decided to measure the pollution data of DMRC network. Since, the pollution data of DMRC network was not readily available; a need was felt to get it measured through a specialised agency, Central Power Research Institute (CPRI, Bangaluru). DMRC along with CPRI Bangaluru conducted pollution mapping of Delhi and NCR and classified Delhi into various Pollution Zones as per IS:13134-1992. As per the Pollution mapping results, 98% of Delhi Area was classified into Heavy/ Very Heavy Pollution level.

2.3. Technological advancements in 25kV AC system worldwide: In last few years there was a lot of technological development and advancement in field of 25kVOHE system worldwide. DMRC is always keen to upgrade depending on whatever best the manufacturing industry for the 25kV OHE system has to offer.

3. Item wise Improvements

3.1 Insulators:

Due to pollution, conductive layer of pollutants is formed on the surface of the insulators, resulting into increased leakage currents and sometimes flashovers on the insulators and tripping of power supply. This necessitates the increased frequency of cleaning of insulators. This also results in tripping of traction system and sometimes delays in train operations.

Accordingly, In Phase-III, DMRC has adopted higher Creepage Distance Insulator (1600mm) insulators instead of 1050 mm Creepage Distance Insulators to avoid unwanted tripping/flashovers.

3.2 Aluminium Cantilevers:

In DMRC Phase-I and Phase-II Galvanized Steel Cantilevers had been used. However, in Phase-III Aluminum Cantilevers have been adopted for the following reasons:

- (a) Better corrosion resistant property over GS
- (b) Light in weight,(kg vs. kg)
- (c) Easy to handle during installation, commissioning maintenance and breakdown.
- (d) Better Reliability due to lesser number of components.(16/ 21)
- (e) Present Day Technology with Modular Design.
- (f) Aesthetically more pleasing to suit the urban landscape.



3.3 CuMg Messenger Wire:

In Phase-I & II Copper Cadmium (Cu-Cd) Messenger Wire had been used. In Cu-Cd Messenger Wire of various manufacturers approved by the Research Designs and Standards Organisation (RDSO), is being used in various lines/ existing metro network, large number of failures of strand breaking and parting were observed. Frequent rejection of material during factory acceptance test inspection also took place due to inconsistency in quality. Further Cadmium being polluting and hazardous for environment, its use is being discouraged globally and it is banned in several countries. Phase-III onwards, it has been decided to use Cu Mg 0.5 catenary wire of 65sqmm as per DIN 48201.

3.4 CuAg Contact Wire:

In various lines of Phase-I & II/ existing metro network electrolytic copper had been used for Contact Wire. At booster transformer overlap there have been failures due to flashing between Contact Wire and stationary pantograph. If the intensity of flashing is high, it also melts Contact Wire at the point of contact. It may be noted that softening temperature of Electrolytic Tough Pitch (ETP) copper is around 180°C whereas for copper silver, it is 345°C. Therefore, silver copper alloy can withstand comparatively higher arc level generated due to stationary pantograph and passage of pantograph on account of the kink, etc. Operating temperature of electrolytic copper, as per EN 50149 is 80°C whereas for copper-silver alloy materials, it is 100°C. As a result, Contact Wire of silver copper material of same size is able to carry 12% more current as compared to ETP copper. Considering the benefits, Copper Silver- 0.1 alloy contact wire is used in one of the lines of Phase III.

3.5 Current Carrying Droppers:

The Droppers provided in earlier phases of DMRC are not designed to carry current and are meant to maintain contact wire sag within design limits. The Droppers have been breaking on contact wire side from just near crimped end. Since the contact wire uplift due to pantograph pressure causes Droppers to bend near the crimped end on contact wire side, the bent portion is subjected to stress and failure at that point. At some places the flashing marks were also observed in Droppers.



Current Carrying Droppers are being used in Phase-III section. These Droppers have several advantages over non-current carrying Droppers. Bending issue near crimped end on Contact Wire has been taken care in Current Carrying Droppers. Being current carrying, these Droppers shorten the distances between points for equipotential bonding and allow a better current conduction. These Droppers are lesser in weight and hence they have lesser influence on the dynamic behaviour and also have good bending fatigue strength.

3.6 Spring ATDs

In DMRC normally, 5-Pulley Automatic Tensioning Devices (ATDs) are used. However, wherever there is constraint of height or safety concerns, Gas type ATDs were used upto Phase-II. Due to poor reliability of Gas Type ATD, they were replaced in Phase-III by Spring Type ATDs.



Helical spring ATD



Spiral spring ATD

3.7 Tubular Masts

Bird nesting menace on B series masts and portals with hollow cavities are quite high and it requires frequent removal during bird nesting season. Bird nesting is one of the major established causes of catenary failures. Tubular poles are free from accessible hollow cavities and offer long term maintenance advantage. Apart from this, these poles are aesthetically more pleasing compared to the present structures to suit the urban landscape. Hence, initially 200 numbers tubular poles are being provided in Phase III on experimental basis. Tubular poles have been used in substations of Phase-III instead of lattice steel structures to reduce the erection time and improve aesthetics.



3.8 Single Insulator Cantilevers:

Adoption of Single Insulator Cantilever type helps in increasing the electrical clearances from the fixed structures besides reducing the requirement of insulators and maintenance. SIC have lesser number of parts hence better reliability and easier maintenance. This also will help in reducing the damage to catenary due to bird menace. This is being adopted in 3 km section of one of the lines of Phase-III on an experimental basis.



3.9 Retractable OHE systems:

In DMRC Phase-III, Retractable OHE system has been provided in Inspection Bay lines of all depots. This retractable OHE is suitable for EoT Crane working for Rolling stock maintenance. There will be no vertical obstruction to maintenance personnel while working on the roof of the train. Further the physical separation of the OHE from the charged section ensures safe working conditions.



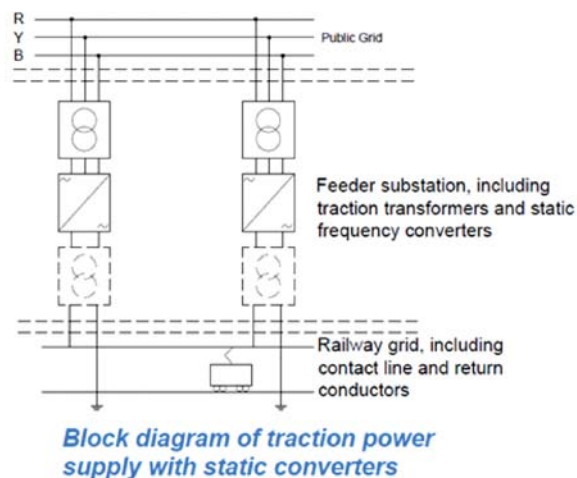
3.10 Contact Wire Heatsink

DMRC had 3 cases of Contact Wire snapping at BT overlaps. In case the train stops at insulated overlap, the current tends to flow through the pantograph and continuous sparking occurs.

To have higher arc level and better thermal characteristics, heat sinks are being planned for use at insulated overlaps, BT overlaps and at switching stations.

3.11 Static Frequency Converter (SFC):

SFCs are designed to draw three phase balanced load at nominated power factor from public grid. No separate load balancer system is needed. They can freely control voltages, angles and frequencies on both public and railway grid sides. Overhead line can be synchronized over a long distance. Simulations studies reveal that interspacing between feeding posts can be increased to 1.7 times in 25kV AC system and 2 times in 2x25kV system with SFC as compared to a conventional transformer system. Adjacent railway sections can be connected together and system can work without neutral sections.



SFC can control the traction voltage to a higher level, independent of public grid. This increases the efficiency of circulating trains. The ability to connect at lower distribution voltages (i.e. 33 kV), which are more abundant and less expensive to work with than transmission infrastructure. Active power consumption will decrease and global system efficiency will increase.

The two sided feeding system reduces the peak load consumed at the individual connection points to the public grid. It also reduces the effective railway impedance with some degree of redundancy. SFCs have a fixed harmonic spectrum towards the public 3 phase grid. Harmonic distortions from the Rolling Stock are eliminated.

DMRC is planning to adopt SFC to mitigate the problems of Voltage distortion due to harmonics, phase imbalances, etc.

Single Cut Signalling Circuits – Learning from an Unsafe Side Signal Failure



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Introduction: One of the earlier accepted methods of Signalling Circuit in the Railways for controlling safety critical signalling functions was Single Cutting arrangement. The method was adopted to economise the number of cable cores, relay contacts and there by, reducing the cost of installation. In that type of circuitry, relay contacts are provided in the positive path and the negative path is common for two or more functions. A single unsafe failure such as an earth fault, contact weld, decay of cable insulation, etc. will result in malfunction which could lead to a fatal accident. I would like to share one such learning.

System of Working at the Station: The Station which I am referring to is situated in a non-electrified single line section. It is a 'B' Class Station equipped with motor operated multiple aspect Upper Quadrant Signals. The signal machines were operated with 110V DC. The Station had free wired relay interlocking with 'Q' series relays. The Station Master used to operate the functions from a SM Slide Control instrument from a central location. A mini panel was provided for indication purpose.

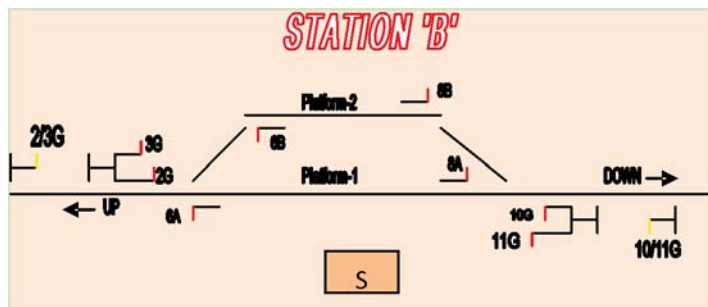
The system of train working was Absolute Block System with Neal's Ball token instrument. Track circuits were provided from Home Signal to Home Signal. The normal position of the signal arms pertain to UP direction signals were proved in 'ARGPR' relay and DOWN direction signals were proved by 'BRGPR' relay. The respective RGPRs were provided in the Block instrument locks which would be effective while turning the instrument to Line Block from TGT or TCF. In case a signal got stuck in the 'OFF' position, the respective Block instrument was made to fail.

It is the duty of the Station Master to verify the position of the signals before normalizing the Block instrument. If the signals are found stuck in OFF position, the Station Master is supposed to normalize the defective signal manually.

Location of Station



Signalling Arrangement



Sketch - 2

The Incident: The Station Master had granted line clear to Station ‘C’ for receiving an UP Passenger train. He had cleared Home Signal (11G) for UP Main and received the train on Platform-1. After dispatching the train he tried to normalize the Block Instrument (Section ‘B’ - ‘C’). He could not do so and hence verified the position of UP Home signals. He found that the UP Loop Home Signal (10G) was at 45 degree implying caution. The SM was surprised to see the Loop Home Signal at caution. He checked the panel and found all controls normal.

He then proceeded to the Home Signal (10G) to restore the defective signal to ‘ON’ position manually. Once he pulled the signal to normal it went to OFF position automatically. The Station Master was surprised to see the signal going back to OFF again and again. Finally he kept the signal suspended and informed the Signal Maintenance staff. The Signal Technician tried to restore the failure but he could not since it was a complicated failure. When I received the message, I proceeded immediately to the site at around 12.00 pm. On reaching there I checked the signal. To my surprise, I found the signal motor was getting 110V DC supply continuously. I disconnected the supply links at the location box and restored the signal to normal (ON) position.

Signal Circuit:

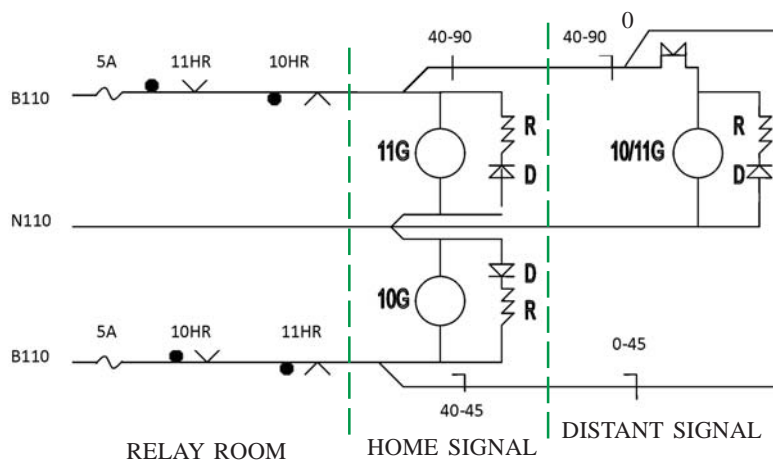


Figure-1

Normal Working: As shown in Figure-1, the Single Cutting arrangement with Common Return Circuit was provided to the signal. Only 3 conductors were used for operation of two signals. The Negative path was made common for both Loop Home (10G) signal and Main Home signal (11G). The controlling relay contacts were provided in the positive path only. The front contact of concerned HR and back contact of the conflicting HR and other contacts as applicable were provided in the positive path of the signal circuit. When the signal slide is pulled, 110V DC supply is extended from the Relay Room to the signal through the selection circuit.

Unsafe Failure: While the first passenger train was signalled, the snubbing diode (BY127) at the Distant Signal (10/11G) got punctured and short circuited due to lightning. Due to short circuit of the diode at the Distant Signal, the circuit current increased many fold from the normal value of 120 milli Amps (*hold on current is 15 ma only*) to 3.8 Amps.

In the above case, the short circuit current was limited to 3.8A due to line resistance of the cable conductors (length approx. 1.5 km + 1.5 km, size of conductor- 1.5 sq.mm Cu.). Unfortunately the over current could not blow the control fuse, since the rating of Control Fuse provided was 5A.

There was a strong belief among Signal Engineers that metal to carbon contacts never weld. But the root cause of that failure was solely due to the welding of the contact, but in an unbelievable way. The high current passing through the arm contact of 11HR relay resulted in overheating of the arm contact. The overheated arm contact bent towards the arm (metal) of the back contact as shown in Figure-4. Both the arm contacts of 11HR front and back got welded and offered a continuous current path to the UP Loop Home signal (10G). My assumption is that while the bent contact of 11HR was about to touch the bottom contact, a heavy arcing must have taken place. The over heat generated due to arcing was sufficient to weld the contacts which caused continuous availability of 110V DC supply to the Loop Line Home Signal motor, even without operation of control device (refer Figure-5).

Short Circuit Current Flow

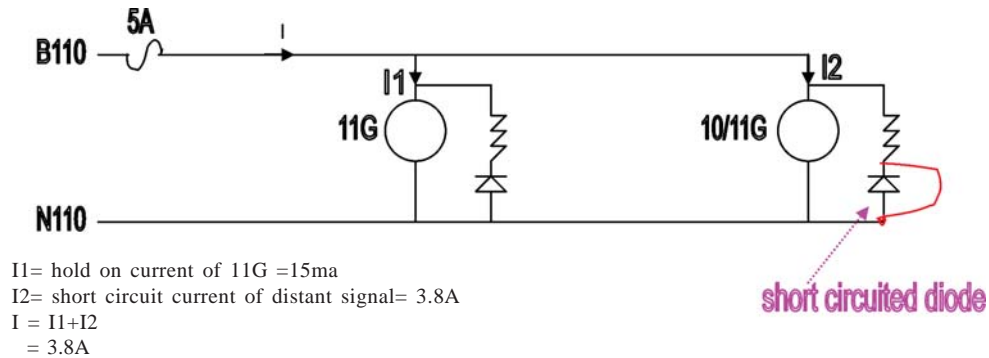


Figure-2

‘Q’ Series Relay Contact Position

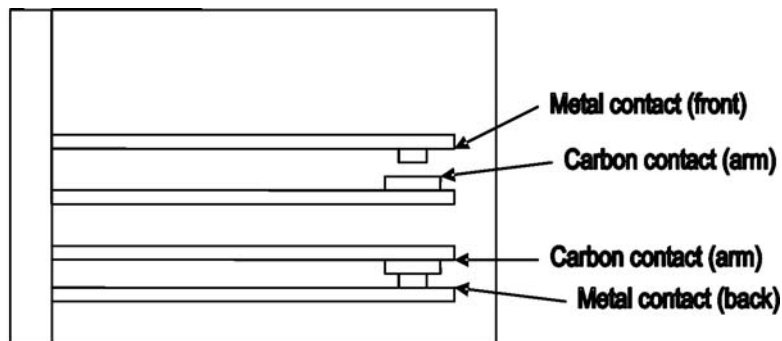


Figure-3

FAULTY RELAY CONTACT

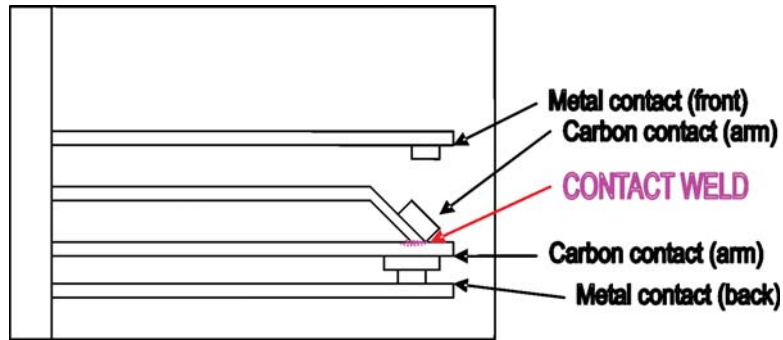


Figure-4

FAULTY CIRCUIT

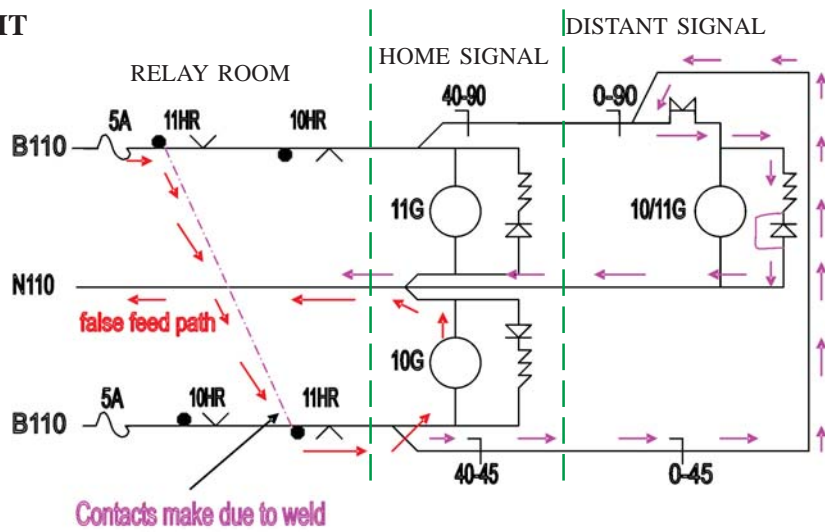


Figure-5

Signal Control Circuit with Double Cutting Arrangement

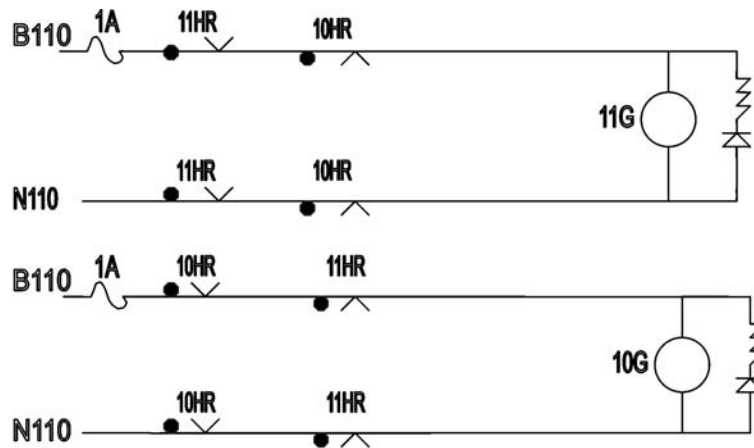


Figure-6

The Consequences: Suppose, if the Station Master had issued a paper Line Clear ticket for the next train without verifying the position of the signal arm, the driver could have entered into the Station by seeing the Loop Home and Distant signal, which would have resulted into a fatal accident.

Things Brought to Light:

- (i) Improper Rating of fuses used.
- (ii) Independent Return Path not used for Safety Critical Circuits.
- (iii) Double Cutting not used for Safety Critical Control Circuit.

Remedial Actions Taken:

- All signal control fuses were replaced to 0.5 Amps.
- New cables were laid and Double Cutting arrangement was implemented.
- The existing practice of Common Return Path was discontinued.

Abbreviations:

‘B’ Class Station- Trains can be crossed at this type of station.

DC- Direct Current

SM- Station Master

OFF- Signals operated for reception/ dispatch of signal

ON- Signals showing Red Light or Horizontal position of Semaphore Arm

TCF- Train Coming From

TGT- Train Going To

MAUQ- Multi Aspect Upper Quadrant Signal

Distant Signal- The first reception signal (trains can pass this signal even if it is at ON) of a MAUQ station

Home Signal- The first stop signal of a station for receiving a train

Starter Signal- Signal which control the dispatch of a train

‘Q’ Series Relay- a plug in type signalling relay

Metro systems of the world:

There are more than 155 metro systems on the planet. The **New York Subway** has the most number of stations - **421** by conventional definition, but actually considered to be 468; the **Shanghai Metro** is the longest metro system by route length - **538 km**; the **London Underground** or the ‘Tube’ is the oldest metro system in **the world** and has been operational since **1863**.

The **Moscow metro** system is not just another metro system. The stations are known as “Underground palaces” and are beautifully designed with pictures on the walls, chandeliers hanging from the ceilings and more.

Source: Most today.com/Quora



Railway Signalling and Telecommunications: A niche area for Professional Skill Development

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World class development in transport sector be it Highways, Shipping, River Transport, Railways or Air Transport are top priorities of the Modi Government. The Development agenda of Prime Minister Modi emphasized on en-cashing in on 4D i.e. Democracy, Demography, Demand and Deregulation which are taking place to take the country on a fast track of progress. Further to take Demographic benefits of the youths of the country, a highly ambitious agenda of Skill Development was put in place by creating a Ministry of Skill Development exclusively to train manpower in various skills required by the indigenous industry and those of other countries too.

Among the means of transport, the railways are the life line for the Indians. Being the most economical mode of transport for the common man and largest employer in the Government sector it has a high priority for development. In the past decade there has been rapid expansion in Metro Railways as a prominent means of transport in cities like Delhi, Mumbai, Hyderabad and Bengaluru, etc. The target of making of 100 smart cities in the country cannot be possible without developing smart urban transport which is fast, clean, safe, secure, economical and comfortable. Development of the Railway Freight Corridors and the Bullet trains are also going to be a reality in few years. Therefore the demand for infrastructure, skilled man power and opportunities for Make in India are enormous in the Railway sector. In the Rail Budget of 2015 a Railway University was proposed so that the growing demands for the specialized manpower of railway sector could be catered to.

Good Signaling and Telecommunications facilities are the core of a smart railway system. Since this is a very specialized subject, practically it is difficult to train manpower in large numbers as demanded by the industry. The Honorable Minister for Railways while addressing a seminar organized by IRSTE at Vigyan Bhavan, New Delhi in April 2017 had shown keen interest and given a Vision and Roadmap to train the manpower as below:

1. Prepare Course Curriculum in consultation with Industry to cater to the need of the industry.
2. Private Universities be encouraged to launch such training program of short term duration and long term duration.
3. Practical be allowed in the Training Institutes of the Railways for which the infra is already available at affordable cost. These Training Institutes may work on enhanced working hours, and additional man power may be recruited in case the capacity of Training Institutes is fully utilized.
4. Ministry of Railways may recognize such courses and may give preference in promotion and new recruitments.
5. Senior and retired people should take keen interest in providing training and sharing their experiences so that they may remain useful to the society and live purposeful life even after retirement.
6. Senior and retired people should also share their experience in blog/ writing articles addressing workshops, etc. Their experience is valuable and it is not available through text books

In line with above vision some prominent institute like IIIT Hyderabad, IIT Kharagpur and Osmania University College of Engineering, Hyderabad have already begin a Master course for Signal and Telecommunications.

Besides few private institutes like Institute of Metro & Rail Technology (IMRT), Hyderabad and Rayat-Bahra University, Mohali in Chandigarh have launched Post Graduate program for Railway Signaling and Telecommunication under Guidance of IRSE (India Section). The students are trained by the domain and industry experts. “According to the survey conducted for the Rail projects, nearly 1600 to 2000 new people will be required every day in next five years in Signaling and Telecommunication alone with more than 30% of these people to be of technical level.”

(Source: International Man Power Resource web link: <http://www.indianmanpower.com/imr-railway-manpower-from-india.htm>)

In time to come many more such specialized courses will be available for the technical graduate who would be ready to work in the industry. This would save time and training cost of industry and fulfill the gap of trained man power in the Railways and other industries looking for manpower with specialized niche skills.

Dear Passengers,

Government has taken significant transformative steps to ensure high standards of safety and constant endeavour is made to improve the same in Railways. As a result, during the current year i.e. 2017-18 (from 1st April to 30th November 2017), a total of 49 consequential train accidents took place in comparison to the 85 accidents in the corresponding period of the previous year, which is an improvement of 42 percent over last year.

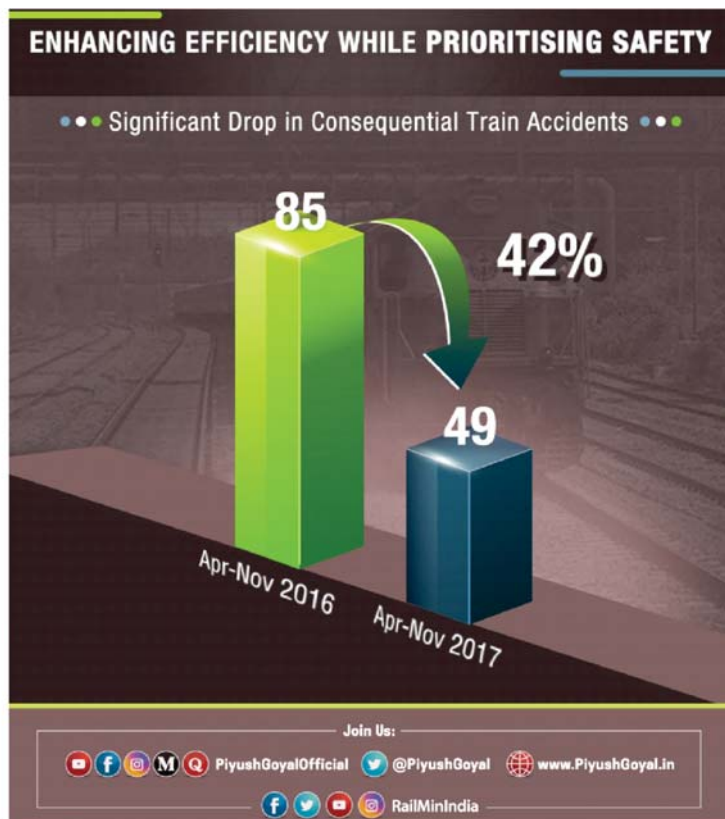
For the year 2017-18, 3,600 km target has been kept for track renewal. Detection of flaws in rails through digital type of machines & Electronic monitoring of track geometry are being carried out in advance to avert train accidents. Complete track circuiting of stations for verification of track occupancy by electrical means instead of human element has been completed at about 5,889 stations upto 31.10.2017.

Electrical/Electronic Interlocking with centralized operation of points and signals at 5,661 stations & Interlocking of Level Crossing Gates at 10,921 gates to avoid accidents has been done upto 31.10.2017. Priority has been accorded for elimination of UMLC gates (unmanned level crossings) in a time-bound manner up to December 2018. In the meantime we are deploying Gate Mitras for the interim period.

Train Protection & Warning System (TPWS) to mitigate safety risk of accidents/collisions due to loco pilot's error of signal passing at danger or over speeding has been operationalized on 342 kms. Complete switch over to manufacturing safer LHB from conventional ICF coaches from 1st April 2018 onwards.

Many other steps are being taken. Railways is committed towards safety of every person.

Regards,
Ministry of Railways
Government of India



India's Rapidly Growing Urban Transportation Market & New Generation Time Servers/ System



Sandeep Kumar Barnwal
*Technical Lead – MOBATIME
 India Private Limited, Delhi*



Prashant Saxena
*Country Head – MOBATIME
 India Private Limited, Delhi*

Whenever punctuality is essential to a functioning system, Swiss Time Systems by MOBATIME is there: at train stations, subway stations, airports, schools, hospitals, power plants, IT applications, communication networks, industrial, administrative buildings, etc. We have references in more than 10 different fields of applications, in more than 60 countries and in the field of special clocks.



Europe's largest train station clock in Aarau, Switzerland. The clock face alone measures nine meters.

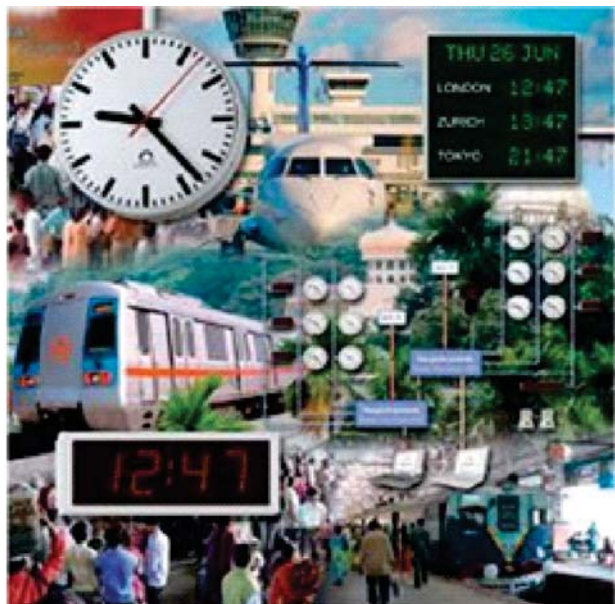
Apart from its standard products, MOBATIME offers a multitude of customized solutions such as facade clocks, floral clocks, and designer clocks

Time System for Metros in India

For several years India has been investing large sums of money in the construction of metros in large cities. The master plan is that every city with a population in excess of one million is entitled to an evaluation and if need be – provided that financing is secured the construction of a metro.

Precise timing is essential for Transit system including signalling systems and operation of metros/ trains. Traditionally, the time on platforms, in waiting rooms, shopping areas and in offices has been displayed using analogue and digital clocks. In addition, a precise time reference is increasingly used for the synchronization of subsystems such as access control, monitoring cameras, loudspeaker systems, etc.





In addition, analogue clocks in particular are important bearers of the corporate identity of a metro or train, using logos, shapes and colors in the respective corporate design.

Precise time synchronization requirements of Clocks, signalling systems, Public announcement systems, CCTV systems, Passenger Information display systems and various other systems are also represented in one of the largest metro systems in the world, the Delhi Metro. This system, for which the Delhi Metro Rail Corporation (DMRC) is responsible, currently comprises a network over 180 kilometres long with 138 stations. The supplier cum service provider is involved in the running of this impressive metro network.

Challenges

To keep improving the new generation of timeservers and clock systems, R&D has to be done continuously

and also make sure that nothing was overlooked. Working with new standards, third parties and multiple devices means they have to stay on top of everything that is happening over the network. Knowledge and expertise in synchronization technologies is growing, which in practice means that more and more processes and solutions need to be thoroughly checked.

Timeservers are designed to work on Ethernet infrastructure, hence the Software & Hardware deployed have to make sure they have full access to the information on the network connection. Third-party devices can also influence the way a product behaves. To make sure these devices correctly align and work well together with the existing infrastructure, it is important to solve all the problems in the early stage of development and deployment.

Accurate measurement results can be used to convince involved parties of present problems and the required steps needed to solve them. An integral solution provider for synchronized time is necessary for the Transport/ Metro projects.



A Multiport NTP/PTP

Did you know ? - The Delhi Metro Rail Corporation was certified by the United Nations in 2011 as the first metro rail and rail-based system in the world to get "carbon credits for reducing greenhouse gas emissions" and helping in reducing pollution levels in the city by 630,000 tonnes every year

Building the Foundation for a Next Generation Mission Critical Rail Communications Platform

The implementation of a state-of-the-art, mission critical rail communications platform extends beyond communications network and technologies. Rail service operators will need to consider the full span of highly complex systems that are being integrated and coordinated across multiple technology assets, along with a compatible supporting platform in order to result in the operational outcomes required by end users.

Motorola Solutions manages the integration of a complex communications system for rail operations by working with a strong ecosystem of local partners to support the deployment of radio and broadband operations, as well as the development of software applications, managed services, training and change management.

Optimized Networks, Specially Designed For Rail Operations

Communications systems for rail operations must be designed to match exceptional standards in order to support the massive load of critical rail workflows and engage effectively in emergency incident responses. These systems have to ensure a high level of reliable performance under the worst possible circumstances – thousands of rail workers, first responders and municipal agencies communicating simultaneously in highly challenging coverage locations.

With a clear understanding of such “demanding” expectations, rail operators around the world are looking for dedicated, standards-based TETRA and LTE-R networks that are designed with exceptional capacity and performance levels, along with dedicated spectrum resources in order to ensure the coverage, capacity and capability needed to support their wireless installations.

When Your Operations Are On The Line And Critical Communications Must Go Through – You will Need TETRA For Rail Operations

Apart from Public Safety services, transportation operations have always been the fastest growing application of TETRA technology across the globe. Over the years, rail service operators have placed increasing confidence in Motorola Solutions Dimetra IP TETRA system - a state-of-the-art, mission critical communications platform providing the most comprehensive suite of advanced voice and data features.

Built on an advanced IP network architecture, the platform offers maximum flexibility to support the mission critical requirements of rail operations while maintaining enterprise-wide security and manageability. Equipped with a highly scalable architecture, the TETRA rail systems are designed to meet today’s needs and capable of up-scaling over time in order to address future expansion with additional railway lines, increased data utilization as well as growth in media-rich services.

Motorola Solutions provides the world’s only TETRA platform that is “future-ready” for LTE. Rail operators thus have the benefit of a converged radio, core and transport architecture that is ready to support an end-state network that is optimized for next-generation LTE broadband services and applications.

From secure radio communications, rail operation control centre applications, trainborne equipment to field personnel communications, Motorola Solutions continues to drive TETRA innovations that are trusted by the world’s leading rail service operators.

Motorola Solutions - A Global Leader in TETRA Communications

Motorola Solutions' deep commitment to developing industry leading TETRA solutions for railway operations is guided by our accomplishment as a prime TETRA critical communications provider to over 100 rail projects over the past 40 years.

As the world's largest supplier of TETRA radio communications, more than 600 TETRA customers in 100 countries have placed trust in our state-of-the-art technology for their mission-critical communications. In Malaysia, Motorola Solutions has deployed the first operational TETRA radio system for rail way operations with ERL as well as the first TETRA contract for high-speed rail in South Korea.

Today, Motorola Solutions' TETRA solutions for railway operations serve over 3 million passengers daily in the London Underground, guide driverless train operations across the Shanghai Metro, and cover the world's longest passenger railway system with Taiwan Railway Administration.

In addition, Motorola Solutions has experience in the design, deployment and operation of the world's largest TETRA installations. This spans over complex systems integration, managed services as well as the end-to-end overview of the entire supply chain and logistics management.

As the leading supplier of nationwide TETRA systems, Motorola Solutions is proud to operate over 30 nationwide systems and to have won 9 nationwide contracts.

Leading Edge Innovator in Mission Critical LTE

As the pace of change in mobile communications accelerates gradually, Motorola Solutions continues to be at the leading edge of technology with a new category of broadband innovations in mission critical LTE-R and Intelligence Led Rail Operations.

As the world's global leader in mission critical communications, Motorola Solutions has placed a strong R&D focus in developing the industry's standards-based LTE technology to equip it with the necessary capabilities to meet mission critical requirements for public safety, transportation and industrial applications. Over the years, we have already invested over a quarter of a billion dollars to develop mission critical LTE.

Motorola Solutions also has the great privilege of being awarded with the role of prime contractor for the largest government Public Safety LTE contracts in the world. Bringing together an unparalleled ecosystem of the most recognized industry players in the Information, Communications and Technology sector, Motorola Solutions provides turnkey services to implement and manage end-toned integrated communications networks for both governments and enterprises across the globe.

Metro in India

The first rapid transit system in India was the **Kolkata Metro**, which started operations in 1984.

Planning for the Delhi metro started in 1984, when the Delhi Development Authority and the Urban Arts Commission came up with a proposal for developing a multi-modal transport system for the city. The **Delhi Metro Rail Corporation (DMRC)** was incorporated in May 1995 and construction started in 1998. The Delhi Metro was India's first modern metro to open in 2002.

The development of the network is in phases; Phase I containing 3 lines was completed by 2006, and Phase II in 2011. Phase III is scheduled for completion by 2018. On completion of its phase IV project in 2022, the total length of Delhi Metro network is expected to go up to 456 km. *Source: Wikipedia*



Institution of Railway Signal Engineers

The IRSE is the international Professional Engineering Institution for people working in the fields of:

- Train control systems
- Railway communications and data management
- Railway systems engineering

We welcome engineers, technicians, students, researchers, managers and directors who are involved or interested in these fields of work.



We run events at international and local levels, such as:

- The International Convention (recently in France, Australia, and China).
- The ASPECT Conference, held in London in 2015, with the next one planned for Singapore in Nov 2017.
- An annual Presidential Programme of Technical Papers
- Technical meetings in countries where we have Local Sections
- Technical visits and seminars on subjects such as Competence, Systems Engineering, EULYNX, and ATO



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Published by IRSE India

CEAI NEWS

Report - Seminar on “MANAGEMENT OF PHYSICAL ASSETS To Deliver Business Outcomes Cost Effectively”.

CEAI, on the initiative by the CEAI-Western Region Centre who collaborated with the Institute Asset Management, UK organised the seminar on 12th October, 2017 in Mumbai.

The intent of the seminar was to draw attention to the fact that an asset is a boon only so long as it provides value to an organization and its stakeholders, or else it becomes a liability.

It served to emphasise that building an asset and maintaining that asset so that it can continue to remain fit for the intended purpose in a safe and efficient manner for its design life are two different scenarios. The former is for a short duration but the latter stretches over the life of the asset ranging from a few decades to over a century. The state of un-kept and ill-maintained assets is costing the country dearly. The burden like any other is borne by the masses. There is therefore an urgent and dire need to bringing greater awareness amongst all those involved in managing physical assets; and to promote the adoption of international standards and best practices in India.

Physical assets include public and private buildings, hospitals, education centres, hotels, roads & highways, drainage, railways, ports & harbours, shipping, aviation, water and sanitation, flood protection, space research, defence, chemical & industrial plants, power generation and transmission, oil & gas, telecommunication, irrigation, etc. These assets which include the fixed as well as the movable assets such as plant & equipment are vital for the socio-economic development of any nation.

The seminar brought out that if an organization has multiple assets at the heart of the business, then an efficient asset management strategy, regardless of whether the assets are tangible or intangible, financial or non-financial, would contribute to better operating results, service performance and ultimately improve

the bottom line of the organization and at the same time sparing the masses the burden of funding for rebuilding the asset. The concepts and principals of asset management are not limited to organizations per se but can be equally be extended cities, regions and even to individuals.

The International Standards Organization (ISO) has created the ISO 55000 family of standards to give guidance on asset management best practice. This was a collaborative effort of 36 countries, including India. It focuses on helping to develop a proactive lifecycle asset management system. It thus supports optimization of assets and reduces the overall cost of ownership while helping to meet the necessary performance and safety requirements. It was released in 2014.

The incorporation of a chapter on Asset Management in National Building Code of India 2016 will give a much need impetus to proper maintenance of buildings.

The seminar was well attended considering that it was on a captivating, educational and stimulating topical issue of managing physical assets.

The presentations were informative and give a range of perspectives on managing assets.

During the inaugural session Mr. A P Mull, Past President CEAI accorded a warm welcome to the Chief Guest, all the dignitaries and participants. Mr. Uttam Sengupta, Vice President, CEAI and Chairman CEAI-WRC briefed the participants about the seminar. Ms. Sayona Philip, President CEAI also stressed on the need for generating awareness on the seminar theme.

Mr. Neeraj Bansal, Dy. Chairman, Jawaharlal Nehru Port Trust (JNPT) who was the Chief Guest, enlightened us about the proactive measures being taken by the Government and public sector to converge the synergies between finance, logistics and physical management especially in the context of managing such a large asset as JNPT.

Dr. Harshavardhan Subbarao dwelt on the considerations that led to deciding on the theme. Thereafter he convened the proceedings of the day.



Mr. A P Mull welcoming the Chief Guest, Dignitaries and Participants



Mr. Uttam Sengupta briefing about the seminar



Ms. Sayona Philip addressing the gathering



Mr. Neeraj Bansal, Chief Guest delivering his address



Mr. Bansal explaining the measures taken at JNPT for better functioning



View of Audience



Dr. H Subbarao explaining the seminar theme



Mr. David McKeown stressing that people from all professions necessary for Asset Management



Dr. Navil Shetty explaining the ISO 55000 suite



Mr. V Suresh expounding Asset Management as per National Building Code of India 2016



Ms. Holley Chant dwelling on the link between Sustainability and Asset Management



Dr. Barun Chakrabarti on Asset Management for chemical & industrial plants



Mr. Pravin Shahu conveying the benefits of digitization in Asset Management



Mr. Dinesh Sharma explained how technology can help streamline asset management



A view of the audience



Presenting a bouquet to Mr. Ahmad Etman



Mr. Ajay Mathur emphasized on the need for proper commissioning



Panel Discussion in Progress



The people behind Asset Management



Mr. Jeffrey Nambiar giving the Vote of Thanks

Mr. David McKeown, CEO, Institute of Asset Management, UK then took us through the business case for asset management and stimulated a discussion on how every human being is really as asset. He stressed that people from all professions and not only engineers need to be a part of the team for Asset Management.

Dr. Navil Shetty, Director, Fellow & Technical Chair for Asset Management, Atkins Limited, UK provided a clear presentation and summary of the ISO 55000 suite of standards supplemented by practical advantages of optimising the assets through a systematic management system as well as what happens when the assets are not managed properly. He mentioned that long term cost savings result from proper asset management.

Mr. V Suresh, President, Good Governance India Foundation, Vice Chairman, National Building Code of India and Former CMD HUDCO made a passionate speech about the new chapter introduced in the National Building Code of India 2016 on Asset Management that led the audience to question as to what would happen to their house as an asset say 20 years down the line and which stakeholder would be responsible for maintaining it.

Ms. Holley Chant, Executive Director, Corporate Sustainability, KEO International Consultants presentation pointing out to the link between sustainability and physical asset management and describing the earth as the largest and most valuable asset which we need to manage, struck a chord with all present.

Dr. Barun Chakrabarti, General Manager, Asset Management, Engineering Services, L&T Hydrocarbon Engineering Limited described asset management for chemical and industrial plants and the steps that are being taken to design the life of an asset, to create an organised means to extend the life and assess the residual value of the existing physical assets was an engaging exposition.

Mr. Pravin R Shahu, Vice President, Tata Consulting Engineers Limited explained at length how digital

technology can be pressed in service for assets management including giving an insight on Resilient Infrastructure Modelling and Digitisation.

Mr. Dinesh Sharma, CEO, DNR Process Solutions PTE Ltd. spoke on efficiency and saving by digitisation of asset management and gave a perspective on the use of technology and steps that can be taken to make it more streamlined.

Mr. Ajay Mathur, Technical Director, Power Q Technology Pte Ltd. explained at length the need for proper commissioning of each system to obviate problems later on and ensure that they perform as desired.

The Panel Discussion on “Accelerating the adoption of Asset Management standards and best practices in India” was moderated by Dr. Harshvardhan Subbarao, the Convenor, Co-Chairman CEAI-WRC and Past Vice President CEAI. The issues discussed were the experience in other countries, raising awareness in India, the role of Government, Regulatory Bodies and Financial Institutions, Trade Bodies, Professional Institutions and Academic Institutions. There was good participation from the audience. The attendees were keen to adopt asset management as per codes in their sphere of operation.

Mr. Jeffrey Nambiar, Hon. Secretary & Treasurer, CEAI-WRC, proposed the Vote of Thanks.

Seminar on “KOLKATA EAST WEST METRO-Unique Construction Challenges” on 14TH October 2017 at Kolkata

CEAI, E& NE Region centre, held a Seminar on the ongoing EW Metro Rail project, with the object of making the Engineering fraternity aware of the goings on, on this interesting and innovative engineering work. The Metro Rail authorities gave unstinted support and the organising committee was formed with representatives from CEAI, Metro Rail officials and senior members of the construction agencies involved in the project.



Inaugural Session



250 plus delegates during Inaugural

The Inaugural session was presided over by the Head of Metro Railways and the delegates were welcomed by Somenath Ghosh, Vice President of CEAI.



Welcoming presenters in Technical Session



End of Seminar – delegates still in place

There were four technical sessions, one devoted to the experiences of the first Metro Project at Kolkata in the late twentieth century (which was the first Metro Project in India), and the other three covering Planning, Design and Construction of the present project. The underground construction, for most part of the alignment, including the unique work under the tidal Hooghly river (locally known as Ganga), has thrown up interesting challenges for the designers and constructors, which were discussed threadbare during the proceedings by those present.

The sessions were all chaired by well-known technocrats, including Dr. Samarjit Chatterjee, Past President CEAI, who chaired the Design session.

The presentations made during the event are posted on the CEAI web site for benefit of all members.

Brief Report on Workshop “USE OF STEEL IN PORT SECTOR”

India has developed more than 130MT installed capacity for Steel production over the years, but the consumption is lagging behind. The Prime Minister’s Office (PMO) and Ministry of Steel are concerned about the wasted capacity and have been trying to persuade different Ministries to act proactively to increase steel consumption in the country.

Ministry of Steel and Hindustan Steelwork Construction Limited (HSCL), a unit under Government, approached CEAI for providing support in convincing the Industry at large in this respect. CEAI had earlier attended meetings with Ministry of Transport for enhanced use of steel in the Highway sector and same yielded good results, with MIC Mr Gadkari directing use of steel in hitherto concrete structures used in Highway sector.

Happy with the results, Secretary, Ministry of Steel and HSCL requested CEAI for technical support in convincing the Steel manufacturers and Steel construction Industry members invited for a half day Workshop at Kolkata on 8th November 2017.



View of participants

The Workshop had presence of about hundred delegates, including high level representatives from manufacturers like SAIL, RINL, Tata Steel, JSW, etc., and also from the Construction Industry.

CEAI was represented by Dr. Samarjit Chatterjee, Past President - CEAI, Dr. Ajay Pradhan and Mr. Subhasis Sen, both experts in the Port Sector, and Mr. Amitabha Ghoshal, Chairman E & NE Zone of CEAI.

Mr. Ghoshal anchored the event and explained the potential for greater use of steel in the sector and the interest CEAI has in supporting this thrust of the Steel Ministry for reducing wasted investments made by the Nation.

Dr. Ajay Pradhan made a forceful presentation on the growth prospects of Port Sector and Inland Waterways sector under Sagarmala initiative and the Make in India program, and the opportunities this growth provide to Steel Sector.

Mr. Subhasis Sen, an experienced design professional in the Port Structures, made a convincing presentation on how greater use of steel can improve the performance in the Port Sector, bringing in more efficient use of materials and improving the environmental effect during construction.



Dr. Chatterjee chaired the Technical session and monitored the long Question Answer session.

The Industry leaders openly acknowledged that the presentations have given them new insight and requested for more information from specialists for guiding them in future developments.

The Secretary of Steel was pleased with the presentations and their impact on the participants. She wanted continued help from CEAI in organising future awareness events and asked for CEAI help in convincing the senior officials of Ministry of Shipping and the MIC, Ministry of Shipping.

CEAI looks forward to taking this relationship with the Ministry of Steel forward and in the process assist the Ministry in accomplishing its mission to increase utilisation of Steel plant capacities and per capita consumption of steel, to the benefit of the Nation.

Brief Report on Presentation to MINISTRY OF STEEL & MORTHs

Dr Aruna Sharma, Secretary, Ministry of Steel jointly with Mr Gopalkrishna, Secretary, Ministry of Shipping, called a meeting with representatives of CEAI, Mr M Bhaduri, CMD HSCL, representatives of premier steel manufacturers and officials from the Ministry of Steel and Ministry of Shipping on 24th November 2017. CEAI was represented by Ms Sayona Philip, President and Dr. S Chatterjee, Past President, CEAI. CEAI experts made a presentation.

Some of the relevant points are described below:

Port structures provide a cost-effective method for transporting large quantities of commodities into and out of a region. In the olden days, ports had greater use of steel. Steel usage was common in port construction using Sheet Pile Earth Retaining Walls, Cast Steel Screw Piles and Steel Concrete Decks. However, over time local producers were unable to supply required quantities of steel, due to scarcity of steel and restriction on imports. Due to this, there was a major shift from the use of Steel, post-Independence. Concrete usage was encouraged and grew rapidly.

However, today, newer technologies and policies have opened up opportunities for intensifying steel usage. Steel piles/ sheet piles/ hollow section/ composite construction are easier to obtain today. In view of this and the huge growth potential of the port sector, it is necessary for a relook and intensifying steel usage keeping in mind the objectives of the Ministry of Steel. However, awareness is required for all stakeholders.

Report on NATIONAL WORKSHOP ON NBC 2016 and RECENTLY REVISED SEISMIC CODES, Kolkata, 8th- 9th December 2017

- Sakshi Mehra

CEAI organized a very successful workshop on the National Building Code 2016 released earlier this year and the recently revised Seismic Codes in Kolkata on 8th- 9th December 2017 under the aegis of Mr. Amitabha Ghoshal, Chairman of the Organizing Committee. The two day programme was a grand success by all accounts with more than 250 delegates including about 50 registrations on the spot on the first day of the Workshop. The Workshop had excellent speakers and the presentations which were very clear and concise. There was intense participation from the audience. The speakers of Codal Committee provided a lot of clarifications regarding IS 1893 (Part 1): 2016 and IS 13920- 2016. The participants at the Workshop were very thrilled to have several rounds of technical discussions with the stalwarts of Codal Committee Members, namely, Prof. C.V.R. Murty (Director, IIT Jodhpur) Prof Yogendra Singh (Prof & Head of Dept. of Earthquake Engineering, IIT Roorkee), Mrs. Alpa Sheth (MD, VMS Consulting Engineers).

Er. Tathagata Roy, Honourable Governor of Tripura was the Chief Guest and he inaugurated the Workshop on a very positive note about mentioning that he would help the engineers associations in the process of getting the much needed legislation for Engineers passed in the parliament. Mr Vinay Gupta, Director & CEO, Tandon Consultants Private Ltd., Head of Technical Committee explained the topics of the Seminar which were very relevant and well distributed over the two days. Mr. Gupta also explained various activities which

Indian Association of Structural Engineers undertakes regularly for professional development programme.

Mr. Amitabha Ghoshal Chairman of Organizing Committee described how the Workshop was conceived from the beginning and the various stages they had gone through for its realisation.

Dr. S Chatterjee explained the role of CEAI in promoting Consulting Engineers and how consultants can benefit by becoming part of CEAI.

Dr. D K Paul, Retd. Prof, IIT Roorkee, briefly explained the importance of designing structures based on the recommendations for earthquake resistant design of structures, highlighting the developments in codal provisions for design and construction of buildings and structures.

The Vote of Thanks for the Inaugural Session was given by Mr .Sutanu Ghosh, Chairman CEAI-Eastern & Northeastern Region Committee.



Inaugural Session in Progress



Chief Guest Er. Tathagata Roy, Hon'ble Governor of Tripura giving the Inaugural Address



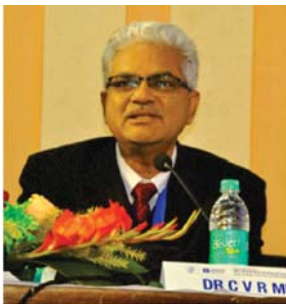
Dr. D K Paul Chairman IS 1893 (Part 1) 2016 Codal Committee giving the Keynote Address

The Workshop was divided into 6 Technical Sessions with 3 sessions on each day.

The First Technical Session had eminent speakers Prof C.V.R. Murty and Mr. Sanjay Pant. The session was chaired by Mr. Vinay Gupta.

Mr. Sanjay Pant (Director and Head, Civil Engg, BIS) explained the various sections of NBC 2016, the regulatory document for code of practice in India. The National Building Code of India provides the requisite material for both administrative and technical purposes, which the state / local regulatory documents can suitably utilise to ensure structural safety.

Prof. C.V.R. Murty explained the philosophy of earthquake hazard estimation which has been followed over the years and the shift towards adopting better approach for hazard estimation. He explained how Stiffness, Configuration, Strength, Ductility, Energy Absorption play a significant role in how the structure behaves in the event of an earthquake.



The Second Technical Session was chaired by Dr. D.K. Paul. The session speakers were Ms Alpa Sheth, and Prof Indrajit Chowdhury. Mrs Alpa Sheth, a Code Committee Member as well as a practising Consultant

shared her experiences and the important aspects of the changes made in IS 1893:2016 Part 1(Criteria for Earthquake Resistant Design of Structures; General Provisions and Buildings) and IS 13920:2016 (Ductile Design and Detailing of Reinforced Concrete Structures subjected to Seismic Forces- Code of Practice). Her talk highlighted how an intelligent and judicious interpretation of the code would help designer optimise structural design while also providing a robust design.

Prof Indrajit Chowdhury expressed his views on how professional design practice is affected by the revisions in the codes vis-à-vis the older versions and the advantages and clarity now provided.

The Third Technical Session was chaired by Dr. C.V.R. Murty. The session had very interesting presentation from Prof. Rupen Goswami (Asst. Prof. IIT Chennai). He clarified various codal clauses with reasoning behind those changes made in clauses and the likely impact in terms of execution of design of structures. Mr Sumantra Sengupta (Chief Manager, Design, STUP Consultants) shared his interpretation and use of some of the clauses of IS 1893:2016.

The Fourth Technical Session was chaired by Prof. Anjan Dutta. The session comprised presentations from Dr. Nitin Som (Geotechnical Consultant) and Prof. Debasis Roy (Prof. IIT Kharagpur). Dr Som talked about Seismic Effect on Structures and Foundation. Prof Debasis shared his experience on site effects, bearing capacity, settlement and soil liquefaction from the perspective of a Geotechnical Engineer.



The Fifth Technical Session was chaired by Mr. S C Mehrotra. The session had a very interesting presentation on Future of Design of Structures in India, Performance Based Seismic Design given by Prof. Yogendra Singh. He explained that current seismic design code is Prescriptive force based design approach which is based on linear elastic analysis of structures. In the



future, the design would be based on defining acceptable level of performance when the structure is subjected to seismic hazard. The acceptable performance level could vary from one structure to another depending on its importance, usage, etc. His talk provided an overview and terminology of performance based design with its objectives and concepts underlying the non-linear modelling and analysis of structures.



Prof Anjan Dutta, Prof., IIT Guwahati gave a presentation on Seismic Performance Evaluation of Unbonded Fibre Reinforced Elastomeric Isolators. Dr. Mangesh Joshi, CEO, Sanrachana Structural Strengthening talked about retrofitting of existing structures with the help of Carbon/ Glass Fibres.

The Sixth Technical Session was chaired by Mr. Amitabha Ghoshal and was open for all delegates to get their queries resolved and by the end of day 2, all the delegates were infused with lot of zeal to carry out design and analysis with clear understanding of revised codes and the concept behind the codal changes.



The seminar was a grand success for CEAI, IA StructE, BIS. and the Institution of Engineers India as well as the participants. It was “An Affair to Remember” as mentioned by one of the overzealous participants.

FIDIC Training Course on ‘MANAGEMENT OF CLAIMS AND DISPUTES RESOLUTION’

CEAI is organizing a two-day FIDIC Training Course on the module “**Management of Claims and Disputes Resolution**” on 17th & 18th January 2018 at India International Centre, New Delhi.

The course covers the identification of project risks, their allocation, and the various causes of claim which can emerge over a construction contract and the way FIDIC addresses those issues. This course will provide the participant, the necessary detailed knowledge and insights to the claim management and dispute resolution provisions under the FIDIC Conditions of Contract document, 1999 Edition.

Mr Bogdan Oprea, a FIDIC accredited faculty, will conduct the training course. He has trained exclusively for FIDIC as an accredited FIDIC trainer in Europe, Middle East, Asia, South America and Africa, specializing on FIDIC contracts and the management of claims and the resolution of disputes.

Please register at the earliest as the seats are limited. The fee for CEAI members will be Rs 22,000/- plus GST as applicable and for Non-members Rs 24,800/- plus GST as applicable. A discount of 5% is applicable, if an organisation nominates four or more participants.

For more details please contact CEAI Secretariat or visit our website www.ceai.org.

Training Course on ‘CONSULTING ENGINEERING PRACTICE’

With a view to improve the skill development of new entrants to Consulting Engineering Organisations, fresh engineering graduates and final year engineering students, CEAI is planning to organise training programs for young engineers and engineering students on different modules. The courses will be conducted by experienced high profile practising consulting engineers.

The first training course ie Module I on the topic ‘Consulting Engineering Practice’ is scheduled to

be held on 17th February 2018 at CEAI Centre, Vasant Kunj, New Delhi. Upto a maximum of 20 participants will be accommodated on a first come first served basis. The training fee will be Rs 2000/- plus GST as applicable per person. Currently the GST applicable is 18%.

For more details please contact CEAI Secretariat or visit our website www.ceai.org.

GENERAL BODY MEETINGS OF CEAI

a) Extraordinary General Meeting

An Extra-Ordinary General Meeting (EGM) of CEAI was held on Saturday, 16th December 2017 at the CEAI Centre, to consider additions, amendments, deletions of the Rules & Regulations of the Association as recommended by the Governing Council, given as below:

EXISTING RULES	PROPOSED AMENDMENTS APPROVED BY EGM														
<p>2.1 Membership Category Membership of the Association shall be for both individuals and organizations and shall comprise the following categories.</p> <ul style="list-style-type: none"> • Honorary Fellow • Life Member (Individual) • Member (Individual) • Affiliate Member (Individual) • Young Professional Member (Individual) • Member (Organisation) • Member (EPC Organisation) • Affiliate Member (Organisation) • Engineering, Business and Industry associations/ Educational and Research Institutions/ Promotional organisations. 	<p>2.1 Membership Category Membership of the Association shall be for both individuals and organizations and shall comprise the following categories.</p> <ul style="list-style-type: none"> • Honorary Fellow • Life Member (Individual) • Member (Individual) • Affiliate Member (Individual) • Young Professional Member (Individual) • Member (Organisation) • Member (EPC Organisation) • Affiliate Member (Organisation) • Engineering, Business and Industry associations/ Educational and Research Institutions/ Promotional organisations. • Affiliate Student Membership for Final Year Engineering Students desirous of joining the consulting profession (with no voting rights) 														
<p>2.3 Life Member (Individual) 2.3.1 Member (Individual) who has been on the roll of the Association for 2 years and his/her subscription is not in arrears, may opt to become a Life Member (Individual) after paying one time subscription as under:-</p> <table border="0"> <thead> <tr> <th><u>Age of Member</u></th> <th><u>Subscription</u></th> </tr> </thead> <tbody> <tr> <td>a) 40 to 49 years</td> <td>15 times annual subscription</td> </tr> <tr> <td>b) 50 to 59 years</td> <td>10 times annual subscription</td> </tr> <tr> <td>c) 60 to 69 years</td> <td>5 times annual subscription</td> </tr> <tr> <td>d) 70 years and above</td> <td>2 times annual subscription</td> </tr> </tbody> </table>	<u>Age of Member</u>	<u>Subscription</u>	a) 40 to 49 years	15 times annual subscription	b) 50 to 59 years	10 times annual subscription	c) 60 to 69 years	5 times annual subscription	d) 70 years and above	2 times annual subscription	<p>2.3 Life Member (Individual) 2.3.1 Member (individual) who has been on the roll of the Association for 1year and his/her subscription is not in arrears, may opt to become a Life Member (Individual) after paying one time subscription as under:-</p> <table border="0"> <thead> <tr> <th><u>Age of Member</u></th> <th><u>Subscription</u></th> </tr> </thead> <tbody> <tr> <td>a) 40 to 49 years</td> <td>15 times annual subscription</td> </tr> </tbody> </table> <p>2.3.2 Member (Individual) above age of 50 years may opt to become Life Member (Individual) after paying one time subscription as under:-</p>	<u>Age of Member</u>	<u>Subscription</u>	a) 40 to 49 years	15 times annual subscription
<u>Age of Member</u>	<u>Subscription</u>														
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	<u>Age of Member</u>	<u>Subscription</u>
	a) 50 to 59 years	10 times annual subscription
	b) 60 to 69 years	5 times annual subscription
	c) 70 years and above	2 times annual subscription
<p>2.5 Affiliate Member (Individual)</p> <p>d) : he/she is a graduate from a recognized university or institution in the field of economics, sociology, geography, environment, law and any other field and he/she should be involved in engineering consultancy or a consulting profession for a minimum period of 3 years, which enables holistic appreciation and fulfilment of any engineering work.</p>		
<p>2.5 Affiliate Member (Individual)</p> <p>d) he/she is a graduate from a recognized university or institution and has been actively involved in the Consulting Engineering profession for a minimum period of three years.</p>		

b) Annual General Meeting

The 21st Annual General Meeting of CEAI was held on Saturday, 16th December 2017 at CEAI Centre. The AGM took the following decisions:

- i. Confirmed the Minutes of the 20th Annual General Meeting held on 20th December 2016.
- ii. Adopted the Annual Report of the Association for the year ended 31st March 2017.
- iii. Passed the Audited Accounts of the Association for the year ended 31 March 2017.
- iv. Appointed Auditors for the Financial Year 2017-2018.

THE CEAI STORY

For the benefit of the engineering fraternity in the country as well as abroad, the Governing Council of CEAI had decided to prepare a Coffee Table Book, elucidating the history of formation of CEAI, starting from 1959. The story has been compiled with the best effort put in by founder members of the Association, viz, Mr. Mahendra Raj, Mr. Srikumar Ghosh and senior members, Mr. Umesh Shrivastava, Mr. Sudhir Dhawan, Dr. Samarjit Chatterjee and several others.



The CEAI Story

Mr. Mahendra Raj, Chairman Emeritus and Mr. Srikumar Ghosh, Past President CEAI, released the Story during the Governing Council meeting held on 17th November 2017.



Releasing the CEAI Story

The Story is printed in two volumes, one hard cover with appendices and the other one is soft cover without appendices. The publication costs at Rs 1800/- and Rs 1000/- for the hard and soft cover respectively. Courier charges will be extra.

MAJOR GENERAL HARKIRAT SINGH MEMORIAL AWARD

Maj Gen Harkirat Singh Memorial Scholarship was instituted jointly by Mrs Harkirat Singh and the Association of Consulting Engineers (India) (now 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 Civil Engineering at IIT, Delhi, who scores the highest marks.

The Scholarship for the Session 2017-2018 was awarded to Mr Neelesh Kumar.

CEAI INTERVENTIONS

PREPARATION OF DPR INCLUDING TECHNICAL AND FINANCIAL STUDY OF YAMUNA RIVER (NW-110) AND THE JHELUM RIVER (NW-49)

In response to the recent tender notice issued by the Inland Waterways Authority of India (IWAI), CEAI had written to the Chairman of IWAI on behalf of the practising Consultants in the Inland Water Transport Sector, indicating that the bidding terms and conditions suggested in their tender were contrary to the recommended best practice for the selection of the bidders.

In its representation, CEAI requested IWAI to incorporate necessary changes in their tender documents to allow for a fair competition and selection of competent consulting firms for current and future IWAI assignments.

REQUEST TO NHAI CMC FOR REVIEW OF PAYMENT TERMS FOR LOGISTICS PART IN THE AUTHORITY'S ENGINEER AGREEMENT

On behalf of members involved in NHAI projects as Authority's Engineer (AE), CEAI voiced their collective

concern that, currently, payment for logistics (ie transportation, duty travel to site, communication and other direct overheads) is linked to the financial progress of the civil work achieved by the Contractor. Often, the Contractor is unable to achieve Project Milestones in accordance with the relevant Schedule of the EPC Agreement, due to various reasons which are not attributable to the Contractor/Consultants.

Regardless of this, AE has to discharge its obligation of supervision/monitoring of the Project in accordance with Term of Reference (TOR) of the Consultancy Agreement which means that the AE has to deploy its manpower resources on a regular basis for supervision, quality control, testing of various project components, certification of stage payments, etc., in addition to attending various meetings convened by the Authority and the District Administration.

The linkage resulting in non payment of the Consultants' dues for long periods causes significant financial hardship to the Consultants.

CEAI conveyed to NHAI that in its considered view, linking payment of the logistics to financial progress of the project is not realistic and requested that the NHAI Contract Management Cell (CMC) take an appropriate decision to make suitable amendments for all such projects, to enable release of logistic payments at the rates specified in Appendix G of the Consultancy Agreement without linking the same to the Contractor's financial progress. NHAI could also issue suitable amendments for the Agreements signed prior to 2017.

JICA STUDY TEAM MEETS WITH CEAI

The Japanese International Cooperation Agency (JICA) has been supporting the Government of India to expedite infrastructure improvement, human resource development of government officials, and ultimately development of the country through Japanese ODA including loans, grant and technical cooperation.

However, problems are being encountered during bidding and execution of the contract in JICA funded infrastructure projects - particularly in civil works with issues such as delay in bidding; serious disputes between the employer and the contractor and even termination of some contracts in India.

JICA has therefore constituted a Study team to assess the effectiveness of JICA's ODA program and are in the process of carrying out a comprehensive study to examine the issues of procurement and contract management for infrastructure projects in India.

In this connection, the JICA Study team visited the CEAI Centre and had an interaction with the CEAI members on 7th December 2017 at CEAI Centre. The CEAI team comprised the President, Vice President and included representatives of TCE, STUP, ICT, Mantec Consultants, etc. who shared their experience on JICA funded projects and gave their feedback for consideration of the Study team.

CEAI OUTREACH

As part of an ongoing process, CEAI is continuously expanding its outreach by way of providing support to other professional events and promoting its own to reach out to new members. One such event is:

- India Smart Grid Forum - 4th Edition of India Smart Grid Week (ISGW 2018), International Conference and Exhibition on Smart Grids and Smart Cities, scheduled from 05-09 March 2018 at Manekshaw Centre, New Delhi.

FIDIC NEWS

FIDIC INTERNATIONAL INFRASTRUCTURE CONFERENCE 2017

FIDIC International Infrastructure Conference 2017 was held from 1st to 3rd October 2017 at Jakarta, Indonesia. The conference provided a platform to evaluate and discuss the understanding of what constitutes resilient infrastructure.



Ms. Sayona Philip, President, CEAI and Mr. Sudhir Dhawan, Past President attended the Conference as official delegates from CEAI and participated in the DNS and Presidents meetings and ASPAC meetings held prior to the Conference.

It also gave an opportunity to CEAI delegates to interact with FIDIC Executive Council members, office bearers of other FIDIC Member Associations and share best practices, issues and solutions.

The conference provided a unique opportunity for delegates to meet consulting engineering leaders and



professionals working in the infrastructure industry from 100 countries in a single place.

Other CEAI member companies who were represented as exhibitors/ speakers/ delegates are Intercontinental Consultants and Technocrats Pvt Ltd, Tata Consulting Engineers and Aarvee and Associates.

In addition to the Conference Business program, FIDIC also organised social events like a Welcome Reception, a Gala Dinner and Awards ceremony and a Local



Colour Night to provide delegates with the opportunity to meet and interact with fellow professionals, potential clients and partners.

On conclusion of the Conference, the General Assembly Meeting (GAM) of FIDIC was held with participation from all Members Associations present.

Ms. S Philip, President CEAI and Mr. Prashant Kapila, young professional, represented CEAI at the FIDIC GAM held on 3rd October 2017 at Jakarta.

FIDIC PRESIDENT 2017-2019



During the FIDIC General Assembly meeting (GAM), Mr. Alain Bentejac, Chief Executive of Artelia Group in France, was formally elected as the new FIDIC President for 2017-2019.

MR K K KAPILA COMPLETES HIS TENURE

Mr. K K Kapila completed his tenure of four years in 2017, as member of the FIDIC Executive Committee representing CEAI, the Indian MA. At the GAM, the EC acknowledged his considerable contribution to FIDIC.



CEAI congratulates Mr. K K Kapila on completion of a successful tenure as FIDIC EC member.

FIDIC YOUNG PROFESSIONAL AWARD 2017

The FIDIC Young Professionals Forum is the group of Young Professionals of the International Federation of Consulting Engineers (FIDIC). It was formed with the intention of providing Young Professionals (YPs) with the opportunities to participate in FIDIC with their peers and to develop the next generation leaders of FIDIC and consulting engineering industry.

As a leadership committee, the Young Professionals Forum Steering Committee (YPFSC) was formed to develop communication and networking opportunities for all Young Professionals involved in the FIDIC

community. It is run by a committee of Young Professional volunteers.

Through its core activities, the YPFSC helps develop and promote YPs through communication activities (including newsletters, webinars, conferences, and social media such as Facebook and LinkedIn accounts) and networking opportunities.

To further support, acknowledge, and promote the efforts of Young Professionals in the industry, the FIDIC YP Award was established in 2015. In March 2017, FIDIC invited nominations from CEAI for the YP Award 2017.

The FIDIC communication was circulated to CEAI members and CEAI received entries from young professionals of member organisations of CEAI.



A committee formed by the CEAI Governing Council examined the entries based on FIDIC guidelines and selected the candidature of Mr. Prashant Kapila of Intercontinental Consultants and Technocrats Pvt Ltd,



and forwarded his application to FIDIC for consideration.

The FIDIC Award Jury, comprising members of the FIDIC Executive Committee, Past Presidents, and learned individuals, evaluated application documents based on FIDIC criteria and selected the candidature of Mr. Prashant Kapila from India for the FIDIC YP Award 2017.

The award was presented to Mr. Prashant Kapila at the FIDIC Gala Dinner and Awards ceremony held during the FIDIC Conference.

CEAI Congratulates Mr Prashant Kapila on this significant achievement.

FIDIC – ASPAC EXECUTIVE COMMITTEE



FIDIC Member Associations in the Asia-Pacific Region (ASPAC) were invited to submit nomination for the ASPAC Executive Committee election.

CEAI Governing Council unanimously decided to nominate Mr. Sudhir Dhawan, Past President CEAI, for participating in the election.

The election result was announced on 1st October 2017, during the General Assembly Meeting of ASPAC held in conjunction with FIDIC International Infrastructure Conference and Mr. Sudhir Dhawan was elected as member of the ASPAC Executive Committee for the term 2017-19.

CEAI congratulates Mr. Sudhir Dhawan on his achievement and wishes him the very best for a successful tenure.

KOREAN DELEGATION TO NEW DELHI

The Korea Trade Investment Promotion Agency (KOTRA) and Korea Engineering & Consulting Association (KENCA), a Member Association of FIDIC from South Korea, organised a seminar named ‘2017 India Project’ or the New Delhi Project Plaza on 20th November 2017 at Le Meridian, New Delhi.

The Korean EPC companies which visited New Delhi for participation in the seminar were:

- a) Yooshin Engineering Corporation
- b) CHEONG MYUNG Civil & Architecture
- c) SATCO
- d) DASS TECH Co. LTD
- e) USUN Co. Ltd
- f) Ssangyong Construction

Several Indian Government agencies and The World Bank gave presentations.

KENCA invited CEAI members to attend the seminar and several members availed the opportunity for business networking with the Korean companies.

CEAI SIGNED MOU WITH KENCA

With a view to promote and develop the engineering industry in India and Korea, CEAI had signed an MoU with KENCA in 2009 which expired in 2012.

The MoU between CEAI and KENCA was renewed and signed on 20th November 2017 by Ms. S Philip, President CEAI and Mr. Myong Chun Yeom, Vice Chairman KENCA. The MoU covers:

- Exchange of engineering information and materials
- Joint study and research activities
- Joint seminar and symposium
- Firm level cooperation
- Promotion of other cooperation on mutually beneficial basis in the field of engineering

OTHER NEWS, VIEWS & NOTES

Corrigendum (September 2017 issue of View Point)

There was an inadvertent omission of IEST, Shibpur in the list of the “*Oldest Technical and Engineering Colleges/Institutes in India*”. A short note on it is given below.

Indian Institute of Engineering Science & Technology (IEST), Shibpur: Prompted by the

idea of meeting the requirement for trained engineering personnel for the Public Works Department, the Council of Education, Bengal, decided to open Civil Engineering classes and a Professorship in Civil Engineering. A college was established on 24 November 1856 named Calcutta Civil Engineering College, to train personnel for the Public Works Department, and was located at the Writers' Building, Howrah. With the establishment of Calcutta University on 24 January 1857, the college was affiliated to this University in May 1857. In 1865, the college merged with Presidency College, Kolkata and from 1865 to 1869 the college functioned as the Civil Engineering Department of Presidency College. In 1880, the college was shifted to its present campus at Shibpur, Howrah, and was christened the Government College, Howrah, in the premises of Bishop's College. On 12 February 1920 the name was changed to Bengal Engineering College, Shibpur. The word Shibpur was deleted on 24 March 1921 and it became Bengal Engineering College. The college was elevated to the status of a Deemed University in 1992, thus breaking its ties with the Calcutta University. In March 2014, it was upgraded to the status of Institutes of National Importance under the banner of Indian Institutes of Engineering Science and Technology, thus renaming it IIST Shibpur. (Source: Wikipedia)

ECI AWARD FOR EMINENT ENGINEER

Engineering Council of India (ECI) was incorporated on April 4, 2002 as an apex body of the engineering profession in the country by coming together of 24 professional organizations/ institutions of engineers to work for the advancement of engineering profession in the country. Today, the membership of ECI stands at 32 Associations/ Institutions of Engineers.

It is now proposed to give Eminent Engineer's Award 2018 to two eminent persons with engineering background who have contributed significantly to any of the fields of engineering profession, one in the Industry category and the second in Research and Consultancy category, These awards will be conferred on the winners at the Foundation Day function to be held on April 4, 2018 at New Delhi. The criteria for the Award shall be as below.

Criteria:-

Eminent Engineer's Award will be given to a person with engineering background who has contributed significantly to any field of engineering, while holding top level engineering/management positions in corporate, government, industry, academic, research and other institutions.

He/she should:

- *Have demonstrated innovative thinking and leadership qualities.*
- *Have impeccable and unblemished record, not subjected to any disciplinary or criminal proceedings.*
- *Have contributed significantly to sustainable economic development and social welfare.*

It is proposed to give 2 Awards, one in Industry category and the other in Research/Consultancy category.

ECI invited nominations for the Award. Please forward the names of suitable candidates with their CV who meet the criteria, to ECI latest by 31st January, 2018.

OBITUARY



CEAI regrets to convey the sad demise of Mr. L D Gupta, Former Director and Individual Member of CEAI on 8th December 2017.

Mr. Gupta graduated in Electrical Engineering and did his M.Tech from IIT Bombay. He served in various organisations and retired from NTPC as Executive Director.

During his tenure as Director CEAI, he managed the activities of the Association efficiently. We still remember his great contribution for the benefit of our members.

CEAI conveys its deepest condolences to Mr L D Gupta's family members and prays that his soul may rest in peace.

VIEW POINT

The next issue of the View Point will be published in March 2018 and will be dedicated to **Environment and Climate Change**.

Considering the experience in the subject of CEAI members and various stakeholders and challenges being faced Human Resource Departments across companies, CEAI would be happy to receive articles on the above theme.

Authors could share their views, practical difficulties experienced and suggest solutions. Photographs may be added in the articles for better appreciation of the issues encountered and addressed. The articles for the March 2018 issue of VIEWPOINT need to reach CEAI by 28th February 2018. Articles need to be in Times New Roman 12 with single line spacing.

ADVERTISEMENT IN VIEW POINT

VIEW POINT is circulated to all CEAI Members, Ministries of the Government of India, Public & Private Sector Undertakings, Construction Firms, Contractors, Consultants, Foreign missions and Funding Institutions in India and others organisations related to or dealing with the engineering profession.

In order to encourage members and others, CEAI offers attractive advertisement tariffs.

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**In case the advertisement is to be inserted in consecutive four or more issues of View Point, a rebate of 20% will be admissible.*

Tech Quiz¹

1. What is the latest Signalling technology being adopted by Metros/Urban/City based projects across the world?
 - a. DTG Technology
 - b. ETCS Level 1
 - c. CBTC
 - d. Mechanical Signalling
2. In which year was the first Metro project inaugurated in India?
 - a. 1990
 - b. 1995
 - c. 2002
 - d. 1984
3. How many Metro projects in different cities were inaugurated in the year 2017 in India?
 - a. 1
 - b. 0
 - c. 3
 - d. 2
4. What is the full form of AFC, a system used in Metro/Railways?
 - a. Automatic Fare Collection
 - b. Automatic Funds Collection
 - c. Automatic Fare Computer
 - d. Advanced Fare Collection
5. Which company is involved in running the Operations of the Hyderabad Metro?
 - a. Serco
 - b. Keolis
 - c. L&T
 - d. CAF
6. Which is the biggest Metro system in the world in terms of number of kilometres of operations?
 - a. London
 - b. Paris
 - c. Shanghai
 - d. Delhi
7. Which Metro system has the largest number of stations?
 - a. New York
 - b. London
 - c. Delhi
 - d. Shanghai
8. Of which country / city is U-Bahn a Metro system?
 - a. London
 - b. Austria
 - c. Germany
 - d. Spain
9. Which is the oldest Metro system in the world?
 - a. London
 - b. Kolkata
 - c. Paris
 - d. Moscow
10. What is the full form of ISA in connection with Metro Projects commissioning?
 - a. International Safety Association
 - b. Independent Safety Assessment
 - c. Independent Security Assessment
 - d. Indian Safety Association

The first person who mails the correct answers to CEAI info@ceai.org.in will get a congratulatory mail and will be acknowledged by publishing his/ her photograph in the next issue.

¹contributed by Mr Nikhil Swami, Guest Editor

Answers to Tech Quiz September 2017 issue:

1(C), 2(A), 3(A&B), 4(B), 5(A&D), 6(A), 7(B), 8(A&D), 9(B).

Mr Vishal Shah and **Mr Jitendra Tyagi** of TCE are the winners of the Tech Quiz with full/ maximum marks.

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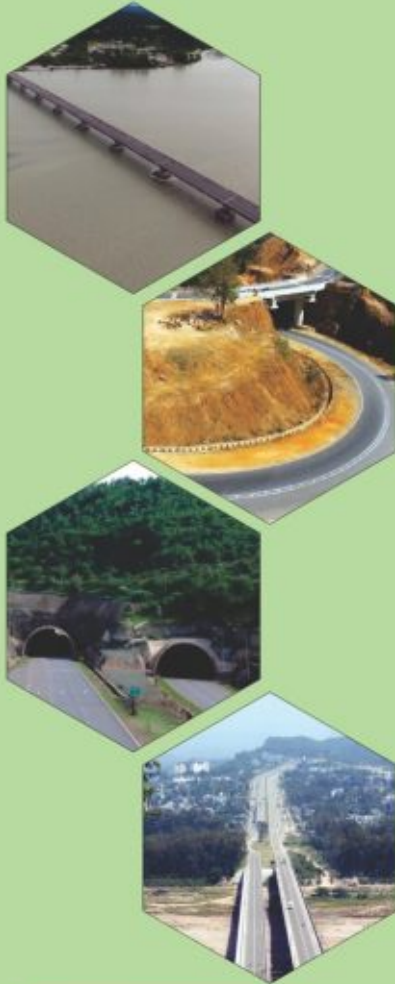
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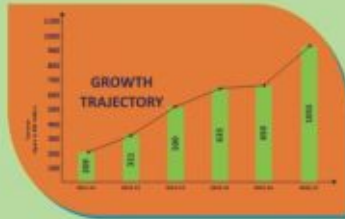
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