HELMET

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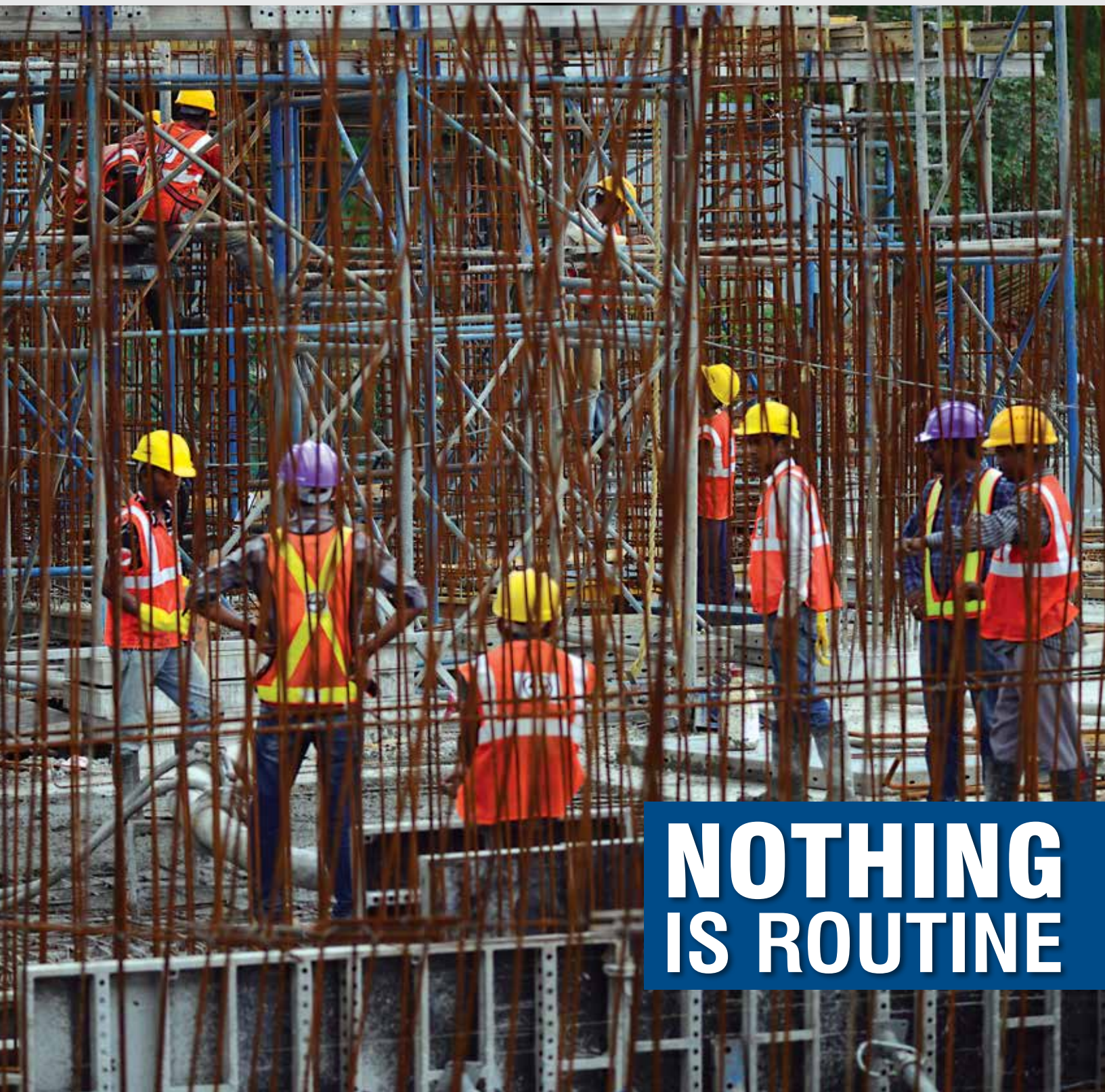


NOTHING IS ROUTINE

Foreword

In the construction industry, ensuring production and safety of lives and assets are the two faces of a coin. Any imbalance or lack of synchrony results in mayhem which could compromise quality of work and safety of the employees. At Heavy Civil Infrastructure IC, we have adopted a proactive approach making EHS an integral part of our business. Sustainability in our business drives the EHS culture at HCI IC.

In our constant pursuit to improve the safety culture within HCI IC, we have been introducing several initiatives, best available technologies and embedding awareness through training, motivational programs among the workforce, which is so dynamic in our industry. "Learning from your mistakes is being smart but learning from the mistakes of others is being wise." Embedding this philosophy within ourselves, we not only learn from our own shortcomings but continuously look at our peers to improve our practices and adapt ourselves to the changing business scenarios.

It is always a challenge to keep pace with the evolving technologies in construction along with the health and safety aspects of these changing scenarios. It is the need of the time to think out of the box to keep our workforce safe and sound, protect and conserve nature and bring smiles to all the stakeholders.

As HCI IC moves towards a zero harm vision, it requires a phase shift in our attitude and approach towards the way we look at safety. As our business is growing significantly, the challenges to maintain and further improve the EHS standards grow too. The enormous scale of operations, large workforces of more than 50000, diverse fields of operations have their own sets of challenges ranging from the heights of Hydel projects to the sophistication of nuclear projects, the length of special bridges to the precision of Defence projects, from the vastness of port projects to the dynamic nature of metro projects; and, needless to say, we have our fair share of challenges. To get the better of these challenges, HCI IC has been continuously monitoring and reviewing the current EHS standards and implementing new ones according to the requirement to achieve the ZERO HARM VISION.

We have been continually identifying class 1 high risk activities (currently 16 activities) throughout our diversified operations. New projects are being added with new scopes of work, methodologies and modern technologies that pose challenges to identify risk and the strategy to manage it. To overcome these challenges, our IC is continually working to develop skill sets of our employees to make them aware and ready with the competencies and capabilities to manage risk. This includes, but are not limited to, skill based training, specific risk management training and collaboration with technical solution providers in the field of EHS. "If you SEE something, SAY something!! If you SAY something, DO something!! – Robert Morgan." We encourage our staff and workers to come forward and point out even the slightest of safety gaps they notice.

> **Learning from your mistakes is being smart but learning from the mistakes of others is being wise.**

We do detailed assessments of past incidents for valuable inputs. Based on learning from trend analyses of past incidents, a major area of concern identified was the competency level of crane operators and riggers including sub-contractors working under our responsibility. This has prompted us to assess their competency levels to meet international standards and have engaged a third party agency in November '17 to train, assess and certify crane operators and riggers. Thus far, 51 crane operators and riggers have been trained, assessed and certified till December '18 and we plan to cover the entire lot by 2020.

The EHS strategy plan, construction EHS standards and IMS Procedures have been developed and implemented across projects to manage the EHS need of the time. Safety statistics have also improved i.e. AFR reduced to 33% compared to that in FY 2016-17.

Roles and responsibilities at all levels have been revisited and EHS ownership has been induced to key positions. Personal EHS KPIs for leadership (03 Nos) have been aligned to the L&T annual FAIR and promotion processes. Business EHS KPIs (Nos 14) are set for projects and monitored at Cluster and HQ levels. EHS audits are conducted by cluster EHS Heads and HQ-Compliance auditors as per the schedule, non-conformances are addressed for close out within the specified time frame. In house and external EHS trainings are being organized based on the need analysis.

In an era, when our old mobile phone has become smart, so should we. The advent of technology has opened a Pandora's Box for us. It's on us how we utilize it. Under the guidance of senior leadership of L&T, we are committed and dedicated towards using digitalization to improve safety and have taken several digital initiatives like the mobile safety app for pre-start briefing, incident reporting, EHS inspections, audit reporting, monthly EHS performance reporting, VR Module training, digitalized induction training, digital health screening for real time monitoring and reporting. HCI IC has also launched BIM for Safety at the Chennai Metro UG 02 site.

HCI IC has bagged numerous safety awards for best safety practices including 7 British Safety Council Awards, 3 National Safety Council awards, 2 ROSPA awards, 2 OSHAI awards, 2 Confederation of Indian Industry (CII) awards and 1 Institution of Engineers (India) award. But what holds more value than these awards is our commitment and dedication towards ensuring a safe workplace.

To encourage workforce and enhance EHS implementation across projects, mid-year and annual rolling trophies are being given to selected sites for their EHS performance. Vizag Steel project won the Midyear trophy with the Barapullah Bridge project coming runners-up.

> **Safety is an engine, and we all together are the key that starts and keeps it running.**

We, at HCI IC, do understand that EHS is not only about safety and are dedicated to protect our environment and conserve our natural resources while doing our business. In line with our overall commitment, we have a proactive approach to entrench this ownership of protecting and conserving our nature into the DNA of the entire workforce and to work closely with all our stakeholders which includes not only the community where we work but various interested parties (NGOs, Civil Societies, Advocacy Groups, our other suppliers / vendors, etc). To drive further, we are reviewing, updating and implementing our environmental and waste management procedures, bringing more environmental experts and comprehensive management of environmental impacts throughout our projects. We are the first to create an Environmental section within the EHS department headed by an Environmental Expert to significantly improve our overall environmental performance throughout our projects.

We are committed to the Corporate Sustainability Roadmap 2021 and are working proactively in bringing more and more synchrony with our Corporate Sustainability Team and stakeholders.

I assure that I will extend my full support i.e. resources to the all departments and individuals for successful accomplishment of our EHS business targets. Safety is an engine, and we all together are the key that starts and keeps it running.

In 2018-19, with rejuvenated zeal and dedication, we will focus on an exhaustive implantation of IMS procedures and CEHSS across projects to not only meet, but exceed the project/Corporate EHS strategic plan expectations. EHS will be of paramount importance for HCI IC along with operational excellence ensuring ZERO HARM vision, enhancing employee health, improving emergency response capabilities by proactively involving the EHS monitoring programs framed in 2018-19 business plan.

We at Heavy Civil Infrastructure IC are committed towards safety. "Safety is like a member of your family. Treat it with disrespect and it will leave you exposed to harm. Treat it with respect and nurture it as you go and it will remain with you always." With this motto ingrained in our mind, heart and soul, we are dedicated to leave no stone unturned to achieve our vision of ZERO HARM.

S.V. Desai

EVP & Head-Heavy Civil Infrastructure

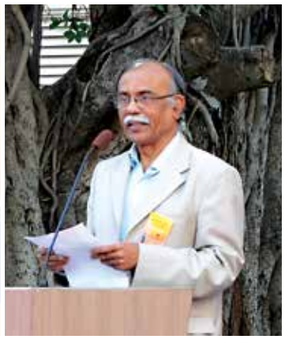
“Safety is everyone’s responsibility!”

- SNS

Safety has often been regarded as the triumph of teamwork and collaborative working which was the essence of Chief Executive Officer & Managing Director, L&T, Mr. S N Subrahmanyan’s message to the 1,000+ L&T Construction employees gathered for the inauguration of the Safety Month on the morning of 5th January, 2018. Delivering his keynote address after hoisting the safety flag, SNS said, “I am happy with the many initiatives and the stringent measures that have been taken to improve the standards of safety within the organization but the time has come for action and for the various efforts to start taking effect across sites and offices.” He stressed the importance of making EHS a way of life. Relating to some of the significant projects of the past that had set safety benchmarks, he urged, “Where there is a will, there’s a way and keeping your sites and workplaces safe is very much like at your own houses where safety and cleanliness should be your top priority. No, safety is not the job of the safety managers alone. It is the responsibility of each and every employee and that is the only way we can nurture a safety conscious attitude in our effort towards achieving zero accident.”

The inaugural event that was attended by the entire senior management of L&T Construction, began with Mr. S Kanappan, Executive Vice President & Chief Executive Officer, L&T Geostructure, administering the safety pledge saying that he felt an emotional connect with and a sense of ownership towards the Chennai Manapakkam campus every time he administered the safety pledge. Touching upon the perils of not following safety norms, he mentioned that in a small survey conducted on the campus, a number of jay walkers were spotted speaking on their mobiles oblivious of the moving traffic. “These are dangerous signs,” he warned and urged all to be more aware of their surroundings and more safety conscious.

The theme for the Safety Month of ‘Embrace digital for a safe workplace’



was referred to by Mr. M V Satish, Whole Time Director and Senior Executive Vice President, Buildings, Minerals & Metals, in his welcome address. "There are a number of digital initiatives that are being implemented for improving safety across project sites," he informed, making a special mention of 'BIM for Safety' and the 'Safety Mobile Apps' as relevant digital tools to enable a safe work culture. "L&T is the only construction company in India and one among a few international contractors who are using the BIM platform for safety," he stated confidently. He spoke about the Safety Innovation School at Kancheepuram which he described as "a unique set up where safe working methods were being taught with the use of virtual reality and the integration of pertinent digital tools to ensure that safety is a way of life across work functions."

"Initially people did not have too many safety equipment to rely on and hence they were far more concerned about their wellbeing but today with so many safety features, gear and apps available, people are taking safety for granted which is not a good thing," lamented Mr. D K Sen, Whole Time Director & Senior Executive Vice President (Infrastructure). He also spoke about the dangers of the mobile phone at the workplace and in everyday life which has become a huge distraction. "It distracts you when you are working and that is beginning to have an adverse impact on productivity." He insisted that it was vital to focus and ensure that comprehensive safety orientation was given to all new inductees at sites by making use of the digital tools and mobile apps available and signed off by reiterating that safety is collective responsibility.

Mr. M. Kamarajan, Head - Environment Health & Safety (EHS), B&F IC, shared the month long events and activities planned at HQ. Mr. K.P. Ravinath, Head EHS, GeoStructure then proposed the vote of thanks and brought the short but meaningful event to a close.

ROAD SAFETY

WALKATHON










WINNERS ALL!

'Sword of Honour' Award from British Safety Council

- WIPRO IT SEZ Project, Bengaluru (B&F)
- Commercial Buildings & Airports SBG - East (B&F)
- Commercial Buildings & Airports SBG - North (B&F)

Five Star grade from British Safety Council

- Residential Buildings & Factories SBG - West (B&F)

Annual EHS Trophy

- Airside Works at Kannur International Airport (TI)
- OPGC MGR Project, Odisha (TI)
- Ford GBS Facility Project, Chennai (B&F)
- Godrej Trees Project, Vikhroli (B&F)
- Kharkai Barrage Project (WET)
- Safe and Smart City Project-Hyderabad & Cyberabad (SWC)
- RAPDRP Part-B Project, Kozhikode (PT&D)
- Vizag Vessel Project (HCI)
- IOLPL LNG Terminal & Marine Facilities Project, Ennore (Geo)
- Emirates Global Aluminium Project, Abu Dhabi (MMH)

EHS AWARDS

EHS Trophy Winners - 2017

Giving safety a new definition!

WIPRO IT SEZ Project - A 'Sword of Honour' Winner!

WIPRO IT SEZ Project – Kodathi, received a 5-star rating and an 'Excellent' safety score of 92.8 for the Occupational, Health and Safety Audit from BSC that covered a wide range of areas like Policy & Organisation, Strategy & Planning, Implementation & Operation, Performance Measurement, Evaluation & Review, Leadership and Continual Improvement. Thereafter, the project qualified for and won the prestigious 'Sword of Honour' award too.

Quite understandably, T Nandakumar, Head of this project that features an IT office space constructed for WIPRO distributed in 4 towers of 14 floors each with a common basement of 3 levels, is a pleased man. "It will sound clichéd if I said that the challenges that we faced at WIPRO were unique," he smiles, "but I would say instead that the way we faced and overcame our challenges were unique. The 'Sword of Honour' is also a recognition not only of our safety practices but also of the depth of detailing that we got into."

T Nandakumar
Project Director

The way we faced and overcame our challenges were unique. The 'Sword of Honour' is also a recognition not only of our safety practices but also of the depth of detailing that we got into.

"EHS management encapsulates the use of end-to-end processes and requirements designed to systematically achieve continuous improvement in our EHS performance," states R V Sudhakar, Cluster EHS Manager, sounding almost professorial. "These processes reflect EHS performance in the large scheme of sustainability performance and operational excellence, taking into account the designing, planning, processes, procedures and implementation of EHS initiatives. In turn, these directives are rooted in an established work methodology designed to achieve performance, evaluate results and provide mechanisms for acting on recommended actions." It is obvious that these were followed to the 'T' at the WIPRO SEZ project.

Training & awareness

"Training is key to improve on-the-job safety of workers," shares Sudhakar. "Seeing is believing so we had interactive sessions especially at the entry stage wherein we captured and presented to work crew work-based unsafe acts and conditions to make them understand the challenges they would face in real work situations." Workers were transformed from unskilled to skilled through sessions at the Construction Skills Training Institute (CSTI) within the site during which once again site construction activities were simulated and shared. "These simulations had a very positive impact on the workmen by motivating and helping them understand what was expected of them by the management. Daily interactions with the safety team was about improvisation of work conditions and the evolution of these conditions led to the commendable occupational health and safety performance of the project!"

R V Sudhakar
Head - EHS

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A road map to success

Sudhakar lays down the road map that was developed and followed that led the team to a 5 Star rating and the 'Sword of Honour'.

- Understanding the requirements by the EHS team and then doing a gap analysis with respect to our EHSMS
- Requirements & procedures of FSA not captured in the EHSMS but important for the project were made and incorporated
- The gap between our EHSMS and their requirement was bridged by the EHS team
- PDCA cycle was made for all elements of FSA requirements and related documents were linked to it
- Individual functional roles & responsibilities with respect to FSA requirements were communicated to all stake holders including to all functional heads & departments
- Interacted with all functional personnel involved in the project about their understanding and their provision for resources to comply with the requirements of BSC were taken on board
- Adequate resources were deployed
- Mock audits, at times even from HQ, were conducted internally based on which the short-comings noticed were reviewed and addressed

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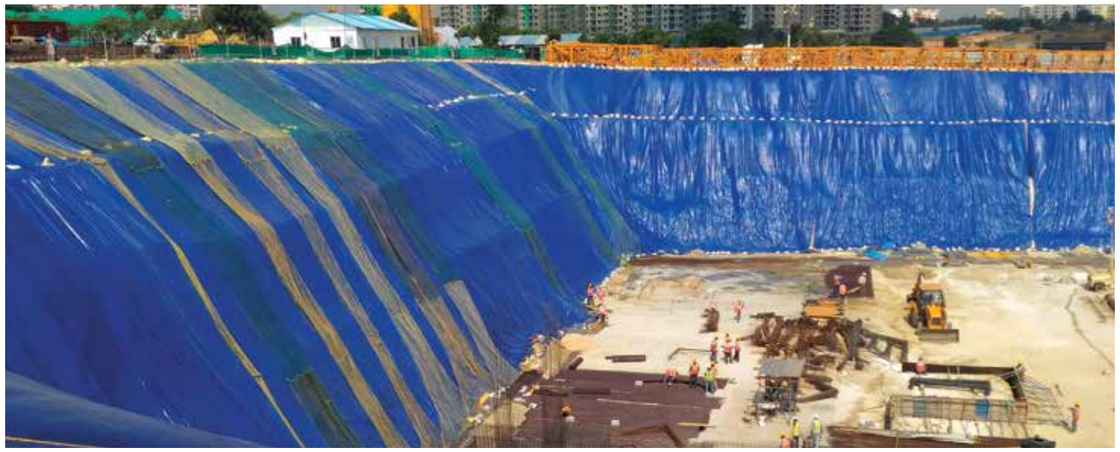

Changing work place conditions

One important consideration at WIPRO SEZ was that workmen were drawn from all over the country from different communities, having varied backgrounds and speaking different languages. Hence, it was important "to have an effective screening process and then communicate the EHS requirements in a language and form that they understood. Our rating and the award are recognition that we succeeded in our endeavour," laughs Sudhakar, although one can imagine that the task would have been no laughing matter.

Risk management & control

Risk Management in the construction project context is a comprehensive and systematic way of identifying, analysing and responding to risks to achieve the project EHS objectives. To address this, a Risk Profile of the project was developed and high risk activities listed out. A safe work method was developed for all site activities right from an established technique of risk assessment, which formed a part of the EHS management system. Method statements were prepared to define the scope and methodology of each and every activity. Risk assessments were prepared for all activities by taking the inputs from the method statement, as per procedure, which were constantly reviewed and revised as per the requirements.

Some best practices demonstrated at site

EHS was integrated across functions including formwork and CMPC. "In fact," as Sudhakar reaffirms, "it was involved for heavy erection right from the selection of the crane, checking the SBC of soil to safe angle and erection scheme. While workers working at height could only do so with Height Passes, we reduced work at height by introducing the Large Area Table Formwork system. We adopted a work permit system with a tracking mechanism and OEMs were mandated to inspect all critical equipment once every 6 months."

One of the major challenges faced by the team was the task to protect the slope from collapsing during adverse weather conditions as the deep excavation for all blocks had to be kept open for more than a year. "This was considered as high risk at the design stage itself and opinions to address it were sought from experts like IIT professors and Geologists and their suggestions were then incorporated into our scheme drawings by CMPC and executed safely."

Tower cranes can be a source of incidents if adequate attention is not given. The EHS team ensured safe tower crane operation with some well thought of measures. Solar blinkers on the hook of tower cranes were visible to operators at night to ensure safe movement; a wind alarm system fixed on the tower crane alerted the operator when wind speeds exceeded 45 KMPH while collisions were avoided by fixing anti-collision devices on the tower cranes. Blind corner sensors with alarms were also installed to alert the driver and pedestrians around both corners.

With so many steps implemented perfectly to ensure a safe work culture, it is hardly surprising that the WIPRO SEZ project walked away with the prestigious 'Sword of Honour'! Both Nandakumar and Sudhakar have every reason to celebrate.

A 'Sword of Honour' winner from the east!

Commercial Buildings & Airports - East

CBA, East is involved in the development of a host of unique projects: convention centres, business hubs, IT Parks, educational institutions, health care and data centres and mixed use development projects across West Bengal, Bihar, Odisha, Tripura, Meghalaya, Jharkhand, and other states of eastern India.

All on board

After the nominations, the teams from all the 5 project sites enhanced the management of occupational health and safety. "We specially concentrated on the 5 best practices of leadership, stakeholder engagement, risk management, organizational health and safety culture and continuous improvement," shares K R R Chandran, the then Operations Head – East, CBA SBG. The audit process and requirements were communicated to all, gap analysis conducted at Cluster and project levels based on which action plans were devised.

KRR Chandran
Head - Operations (East), CBA SBG

We specially concentrated on the 5 best practices of leadership, stakeholder engagement, risk management, organizational health and safety culture and continuous improvement

Competence, capability and structure

"Role specific competency requirements of employees at different levels were

5 projects were nominated for conducting a 5 Star Audit that received a 5 Star rating and the 'Sword of Honour' too!

Project Name	Project Manager	EHS In-charge
ITC - MXD, Rajarhat	Mr. Krishnendu Chakraborty	Mr. Manas Ranjan Das
State Convention Centre - WBHIDCO	Mr. Sudipta Kumar Basu	Mr. Tapan Mistri
Dr. B. C. Roy Hospital, Kharagpur	Mr. Bibhas Chandra Das	Mr. Jyotiranjan Mohapatra
Multistoried Hospital Buildings, Agartala	Mr. Bikash Bhattacharya	Mr. Balasubramaniyan N
Medical College and Hospital Madhepura	Mr. Anil Kumar Singh	Mr. Tabish Hussain

identified in the competency matrix and included in the EHS Management System," informs Sujit Saha, Cluster EHS Manager. "A training matrix linking competency and capability requirements was introduced at the initial planning stage and training needs were identified and incorporated into the project EHS Plan." A system of core competency to evaluate and monitor health & safety was developed for the different stages of construction activities. A feedback mechanism was put in place on competency development training and actual project performance based on which, the skill and proficiency requirements for the trainers were developed along with an evaluation criteria for the trainers.

All elements of the EHSMS were modified into a simple roles, responsibilities, accountabilities and authorities matrix so that everyone were fully aware of what was expected of them. Communication protocols and procedures were made part of the EHS Plan along with a feedback mechanism.

Contractual obligations

Work only began after the client's approval of the EHS Plan and monthly coordination meetings with the client kept everyone on the same page. In fact, a 'Client Satisfaction Certificate' was signed by the client on a monthly basis. Feedback from which was one of the main agenda points during the monthly review meetings. This committee was also involved in promoting a positive safety culture at site by participating in awareness programmes, health camps and site tours.

Workmen committee

A committee comprising workmen and supervisors was formed to participate in the risk assessment process, work place inspection and incident analysis.

Progress pressure

Safety was driven from the top and 'Leadership through action' was followed with no half measures allowed. Duty hours were monitored through the bio-metric system so that no workman worked extended hours although despite planning, there were occasions when manpower had to be increased due to work pressure. Even in these cases, no workmen were allowed to work at site without screening: safety inductions, medical check-ups and height pass systems. A robust access control system restricted all unauthorized entries and no work was allowed without risk assessments, tool box talks and START Cards. A quality assessment and control system ensured that no inferior materials got through to site and all major equipment and materials were purchased at the Cluster Office and not at site. The quality department ensured that all requirements were fulfilled while releasing the purchase order and on arrival at site, the quality of all materials was thoroughly checked and cleared.

Change management

Operational Risk Controls arising from different changes were captured and documented in a separate format as part of the Change Management System Procedure. The requirement of maintaining a database on the different changes and controls was included in the Project EHS Plan for which a special format was developed.

Contractors

"Contractors have a major role to play in maintaining Health and Safety Culture at the work place and pre-qualification guidelines were set for them and only those who qualified the benchmark were allowed to work with us," says Saha. "In fact, the EHS requirements were included in the work order which the contractor had to accept and on arrival at site, a kick-off meeting was conducted with the Project Manager, EHS Department and concerned department heads. Any difficulties and suggestions from the contractor were discussed at this meeting and their concerns addressed. Safety Code of practices were also decided at the meeting which the contractor had to agree to before work."

Sujit Saha
Cluster EHS Manager

In the case of electricians and plumbers, we only picked trainees from CSTI that ensured that they had the required skill training.

A contractor's on job performance was observed and monitored through various feedback mechanisms like upward communication, near miss reporting, Health & Safety inspections audits and site tours. Every month a coordination meeting was organized with the contractors during which expectations were discussed and difficulties addressed. A database was also maintained on good and poor performers which was referred to for giving further orders.

Trade identification and skill development

Workmen like carpenters, fitters, welders etc. were evaluated by executives to identify their individual skills through questionnaires and observations on the basis of which a practical trade test was proposed before deploying workmen. As Saha elaborates, "in the case of electricians and plumbers, we only picked trainees from CSTI that ensured that they had the required skill training."

Issues of workmen turnover and poor connectivity

A major challenge was of workmen not staying for more than a month at any of the projects. "Initially, we were struggling to maintain safety culture at workplace due to high workmen turnover as the wheel had to be reinvented every time," laments Saha. "Another challenge was that of poor connectivity since many of our projects were located outside the city. For example, the Agartala project team struggled with a lead time of 25 days from Kolkata for all machines, materials and manpower."

Leadership at Cluster level

Cluster Specific EHS Objectives were set and action plans evolved to ensure that competent resources were provided for implementation, monthly monitoring of EHS objectives, monitoring of all action plans and performance across projects. Safety walk downs were also conducted during site visits.

Driving safety from the top

"I made it a point to directly address the workforce and share details of near-misses to increase safety awareness levels," shares Chandran. "Brain storming and case study based incident alerts were demonstrated and institutionalized to enhance their tempo and zeal towards achieving a positive EHS culture." To ensure that all potential hazards were identified and controlled, a safe to start card system was introduced while a team of site engineers and EHSO conducted Hazard Identification and Risk Assessments to identify the hazards and establish suitable control measures.

To address the risks involved in working at heights, workers were screened and identified by simulating various work-at-height scenarios to test their competency and medical fitness, preceded and succeeded by medical tests for blood pressure, vertigo, headaches, etc. by a certified doctor. Only workers who successfully passed these tests were employed to work at heights.

Rewards and recognition

The Cluster implemented a rolling trophy on a quarterly basis to encourage projects to improve their EHS performance and the best site was recognized at the Cluster EHS review meetings. An EHS rolling trophy was also introduced for sub-contractors to motivate them. "We also organized several awareness programs like stress management, Behavior Based Safety training, yoga, mock fire & emergency drills by internal & external agencies, pre-employment medical check-ups, periodic medical check-ups, eye check-ups, chest x-rays and a lot more. Thanks to all this, we have won the ROSPA gold and NSC awards every year," states Saha proudly, "the Annual Safety Award – 2017 and, of course, the Sword of Honour!"

Proving yet again that safety is a triumph of teamwork!

CB&A (North) - A Sword of Honour winner!

Commercial Buildings & Airports (North) of the B&F IC won the Sword of Honour but what is more remarkable is the fact that there were all of nine projects that were being audited and the award is due recognition of the great coordination between the Project and EHS teams of these multiple sites. "Each site was quite unique in its nature and the EHS challenges that they threw up," summarizes M Kamarajan, Head – EHS, B&F IC, "covering a whole range of projects that included cyber parks, mixed use development projects, hospitals, educational institutions, malls, headquarters for two of India's leading political parties, the works". "What's more, four of these projects were audited directly by experts from BSC which meant that those projects had to stand up to some really close scrutiny of their safety systems and process. That's why this award is so well coveted!" says L Ramakrishnan (Head - Operations) sounding triumphant.

L Ramakrishnan
Head - Operations (North), CBA SBG

Four of these projects were audited directly by experts from BSC which meant that those projects had to stand up to some really close scrutiny of their safety systems and process. That's why this award is so well coveted!

The projects that featured in the audit and the people who made it happen!

Project Name	Project Manager	EHS In-charge
DLF Cyber Park, Gurugram	Mukesh Dahiya	S Kannan
Kendriya Karyalaya BJP Head Quarter, New Delhi	Vikas Sharma	Singh Manoj Kumar
DLF Mixed Use Development at Vibhutikhand, Lucknow	P G Hegde	R Karthikeyan
Police Bhawan, Lucknow	Amit Kumar Jain	R Ummat
Indira Gandhi Bhawan, Congress, New Delhi	S K Jain	Gourav Gera
Indira Gandhi Hospital, New Delhi	A K Kushwaha	S P Yadav
Faridabad commercial complex	A Kannan	A K Chauhan
Shiv Nadar University, Dadri	Prabir Kushary	M C S Chauhan
Delhi One, Noida, UP	Abhishek Nath	Rakesh Varma

Understanding an unknown entity

Being a first of its kind exercise, there was apprehension all around, quite understandably so, as to what all was required to achieve the goal. Mohammad Moizuddin, Head EHS, B&F IC (North) elaborates: "It was important to first thoroughly understand the requirements of the audit and perhaps the most crucial aspect was documentation. Of course, there were other challenges related to behavioural safety, change management, implementation of safe scaffolding and general housekeeping but these were judiciously dealt with by the Project teams." He cites the Police Bhawan project, led by Mr. Amit Kr. Jain, which had been facing constant problems related to effective implementation of the requirements after the FSA roll-out. "The extra efforts and initiatives we took to address these issues turned out to be a source of inspiration for others which was even appreciated by the auditor."

All on the same wavelength

Each and every employee at all of these sites were made fully aware of the FSA criteria and guidelines which made EHS management easy and manageable across sites. Head Operations - L Ramakrishnan and Cluster Project Managers (V Ramesh -Delhi & Col SS Sharma - Lucknow) took the lead and were deeply involved throughout the process spearheading and reviewing the gaps with the Project and EHS heads, setting internal targets and driving the sites to achieve them. "Till a couple of days before the audit, we did not know which project sites would actually be audited," says Mohammad "so our level of preparation had to perfect and uniform across all projects." Safety is a result of teamwork and Mohammad is extremely appreciative of all the heads of the various functions and departments who came together to make this achievement possible. "We have to acknowledge the excellent strategic planning at the Cluster level which ultimately translated into better implementation, monitoring and review. Criteria like risk management and monitoring of occupational, health and safety objectives proved to be the chief reasons for our success!"

Planning & preparation

To make things less complicated and target achievement easier within the stipulated timeline, the EHS personnel were divided into three teams with each team assigned with a specific set of responsibilities. These teams met on a bi-monthly basis to review the status as per the requirements and addressed gaps. These were then reviewed by the Operational Head and CPMs to adequately guide the Project Managers to fulfil what was expected of them. With safety parameters integrated into the scheme drawings, various potentially unsafe situations were addressed like formwork, scaffolding, etc.

"It was a big challenge to maintain a uniform system from Delhi to Lucknow," admits Mohammad, "Training,

We also adopted a unique cross-checking strategy amongst the projects to analyse gaps and bridge them within time.

Mohammad Moizuddin
CEHSM, North

inspections, internal audits were conducted under the able guidance of M Kamarajan, Head – EHS, B&F IC and P. Nagarajan EHS Head - Operations. We also adopted a unique cross-checking strategy amongst the projects to analyse gaps and bridge them within time. Similarly, we had crisis management sessions at the last moment involving the cluster teams which proved extremely useful to iron out all shortcomings among project teams."

Since the cluster offices were also under the scope of the audit, it was critical to have all the relevant legal compliances in place, training, emergency systems and review meetings up to date based on PDCA cycle. All functional heads and EHS coordinators (Ms. Tanvi Kapoor, Amol Swami and G. Baskar) at cluster level played a very important role to fulfil the audit requirements.

Some other basic steps to ensure a safe work culture

EHS inductions and refresher training were made uniform across projects. EHS surveys were periodically conducted and the feedback implemented. Safety workshops were held during which personal safety products were demonstrated. For the senior management, legal workshops were held by the Chief Factories Inspector & DCP as also EHS Leadership programmes for CPM & Project heads.

Effective fire prevention and protection systems were installed at the workmen quarters with ventilators, extra electrical sockets, competent camp watches and a mandatory provision for separate kitchens. The produce from an Organic Waste Rapid Composter was used for plantation as part of an environmental initiative taken at IGB Congress HQ by Mr. S K Jain & Mr. Amol Swami.

Digital interventions

The Mobile Safety App was made operational at all projects with regular monitoring by the cluster EHS department while a Safety Harness App was used to inspect full body harness at projects. Special full body harnesses were also stitched with unique ID numbers. Tower crane anti-collision devices were integrated with the ground monitoring system. "We had a monthly felicitation of the best EHS digital site to promote maximum usage of these digital initiatives," smiles Mohammad.

Awards & recognition

Hardly surprisingly, the cluster reaped safety awards for their efforts winning the annual Best EHS Site Trophy for the cluster and the Best EHS and P&M joint trophy quarter wise. And, of course, the Sword of Honour to top them all!

CLOSE CALL

Edge Protection

Scenario

When a workman was fixing the L-bracket, ledger pipe and safety net at the external side, he stepped on the edge of a H-Beam, slipped and fell down as the H-beam toppled along with L-bracket. However as the safety harness was anchored with edge protection arrangement, it prevented the workman from falling down.

What was the cause?

1. Workman engaged in incomplete shuttering
2. Poor supervision
3. Engineer has directed the workmen without checking the location
4. Safe to start work card not prepared for that activity
5. Job not carried out in a step by step sequence

What are the precautions to be taken to prevent recurrence?

1. Job sequence to be followed and step by step procedure to be briefed to all concerned before engaging at site
2. Spot inspection to be ensured by front line engineer before engaging in such critical works

PHEW!

Making a tall, safe impression

Residential Buildings & Factories - West

Working on high rise towers is always fraught with risk therefore the achievement of RB&F, Mumbai, B&F IC, to get a 5-Star rating for their safety, health and environmental management excellence is a matter of great pride for Kalyan Kumar Dey, Head – Residential (West), Sarvesh Soman, Head – Operations, Residential (West) and Hemant Kadu, EHS Cluster Manager (West). "Interestingly," quips Sarvesh with a laugh, "The team hardly did anything extraordinarily different but what they did, they did extraordinarily well!".

Sarvesh Soman
Head - Operations
Residential (West)

The team hardly did anything extraordinarily different but what they did, they did extraordinarily well!

Teamwork wins the day

"It was through and through a team effort," according to Kalyan, "every employee, every workman knew what was expected of them and they participated in the process with total commitment and passion. What's more, with time they became our ambassadors encouraging their team members to get involved and demonstrate their commitment towards our EHS culture. It was really a case of being driven by a common goal which won us the 5-star rating," shares a visibly delighted Kalyan.

Several actions were planned and conducted in a most orderly manner including roll-out meetings with senior management representatives, familiarizing with BSC's 5-Star Audit specifications, conducting roll-out meetings at each project, briefings on the objectives of the audit and the benefits of the audit assessment to the organization. "It was like selling a new idea," is how Hemant puts it. Then there were exclusive interactions with the functional heads across all the projects and finally status reviews with gap analysis audits.

Hemant and his EHS team had a task on their hands to integrate the working across 11 different sites and align their working to the audit requirements. "Yes, aligning the processes was an issue but what was more difficult was to first understand and then align our systems to international EHS standards and requirements across every business activity. The P-D-C-A system was integrated and then it was all about urging, encouraging and facilitating our team members to create and maintain factual evidence and records which were crucial for the audit."

Kalyan Kumar Dey
Head - Residential
(West)

It was through and through a team effort. Every employee, every workman knew what was expected of them and they participated in the process with total commitment and passion.

A thorough and measured approach

"We were thorough in our understanding and in analysing the audit specifications," assures Hemant, "and once we were on firm ground, we studied our existing level of compliance, identified the gaps and addressed them through a systematic 4-stage process."

- **Awareness stage:** This was the stage of introducing the team to the demands of the audit, what was required to win the 5-star OH&S Award. Their in-depth understanding of these requirements had a positive fallout: they actually started to naturally integrate EHS into their business activities.
- **Gap analysis:** This was a phase for introspection; re-looking at the way EHS had been followed over the years and what needed to be changed or corrected. The gaps were identified and actions were initiated to plug the gaps.

The projects that were a part of this achievement:		
Project	**Project Manager**	**EHS In-charge**
Crescent Bay, Parel	P Dhananjaya	D G Patil
Godrej Trees, Vikhroli	PTV Bharathan	Nitin Pingale
Omkar - Worli	S Somasundaram	A V Muruganantham
Omkar - Malad	P S Suresha	Ved Mishra
Dheeraj Livsmart, Kurla	Neeraj Gupta	Akshay Sharma
One ICC & Two ICC, Wadala	O V Divakaran	Wilfy Sabu
Oberoi Sky City, Borivali	V V Bhosale	Sharad Mutkule
Oberoi Splendour, Jogeshwari	Nitin Chaple	Sharad Mutkule
Oberoi Eternia, Mulund	Niraj Kumar Mishra	Ashwin Kohale
Samriddhi, Bhayander	Sunil Dalvi	Shahzad Husain
Minerva, Mahalaxmi	C R Mishra	Sanjay Chvhan

- **Mock audits:** Another positive fallout was that those who underwent the mock audit were eager to know how they had performed revealing a sense of ownership and passion to succeed. Even after knowing the results of their 'performances', they displayed a refreshing eagerness to know what were their shortcomings and how they could overcome them going forward.

- **Final preparations:** This was the final stage of reckoning by which time the entire team across all 11 projects had started to sense their knowledge and overall process improvement. This created an enhanced sense of 'self-esteem' which was an extremely positive development in the long run for the entire Cluster.

Going the extra mile

"Once the gaps had been addressed, we are happy that our in-built systems were more than adequately and appropriately meeting the audit requirements," nods Hemant, "but not satisfied with that we introduced some proactive steps which went a long way in us winning the award." Kick-off meetings and field visits to critically analyse the business EHS risk were conducted before the commencement of any new project and thereafter a specific EHS plan was formulated and followed with due diligence. "We encouraged the participation of the project team members in regular joint EHS walk-downs, EHS committee meetings and upward communication on EHS," shares Hemant who then adds, "Active participation deserves rewards and recognition which was duly given. Of course, in cases where people erred, we did reprimand them and then counselled them to improve their EHS performance."

Hemant Kadu
Cluster EHS Manager, Mumbai

Of course, in cases where people erred, we did reprimand them and then counselled them to improve their EHS performance.

For Hemant and his team, the gains were even more for all these initiatives helped to create a much improved and sustainable positive EHS culture.

Giving the digital edge

EHS-related digital initiatives were cascaded down the line and to every business activity and people were urged to follow them. "We did win some extra points because of our digital drive," laughs Hemant, "because of the use of the EIP dashboard to review compliance status of the Safety App, the use of the 'Safety harness' app and widespread use of Whatsapp for quicker communication and better EHS compliance all helped us to not only win the 5-Star Rating from BSC but also won us the Annual Safety Trophy for 2017! Hemant's satisfied smile says it all.

CLOSE CALL

Slewing the Crane

Scenario

The tower crane operator slewed the crane for shifting materials resulting in damage to the main jib of an adjacent mobile crane boom.

What was the cause?

1. Without instructing the signalman, the tower crane operator rotated the crane
2. Over confidence of the operator
3. Both the cranes were operating almost along the same line
4. Specific location and equipment based hazard communication protocol was not followed when interchanging the operators and signalmen

What are the precautions to be taken to prevent recurrence?

1. Trained/certified operators and signalmen should be deployed
2. Instruct the operators to carry out only one of the operations, when cranes are at the same level

PHEW!

Important infrastructure built to ensure 'safe' take-offs and landings!

Kannur International Airport

The Airside Works for the Kannur International Airport was a prestigious project bagged by TI IC that is envisaged to meet Kerala's increasing aviation demand. "For the construction of this artificial table top airport, we had to face a host of unique challenges," says Project Head, P K Sreekumar, "like the mammoth amount of bulk earthwork involved, reinforced soil slope filling, the large amount of blasting in fairly close proximity to people's dwellings, the creation of lots of dust and noise and, of course quite needless to say, we had a very tight deadline from a demanding client."

The KIAL project scope included the construction of a 3050 m runway with a simple approach landing system (with CAT – 1 provision) on one side and a simple approach landing system on other side; 2.6 Km of parallel taxiways, 0.4 Km of rapid exit taxiways and 0.7 Km of link taxiways, 816.5 m X 166.5 m sized apron, operational and approach roads of 16.9 Km, 177 Km of AGL cables, 49 Km of HT and LT cables, 3.96 Km of external sewerage system, 142.9 Km of drains, 179 culverts, 20 lakh Sq. m. of landscaping and turf, 33.53 Km of boundary wall and 15,000 trees planted in a green belt.

If the challenges were unique from a project perspective, the safety challenges for Shanmuga Sundaram, EHS Manager, were equally tough and testing. "Nothing

is ever simple in a project," he smiles, "Which is why each activity was studied, examined, discussed from legal and technical points of view and the potential hazards identified by a dedicated HIRA team for all activities. The identified hazards were breached and administrative and engineering control measures were adopted without fail," he asserts.

Moving the earth

"We did some 45 million cum of earthwork and that was one of my biggest safety challenges," points out Sundaram, "because it gave rise to other safety issues like the movement of a number of vehicles in a confined space with poor visibility because of all the dust flying around. We did reinforced soil slope fill of about 78 m, a sensitive work, which was designed keeping all the safety aspects in mind." Kerala receives a huge amount of rainfall during the monsoon months which was another issue that had to be addressed as the work was progressing on a slope with heavy machinery deployed.

Ensuring workmen safety and comfort

Due to the nature of the soil, the kind of work and almost continuous vehicular movement, a lot of dust was being raised which were potential hazards both for the workmen and for the people around. Sundaram and his team had to address this issue. "So the first thing we did was laying the approach roads with good, well-compacted red soil," Water was frequently sprinkled to settle the dust while dust masks were made mandatory at site. "We made wearing of ear muffs for workmen compulsory at site and frequent job rotation reduced their exposure to the dust and noise." Wheeled rest shelters were constructed and deployed at identified locations for the workmen to rest when it became unbearably hot during the afternoons. "It also prevented workmen from taking

shelter under machinery or parked vehicles which reduced chances of incidents to a great extent." Advance warning hooters, hand sirens and wire-less sets eased communication during the execution phase.

All vehicles were fixed with reverse horns, reverse lights; cranes were equipped with rear cameras and sensors to detect obstructions. "We installed vibrating rollers with safe starter switches at the front and rear; warning posters and speed limit signboards were put up all across the site and we even had dedicated signalmen equipped with flags, batons and whistles to aid reversing vehicles." All vehicles were pre checked and only vehicles found fit were authorized for construction activities on site. Sundaram adds, "All drivers were screened for valid licenses and underwent a defensive driving training programme as a part of administrative control. In fact, we conducted spot vehicle checks, tests to control rash and drunken driving, used speed guns at site to control speeds and even did alcohol breath analyser checks."

The labour colony was set up on the site premises that could accommodate 1500 workmen. It was well maintained by the Administration department with a canteen, a grocery store, clean RO drinking water, proper sanitation and even a playground for recreation.

Working at height

For Sundaram and his EHS team, fall of people or material from height was always a major safety consideration. As a part of engineering control, height work temporary structures were designed with approved drawings, ensuring safe access / egress and adequate working platforms with hand rails. "Apart from the normal fall protection measures

S Shanmuga Sundaram
EHS Manager

KIAL holds the top position in the effective implementation of e-tools, having achieved 100% compliance on all CAT (Confirmation on Action Taken) observations at site.

like safety nets, fall arrestors, rigid life lines, full body harnesses, other PPEs and the like, we implemented the Work at Height permit and risk check lists and adhered to them strictly," informs Sundaram, "and everyone working at height had to pass the 'Height Test System'." The areas below were cordoned off and unauthorized entry prohibited.

Working at night

Safety hazards multiply during night time and since night shifts were on from the beginning of the project, adequate lighting was installed for smooth execution. "One critical hazard is electrocution," warns Sundaram, "and we had several control measures in place for that: LOTO system, RCCB/ELCB, MCB, Fuse and earthing were provided as part of engineering control. Normal domestic cables were replaced with double insulated cables. In addition, we had a work permit system, a warning sign and frequent training as a part of administrative control to minimize risk." The effectiveness of the control measures were periodically evaluated with permit audits, job EHS inspections, reporting, follow-ups and compliance status updates, the EHS Golden Rule implementation status, a green card system, training man-hours and percentage of effectively reporting near misses and ensuring corrective and preventive actions.

Using digitalization for safety

"KIAL holds the top position in the effective implementation of e-tools," declares Sundaram, "having achieved 100% compliance on all CAT (Confirmation on Action Taken) observations at site." An EHS Whatsapp group kept themselves abreast of all EHS activities from all across the site while a PTZ CCTV camera, installed at site, kept off time vigilance over the RSS embankment work and RESA 07 side cutting areas.

"With such attention to safety it is not surprising that we were able to clock more than 8 million safe man hours, bag a whole slew of safety awards including the RoSPA in 2015, the British Council Safety award in 2017 and our own Annual Safety award for 2017!" shares a proud PSK who is all praise for his EHS team. "International recognition gave us the confidence and the motivation to maintain a good safety culture and the recognition and appreciation we have received from various stakeholders is affirmation that we have done our job well!" he sums up with a hugely satisfied smile.

P K Sreekumar
Project Head

International recognition gave us the confidence and the motivation to maintain a good safety culture and the recognition and appreciation we have received from various stakeholders is affirmation that we have done our job well!

Laying a path to safety

OPGC MGR WP Project, Odisha

A S Phanendra Kumar, Project Head, OPGC MGR WP Project in Odisha has his hands full constructing a Merry-Go-Round (MGR) railway corridor and water transportation pipeline from IB Thermal Power Station to Manoharpur Coal block for the Odisha Power Generation Corporation (OPGC) & American Energy Services (AES). The project being constructed by TI IC on a lump sum, turnkey basis is spread over a total length of 49 km involving 1.1 crore cum. of earthwork, which includes 22 lakh cum. of rock ballasting ranging from depths of 8 to 16 meters, embankment filling ranging from heights of 6 to 15 meters and 11 kV & 132 kV EHT lines; 106 bridges including 18 major ones with PSC and steel girders, Rail Over Rail Flyovers crossing the Mumbai-Howrah Main Line and Road Under Bridges crossing NH-49, 66 TKM of P-Way linking, 2 loading platforms, 5 station buildings, electrical and S&T works.

"The alignment cuts across various terrains," sighs Phanendra, "dense forests, villages, fields; then there are high tensions wires and busy railway lines to contend with, very testing work conditions and sometimes extreme weather conditions." Remarkably, despite of all these huge challenges, Phanendra Kumar, Ramakanta Pasayat, his able EHS In charge, and team have taken everything in their stride to maintain a clean record of Zero LTI! Ramakanta settles down to share how the Project Team has achieved this praise-worthy feat.

Going cross country

Since the project was linear in nature cutting across various terrains, logistics of reaching the site was a major hurdle. "We had aggrieved land owners protesting as they were deprived off their lands, miscreants causing trouble and widespread ROW issues. Planning to address these issues was vital. To start with, a master traffic management plan was prepared for the entire project clearly demarking entry and exit points; workmen accommodation and movement was meticulously planned for easy mobilization and competent security agencies were hired to protect the project team from local disputes and agitations."

Blasting with care

Hard rock had to be excavated by blasting to a maximum depth of 30 m which was potentially dangerous for human life, domestic and wild animals in the vicinity and for property. Blasting thus had to be carried out with extreme care that started with the preparation of a method statement and HIRA by domain experts which was approved by the client. "All statutory permits and requirements are fulfilled as per explosive act." Ramakanta was taking no chances, "while the locals were always intimated using communication methods suggested by the government about the blasting location and timing. Mostly, we did controlled blasting and all measures were taken to prevent the hazard of flying rocks." The team only employed licensed and experienced blaster and blasting crews while during the blasting signalling devices like megaphones, whistles and flashers were used.

Staying safe from hot lines and live train tracks

Another hazard was from the numerous high tension lines that were passing through the alignment especially during the construction of the 25 m high embankment. As part of control measures, all the high and low tension lines were identified

Ramakanta Pasayat
EHS Manager

Falling from height was our main cause of worry so a proper lifting plan was submitted and approved that complied with all EHS procedures and standards.

and permissions procured from the respective agencies to reroute the lines after complete shutdown.

A part of the project lay adjacent to a live railway line as the contract stipulated merging the new line with the exiting one. "We had to be extra careful to prevent any mishaps so proper block permits were taken prior to the commencement of the job and all measures were followed as per the norms of the Indian Railways." Not stopping there, Ramakanta and team conducted training for the crew before assigning them to the job next to the live tracks.

Working at height

For the erection of PSC and steel girders for the major bridges, workmen had to work at heights of up to 17 m which necessitated a number of safety measures. "Falling from height was our main cause of worry so a proper lifting plan was submitted and approved that complied with all EHS procedures and standards," informs Ramakanta. Other potential trouble areas were workmen tripping while working, injury from crane machinery, exposure to heat and vibrations, collapse of the structure or equipment being used and the ever-present danger of unskilled manpower doing the work.

The activities of all contractors were coordinated and supervised. "We first certified whether the ground surface was suitable for plant, equipment

and cranes to operate safely before commencing work and the erection manager had to certify the stability of the ground with adequate compacting, if necessary, before each stage of girder erection. The dangers of the ground settling under or around the outriggers, ground water accumulation or such like were also taken into consideration." Holding-down bolts, cast in concrete footing, pedestals or slabs, were all within tolerance limits. It was the responsibility of the Erection Engineer to ensure that personnel, including that of the sub-contractor, were given HSE training and made aware of aspects like first aid, fire safety, defensive driving, etc. and of making the workmen aware of the procedures and risks involved in girder erections to eliminate or at least reduce risk.

Workers had to undergo medical examinations specified for crane operations, working at height and other operations related to structural erection while appropriate PPE was identified and provided to all the employees.

Exposure to dust

The cross-country nature of the project alignment exposed about 75% of it to an open cast coal mine area where heavy coal dust was getting generated due to mining activities. Added to that, earthwork and blasting activities also generate a lot of dust. To counter this dusty hazard, standard green mesh enclosed rest sheds were put up to arrest air borne dust. "A dust suppression plan was prepared and implemented and truck-mounted water sprinklers were used at regular intervals to settle the dust," says Ramakanta.

Beating the weather

Temperatures, at times, soared to 45*C and above exposing the workmen to heatstroke. "Working hours were rescheduled with work suspended between 11 and 3 in the afternoon; electrolytes and treated water were distributed among the workmen and on-the-job, in-house training on 'heat prevention' and 'heat stress' were regularly conducted both for employees and workmen during the hot summers."

Going digital to remain safe

Digital cables and service detection systems were pressed into service to detect the presence of cables or services, dead or alive while GPS was installed in all vehicles to control speed and in earth moving machinery to monitor usage. Lux meters measured and ensured adequate illumination during night shifts while random checks with alcohol meters prevented intoxication of workmen at site. Instant communication was maintained through various Whatsapp groups.

"A positive safety culture exists when a set of shared values and beliefs about workplace safety and health influences are practiced to prevent workplace injuries and illnesses," affirms Phanendra Kumar, "therefore safety comes first for our people, our contractors and the individuals in our communities. Everyone has the right to immediately stop work if they find a situation that they believe to be unsafe." A strong message indeed which was supplemented by a qualitative approach towards improvement in health and safety issues at site with all employees agreeing to a safety walk every month.

A S Phanendra Kumar
Project Head

Safety comes first for our people, our contractors and the individuals in our communities. Everyone has the right to immediately stop work if they find a situation that they believe to be unsafe.

Awards & recognition

Apart from maintaining Zero LTI, the project is entitled to an EHS bonus from the client for maintaining their safety record and thus far they have been rewarded to the tune of Rs. 2 Crores since inception two years ago! The project was the top scorer in the QARS audit amongst all RCBU projects and therefore expectedly the winner of the annual EHS trophy for 2017!

Striving to meet lofty expectations

Ford Global Technology and Business Centre project

The Ford Global Technology and Business Center is a software center being developed by M/s Ford Motor Private Limited and constructed by L&T in SEZ ELCOT, Sholinganallur, Chennai, which will be Ford's second largest office facility in the world with the capacity to accommodate 11300 employees on a campus with gold green building rating.

AT Lakshmanan
Project Manager

The client are seeking perfection in all our deliverables, in a way that's good because it just makes us more particular to deliver the best.

The 2-year project on a built-up area of some 26 lakhs square feet (Phase-1) will feature two office blocks with basements and G+12 floors, canteen and service buildings, Technology and Talent Centers all in a land area of 25 acres. L&T's scope includes structural, finishing and MEP related works and other general development such as roads and landscaping.

For Project Head, AT Lakshmanan, the biggest challenge has been to meet the lofty expectations of a global client. "They are seeking perfection in all our deliverables," he says, "and in a way that's good because it just makes us more particular to deliver the best." Safety In-charge T. Bhuvaneshwaran also carries this onus and as he shares, "Method statements, pre-task analyses and work permit systems are being followed true to the letter and spirit. Work does not start without fulfilling the planning and operational control document. I am happy that the project team has been meeting this standard and I'm confident they will keep doing so going forward."

Quite clearly, Lakshmanan's and Bhuvaneshwaran's efforts have been bearing fruit because the project has already clocked 7 million safe hours since inception in September 2017 much to the appreciation of the client.

Training is key

"We have well established EHS and training facilities with special displays of safety miniatures (vehicle, equipment, pedestrians, material stacking, tower crane) and a safety park comprising formwork, hot-work, electrical, lifting and rigging, project specific safety signage and PPEs," informs Bhuvaneshwaran, "and as standard protocol, during EHS induction, all the workmen are familiarized with these exhibits."

T Bhuvaneshwaran
EHS Manager

We have found that it is essential to screen workmen with respect to their skills, knowledge and individual capabilities because the benefits are many.

At a Construction Skills Training Institute set up at site, workmen are thoroughly assessed and evaluated by expert trainers through a structured process. "We have found that it is essential to screen workmen with respect to their skills, knowledge and individual capabilities because the benefits are many." He then

ticks off the benefits on this fingers. “Firstly, it helps us identify the right worker for the right job by skills and experience. We are able to ascertain their skill sets and thereby assess their levels of quality, safety and productivity on an assigned task. We can recognize good performances thereby motivate them and others to do better and finally we can control wastage and rework by verifying the quality of scaffolding, formwork, civil and rebar work.”

Fall prevention and protection measures

The focus on fall prevention and protection has increased during the slab shuttering and façade activities. Lifelines have been provided for typical floors in each building and load tests are regularly conducted to ensure stability. “We have created a SOP of tying the life line by using the PPE rope as well as the wire rope considering knotting methods, anchorage points and safe fall clearances for better clarity for front line supervisors,” says Bhuvaneshwaran. He adds that during the slab casting and other peripheral construction activities, three-level catch nets have been provided using supports, fixtures and overhanging projections that have been put into a SOP that has been clearly communicated to all the workmen. Drop tests are also being conducted by dropping loads in different scenarios to ensure their reliability and stability.

Visual Job Plan (VJP)

Job specific training right from workmen to front line supervisors, including engineers, are being conducted with the help of some 50 VJPs, prepared in association with the construction manager, frontline engineers and other subject matter experts (safety, quality, P&M and electrical). These are basically pictorial step-by-step representations of all activities that are conspicuously

displayed across work locations for a clear understanding of work sequence and safety measures.

Mock drills

Apart from onsite general mock drills, mock drills are conducted for multiple scenarios at prescribed frequencies (monthly / quarterly / biannually), such as tower crane operator rescue, rescue from passenger hoists during travelling, electrocution while working in the 11 kV substation, workmen fainting while working in confined spaces, medical emergencies either at site or in the workmen habitat.

Monthly EHS drive

Monthly EHS drives are being effectively followed at the Ford site for which a schedule is drawn up and special programmes conceived. In addition, class room training, on the job training, demonstrations, street plays and other promotional activities are conducted to create awareness among the workforce across a wide range of topics including work at height and electrical safety, scaffolding and formwork safety, vehicle & equipment safety, safe material handling, fire & heat safety, EHS Plan & PPE, housekeeping, protection of the environment, health & hygiene.

Environmental initiatives

Several environmental initiatives have been taken up as part of day-to-day operations which Bhuvaneshwaran enumerates:

- Wheel wash facility to clean slush before sending trucks from site
- Automatic shower facility for sprinkling water on loaded trucks before entering the site to control dust generation while dumping
- Dust screens along the fencing wall to control dust spreading to the neighborhood and around aggregate bins, pan mixers and conveyers
- Vehicles exclusively deployed to sprinkle treated water on internal roads
- Concrete debris utilized to make internal roads and pedestrian access maintenance
- Sedimentation tanks have been set up to treat the discharge water from the concrete mixer trucks which is then used for sprinkling purposes
- Sewage treatment plant set up at the workmen’s habitat

Initiatives to ensure electrical safety

- Arc flash suits for personal protection while working in the 11kV high voltage yard
- LED light fixtures have replaced metal halides to reduce power consumption
- Defined SOPs for routing of cables in different areas, both underground and overhead
- Lockout and Tagout (LOTO) placards (pictorial representations) prepared and displayed at all electrical equipment for those engaged in planned maintenance and emergency breakdown for easy understanding
- All power distribution panels have sockets routed with MCBs for under voltage and overcurrent protection
- Test benches with necessary apparatus facility for periodical testing of portable power tools used at site

Eye wash stations and portable eye wash bottles have been provided at appropriate locations such as the chemical storage yard, battery charging room and cement warehouse to be used immediately in the event of any chemical splash to the eye. An Automated External Defibrillator, placed in the custody of the Chief Medical Officer, has been installed to give electrical stimuli in case of heart attacks.

"As part of our digital drive, all monitoring of EHS compliance and performance are through mobile apps that can be monitored by all levels of management," shares Bhuvaneshwaran. Some of the online activities are approved by the EHS engineer like safe to start cards prepared by the site engineers, inspection of safety harnesses, all kinds of EHS inspections, near-miss reporting and issue of improvement slips.

Apart from laurels from an extremely demanding client, these comprehensive EHS steps have won the Ford site the Annual Safety Award – 2017 and there is no doubt that if the team remains committed to the principles of EHS, more laurels and awards are surely on the way!

A tall example of sound EHS management

Godrej The Trees project, Mumbai

As the city of opportunities attracts people every day by the hordes seeking to live their dreams, the requirement for housing in Mumbai has sky-rocketed with more and more skyscrapers constantly changing the city's skyline. Adding to this is B&F IC's Godrej The Trees project – a multi-storied residential apartment complex in Vikhroli that is spread over 34 acres. The complex features 15 midrise towers all of which share a common basement, each tower having 18 typical floors. "Constructing a total built-up area of 14.25 million sq. feet within two and half years called for high speed and steep asking rates of construction schedules which significantly increase EHS risks," says P T V Bharathan, Project Head, "but we were ever mindful of the potential risks and as a big team, we have stuck to our guns and have successfully completed a lion's share of the construction incident free!"

Bharathan PTV
Project Manager

Ever mindful of the potential risks and as a big team, we have stuck to our guns and have successfully completed a lion's share of the construction incident free!

For Safety Manager, Nitin Pingale, the challenges were more pronounced because as he shares, understanding and lining up the EHS standards and requirements for every activity was the key. "The EHS and P-D-C-A management cycle method had to be systematically incorporated and then each team member had to be inspired and helped to create correct records for the audit." Having understood the audit specifications set by the EHSM system, Nitin and his team started preparing for it by laying out a 4-stage strategy: Awareness Analysis, Gap Analysis, Project Inspection and Ultimate Groundwork.

Nitin had one thing going for him and his team from the very beginning: they had the full backing of the top management and safety was at the top of the priority list for everyone, starting with the Project Head. "We ticked all the basic safety boxes," says Nitin, "right from readily issuing PPEs, organizing elaborate inductions for workmen, daily PEP talks and weekly safety walk-downs."

Universally, accidents are largely either due to 'Unsafe Conditions' or 'Unsafe Acts'. The project leadership took cognizance of this to draw out a clear mandate to ensure the prevalence of the safest conditions throughout the project site. Effective systems such as the formation of an EHS Committee, the implementation of 'safe to start' work cards, safety improvement slips and widespread safety awareness campaigns went a long way in sensitizing workmen to avoid unsafe practices and acts.

Safety lies in implementation and the secret to the success of safety at this project lay in the diligent implementation of several safety-related steps that have paid rich dividend.

- **A committee for correction action**

  To create a consciousness for and awareness about safe practices, an EHS committee was formed comprising department heads, the project manager and the safety officer to plan, monitor and implement strategies to create a proactive safe work culture. The committee was responsible, among other things, to conduct weekly site walk-downs during which improvement areas were identified and on-the-spot solutions arrived at.

- **Learning from near misses**

  Near misses, though dangerous, are not only completely avoidable but also opportunities of learning. The EHS committee thoroughly

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analyzed near-miss cases along with the workmen involved to identify the root causes and arrive at remedial measures to avoid re-occurrences. The need for bottom line communication (right down to the workmen) was emphasized to create awareness among workmen.

- **Promoting upward communication**

  To create and promote an atmosphere of transparency in communication and to make it easier for workmen to approach the project EHS committee, especially in the event of near miss cases, a plan was drawn up whereby hazards could be reported on written slips by workmen dropped into complaint boxes that were placed across the project site. Initially, participation was poor because of low literacy rates among the workmen which necessitated a modification of the system whereby workmen could report the hazard verbally. This simpler and easier method proved to be an instant hit and participation soared. What also helped was rapid corrective action if non-compliance or hazards were noticed.

- **'Safe to start work'**

  All activities were permitted to be started only on receiving the 'safe to start card' from the respective site engineers who were given the responsibility to inspect the workplace at the start of each activity to ascertain safe working conditions and to issue 'safe to start' cards only if the work environment was found to be conducive. Precautionary measures were drawn up in consultation with the EHS committee to identify source and cause of incidents, if any, to prevent any recurrence of the same incident which is precisely why the Godrej The Trees project has maintained a 'Zero' incident record to date.

- **Safety improvement slips**

  Safety improvement slips were issued to erring workmen who showed lapses in safety. They were then advised on the importance of wearing the right PPEs and impressed upon the seriousness of safety lapses. These slips greatly reduced unsafe acts by making the workmen aware of the implications of their violations through a proactive EHS management approach that eliminated repetition of safety lapses.

- **Assessing risks**

  Risks are either known or unknown hence a detailed risk assessment was carried out prior to the commencement of every construction sequence to minimize the known risks involved. Strong preventive measures were put in place to safeguard personnel from unknown risks.

- **Investigating incidents**

  A detailed methodology document and incident investigation report for redressal of complaints strengthened the trust of the workmen that the team meant business.

"We solved a lofty issue by implementing some golden rules," says Nitin, "one of which was to make it compulsory for the safety harnesses to be anchored while working at heights. This was reiterated to the workmen through signage displayed at vantage points across the project site. Several other mitigation strategies were implemented to reduce the risks involved in working at heights that included peripheral working platforms and all areas on the ground with higher levels of foot fall were covered with "catch-nets" to protect people from falling objects. Another standard provision we made was to create anchoring points for lifelines on the aluminium shutters themselves." Temporary handrails were provided well before the casting of the slabs that facilitated easy movement of workmen between the floors; floor edge barricades were provided even after fixing the window frames and lift shaft enclosures were put up with lock and key. "Since so much of working at heights was involved, we ensured that all the workmen passed the Vertigo Test, during their recruitment itself," adds Nitin.

Nitin Pingale
EHS Manager

We have left no stone unturned in our drive for safety.

"We were committed to deliver," affirms Bharathan, "and to emphasize our strong commitment towards safety, we made it a practice to begin the weekly review meetings with safety as the first topic. 'Safety moments' or sharing of best practices was presented by one of the EHS committee members during these review meetings." It was also mandated that all meetings at the project would begin with an awareness presentation on a safety aspect and an exclusive, daily EHS committee meeting was conducted to quickly discuss points to constantly re-engineer safety systems and innovations.

Further, the EHS committee suggested that employees from across departments visit workmen habitats once every two days on a rotational basis to improve the overall hygiene and maintain good housekeeping. Even this subtle contribution towards EHS was duly noticed and greatly appreciated by the client through recognition certificates.

"We are using digital initiatives wherever possible to maintain safety," offers Nitin. Apart from the Whatsapp groups that facilitate quicker communication of EHS action and compliance, two apps being used extensively are the 'Safety' and the 'Safety Harness' apps.

"We have left no stone unturned in our drive for safety," reminds Nitin and the results are testimony that the Godrej The Trees project was worthy of the Annual Safety Award for 2017.

How to safely build a barrage across a river

Kharkai Barrage

L&T Construction's WET IC was mandated to construct the Kharkai Barrage across River Kharkai tributary of River Subarnarekha envisioned to irrigate 24,388 hectares of land in the state of Jharkhand by providing 18 cum/sec of water and, in the process, recharge the nearby Sitarampur reservoir to meet the drinking water needs of Adityapur and the major industrial belts of the state. Apart from building the barrage, the scope also included civil, mechanical, electrical and SCADA system.

"Not only was it a much delayed project but we started on the back foot having to face a lot of opposition from the locals," says Project Manager, Dinesh Kharbanda, "but we were able to convince them of the huge advantages of the project after which they became our supporters," he smiles. "Massive civil work was involved in a limited area of around 90,000 sqm unlike in other water projects and because of a delayed start we had to open multiple

Dinesh Kharbanda
Project Manager

We started on the back foot having to face a lot of opposition from the locals, but we were able to convince them of the huge advantages of the project after which they became our supporters.

We had to carry out 63 blasting operations for hard rock excavation, and all 63 were safe operations.

Subhra Ranjan Khandual
EHS Manager

work fronts. At peak time, we had 25 'live' locations. With excavation, blasting, concreting, mechanical fabrication and lots more all happening at the same time, we had to have some very good IMS and SOPs in place. We had them because of which we have clocked 5.67 million safe man hours till date!"

"We had to carry out 63 blasting operations for hard rock excavation," shares Safety Engineer, Subhra Ranjan Khandual, "and all 63 were safe operations thanks to our modus operandi of prior warnings, using of our people to create safe zones, continuous siren blasts just prior to the blasting and perfect coordination. Our efforts have even been recognized by our client, Water Resource Department, which has issued a certificate of appreciation."

The other big challenge for the team was to work in the river for which, Khandual, explains, "We collected over 100 years of data from the Central Water Commission to understand the flow of the river over time. Along with the construction activities and the river diversion plans, an emergency rescue plan was also in place to be activated in case of flash floods."

To minimise the dependency on availability of dry river bed, the construction method was improvised. Instead of the conventional staging method from ground level, a bracket support system for the super-structure

work was adopted in consultation with the EHS department "which helped us a lot in extending our work during the monsoon period as we were not worried about the removal of staging material in case of flash floods," shares Kharbanda. In addition, a slew of other safe work methods were implemented such as work permit system, breath detectors for night shift workmen and the use of PPEs along with motivational schemes.

Having done all the hard work that involved 2,27,000 cu.m. of concreting; 1,09,000 sq. m. of shuttering and 5,800 t of reinforcement, the site won the prestigious 'British Safety Council' award and the Annual Safety Award for 2017 but what has cheered both Kharbanda and Khandual more are the hearts of the locals they have won!

(For a more comprehensive report on both the Kharkai Barrage project and their various safety initiatives please refer to our previous issues of ECC Concord (April - June, 2017) and Helmet (April - June 2017))

Safe & Smart City Hyderabad Project

Truly living up to its name!

The Hyderabad Smart City project is one of the largest surveillance and intelligent traffic management projects in the country that loftily aims at community policing and cop-less traffic management. The mandate for L&T Construction's Smart World Communication BU is to implement a citizen friendly, holistic, integrated, and responsive IP-based citywide CCTV surveillance system and city wide integrated traffic management system for Hyderabad, Cyberabad & Rachakonda.

The scope involves around 3000 junctions (including 372 ITMS junctions), covering 10,000+ cameras, viewing centers at 104 Police Stations, 2 Command Control & Data Centers each at Hyderabad & Cyberabad), viewing centers at 12 zonal & 11 senior officials offices and 10 Mobile CCCs. The entire system will then be integrated with the existing 100,000+ Community CCTV cameras and other IT systems in both cities.

"The project has remained smart and safe," says Project Head – M Shanmuganathan, who has been driving the EHS initiatives at site which has translated into the project clocking half a million safe man hours without any LTI during the 1st phase of execution activities. "But it has not been easy to keep our motto of Zero LTI and Zero harm," he admits for the challenges that such a project throws up are unique.

Starting from scratch

For EHS In-charge, P D Gopakumar, the first EHS challenge was an internal one: "At the start of the project, we had a brand new team most of whom were 'freshers' and our IMS system documents had just been released so it was a major task to make the team aware of the system and start implementing it properly." Therefore the initial need was proper planning to ensure error-free execution for which, as he elaborates, "Roles and responsibilities were clearly communicated to the team members which helped a lot. Workmen screening was strictly implemented to ensure that no untrained workmen were directly deployed at site. In fact, EHSD was involved in all project functions and with all departments coordinating we were able to keep our safe record intact," he smiles.

Working with the perils of traffic and the unknown underground

As the majority of the project work was concentrated around 3000 junctions, the team had to combat issues like air pollution, traffic, noise pollution and public interference. "We used hard barricades, road signage, employed traffic marshals and made traffic diversions wherever required to minimize risk and ensure safety," informs Gopakumar. "Since it was difficult to do our work uninterrupted at busy junctions during the day, a lot of our major installations were done at night which has its own share of challenges," he says and there was a large amount of installation work involving precast foundation, poles and cantilevers, cameras, pole mount junction boxes, etc. "Workmen were working at heights mostly at nights when installing the edge devices so we had to take extra precautions to avoid any incident with proper illumination and ensuring the use of harnesses and other protective equipment." Further, although not habituated to it, the subcontractors were instructed to use man-lifts and new generation hydras for the installation of all equipment.

The project has remained smart and safe, clocking half a million safe man hours without any LTI during the 1st phase of execution activities.

M Shanmuganathan
Project Head

If working in the midst of dense traffic was difficult, working underground was even more demanding. "We had to carry out more than 150 km of trenching work to lay the cables to connect the cameras, network switches and power connections," says Gopakumar, "and to mitigate the hazards from underground utilities during trenching work, we carried out underground utility surveys at all junctions. The reports were made available to all site engineers and subcontractors before start of the trenching work which went a long way in avoiding any untoward incidents underground."

Digitalization for safety

Several online modules were developed by Smart World and Communication Business Unit to monitor EHS performance at the various sites, the information from which were compiled and analysed to evaluate EHS performance.

- **Online EHS Monitoring Module:** Daily EHS observations were recorded on this system pertaining to location, site in-charge, section in-charge, Project Manager and details of the subcontractor. The observations had to be closed by the concerned site engineer within a stipulated time frame. Failure to do so would result in an escalation to the higher level. These observations could be analysed to monitor a site engineer's UA/UB, unsafe conditions, a sub-contractor's EHS performance or even an EHS officer's productivity.
- **Confirmation of Action Taken (CAT):** All site visit reports by senior management, incident reports, Project Manager Walk Down reports and minutes of committee meetings were uploaded in this portal for compliance.
- **Online Audit Module:** Quarterly internal audits of the Integrated Management System adopted by the EHS department were conducted by certified internal auditors and the non-conformities observed were promptly rectified.
- **EHS Home:** Every month end, site EHSOs would enter various safety performance details such as incidents reported, first aid cases, near misses, training programmes conducted, waste generated, any other initiatives taken, NCs and observation details, which would then be verified and approved at various levels within the organisation.

Keeping a good thing going

Very often, projects are able to keep their EHS slates clean by following some basic yet critical EHS steps; so was the case with the Hyderabad Smart City project, as Gopakumar explains. "We executed SEC (Safe Execution Card), the back bone of the EHS management system, which helped us to get a step by step analysis of EHS requirements for each of our work locations to check whether the requirements were being complied with or not. This also helped the Site Engineers / GETs to easily identify hazards at early stages of execution works and take adequate control measures proactively." PTW (Permit To Work) systems were implemented while check lists and other periodical inspections were conducted and monitored strictly.

"Every month we conducted an Executive Walk Down with the Project Director and the Project EHS committee members to assess the effectiveness of EHS implementation at site and the findings were discussed at the EHS committee meeting. All the Executive Walk Down reports and minutes of the EHS committee meetings were made available to the committee members and the top management by uploading them in the CAT (Corrective Action Taken) Module."

Gopakumar P D
Asst. EHS Manager

157 sessions have thus far been conducted with a total of nearly 3,000 people trained and close to 4,000 training man hours achieved. These include behaviour-based safety and safe execution engineer training organized by EHSD, HQ and other site-specific and contractor workmen training.

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Surveillance audits by **Mr. Sudheesh Kumar, EHS Head** were most helpful to implement & stream line the IMS standard requirements at site. Our EHS coordinator **Mr. Minhaj Ahmed Ansari** and EHS Operations Manager **Mr. Sujan Kumar Dey** regularly visited the site to ensure the compliance of EHS requirements at site.

"We used all the above modules to register 2424 observations and closed with evidences of corrective and preventive actions taken within the stipulated time," says a satisfied Gopakumar.

On Environment front the Project Team planted 2502 Saplings in Hyderabad city, as a responsible social partner to the community. "We also conducted two Blood Donation Camps and donated 126 Units of Blood."

Shanmuganathan's call that each member of the project should be a 'Safety Engineer' was taken in right earnest by the team and their perfect safety record won them the Annual Safety Award for 2017. "EHS compliance is only possible with team work and I must compliment everyone for their contribution to winning this award," says Shanmuganathan while mentioning G S Raghavendra (Project Manager), D Srinivas Rao (Design & Engineering Head), P Dhandapani (Planning Lead) and Mr. Girish Iyer & Vineeth Shetty (Construction Leads). "How can I forget the excellent support and guidance that WET IC & SWC BU EHS Head, K S Sudheesh Kumar gave Gopakumar and team for us to remain smart and safe!" he concludes.

Bringing more power to Kozhikode city safely!

R-APDRP Part-B Works

L&T's project for Kerala State Electricity Board (KSEB) is to augment and improve the power system in 23 sections of the divisions of Kozhikode, Balussey and Feroke.

"The project has some ambitious targets," says Project Head, A Rajaram. "It aims to reduce aggregate commercial and technical losses for KSEB from 23.6% to 15%." Technical losses are due to ill-maintained equipment, substations and inadequate infrastructure while commercial losses are a result of low metering efficiency, faulty meter reading, theft and pilferages.

The scope of PT&D's mandate was: in the area of underground works. 11 kV cable laying, horizontal direct drilling, open trenching and RMU installation. Overhead works involved HT construction and reconductoring, installing a 100KVA distribution transformer, LT construction, conversion and reconductoring, HT & LT AB cable and energy meter replacement works.

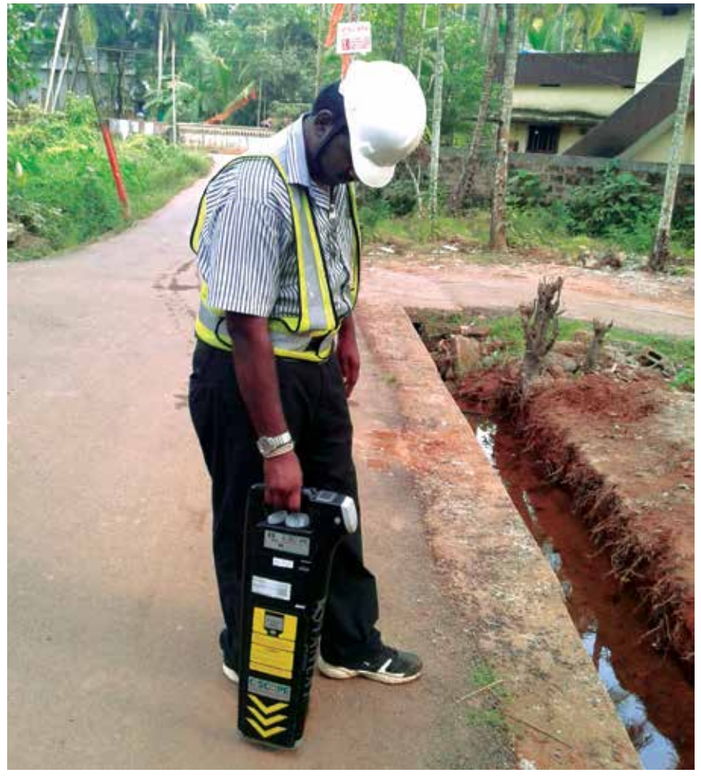
Challenges galore

The first challenge that the team faced was the nature of the location itself. Kozhikode is Kerala's 3rd largest city with dense population, narrow roads, heavy traffic and a veritable forest of underground utilities like power cables, communication cables and water pipelines. For Safety In-charge, U Manikandan, the roads were a huge headache. "Since the roads were very narrow and crowded with people and heavy traffic, we had to do the manual trenching and HDD works with great care. A lot of it had to be done at night too because of the tight delivery deadline. The roads in Kozhikode are also full of humps and curves which required more supervision. The other issue was that as Kozhikode is situated on a hilly terrain, many areas are still not connected by proper motor able roads so we had to use trolleys to shift the poles."

Ticking all the safety boxes

"As you can see, each of these tasks were critical but we were able to complete all of them following the best safety procedures and systems," says Manikanadan, with a thumbs up. "Of course, we started by first thoroughly analysing all the hazards and prepared safe work methods for site specific activities thereby eliminating risks to a large extent."

Training programmes for specific activities were carried out at frequent intervals via e-learning methods to improve the knowledge of workmen; some of them from the subcontractor's teams were given special training in traffic control and management. "All the activities were laid up in one place as a mock up and presented for awareness of the requirements and safety," shares Manikandan. The Pre Task Plan (PTP) was strictly implemented with both PTP Plans A & B prepared a day in advance along with KSEB.



M. Bhaskaraiah
EHS Manager

These PTPs were critical because almost all the work required power shutdowns and therefore we had to have a robust shutdown process that had to be closely monitored.

"These PTPs were critical because almost all the work required power shutdowns and therefore we had to have a robust shutdown process that had to be closely monitored. The client also supported us with the right power isolation of battery limit of the work area. We also introduced several recent technologies to protect the workmen from electrocution like HMIT, Pen Type Testers, HV Testers, latex hand gloves, FRP ladders and 11kV graded safety shoes." It was also based on the PTP that the power isolation of primary, secondary and earthing systems were strictly implemented.

Regular EHS audits were conducted and based on the observations, corrective or preventive actions were taken. DEHSR (Daily EHS Reports) that consists of all the checklists, permits, attendance reports, token issuance forms, etc. were strictly followed by the site engineers, supervisors and safety stewards.

By forecasting job and manpower deployment, the appropriate safety gadgets and PPEs were organized in time. According to the job skills, the workmen were identified with a token system: Red – for workmen at height during shutdown; Blue – ground workmen during shutdown; Green - for workmen at height during non-shutdown; Yellow - ground workmen during non-shutdown.

The helmets of the workmen were also colour-coded depending on the nature of their work: Green – discharge rod providers who were authorized to put and remove discharge rods on feeders

based on LC confirmation; Red – cut pole workmen; Black – for those working on earthing, coil or pipe; Blue – stringing workmen.

Reflective caution boards in English, Hindi and Malayalam were displayed at all work zones while excavated areas were equipped with flasher and solar blinkers to alert drivers and the public. Open trenches were barricaded with solid cordoning arrangements. Utility scanners were arranged to avoid any damage to the several utility cables and lines.

A Rajaram
Project Manager

Two external audits by Bureau Veritas Quality, India were conducted with No NCRs or major observations. The customer feedback from all 23 sections has been "Excellent".

U Manikandan
EHS In-charge

The project's Risk index is. 2.25, with the Safety Steward Ratio at 50:1 and Site Supervisor Ratio at 20:1 for effective supervision and control of systems.

"The project's Risk index is. 2.25," informs Manikandan, "and we have maintained our Safety Steward Ratio as 50:1 and Site Supervisor Ratio as 20:1 for effective supervision and control of systems."

Digital interventions

All the approved PTPs were uploaded in a mobile app for the benefit of all at site for onsite checks and to avoid later modifications in PTPs. An effective message system was also implemented between the Site Engineer and Site Supervisors to confirm the battery limits, line clearances and man power deployment on OH lines as written procedures.

Playing it safe

Rajaram's face has a satisfied smile because all these safety initiatives have helped the project clock four million safe man hours. "Two external audits by Bureau Veritas Quality, India were conducted with No NCRs or major observations. The customer feedback from all 23 sections has been "Excellent" and we achieved an audit score of more than 85% in all internal audits. In fact, our last internal audit score was 98% and our internal KPI score is more than 86% over the last three years!" The numbers do tell a story and the Annual Safety Award 2017 is due recognition of their sterling efforts in achieving excellence in safety management!

Constructing a defence installation … safely!

Vizag Vessel Project

L&T has been playing a vital role towards shoring up the country's defences and is presently executing certain strategic defence projects at Vizag. "Everyone must realize the importance of safety at work place and their roles and responsibilities to ensure a safe working environment," begins P. Vijay, Project Head and, "the site team with the active support and guidance from the customer is working to achieve excellence in EHS practices and thereby ensure a 100% safe work environment for all." The combined effort of Vijay and his team is certainly paying off as the Vizag Vessel Project has already clocked 28 million safe man hours till December '17.

"The nature and complexities associated with the project demands high standards of safety in each and every operation," Vijay elaborates, "as it involves installation of structural steel components, equipment, piping, electrical cabling and instrumentation works in confined spaces and, of course, handling of various components with different kinds of cranes, hot works (welding, gas cutting, grinding, etc.), pressure testing of piping, lighting and powering of various systems, etc." The

P Vijay
Project Head

Everyone must realize the importance of safety at work place and their roles and responsibilities to ensure a safe working environment.

EHS mantra at site is to ensure 'L&T – LIFE' i.e. 'Live Injury Free Each day' by following the '20 Golden Safety Rules'. Safety is a top-driven philosophy and the team is tireless in their pursuit of keeping safety uppermost in people's minds through motivation, supervision, feedback and strict site management.

"We always want to excel," smiles EHS In-charge, J Dhinesh, "which is why the Gold Rating we received for an EHS Audit in July 2016 was not good enough for us so we targeted and won the Platinum Rating in the next audit conducted at IC level."

Worth an 'Oscar'

Though internet usage and smart phones are banned at site, the team has been working towards digitalization and one significant initiative has been creating the EHS compliance model – OSCAR (Online Safety Compliance And Records) which includes online safety observation status, online work permit status, subcontractor evaluation on EHS performance, and a lot more. It eliminates all pending observations, bringing in transparency and accountability amongst the team and better communication between the EHS team and the engineers for EHS observation compliance. "There's also no need to monitor pending observations because they are auto-generated and if a deadline is missed, the matter immediately gets escalated to HOD or Project Manager," adds Dhinesh.

Though initially developed to monitor safety observations, OSCAR now covers work permit systems for Leak Tests (LT) and Hydro Pressure Tests (HPT), sub-contractor EHS performance evaluation, etc. Vijay explains that the hose bursting or flying off during a leak or hydro pressure test in a confined area is a big safety hazard but "by uploading LT/HPT permit details through OSCAR, tracking and monitoring the life and repeatability of high pressure hoses used in these tests is much easier."

EHS Risk Management

EHS risk management teams, involving senior managers to technical supervisors, have been formed, which after much deliberation have identified and developed activity-specific Risk Assessments (RA) and Safe Work Methods (SWM) that are communicated daily to the work force during the pre-start verification and briefing. The effectiveness of the system is monitored in many ways at site and IC levels. At site level, it is through monthly audits and the compliance level is reviewed at the monthly EHS committee meetings and through the OSCAR portal. At the IC level, an auditor from IC Corporate visits the site once every six months to review and the observations, if any, are implemented within agreed timelines.

Presently, 50 RAs and SWMs are actively implemented at site and reviewed once in six months or whenever a job demands it. Identified near misses, first-aid incidents and relevant incident alerts received from the EHS Dept. HQ, are also incorporated after such regular reviews. Thus, unknown and hidden risk/hazards are identified during the EHS risk management process and control measures taken to ensure a safe working environment.

Construction in confined spaces

Lack of air movement and space can create issues for workmen in confined spaces hence they are instructed and pre-briefed about the nature of hazards involved in such work and necessary precautions taken like wearing protective and emergency equipment. For Dhinesh, it is tough because at any given point during peak operations about 600-800 workmen plus supervisors, engineers and client's personnel are engaged in work in confined spaces. "Firstly, proper ventilation and air-conditioning has to be provided to ensure a safe and comfortable working environment inside the confined area," he informs. "Oxygen and carbon monoxide levels inside the confined area are monitored and recorded with multi gas detectors every day at frequent intervals."

Electrical safety is another important aspect to be considered while working inside confined spaces. All electrical

We never allow workmen to work alone in confined spaces; he is always accompanied by a stand-by.

J Dhinesh
EHS In-charge

connections are of 24 volts and the installed electrical panels conform to IP 44/67 standards which ensure water and dust proof enclosures. The ELCB/RCCB have been installed to protect the personnel from electrical shock and the area is fitted with smoke detectors to prevent fire incidents. Yellow-coloured Fire Resistance Low Smoke (FRLS) cables used for the electrical connections differentiate the temporary power cables from the permanent ones.

"We never allow workmen to work alone in confined spaces; he is always accompanied by a stand-by," says Dhinesh. "Grinding and buffing inside the confined area are generally not allowed to avoid dust emission. However, in case, it is unavoidable, we use suitable blowers. Similarly, fumes generated during welding are eliminated using fume extractors." Mock-drills are regularly conducted to evacuate workmen from confined areas and the time expended for such evacuations are analysed to be better prepared for any kind of emergencies. For Dhinesh and his EHS team, the mock-drills also help to understand and ensure the minimum number of accesses that are required to be maintained. The work permit system is strictly implemented too.

Vijay amplifies that all workmen working inside confined spaces are given specific training such as emergency preparedness, firefighting, electrical safety, stand by person training, etc. "With the approval of the customer, we have also conducted trials to implement Radio Frequency Identification (RFID) based human tracking system. The proof of concept has been launched recently which will help us monitor 24x7 the number of personnel working inside confined areas and ensure evacuation of personnel in case of any emergency. Indirectly, this also helps us to monitor and improve work force productivity," he quips with a smile.

Working with pressurized systems

Another safety hazard is working with pressurized systems as pressure tests ranging from 0.5 to 400 bar that have to be conducted for the various piping systems as per design requirements with air, oil or water as the medium. "While performing pressure tests, we ensure that the hoses are properly tied to a stable structure to avoid displacement," explains Dhinesh. "Whip links are provided where hoses are connected with manifolds/pumps to prevent the hoses from flying off. The safety relief valves are fitted at inlet and outlet points and are set at 1.1 times of the design pressure while the gauges are secured with a mesh arrangement."

The trouble is when, at times, other hot work activities like welding or grinding have to be performed along with pressure testing activities of a piping system, to meet the committed schedule. "Such situations test our ways of working safely as a habit, especially when carrying out 400 bar testing as lack of communication between the pressure testing team and the other working personnel can be dangerous. Hence, pre-planned communication is shared with all concerned clearly indicating the restricted and safe working zones on a chart so that everyone is on the same page."

Motivating the work force

Spreading the good word, keeping workmen ever conscious of working safely, rewards and recognition of individual performances in the realm of safety, celebrating safety months are some of the ways that Vijay, Dhinesh and his EHS team have kept the Vizag Vessel Project free of any incident. They have richly deserved the Annual Safety Award for 2017 and here's wishing them many more safety laurels as they build vital infrastructure for the nation.

Working by the sea - safely!

IOLPL LNG Terminal Project

L&T has been mandated to construct a liquefied natural gas import, storage and regasification terminal at Kamarajar Port at Ennore, north Chennai, that is being developed by Indian Oil Corporation Limited (IOCL) through Indian Oil LNG Private Limited (IOLPL), a special purpose vehicle. IOCL have appointed Wood Plc (a UK based Project Management Company) as PMC for executing the job.

L&T's scope includes the construction of the LNG platform structure, pipe rack, approach trestle, substation building, unloading platform, mooring and berthing dolphins, catwalks, erection of marine fenders as well as driving of steel piles and installation of the gangway tower and quick release hooks.

KSS Kumar
Project Head

Working next to a turbulent Bay of Bengal has its own set of challenges but we are very happy that we have already clocked 3 million safe man hours without LTI.

"Working next to a turbulent Bay of Bengal has its own set of challenges but we are very happy that we have already clocked 3 million safe man hours without LTI," shares Project Head, K S S Kumar. "I must compliment the entire project team for their meticulous planning, optimal utilization of resources and execution of tasks by integrating safety into every aspect.'

Being an equipment-oriented project, the onus on the project team is even bigger to ensure safety of men, material and equipment since a majority of the work is on off-shore mode, says Safety In-charge, Sakeer Babu Kuriyedath. "Of course, we have a commitment of 'Beyond Zero Harm' to our project management consultant but we have an equally important commitment to our own people to keep them safe."

Getting the documentation right

Right from word go, every activity has been enlisted, planned and recorded in the Document Control Index (DCI). A method statement based on a planned schedule is prepared by the execution team a month before the commencement of the activity after which a meeting is held to assess the risk and identify mitigation plans, the outcome of which is shared as a Risk Assessment (RA) document with PMC for their approval. "Work starts only after their approval so that everything is planned and everyone are on the same page," adds Sakeer.

Sakeer Babu Kuriyedath
EHSO

Of course, we have a commitment of 'Beyond Zero Harm' to our project management consultant but we have an equally important commitment to our own people to keep them safe.

Starting right

The skill sets of all workmen to engage in offshore activities are certified by external agencies and before the commencement of any activity, they are thoroughly inducted by the EHS team about the precautions to be taken. "We have ensured that all our workmen are provided with the correct PPE and that

they wear it all times through regular PPE Audit. We are constantly imparting behaviour-based safety training to change their attitude towards safety." The basic five PPEs like safety shoe, reflective jacket, helmet, hand gloves and goggle are mandatory for all the workforce including staff and visitors, entering the site premises irrespective of the nature of their work. Additional PPEs and life-saving equipment are also provided and mandatory to use depending on the nature of work and environment. Sakeer also points out that workmen are immediately removed from any situation that is potentially hazardous.

Some other basic but important steps taken to ensure safety are:

- Certifying the fitness of equipment before deployment and regular inspections by internal and external parties
- Effective protection at the flotilla edges to prevent falls
- Scaffold and access erection under the strict supervision of scaffold foremen
- 100% induction training to workmen, staff and visitors before entering the work premises
- Monthly mock drills to handle and familiarize various emergency scenarios
- Implementation of the Work Permit system
- Regular fogging and pesticide spraying of the workmen colonies and work places

Meetings, walk-downs, inspections, et al

Weekly meetings with the client are convened to review the safety performance of the previous week while weekly walk-downs involve senior management to get everyone committed to compliance of control measures and mitigation of unsafe conditions. Monthly RCM presentations review developments on a monthly basis and quarterly assessments of EHS performance are shared with PMC, elaborating the activities planned and achieved based on the records.

Weathering the storm

"Since work was happening beside the sea, it was crucial to keep ourselves abreast of the weather forecasts and tidal charts so that offshore activities could be planned during favourable weather conditions," and for Sakeer and his team, Cyclone Vardah was a severe examination of their processes and systems. "There was widespread damage to our equipment especially the flotillas that affected our activities but we acted swiftly as soon as the storm had passed and minimized the damage. The workmen's quarters were also damaged but that too was promptly addressed by the site admin team."

Collision and oil spill

The oil spill due to the collision of two ships inside the KPL port premises resulted in the stoppage of hot work for more than 10 days. The Port Authority retracted the hot work permit until the spilled oil was fully recovered from the sea. "We also chipped in, as part of our CSR activities, by helping in the work of removing the oil spill that badly affected the nearby villages. IOCL actually took the initiative to clear all the spill and convert the crude oil sludge to compost," informs Sakeer.

A Safety Day every month

Safety Day is celebrated in the first week of every month to promote awareness and encourage EHS among the work force. "Every month we have a distinct theme depending on the activity selected for that particular month and programmes are conducted on awareness training, mock drills, demonstrations, training from external agencies, etc. The best workers among our workforce who practise safety norms and encourage others to work safely, are rewarded during these celebrations which obviously motivates them to work safely," smiles Sakeer.

Driving digitalization

Kumar is quick to add that the site has gone digital. "ProCube helps us to monitor project progress on a daily basis while the Safety app presently covers pep talks, safe-to-start systems, EHS observations/Inspections, EHS improvements, etc. By using the app, even minor observations related to safety are given priority which we are able to address adequately. Our performance monitoring system has definitely improved because of these digital aids."

"Our EHS management system and the efforts we have taken to create a positive EHS culture has greatly smoothened system implementation. We are committed to fulfilling the philosophy of 'Beyond zero accident' and are striving to complete the project without any lost time injuries," Kumar concludes confidently.

In acknowledgement of the effort made for EHS implementation, this project won the annual EHS trophy for 2017.

Emirates Global Aluminium

12.2 million safe man hours and counting …

It is matter of great pride to the Projects Heads, Shaik Jaleel & Praveen Hajare, of the 2 MTPA Al Taweelah Alumina (ATA) refinery that the MMH SBG is constructing in Abu Dhabi. "Our project has already clocked 12.223 million safe man hours and our performance has won us recognition and accolades from all quarters," says Shaik Jaleel. They chorus that there has been no LTI since inception and that "the project won the annual safety trophy for 2016-2017 from across MMH Sites as recognition for maintaining the best EHS standards and procedures at site. We have won the Contractor of the Month Award for January 2017, the best ES&H Contractor Award for the fourth quarter of 2016 and the Most Improved Contractor Award for the third Quarter of 2016 from our client!" "In fact, the appreciation we received from Mr. Yousuf Bastaki, EVP – EGA for safe completion of the platform, upper mould setting and 7 million safe man hours (at that point in time) is the one that we value most!" adds Praveen Hajare, Project Head.

Shaik Jaleel
Project Head

The project has already clocked 12.223 million safe man hours and our performance has won us recognition and accolades from all quarters.

This rich haul of awards and widespread recognition is well deserved because the project team is executing a tough assignment with the scope of works including 88,000 cum of concrete installations, design and engineering of 137 tanks as per API 650, API 2U & 2V,

Praveen Hajare
Project Head

In fact, the appreciation we received from Mr. Yousuf Bastaki, EVP – EGA for safe completion of the platform, upper mould setting and 7 million safe man hours (at that point in time) is the one that we value most!

procurement and construction of 86 tanks as per API 650, 20,750 MT of tank construction, 6500 MT of structural installations, 75 km of piping, 91 hydro-tested tanks and installing as many as 293 pieces of equipment.

So what have they been doing that has brought them so much success in the EHS space? "A mix of some usual and some unique initiatives," responds Bikash Parida, the EHS In-charge.

Preparation for safe working

"Our job begins every day with a warm-up exercise," indicates Parida, "Pre-STARRT & STARRT (Safety Task Analysis and Risk Reduction Talk)." Job specific approved JHAs are made available at the work spots and all high risk jobs are carried out with authorized permits. "We have displayed hazard bulletin boards at various locations to educate and make workmen aware of the hazards of different kinds of activities," he adds.

Training & competency

A specific EHS training plan clearly identifying the training and skill requirements for this particular project has been developed, based on the project's natural progression, which focuses training efforts on identified skills and competencies. A Training Matrix has been prepared to track the training status of all employees and stickers have been issued to be pasted on helmets after the completion of various levels of training for easy identification.

Safe rigging and lifting operations

Lifting Operations have been categorized thus:

- Light Lifts (under 10T, under 75% of SWL-Lift Study not required; JHA & STARRT Card only)
- Medium Lifts (between 10T &45T; lifts that are 75% & 90% of the SWL- Lift Study needed along with STARRT Card & JHA)
- Critical Lifts (over 45T, lifts that are 90% and more of the SWL - Lift Study needed along with STARRT Card & JHA)

Ensuring safety in confined spaces

"For carrying out activities in confined spaces, we ensured training for all entrants," affirms Parida, "we issued permits and only authorized attendants were allowed inside; we had atmosphere monitoring all the time, bump tests for gas detectors and the like."

Life critical procedure

'Life Criticals' are a set of 12 safety requirements that if not complied with, could result in death or serious harm that apply to all employees on the project including manual and non-manual workers. "We have set one life critical procedure which defines the details of the Project's Life Criticals when there is an alleged breach of one of the Life Criticals," explains Parida, "and compliance with the Life Critical requirements is a condition for employment on the project."

People-based safety (PBS)

PBS is a craft operated process that uses observation and constructive feedback to help prevent injuries by keeping people mindful of their behaviour as well as the task at hand. "PBS is being implemented at site and has worked wonders," says Parida, "because it encourages safe behaviour, recognition of safe behaviour, coaching to correct at-risk behaviour, craft ownership to work safely, open communication, 'no name-no blame' environment, review of data for trending and action, continuous improvement and leadership development among craft employees."

'Stop the Drop' initiatives

These initiatives were targeted to prevent fall of material from heights for which, as Parida explains, "we implemented wooden storage boxes, green mesh on staircase towers, hand rails, demarked zones of high material and traffic movement. Overhead protection was also provided at entrances and exits."

Bikash Parida
EHS Manager

Different theme-based safety campaigns were conceived and conducted like 'Hand Safety', 'Beat the Heat', 'Stop the Drop'; there were also campaigns about life criticals and safe rigging.

Regular inspections and storage of rigging and lifting equipment

Rigging and lifting gears were carefully stored in designated storage racks and weekly inspections were conducted by the authorized rigging crew to certify the equipment.

Authorization card system

Authorized cards were given to all personnel involved in high risk activities like operators, drivers, riggers, scaffolders, fire watchers, flagmen, confined space attendants and the like. "We also issued safety badges to workmen as a symbol of recognition of their EHS effort and performance and the person who received three of such badges was rewarded," adds Parida.

Campaigns & demonstrations

Different theme-based safety campaigns were conceived and conducted like 'Hand Safety', 'Beat the Heat', 'Stop the Drop'; there were also campaigns about life criticals and safe rigging. A safety exhibition at site sensitized all to the importance of safety.

Traffic and vehicle management at site

An approved traffic management plan was in place to control vehicle movement both at site and at office which eliminated incidents relating to vehicles, pedestrians or mobile plants. Authorized traffic control and flag men were engaged to control traffic on the roads and at site respectively. Parida elaborates, "We installed IVMS in our all vehicles to track location, speed, poor driver behaviour such as sudden braking or over revving, harsh acceleration, etc. Vehicle information could be viewed on electronic maps via the Internet or specialized software."

Environmental initiatives

"As part of our environmental initiatives, we provided spill kits and emergency eye wash stations at all chemical storage and handling areas. Sewage tank level alarms were fixed on all ablution units to prevent the overflow of sewage tanks. We even made shaded traffic controller booths by using upcycled water bottles," shares Parida.

Both the project heads and Parida are understandably proud of their safety record and are doing everything in their power to keep their safety record unblemished. We wish them all the luck!

Safety Roll of Honour

Helmet congratulates the following sites for achieving million and more LTI free safe man-hours

BUILDINGS & FACTORIES

41 **Hyderabad Metro Rail Project**
August 2015 to December 2017

39 **DLF Capital Green Project, Moti Nagar**
June 2014 to December 2017

30 **ITC Sonar Hotel Project, Kolkata**
August 2009 to December 2017

22 **Emami City Project, Kolkata**
January 2013 to December 2017

19 **L&T Realty, Sanofi Tower Project, Powai**
February 2013 to December 2017

18 **IIT Project, Hyderabad**
August 2014 to December 2017

17 **UP Awas Vikas Basement Project, Ghaziabad**
August 2012 to December 2017

17 **RIL Township Project, Jamnagar**
May 2014 to December 2017

17 **L&T Realty Bhoiwada Sales Project, Mumbai**
January 2016 to December 2017

17 **Omkar Worli Sales Project, Mumbai**
December 2012 to December 2017

15 **Statue of Unity Project, Gujarat**
December 2014 to December 2017

14 **ESIC Hospital Project, Coimbatore**
March 2011 to December 2017

14 **ESIC Hospital Project, Joka**
November 2009 to December 2017

13 **BARC Trombay Project**
June 2012 to December 2017

13 **TATA Housing Project, Kolkata**
September 2014 to December 2017

Safety Roll of Honour

12 **Prestige Lakeside Project, Bengaluru**
January 2017 to December 2017

12 **Seawoods Ph-II Project, Mumbai**
November 2015 to December 2017

11 **GHP Experion Project, Gurgaon**
July 2016 to December 2017

11 **King Fisher Tower Project, Bengaluru**
July 2013 to December 2017

10 **Gujarat Housing Board Project**
July 2014 to December 2017

10 **DLF Cyber Park Project, Gurgaon**
December 2015 to December 2017

10 **Indira Gandhi Hospital Project, Dwarka**
September 2014 to December 2017

10 **HILL Crest Project, Bengaluru**
July 2012 to December 2017

TRANSPORTATION INFRASTRUCTURE

40 **Western Dedicated Freight Corridor Project (CTP 2)**
April 2015 to December 2017

22 **Kandla Mundra Road Project**
April 2011 to December 2017

17 **MH-KNT Border to Sangareddy**
December 2015 to December 2017

16 **Rewa Katni Jabalpur Lakhnadon Road Project**
June 2015 to December 2017

13 **Development of Unnao to Lucknow Expressway**
June 2015 to December 2017

11 **Delhi Agra Road Project**
July 2016 to December 2017

8 **Chennai Metro Track works**
February 2011 to December 2017

Safety Roll of Honour

8 **Kannur International Airport Project**
December 2015 to December 2017

6 **Mumbai Monorail**
June 2013 to December 2017

6 **BBT Flyover Project**
November 2014 to December 2017

6 **Manwath Beed Road Project**
December 2014 to December 2017

6 **Ghoshpukur Salsalabari Road Project**
December 2015 to December 2017

6 **Hospet Chitradurga Road Project**
May 2017 to December 2017

5 **Hospet-Harlapur RC Project**
January 2013 to December 2017

5 **Riyadh Metro Project**
December 2015 to December 2017

5 **Yadgiri Warangal Road Project**
June 2016 to December 2017

5 **Garden Reach Flyover**
June 2014 to December 2017

4 **OPGC MGR Project**
July 2015 to December 2017

4 **Sambalpur-Barapali RC Project**
April 2014 to December 2017

4 **Sindhudurg Airport Project**
February 2013 to December 2017

4 **Bijapur Gulbarga Homnabad Road Project**
March 2015 to December 2017

4 **Western Dedicated Freight Corridor Project (CTP 1)**
August 2017 to December 2017

POWER TRANSMISSION & DISTRIBUTION

10 **BSNL OFC Package-E**
October 2014 to December 2017

Safety Roll of Honour

6 **HMRL Project - Hyderabad**
May 2012 to December 2017

4 **N-TL-765kV D/C TL from Raipur to Jharsuguda - SPGV**
pril 2016 to November 2017

3 **D-TL-765 kV Aligarh-Orai-PGCIL**
March 2015 to October 2017

2 **N-TL-765kV/400kV Parli Sholapur TL-PGCIL**
June 2017 to December 2017

2 **N-TL-765kV Waroora Parli TL-PPTL**
December 2016 to December 2017

2 **220 kV & 132kV BSPTCL Package-A**
November 2014 to November 2017

1 **RGGVY Ghazipur**
December 2015 to December 2017

1 **RGGVY II Rural Electrification Jaunpur**
January 2016 to December 2017

1 **ODSSP-Ph-II-Pkg-3**
February 2017 to December 2017

1 **220 -132 kV-MPPTCL Construction of SS and TL in Gwal**
September 2016 to October 2017

1 **220 kV BSPTCL NIT 02**
July 2015 to October 2017

1 **D-SS 400/220/66 kV GIS Station, Wangtoo**
October 2016 to December 2017

HEAVY CIVIL INFRASTRUCTURE

28 **Vizag Vessels**

13 **DMRC CC 28**

12 **KAPP-MP**

11 **KAPP- NDCT**

10 **Kolkata RVNL**

Safety Roll of Honour

9 **CMRL UG 04**

8 **HMRL**

5 **KAPP-IDCT**

4 **Singoli HEP**

4 **Kalpakkam - WMP**

4 **DMRC CC 77**

4 **CMRL UG 02**

3 **Kochi KC-03**

3 **Kalpakkam - (FRFCF)**

3 **Delhi Bridge**

3 **Mumbai Metro UGC01**

2 **CMRL UG 03**

2 **Kudankulam MP**

2 **Lucknow CC-07**

2 **Mumbai Metro UGC07**

2 **Lucknow CC-01**

1 **KAPP-CSP**

1 **WDFC 15 A**

1 **Hyderabad AFA**

1 **RAPP Project**

1 **WDFC 15 B**

1 **DMRC CC 27**

1 **Mandovi Bridge Goa**

1 **Khulna Mongla Bridge**

Safety Roll of Honour

WATER & EFFLUENT TREATMENT

8 Bhatpara Sewer Network and Waste Water Treatment

7 Laying of Sewers at Cuttack

6 River Front Development Project, Patna, Bihar

6 RDA-Pakage-1 Development Works of Kamal Vihar

6 Kharkai Barrage with Gates and its allied works

6 Ratangarh Sujangarh WSP

5 Sewerage Scheme in Varanasi City

5 Porbandar UGD

5 Dahej Water Supply Project-Nand Intake - 25 MGD

4 DWSP

4 CETP

4 15 nos LIS in Cluster XV @ Bolngir Subrnapur Boudh

4 UFW D2A

4 Udaipura WSS

4 Jamnagar UGD

4 Godavari Drinking Water Supply Project

4 Gadag Wss - Pkg II

4 Banswara District & Pratapgarh District WSS

4 Junagadh UGD

3 Hanamapur LIS

Safety Roll of Honour

3 13 nos LIS in Cluster XIV @ Kalahandi and Bolangir

3 19 nos of LIS in Cluster III at Sambalpur

3 Nagaur Package TM01

3 Water Supply to Adilabad District - TDWSP

3 BWSSB UGD-4B&4C

3 Integrated Sewerage Work - Pali (Design and Build)

3 Mohanpura LIS

2 Development of Ecocity Mohali

2 Development of IT City

2 Providing Sewerage Facility In Mohan Garden

2 Erection and services for PWS-2, Sagardighi

2 O and M Mehabubnagar

2 WTP for NMDC

2 Pudukkottai

2 Nagaur Package TM03

2 SSNNL - SBC PS 4-5

METALLURGICAL & MATERIAL HANDLING

16 Coal Handling Plant, RRVUNL, Chhabra

14 Blast Furnace#8, BSP, Bhilai

11 EGA Projects, Abu Dhabi

11 Coke Oven, JSW, Dolvi

7 Hot Strip Mill, RSP, Rourkela

Safety Roll of Honour

5 Coal Handling Plant, LPGCL, Lalitpur

5 Coal Handling Plant, Khandwa

4 Pet Coke Evacuation Project, IOCL, Paradip

4 Coal Handling Plant, Lingaraj

4 Coal Handling System, HMEL, Bathinda

3 Coal Handling Plant, NCL, Nigahi

3 Coal Handling Plant, NCL, Khadia

3 LSAW, Abu Dhabi

3 Slab Caster, Bokaro

3 Coke Dry Quenching Project, TSL, Jamshedpur

2 Kansbahal Works

2 LTEW, Kanchipuram

1 Wagon Tippler, DB Power, Raigarh

1 Material Handling System, RIL, Jamnagar

1 Coal Handling Plant, Khargone

1 External Water System for SMS-III, BSP, Bhilai

1 Benification Plant, SK Mines, Dariba

1 Pet Coke Handling Sysem, IOCL, Haldia

Hanging by a thread

For a few moments, a 23-year-old workman's life was hanging by a thread at one of our Mumbai projects on 20th February, 2018. While clearing the debris accumulated inside a safety net, which was partially open for the process, on the 9th level, he was suddenly dragged along with the net over the edge. He was hanging in mid-air 21 meters off the ground with full body harness that was anchored to a life line.

The team instantly swung into an emergency rescue operation. Safety nets were immediately spread out at ground level which workmen were holding tightly to arrest any further fall and a rescue cage and tower crane were pressed into service. While all this was happening, the hanging workman was being counselled by the site staff from the nearest floor level to remain calm.

Fortunately, the 40-45 minutes rescue operation ended successfully and the workman's life was saved.

Cause

Spillover wet concrete, chipping/breaking debris accumulated in the safety net.

THE SWORD THAT HONOURS

The 'Sword of Honour' award instituted by the British Safety Council (BSC) is widely regarded as the pinnacle of excellence in health, safety and environmental management.

The much coveted trophy is a hand-crafted ceremonial sword of stainless steel on which is engraved the year it is presented.

All companies/projects/project clusters that have achieved a 5-Star Rating in their EHS Audit can apply for the award provided there have been no fatalities, no prohibition notices, no convictions in relation to health and safety, no ongoing criminal proceedings or prosecutions in the realm of EHS and demands a full commitment to excellent EHS standards and continuous improvement.

Applications are independently adjudicated by a panel of chartered professionals with marks split between the audit score (40%) and the written application (60%) and in their endeavour to make the process transparent and fair, BSC endorses the right of organizations to enquire about their results and there have been instances of grades either being confirmed, raised or even lowered.

It's an honour worth having; it adds significant value to an organization's credentials, it emphasizes a commitment to highest standards of health and safety management and it is aspirational!

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