

HELMET

 Environment  Health  Safety

EHS journal of L&T Construction

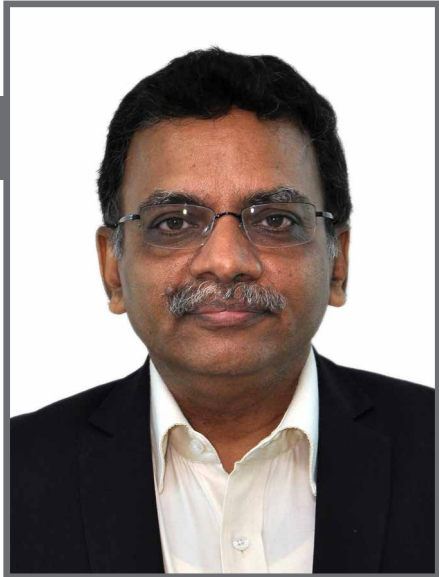
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SAFETY REDEFINED

Featuring projects being built to Speed & Scale



R. Srinivasan
EVP & Head - Smart World & Communication BU

At their most basic level, sustainability and safety are really about the same thing: conserving resources. In the case of sustainability, the resources typically thought of are environmental, material, energy, etc. Whereas, in the case of safety, the resources are human.

Dear L&Tites,

It is nice for an opportunity to share a few thoughts on EHS and especially about some of the initiatives we have taken at Smart World.

Safety is an integral part of any organisation and in projects, it assumes astronomical importance due to constant uncertainties, complexity of the project

Foreword

and location, several of them in highly populated cities and sensitive areas, etc. Further, we are constantly embarking into new areas and geographies across the workspace and the eco system.

Any incident besides affecting the workmen, lost man hours, consequential delays & costs directly affect the image of an organisation and it is extremely important that each one of us gives utmost importance wherever be our work space to achieve zero incident. What also need to be addressed currently, and in the days to come, are environment and health.

It is in these frameworks that digitalisation becomes an important tool to achieve our goal of zero incident and safe environment. Amongst the main advantages, three things stand out.

1. With our workforce and resources, constantly expanding it is extremely important to bring the new entrants and trainees to the level of safety being practiced at the company level and meet L&T benchmarks and digitalization that provide the answer through standardisation of processes.

2. Near misses and / or potential hazard cases at any site and learnings thereof can be transmitted to all the sites instantly so that the entire operation is in sync.

3. With the advent of live monitoring, emergency responses and expert advice as and when required, quick turnaround is possible.

In the days to come, Artificial Intelligence (AI) is going to provide additional ammunition for us to achieve our goal of zero incident.

Hence, it is of paramount importance to adopt digital and practice it meticulously.

Sustainable Cities & Communities is the 11th goal in the United Nations Sustainable Development Goals. It assumes utmost importance when we look at the numbers. More than half of the world's population presently live in urban areas. By 2050, that figure will have risen to 6.5 billion people – two-thirds of all humanity.

In India, under the Smart Cities Mission by the Government of India, the objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions using digital interventions. The focus is on sustainable and inclusive development and the idea is to look at compact areas, create a replicable model that will act like a lighthouse to other aspiring cities.

Sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces. That is what we do at Smart World & Communication business. We make these urban spaces, safer, smart, citizen friendly, eco-friendly and data driven by implementing a slew of smart solutions including Smart Meters, Intelligent Traffic Management Systems, Video Surveillance, analytics, etc. to mention but a few.

At their most basic level, sustainability and safety are really about the same thing: conserving resources. In the case of sustainability, the resources typically thought of are environmental, material, energy, etc. Whereas, in the case of safety, the resources are human.

The activities that we perform at Smart World & communication may seem at first low risk in nature but at their core they are always the same. We work on the busiest roads and highways of mega cities while, at the same time, execute projects in the remotest locations of the country. Our activities involve installation of 6 m tall poles to 30 m communication towers. We integrate world-class data centres and install access ports in Gram Panchayats & Block offices.

Often when working in public spaces, we inevitably cause inconvenience to the public. We liaise with the municipal corporations, traffic police and other local authorities to plan our activities to minimize risks, which means that the majority of activities have to be done at night. This introduces additional risks to execution but, at the same time, alleviates most of the public problems. Accordingly, we have separately designed SOPs for working at nights and heights.

Another challenge is to manage the incoming traffic and speeding vehicles. We prepare comprehensive traffic management plans including diversions, placement of warning boards, barricades and deployment of traffic marshals.

Working in cities also means that we have to deal with endless underground networks of gas, water, sewage and communication and power lines. This is where we combine our liaison prowess with technology, carry out GPR surveys along with representatives from utility service departments to carefully locate these utilities and subsequently plan our activity with minimum disturbance to them.

Such variety of activities and risks has forced us to develop systems, which can adapt and mould according to our ever-changing needs. In EHS at SW&C, we have committed ourselves to introduce solutions that are digital and sustainable.

To uphold the above principles, and continually improve on them, we have developed an innovative digital platform called 'SafeArmZ', which has not only enhanced the level of EHS implementation but has also improved productivity across sites. The app not only makes it easy for a site engineer to meet the compliances but it also provides a window to the top management to monitor the status of risks and hazards at site. The site engineer has to login to the app only once at beginning of the activity, to view the risks and hazards, and fill pre-requisite checklists and permits based on an algorithm.

One of the key aspects of EHS is awareness. We need to continuously train our workmen and staff about the hazards and risks that are present at site. Site engineers must take the lead to deliver Pep Talks to the workmen assisted by interactive and informative articles available on the app.

We assess that going forward the impact of this app will be tremendous on safety in construction and have therefore secured its copyright & Trademark. This app has been highly appreciated and has been shortlisted for the prestigious Aegis Graham Bell awards.

Apart from above, we have many online modules that have proved their worth over time that include Online Observation Modules in which an EHS In-Charge can log

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day-to-day observations of the site and swift resolution is ensured by compliance. We also use an Online Audit Module, by which we have eliminated the use of paper in the entire audit process.

Internationally, an organization's EHS performance is monitored through frequency, severity and fatality rates, however these are the end results of man hours worked through that particular time period. Certain factors like expansion of projects / businesses, floating manpower, geological conditions, cultural and behavioural background of employees and workmen, cosmos culture, technology, engineering are a few parameters that play major roles in sustaining EHS performance.

We have already set forward the BU EHS Objectives for the year 2018-19 comprising 9 EHS Objectives supported by 33 Programs linked to 5 EHS KPIs. As a proactive action, we are in the process of digitizing and quantifying the above leading indicators through our 5 EHS KPIs System for better root cause analysis. This will revamp the entire EHS Performance measurement process, making it integral to the overall Project Management Process.

Trainings are an important part of our day-to-day implementation of safety at sites. Inputs for training are taken from Unsafe Acts/Unsafe Behaviours/Unsafe Conditions and logged in the Observation and Audit Modules. We run our flagship 'Safe Execution Engineers' trainings at all the sites with a target to cover all the front line site engineers & construction managers. We are also conducting Contractor Workmen Training Programs, focussing mainly on behaviours and skills of workmen.

Further down the line, awareness is created among the employees and workmen by circulating EHS Today covering a unique EHS topic every day. EHS alerts share key lessons learned

Top Management is continuously involved in the review of EHS performance at sites with timely reviews and insights, setting an example. At sites, Project Managers have to take up the responsibility to model themselves as "Safety Leaders."

from major incidents while near-misses are reported from across the construction industry.

All the aforementioned EHS systems are continuously audited by various agencies who have appreciated and praised their effectiveness in making workplaces safer. We achieved ISO 14001:2015 & OHSAS 18001:2008 certifications in 2017, within just one year of existence. In a very short duration, SW&C BU has won 3 RoSPA Gold Awards for the Mumbai City Surveillance, Nagpur Smart City & Hyderabad Safe & Smart City projects. In addition, the BU has also won OSHAI OH&S Gold Awards, which is a testament of the effectiveness of the systems that we have developed at SW&C BU.

The top management is continuously involved in reviewing EHS performance at sites with timely reviews and insights, setting an example. At sites, Project Managers have to take up the responsibility to model themselves as 'Safety Leaders' by demonstrating safe behaviour and strive to achieve EHS objectives as key project deliverables.

We recently celebrated L&T Safety day, the motto for this year is to 'Use Digitalization to enhance Safety Performance.' We, at SW&C BU, are

very proud to say that we are poised to achieve that remarkable feat soon.

It is my pleasure to share that we have been working incident free for more than three years from the inception of SW&C BU, however, our commitment towards the vision of ZERO HARM will continue through prevention of 'Personal Injuries, Occupational Diseases and Environment Damages.'

As we talk of various safety measures it is also necessary to look at IT security to digitally connect the complete eco system. While this is being carried out at the company level, in SW&C it becomes even more important when we connect all the sensitive devices and software. We have a dedicated cyber security expert who looks at complete compliance of all our offerings. In one of the projects we are even creating a separate SOC (Security Operations Centre).

Ultimately, it is a commitment that every L&T-ite needs to make to achieve an incident free workspace across projects. That way, it becomes every one's job.

B&F IC scales new heights in EHS management! Six projects win the prestigious 'Sword of Honour' award



Mukesh Dahiya, PM
DLF Cyber Park Project



Sukanta Majumdar, PM
Godrej Two Project



S Somasundaram, PM
Piramal Aranya Project

WINNERS ALL!

- **DLF Cyber Park Project, Gurgaon : CBA SBG**
- **ITC MXD Project : CBA SBG**
- **Godrej Two Project, Mumbai : CBA SBG**
- **Piramal Aranya Project : RBF SBG**
- **Motera Cricket Stadium Project : CBA SBG**
- **APTIDCO Projects : RBF SBG**

B&F IC's programme to raise the bar in EHS management initiated in 2016 rose to new heights with as many as six projects bagging British Safety Council's 'Sword of Honour' awards. "We actually had 12 projects in the race," enthuses M Kamarajan (MK) Head – EHS, B&F IC, elaborating on the achievement. "6 projects received 5 Star ratings that qualified for the 'Sword of Honour' award (clocking an audit score of more than 92%)". What was even more heartening was that 6 other projects received 4 Star ratings, missing the magic number of 92% by a whisker!

"It has been a systematic progression," shares MK. "In 2016, we started our journey of 'Five Star Audit' by British Safety Council in two of our projects, Shell and Omkar 1973, both of which won the 'Sword of Honour'. The next year, we expanded our focus to all the projects of three clusters and bagged the award for all of them. This year, we went further by including government projects and we are delighted that two of them, the Motera and APTIDCO projects, have won!"

Safety can succeed only if driven from the top

“Safety can be top priority only if it is driven from the top,” choruses Subrata Dutta, Project Director, Motera Cricket Stadium project and Mukesh Kumar Dahiya, Project Manager, DLF Cyber Park project. “Leadership and commitment are critical for the development of a positive safety culture,” adds Dahiya, “and every individual on the project has to commit to these principles irrespective of rank or position.”

His EHS manager, Kannan Subramanian, at the DLF project explains how they put concept into practice. “Every department committed themselves to this: like the formwork department exhibited their technical and design features by implementing SOPs in major areas like table form handling and lifting. The task force for scaffolding developed the necessary skills to ensure 100% compliance while the P&M department established safe operations in handling critical machineries and equipment. Even stores demonstrated safety by strictly implementing 5S, integrated best practices and safety standards in procurement from all the vendors and in storage management.”

At the ITC MXD Project, which was nominated for the second consecutive year for the BSC 5-Star Audit, Project Head, Krishnendu Chakraborty set his team a target score of 93.13%. “Nothing short was acceptable,” he declares and is happy that his team has delivered handsomely. “It was an opportunity for all of us to demonstrate and showcase our EHS best practices, capabilities and culture and we, as a team, worked together with a common goal and vision to make things happen through harmonized collective efforts.” His EHS Manager, M R Das elaborates,

“we first studied our existing level of competencies and capabilities, compliances, identified the gaps and addressed them through a systematic 4-stage process – Awareness, Bridging & Reinforcing, Simulation & Cultural Transformation.”

Dotting the ‘I’s and crossing the ‘T’s

Often, the triumph of safety is being well organized and process-oriented. For Mahajan Govind Vasudev, EHS Manager of the Godrej Two project, the auditor’s description of “A well maintained site with no gap in documentation” was reward enough for his meticulous efforts. “We had looked at all aspects of EHS management,” he says, “be it the way visitors were inducted at the gate, emergency response and planning, creating well-defined access and egress points at site, prominent display of awareness messages, the layout of the office lobby that included a full view of the site. We even purchased alcohol meters and commenced testing drivers and helpers,” he adds with a smile. One of the interesting findings, as pointed out by the auditor, is the visible demonstration of Sukanta Majumdar, Project Manager of Godrej Two Project, of a signed and well published declaration of workmen’s right to remove themselves from unsafe conditions in the workplace!

Traffic management was key for Santhosh S Bore, the EHS Manager at the huge Motera Cricket Stadium site. “We have segregated pathways for pedestrians and vehicles with traffic marshals and pictorial, multi-lingual signage as per the guidelines of the Indian Road Congress.”

Special focus was given to manual handling at the DLF project using the TILE (Task, Individual, Load & Environment)



Madhav Kumar
Cluster EHS Manager

“We reviewed the previous audit reports, made the gap analysis and arrived at requirement v/s operational implementation.”



concept with the preparation of a chart on manual load handling while greater mechanization reduced the load on workmen. Awareness sessions were conducted on the safe handling of hazardous substances that has proved extremely useful. While at Motera, risk assessment with CCP (critical control point) is available for all construction activities, facilities, substances and equipment with communication evidence.

During peak periods at the ITC site, the project had 1,800+ workmen with more than half of them unskilled. “Our primary task,” explains Das, “was to induct the screened workmen and sensitize them to adhere to strict safety standards. The EHS team has inducted over 14,000 workmen till date through structurally developed training programmes.”

Learning from experience is equally important and that is what has held Cluster EHS Manager, G Madhava Kumar (GMK) of the APTIDCO Projects in good stead. “We reviewed the previous audit reports, made the gap analysis and arrived at requirement v/s operational implementation.” Competence-building workshops were held at all the three project sites with more attention paid to the weak areas and “separate 3-tier 5-star audits were conducted for lower, middle and senior management to make everyone aware

of their roles and responsibilities.” Apart from brainstorming sessions with individual departments, mock audits conducted by P Nagarajan, EHS Head (Operations) helped all the sites to face the BSC audit confidently.

Riding the digital wave

True to the thrust of the organization, the ITC MXD team brought digitalization to play in the EHS arena and as Das shares, with significant gains. “We were able to track not only individual performances but also measure the project’s overall



Manas Ranjan Das
EHS Manager - IRC
MXD Project

“We were able to track not only individual performances but also measure the project’s overall EHS performance seamlessly. The mobile app monitors, registers, effectively manages and reports EHS performance and the data generated provides significant insights about strengths and weaknesses and helps us shift focus appropriately.”



EHS performance seamlessly. The mobile app monitors, registers, effectively manages and reports EHS performance and the data generated provides significant insights about strengths and weaknesses and helps us shift focus appropriately.” At Motera, Santhosh developed height safety simulation using BIM 360 modelling.

Health is a vital aspect of safety

“Health and wellbeing are the real measures for construction safety development,” says Subramanian, “new standards such as management and control of psychosocial hazards, workstation ergonomics, manual handling, control of noise, control of vibration, health surveillance monitoring, health and absenteeism monitoring are important criteria that need constant attention.” In fact, for the first time in the company, the DLF Cyber City site conducted a study and survey on vibration at construction works, the impact of modern vibration-less equipment and exposure time of works on the health of workmen. Special attention was given to the workmen habitat at the Godrej Two project too with display of ‘Do’s & Don’ts’, incident alerts through audio visuals on TV screens at the dining halls, emergency escape plans and safety parks. “We had separate kitchens, dish washing areas, dining

halls in addition to recreation centres, volleyball courts and first aid centres,” shares Vasudev, “and we ensured maintenance of good health and hygiene standards.”



M Kamarajan
Head-EHS (B&F IC)

“Globally, 61 projects/ workplaces have won the ‘Sword of Honour’ and we are the only construction organization in India amongst the winning lot!”



At Motera, a well-equipped medical room keeps the site healthy while a well-appointed induction room replete with a safety park and an emergency control room keeps Santhosh and his team well prepared to handle emergencies.

For MK and his extended team there is sufficient cause to be proud of their achievement. “Globally, 61 projects/ workplaces have won the ‘Sword of Honour’ and we are the only construction organization in India amongst the winning lot!” Somehow, that doesn’t surprise us!■

Not buckled? What is holding you back?

Always wear a seat belt when driving. It will keep you safe!

To build the largest, you have to be the best!

Project Motera Stadium

Senior EHS Manager, Santosh S Bore is a very happy and proud man! Fresh from his maiden trip to London, he was carrying extra baggage on his return journey, the Sword of Honour that he received from the British Safety Council, a reflection of his exemplary EHS management at the huge Motera Cricket Stadium site. "When we are building the largest stadium in the world, we are bound to face some really big challenges and we, as a team, were prepared for them," says a confident Santosh. The oval or elliptical-shaped superstructure of the stadium tested L&T's engineering prowess for it involved "more number of elements," as Project Director, Subrata Dutta (SD),



Santosh S Bore
Senior EHS Manager

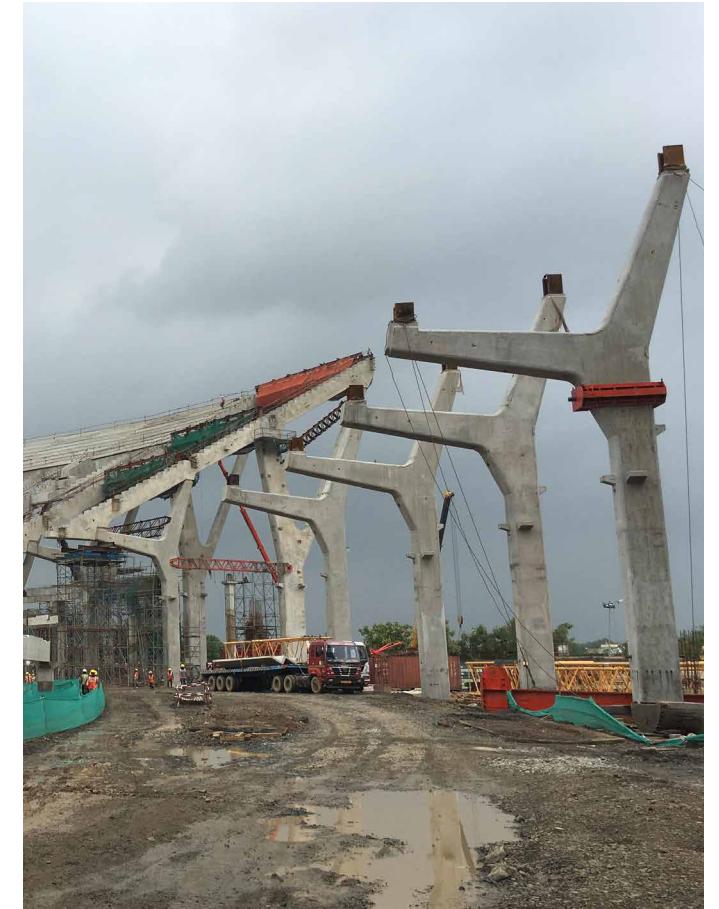
When we are building the largest stadium in the world, we are bound to face some really big challenges and we, as a team, were prepared for them.



elaborates, "for we are erecting around 500-600 elements every month. Then, we had to be careful about the orientation, the alignment, the angle of deflection and other such aspects."

Big safety challenges

For Santosh, the challenges were several: the huge expanse of the project site, working at heights, working in precariously-positioned spaces, the 2,500-strong army of workmen, the huge amount of traffic, and much more. "Our biggest problem, however, was lack of space considering the size of equipment and precast elements that we were handling," sighs Santosh. "We were literally boxed in from 3 sides by a temple, a residential colony and a high-tension line so everything we did had to be within this space. Employing huge cranes and erecting equally huge precast columns especially in the temple area was very difficult. There was danger on the other side too because fabrication work and crane movement was



close to the high-tension line. Then, handling the huge 'Y' frames some of which were 30 m in height weighing over 285 tonnes, transporting them from the precast yard, placing and erecting them maintaining the Centre of Gravity was another tough task. We had to plan the entire erection process meticulously. All activities were conducted with lifting and work at height permits and evidence."

"We also had to monitor and control the height at which work was happening at the upper bowl for which, we have developed safety height simulation with BIM 360 modelling. We also have fall protection at heights of 30 m with a CCTV monitoring system." Fire load calculations have been done for all facilities with independent risk assessment and fire fighting equipment installed as per fire load.

Material and vehicle movement takes up a lot of Santosh's attention and time primarily owing to the size involved. "We are employing cranes of 300, 400 and 600 tonnes and huge mechanical earthmoving equipment. Plotting their movement within the confines of the site is critical so we have a well-evolved traffic plan and traffic marshals."



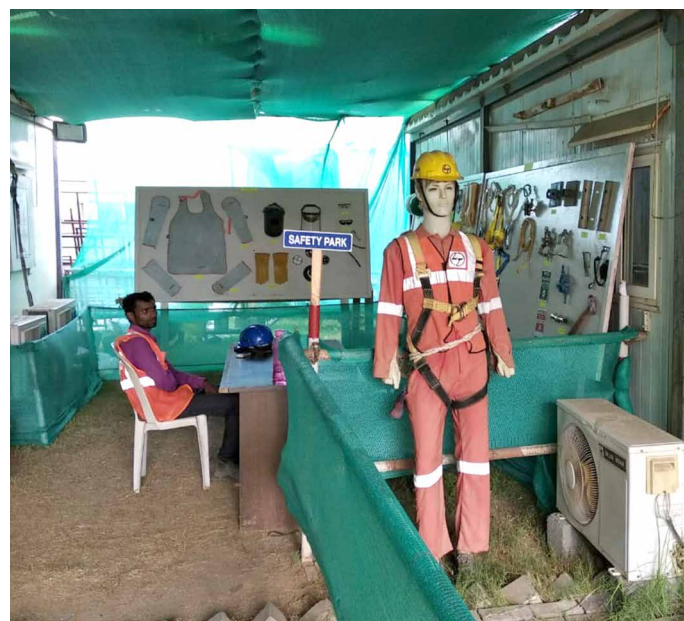


Subrata Dutta
Project Director

We were able to zoom into certain sections of the site for them to clearly see safety railings, the safety nets on the staging and other things.



“Our communication has been continuous and of very good quality,” informs Santosh. “All our posters are in just two sizes: 3’x4’ and 5’x6’, printed on high quality flex that are displayed throughout the site communicating about best practices, Do’s and Don’ts and other safety messages.” There are alerts of incidents on TV screens placed both in the office lobby and the workmen’s dining hall. The site office has clearly marked entry and exits, a fire point, rest rooms, adequate signage as per 5S and a display screen for equipment assessment.



Order and discipline from the word go

The order and discipline in EHS that Santosh and his team have introduced is evident from the entry to the site where there are clearly separate gates for visitors and vehicles replete with pictorial and multi-lingual signage with records of every visitor/vehicle that enters and leaves the site. “We even maintain records of alcohol tests, inductions and vehicle inspections that were verified by the auditor.” In the site office lobby, there is a point from where the entire site can be viewed. “After a visit to our Emergency Control Centre, the auditor was impressed with our CCTV footage which proved to be a big ‘plus’ for us during the audit because we were able to show our safety measures to the auditors from the site office itself,” says Santosh. SD chips in, “we were able to zoom into certain sections of the site for them to clearly see safety railings, the safety nets on the staging and other things.”

Managing labour

Another important consideration for Santosh and this EHS team was the call taken by the project team to house the labour camp within the site premises. “Managing the affairs of 2,500 labour has been a major achievement,” he smiles. “Ensuring that their quarters are clean, free from all incidents, maintaining discipline, ensuring the quality of their food, keeping them in good health are all being handled well.” Considering the confines within which the Motera stadium is situated, it is actually a blessing for him that so much of manpower need not commute through the congested streets of Ahmedabad.

The fruits of shared responsibility

Three senior engineers, an EHSO and seven safety Inspectors make up Santosh’s team. “All my team members know their individual areas of responsibility to maintain a positive EHS culture and to avoid any untoward incident at project,” and thus far they have been successful having clocked 10 million safe man hours. “My team possesses special skills,” continues Santosh, “some are strong in field and risk assessment, some in communication and digitalization, some in imparting training, some in legal requirements while others are

good at coordinating with clients. All are self-starters, proactive in their work and do not require any direction,” he says with a certain amount of pride.

Handling issues on health, environmental obligations, liaising with local enforcement and other agencies are some of Santosh’s other responsibilities. He surely has his hands full but then what else can be expected when building the world’s largest stadium? ■

Rising to meet some 'tall' safety standards

Project ICC Towers

To build two towers of 58 and 51 residential floors respectively replete with multiple basement levels, podiums, service and fire check floors spread over a total built-up area of 26 lakh square feet involving some 240 employees and 3,000 workmen, the safety challenges for Project Manager, Ranjeet Kumar and Senior EHS Manager, Gopi Krishnan can well be imagined. Adding in good measure to their safety challenges is the crushing delivery schedule the team is facing of just 42 months.

"It has not been smooth sailing by any stretch of imagination," shares Ranjeet, "because the project has had to face several delays to begin with due to various reasons and thereafter frequent design changes by a very involved client

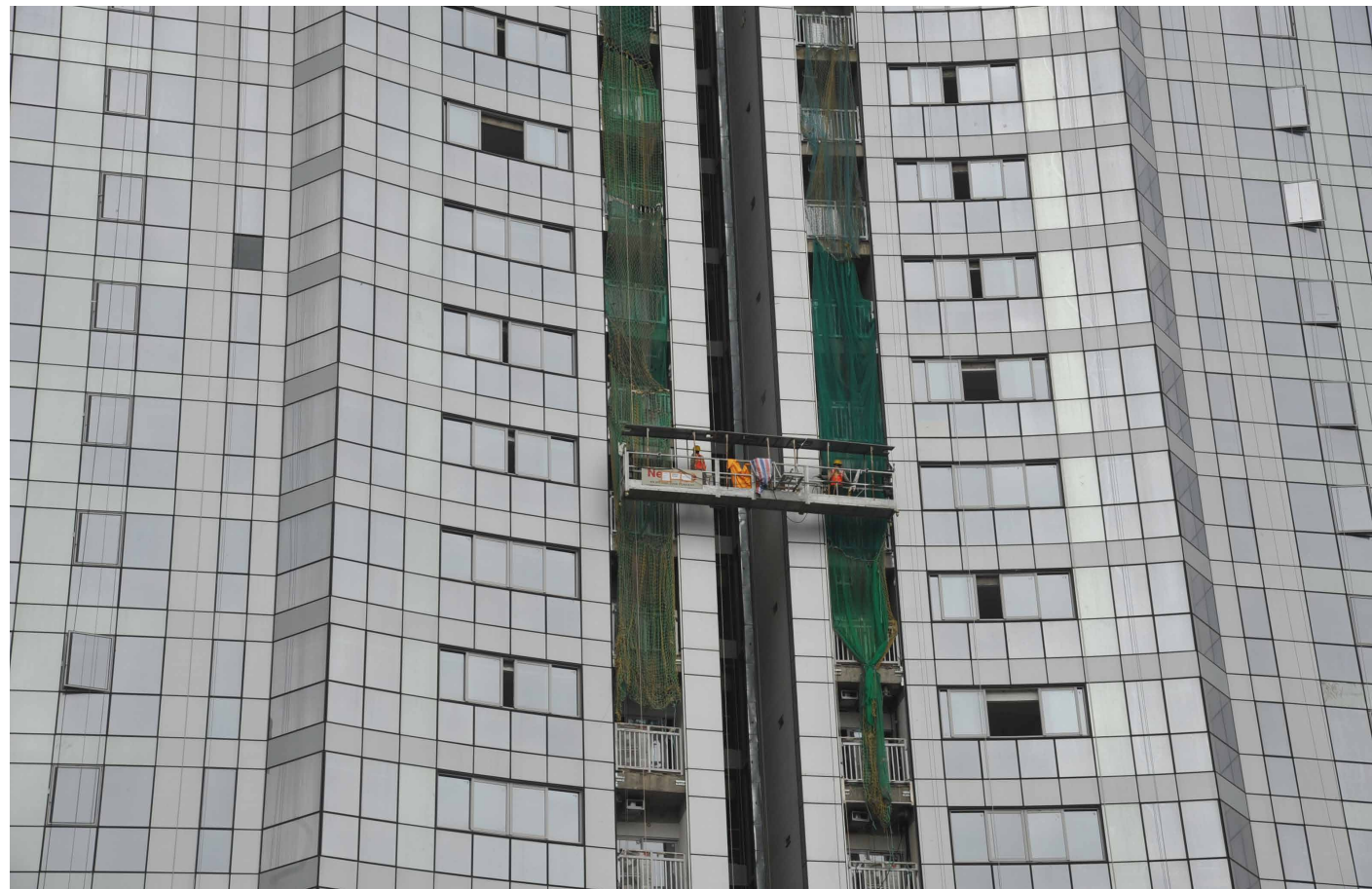


Ranjeet Kumar
Project Manager

Of course, when you are working at speed on a project of this scale and complexity, our responsibility to protect lives, material and machinery becomes very critical.



is keeping us on our toes and constantly increasing our asking rate." He stops to gather his thoughts. "Of course, when you are working at speed on a project of this scale and complexity, our responsibility to protect lives, material and machinery becomes very critical."



ACP installation using rope suspended platform for façade completion works under way

Overcoming tall odds

Being a high-rise project, the primary concerns for Gopi were working at height and falling of men and material from height. Mandated to implement EHS procedures and processes, optimize resource utilization, support administration, logistics and other facilities functions, Gopi has his hands full. As construction went higher, so did his safety concerns as workmen had to contend with heights and the strong winds blowing from the Arabian Sea. "The hydraulic climbing safety screen with staircase greatly helped as the workmen never realized that they were actually working at huge heights. We ensured that we created a scene as if they were working at ground level."

To meet the delivery deadline, Ranjeet and team had no other alternative but to open up several work fronts simultaneously. "Enveloping both the

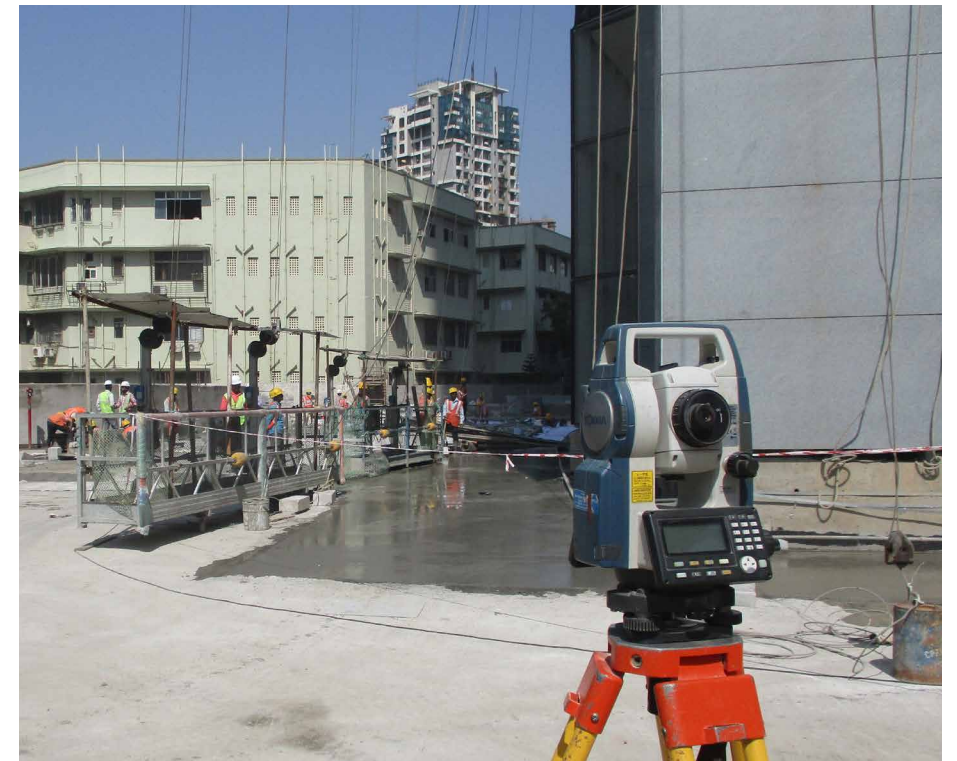


Crown works on the roof of the tower at 225 m above MSL



Gopi Krishnan
Manager-EHS

The hydraulic climbing safety screen with staircase greatly helped as the workmen never realized that they were actually working at huge heights. We ensured that we created a scene as if they were working at ground level.



Water proofing works in the external areas for final finishing



Fabrication works for entrance portal

safety standards.” For Gopi and his 50-man EHS team, the need was for many more pairs of eyes and bodies to keep tab on what was going on. “Work was happening on the exterior as well as interior and across many floors so we had to be always on the run.”

“Some of the other significant risks were lifting operations, managing NSC vendors, and of course, the dynamic turnover of people. We ensured the right selection and implementation of suitable engineering controls for high-risk activities that significantly reduced the human reliability factor.” Fixing customized gates with lock and key for all lift shafts, fall restraints for hand held tools, customized scaffolds with design calculation for height works and works on inclined floors, customized frames & trolleys to reduce risks of manual handling, malaria prevention programs to control vector born diseases during monsoon were some of the other

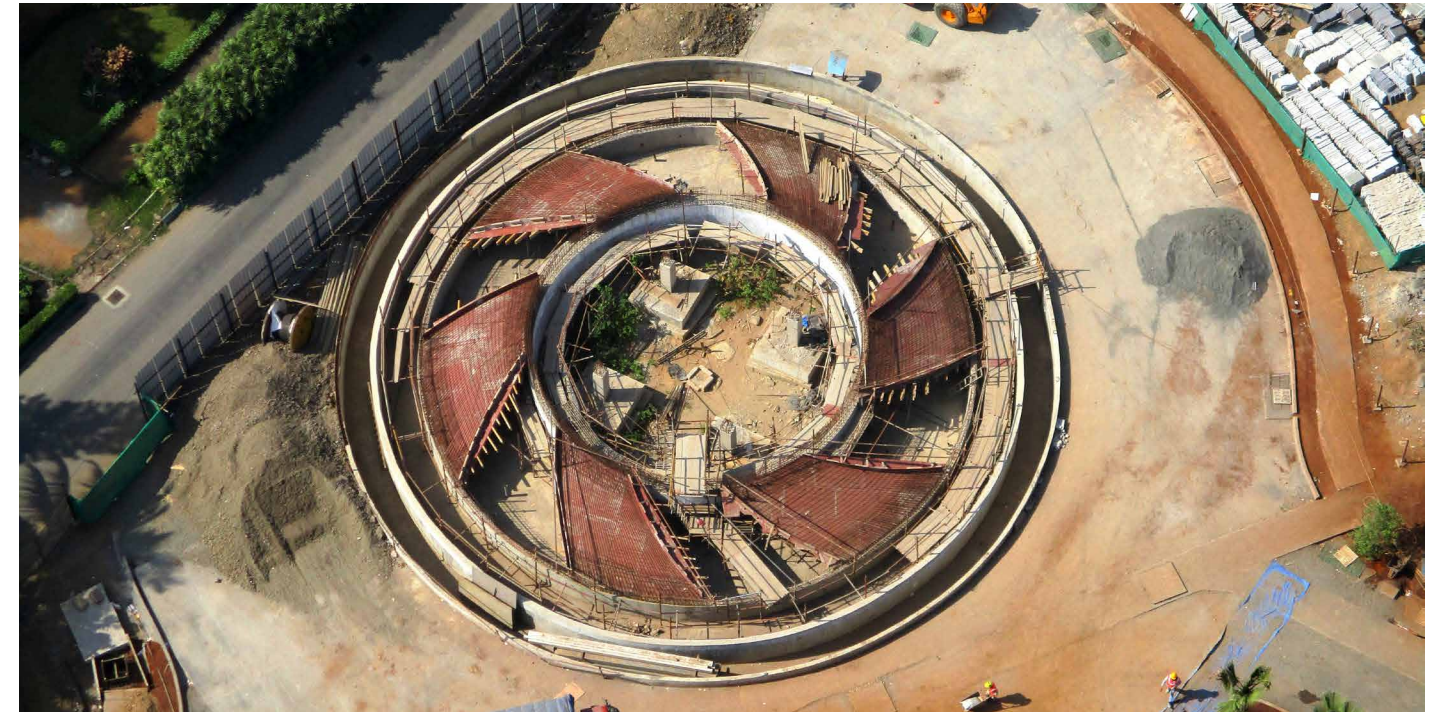
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Gopi Krishnan
Manager - EHS

towers with the glass façade was a critical milestone because that opened up several work fronts for us. In a high rise, the only way work can proceed is upwards,” he grins, “so we started work at various levels all at the same time. Of course,” he nods, “it increased the pressure on us to maintain our high



Granite stone cutting machine with customised guards fitted for onsite cutting works



Birds eye view of the roundabout works underway

measures adopted. “Inspection and monitoring were simplified since all the activities were permitted with method statements and risk assessment apart from job hazard analysis,” Gopi adds.

Mumbai, a huge challenge

With the project site located in the heart of congested Mumbai, it was hardly surprising that managing site logistics was a huge headache. “Space is at a premium in Mumbai and there seems to be no space for anything in this city,” laughs Gopi, “neither for the population nor for the traffic nor for any kind of construction work. Since people and vehicles had to move around in such a constrained environment, the threat of accidents is ever present.” Robust traffic management and strictly adherence to road rules within the site were the answers. Having the labour colonies fairly close to the project site is a boon for it reduces exposure of 3,000 workmen to the vagaries of the Mumbai traffic.

Another aspect that is typical of Mumbai is the monsoon that posed risks especially for deep excavation. “The monsoon played havoc with our already compressed schedules.” Gopi’s anguish is very evident. “The wet earth was at times loose while sometimes it was settling down so we had to be extra cautious. Similarly, stacking and shifting of material posed threats that were very difficult to foresee. We therefore created hard surfaces at selected pockets as designated satellite storage spaces for hard and brittle items with MS frames with a built-in safety lash facility and provided customized pallet trolleys to shift heavy items to reduce the risk of manual handling.”

Addressing the people factor

As every EHS professional knows, ultimately safety is all about people and the manner in which they embrace or reject safety. Other important considerations for Gopi included getting to know the legal environment to involve

the employees in safety, understanding training requirements and implementing robust risk management tools and practices. “I had to ensure that safety remained high on the list of priorities of the management and developed an effective two-way communication system so that while we were able to convey our expectations, workmen also had the chance to share their issues, problems or suggestions. This system worked very well and the fact that we have already clocked 8 million safe man hours at site is testimony to its success.” Gopi’s tone is triumphant!

“We are in the testing and commissioning stage and the real challenge now in terms of safety is the control of risk from the energized system in terms of electrical, pressure, pneumatics and hydraulics.”

Challenges will remain but for Ranjeet, Gopi and their band of committed team members, the focus is on keeping their safety record intact and ensuring delivery to their customer’s many, stringent and tall requirements. ■

“THE TRICK IS TO CONSTANTLY REINVENT AND REFRESH YOUR SAFETY STRATEGIES!”

Stephen Phillip Storey

Head – EHS, Heavy Civil Infrastructure IC



Stephen Phillip Storey has been selected as 'Ambassador of the RoSPA Health & Safety Awards.' Here he is receiving his ambassadorship from Lord Mackenzie & Lord Jordon, the current and former RoSPA Presidents and both current members of the House of Lords at a prestigious ceremony held at the Houses of Parliament, Westminster.

Even a decade and a half of working out of the UK has not corrupted Stephen Phillip Storey's clipped, British accent that he often delivers at breakneck speed, especially when holding forth on his favourite topic – Safety. His smile these days is even broader for he is now RoSPA's first international ambassador for the health and safety awards and the first person from L&T to have been accorded this honour. "The thing I am most impressed about L&T is that they put their money where their mouth is," he shares, as always playing off the front foot. "The primary reason of my joining L&T was SNS and his vision for EHS in this organization. I must add that I have had more opportunities to grow here than I would have had in any other organization that I have worked with." And, Stephen has worked with a number of organizations across the globe starting with the London 'Tube' – the underground rail system – in 1991. In 2004, he moved to the Middle East where he worked for 9 years, then after a year in Hong Kong, he worked in Korea for a while. "My great-grandfather worked for Ford Motor Company in Madras and my grandfather went to school here," he recalls fondly, so coming to Chennai was a return of the native, in a manner of speaking.

"L&T is a huge and complex organization and my first and biggest challenge was to understand it, appreciate its culture and align myself to it. Some business practices were new to me and information sharing was a trifle laboured but that is fast changing thanks to digitalization. The other huge challenge has been the nature of our workforce, drawn largely from the agriculture sector that is highly mobile and seasonal producing a large, quick turnover. There are at an average four turnovers per project. In some instances, new workmen arrive at projects every three months with almost no exposure to construction safety." Making these workmen understand the complex engineering and construction work methods, develop the requisite skill sets all in a small window of time is what Stephen and his ilk face day in and day out at projects.

"The only way to address this reality is to have a clear-cut EHS strategy," says Stephen, crossing his arms as if to communicate that he brooks no opposition. "My strategy is adopted, endorsed and enforced right from the top: from S V Desai, our IC Head, because safety starts at the top, then to the BU heads and percolated right down to

the worker at the end of the chain. And thereafter, it's equally important to keep reinventing and refreshing it. Our workforce supervision and management is robust with intense training including leadership, safety and risk management training, and our managers are empowered to manage and lead to try bridging the gap to achieve a good, demonstrable safety culture and behaviour. We focus on third-party training too from international bodies in crane management, operation and rigging, scaffolding inspection and erection, and run occupational health campaigns on heart attacks, strokes, diabetes and yoga fitness."

Stephen admits that the safety culture in India is not as mature as it is in Europe or the US, "but that is also fast changing," he hastens to add. "With India's economy on the fast track and other global economies slowing down, we are attracting

a huge influx of experienced Indian workforce returning, bringing with them a more positive safety culture."

As is very often the case in recent times, the conversation veers to the subject of digitalization. "The most important aspect of digitalization is change management, it is about changing a mind-set," he taps his temple, "it is a seed that we had planted and now need to nurture it to full bloom but the change is very evident. We are getting there," he says with a loud laugh.

L&T has been a prolific entrant for the RoSPA awards having won 98 awards since 2015 and with his experience, exposure and expertise, Stephen is an ideal choice as their first international Awards Ambassador.

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A 'Safe Victory' mattered the most!

Lucknow Metro Rail Phase II



Elavarasan
Senior Safety Manager

During winter, due to dense fog, visibility was poor and posed a huge challenge for traffic management as the vehicles had to be precisely guided around the access route which was ensured with fog lights, safety bollards and solar blinkers while a TRAP system was implemented to ensure comprehensive safety at work place.



keep the signage visible. During the evening and night, special lining lights were installed on the periphery of the barricades as an enhanced safety measure," informs Farooqi. "During winter, due to dense fog, visibility was poor and posed a huge challenge for traffic management as the vehicles had to be precisely guided around the access route which was ensured with fog lights, safety bollards and solar blinkers while

Lucknow Metro Rail Corporation (LMRC) has etched its name firmly in the annals of India's Metro Rail saga for being the fastest raised infrastructure not once but twice and a large part of this credit goes to the team of hardy professionals from Heavy Civil Infrastructure IC who have safely steered the course. "What makes this special is that achieving 'A Safe Victory' was the first priority at site even before we set the ball rolling," shares Razi Ahmed Farooqi, the EHS In-charge.

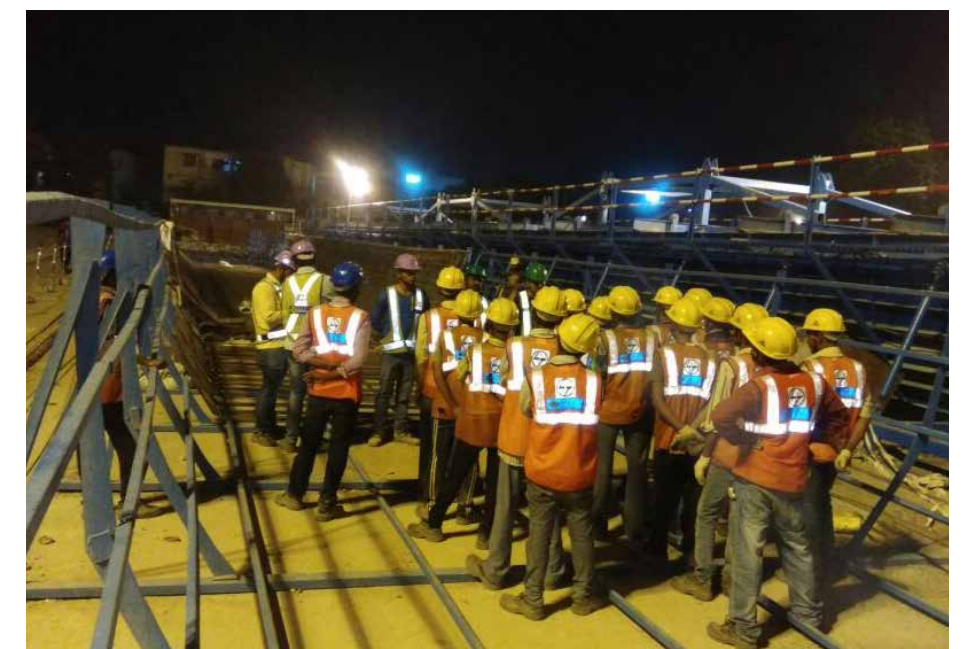
Advocating a 24/7 safety approach

With more than 3 million safe man-hours in the project kitty, Farooqi has

a lot to share on their safe journey. Stepping into the thick of action is how Farooqi defines his stand as he took charge midway into the project. "The EHS system was already in place and needed to be taken forward as and when the new fronts opened up. As we were on an accelerating mode, it was important to get the safety connect going 24/7 and the way forward was to open up channels of secure communication through tool box talks and specific on-site trainings. However skilled one is, it is always important to connect with the basics of tool handling for it serves as an opportunity to pep-up the crew for the day ahead." Along with the safe talking, workmen and work zones were thoroughly screened on a daily basis.

Barricading and messaging the right way

With the alignment running right through the heart of the city, it was mandatory to have a secure barricading with the right kind of messaging to restrict movement across critical areas and streamline vehicular traffic and people movement as per the approved pathways. "A comprehensive traffic management plan was developed in consultation with the Police Department and alternative routes were identified with adequate number of traffic marshals managing various locations. A dedicated team regularly washed the barricade with water sprinklers to





a TRAP system was implemented to ensure comprehensive safety at work place," adds Elavarasan, Senior Safety Manager.

Going only by the work permit

Work spots were strictly defined and access was provided only through

permits. As the scope involved welding and mechanical works especially across the ROB, steel and box girders, a secure scheme was put in place to back-up the critical tasks. "Each location was provided with adequate fire extinguishers with the EHS team allocating and refilling the gas while field in-charges had the onus of using it as and when required," highlights Farooqi. "Every lift was unique and safe positioning of heavy



Razi Ahmed Farooqi
EHS In-charge

Good practices were always a part of this scheme and contributors were just not acknowledged but made to feel good with the EHS team commending the initiative. By creating safety ambassadors among the workmen we were bringing in a cultural change that was well acknowledged even by their families.



equipment was ensured through a daily lift plan," highlights Elavarasan.

Raising awareness through simulations

The EHS team proactively planned simulations across significant work zones with special focus on the critical areas such as the Gomti River cantilever bridge and ROB spans. "The mock-up was a thorough process to address any unlikely incident," remarks Farooqi. "We lined up our responses including how to communicate about the crisis, rescue with first-aid, move to the nearest hospital and bring the situation under control."

Deftly working through sublayers

"Surprisingly, the scope had some deep excavation to be done across each of the stations," mentions Farooqi. "At some places it was more than 12 feet to construct the underground water tanks networked to the station buildings to be supported with water in case of a fire emergency." To mitigate caving in of the soil, a precise shoring scheme was adopted by roping in a specialized agency with EHS teams monitoring every location. "The situation



was critical during the monsoon as we just could not afford any slip," however, he assures, "We addressed with round the clock vigil backed-up by a large number of dewatering pumps to channelize the rain water."

Defining the access and egress points

Safe access and egress points were defined across all work locations with the pathways secured by appropriate safety edge protection rails and fall protection platforms. "Positions for the cantilever bridge and ROB were fixed and illustrated on many occasions through mock-drills as the criticality was high," informs Farooqi. In addition, double layered safety nets were extensively used across the entire alignment spans along with deck sheeting so that fall of persons, tools or objects was completely arrested.

Banking on a range of secure indicators

"Being forewarned is always good and the EHS team at site ensured that appropriate systems and equipment

were installed at site to indicate the threshold levels," avers Farooqi referring to the range of indicators they used that included earth leakage circuit breakers for safe application during electrical installations, noise assessment tools, air monitoring meters, lux meters for measurement of overall intensity of light within an environment, megger meters for checking the insulation resistance of electrical equipment and load indicator gantries. In addition, improvisations such as spark curtailment for welding works and locking arrangements for girders ensured a safe working environment.

Acknowledging good practices

For Farooqi, safety is more of a behavioral approach and in line with this thought, the EHS team initiated a top-down safe approach wherein the message of being safe was communicated to every workmen. "Good practices were always a part of this scheme and contributors were just not acknowledged but made to feel good with the EHS team commending the initiative. By creating safety ambassadors among the workmen

we were bringing in a cultural change that was well acknowledged even by their families."

Being healthy matters

As Lucknow is prone to extreme weather conditions with temperatures soaring during summer and dipping considerably during winter, adequate measures had to be taken to orient workmen on communicable diseases, preventive measures and how to handle situations like heat stroke. "We made sure that every unit had access to potable water with coolers provided at critical work areas while large earthen pots were installed across other locations. Further, timely energy supplements were distributed to the workmen as and when required," highlights Farooqi. The message was clear that safety is 24/7 both at workplace and habitats with the EHS team establishing a hygienic workmen colony with a common kitchen equipped with exhaust fan, adequate dustbins, fire extinguishers and lighting. Ultimately, being healthy and safe both on and off the field was pivotal for defining speed and scale at LMRC! ■

Setting EHS benchmarks in UAE

LSAW Pipe Mill project



Apart from the pressures to deliver a project to stringent time lines and global quality standards, every team executing an overseas project has the added responsibility to maintain and exceed the tough EHS benchmarks set by international customers. The project team from L&T's MMH SBG was in a similar situation after winning the project, in the face of stiff global competition, to build UAE's first LSAW (Longitudinally Submerged Arc Welded) Pipe Mill in consortium with the SMS Group in KIZAD, Abu Dhabi, UAE. Won in October 2015, the US \$ 200 million project (of which L&T's share was US \$ 100 million) had to deliver to



Hare Ram
Project Director

When the asking rate is so steep, the entire engineering and construction process has to be recalibrated to meet the deadlines which puts extra pressure on our EHS system.



M/s. Al Gharbia Pipe Company LLC, a JV between the Senaat Group U.A.E., JFE Steel Corporation and Marubeni-Itochu Steel Inc. Japan.

Project Director, Hare Ram, was both a happy and concerned man. "I was happy because this project was yet another opportunity to establish our credentials as a force to reckon with in such a competitive market but the huge scope and crashing deadlines were cause for concern, if not worry." The 'scope' that he was referring to covered the entire balance of plant engineering, supply, overall plant construction (civil, structural, mechanical equipment,



Pallab Mondal
EHS In-charge

My task was tougher because we had a cross-cultural workforce drawn from different nationalities, backgrounds and speaking different languages so we had to be very careful in the formulation of our EHS communication and how it was shared.



electrical & instrumentation, piping, HVAC, firefighting, water & utility systems, etc.), integration and commissioning. "All of this was to be delivered in about 33 months!" One can understand Ram's situation because as he explains, "when the asking rate is so steep, the entire engineering and construction process has to be recalibrated to meet the deadlines which puts extra pressure on our EHS system."

Critical EHS considerations

There are some extremely stringent EHS codes of practice and legal requirements prevalent in UAE, which was one of EHS In-charge, Pallab Mondal's primary concerns. "We had to take many approvals involving several local authorities, each with their own style of working and many of the approvals involved multi stages. To be honest, we were warned of these hurdles before we started work and our previous experience on other projects really helped us face these challenges."

The creation of a safe work culture at site is directly dependent on how effectively the safety message is communicated to every workman and every employee at the project site. "My task was tougher," admits Mondal, "because we had a cross-cultural workforce drawn from different nationalities, backgrounds and speaking different languages so we had to be very careful in the formulation of our EHS communication and how it was shared."

The weather conditions in the Middle East are well known. Adequate precautions therefore had to be taken to safeguard the workforce from the harsh weather especially during the height of summer. Waste management is an important aspect and as Mondal explains, "There was a legal requirement that we had to recycle 70% of total waste. That apart, there were different types of audits and compliances to be fulfilled



Regular safety briefings

“Often, the first step towards problem resolution is a proper understanding of it,” chips in Ram, “and in the case of our EHS, our understanding of all challenges from the word ‘go’ went a long way in helping us meet our EHS obligations.”

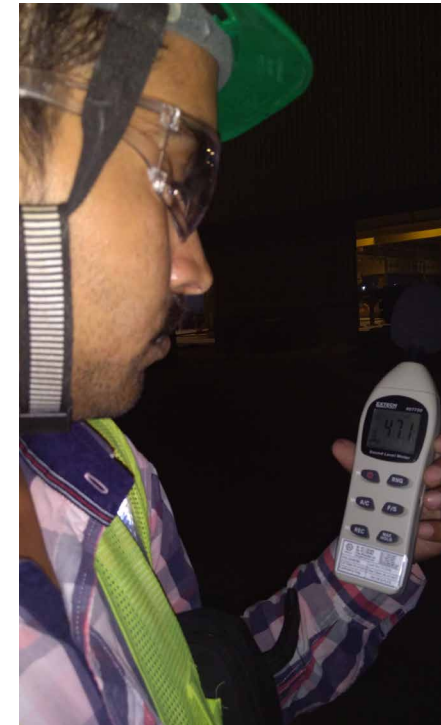
Addressing critical risk activities

Perhaps, the most critical activity for the team was the sequential erection of equipment over the steel structure inside the process building. Some of the other critical activities included dewatering before the start of civil activities. From the power perspective, “we had to lay 11 kV power lines from the ADDC (Abu Dhabi Distribution Company) sub-station to our site, construct an 11 kV substation, civil structures and columns,” explains Mondal. In addition, there were sheeting activities over the process building, GRP lining inside a confined space, the need to construct and erect the firefighting & HVAC pipelines and other equipment.

that had to be regularly submitted to the local authorities for approval.”

It was critical for Mondal and his team to be ultra-careful to avoid any comments from agencies like CEMP (Construction

Environment Management Plan), ESTIDAMA (a green building concept) and the like “for which we had to be vigilant to identify and minimize hazards.”



Monitoring noise levels

Associated hazards were carefully identified and minimized right from the outset. “We established and implemented robust EHS and Construction Environment Management Plans. As a SOP, Method Statements and Risk Assessments were prepared before the start of any activity and every job was executed with specific work permits such as hot work permits, height work permits, permits for confined space entry and the like,” Mondal elaborates. “Any erection of above 10 tonnes was treated as a heavy erection which was planned and the relevant documentation completed in advance. For heavy lifting, we would send all the details of the erection (engineering drawings, size of materials, location of erection, etc.) to our Construction Method Planning Centre to prepare a lifting plan and all heavy loads were erected as per that plan.”



Tool box talks make a huge difference

Keeping the environment intact

No spiny-tailed lizards: Even before construction activities began, the

Environmental Agency Abu Dhabi (EAD), an approved third party, conducted an ecological field survey to assess the presence of flora and fauna within the boundaries of the site. The survey used habitat suitability and field



Rewards for a task well done



Health check-up to keep the team healthy



Systematic waste disposal

signs to ascertain the presence of spiny-tailed lizards, which were not found on site though the resulting report had to be submitted to EAD for the environmental permit.

To ensure no spill: Right at the outset, Mondal and his team identified all the potential environmental issues that could arise during the construction activities and evolved mitigation plans. "To prevent the spillage of oil or fuel during refueling or plant maintenance that could spoil the ground water, we provided a bund wall for the diesel tank and had drip trays for all DG sets and plants." Sewage water from tanks inside the bund wall was regularly disposed and recorded.

Systematic waste disposal: Since waste management was an important consideration for the authorities, the team had to address it diligently.

Waste in separate bins was stored in a separate waste segregation area from where it was picked up and taken away by an approved 3rd party prior to which, an online request had to be made and even post disposal, the loop was closed only after the receipt of a stamped manifest. Mondal adds, "according to these manifests, a monthly waste track and recycle percentage report was generated and submitted to ESTIDAMA."

Keeping the dust and the noise down: While regular sprinkling kept the dust down, covered trailers that carried the disposed soil and stockpiles did not exceed 2 m in height to avoid fugitive 'wind-blown' dust. During construction works, noise levels were constantly monitored and maintained at a maximum of 90dB at site and 70dB outside the boundary wall. "We had to maintain reports for this too," smiles

Mondal, "that had to be submitted to EAD during the CEMP audit."

The proof of the pudding is in the eating

The EHS team monitored all the systems at the project and Mondal is a satisfied man for as he shares happily, "we are about to achieve a Pearl 2 rating under ESTIDAMA and we have clocked 4.48 million safe hours without LTI which is a fair reward for our effort!" For Ram and the entire project team, it was a resounding triumph of teamwork! ■

CLOSE CALL

Fall of material from height

Scenario

During the stringing of an AEC (Aerial Earth Conductor) stringing, the roller slipped from the workman's hand and fell from a height of 1.5 meter, while another workman was climbing the OHE mast to fix the roller.

Fortunately, no workman was standing or working below the mast and hence no injury occurred.

What was the cause?

1. Unsafe handling of material while working at height
2. Non-availability of a tool bag

What are the precautions need to be taken to prevent a recurrence?

1. Safe work method to be followed and step by step procedures need to be briefed in advance
2. Tool bag should be provided to the workmen and hand tools must be tied with harness, while working at height
3. Regular awareness training on manual material handling
4. Ensure close supervision when working at height



Tool bag



Hand tool tied with safety harness

PHEW!



Sujit Panda
EHS In-charge

From the word 'go', we had to ensure that we were on a safe ground as the alignment was routed along critical areas, Breaking down the big numbers was one of the first tasks for sharper focus and to chalk out a secure access plan. Activities were mapped considering the variables through a fishbone analysis to evolve detailed HIRA and EHS plans. Thanks to our digital measures we now have a system in place wherein all observations are captured on dashboards facilitating detailed analysis.



task to line up activities one by one," affirms Sujit. "Appropriate sloping and benching methods were worked out along with additional protection such as safety nets to contain the earth." Other support elements included hard barricading with color coding and signage boards with safety messages while access to work spots was allowed only through an authorized approval which was further backed-up with MS ladders supported with intermediate landing platforms for safe working.

Construction of the fore bay was a critical activity since the area was exposed to the river with fluctuating water levels due to its proximity to the pump house and the barrage. For a safe execution strategy, the project team proposed the construction of a cofferdam on the river side to lower the water level after discussing with the government officials. The scheme was further reinforced in consultation with the EDRC team. "We also deployed a person to monitor the water levels to make sure all gaps were covered."

Pro-activeness
and prevention
are always
better than
cure.
Upper Indrāvati Lift
Canal project

L&T Construction's Water & Effluent Treatment IC was mandated to construct the Upper Indrāvati Project envisioned to irrigate 26,248 hectares of predominately drought prone areas of Odisha's Kalahandi District, and help create one of highest rice producing basins to benefit some 56,000 families. Certainly a tall task, as it involved building a vast water infrastructure network with a range of civil, mechanical and electrical works across a composite alignment in just 60 months!

"From the word 'go', we had to ensure that we were on a safe ground as the alignment was routed along critical areas," says Sujit Panda, the EHS In-charge, "Breaking down the big numbers was one of the first tasks for sharper focus and to chalk out a secure access plan."

An eye for the details

One of the first teams to take stock of deliverables at site was the Group Risk Assessment crew comprising all the core members. "With all of us on the same platform, it was easy to strategize approaches for both the critical and the routine tasks," highlights Sujit. Activities were mapped considering the variables through a fishbone analysis to evolve detailed HIRA and EHS plans.

Banking on our inherent strengths

The expertise of EDRC was relied upon to evolve a secure foolproof execution strategy by excavating the 14 m deep pump house. "Once the profile was finalized it was a straight forward





A deft scheme for the heavy materials

A major portion of the heavy tasks involved the erection of vertical turbine pumps which was deftly handled through a process centric activity with hazard mitigation schemes across each stage. To further streamline works, the project team isolated civil works alongside the pump house and other material handing activities. "We identified skilled workmen specific to the job such as crane operators, welders, riggers, gas cutters, etc. and provided skill authorization passes after conducting the necessary medical tests," highlights Sujit.

Seamless conduit handling

Lining up the MS conduits of varying sizes was a tall order that had to be safely done as the scope involved transportation and integration of the pipes across locations. "A detailed SOP was drawn up with specialized teams taking up individual fronts as pipe transportation and laying was largely through narrow and uneven village roads." To mitigate en route constraints, the project team designed and prepared a saddle based on the curvature of the pipe that was fitted to the trailers to arrest the lateral movement. At a time, two pipes were laid out of the total 8 lines thereby ensuring better control of work and precision deployment of resources. A lifting plan was prepared for each type of pipe along with load capacity of cranes which was verified and approved by the site in-charge and project manager. Multi gas detectors and blowers were used to monitor and control the atmosphere inside the pipe during welding.



Working safely at heights

From a 14 m depth, the ground works for the pump house gradually began to take shape rising in height for which a formidable L&T Formwork System was evolved to support the tasks. "Workmen were engaged only after passing a height test with a formwork engineer engaged to monitor the erection works while horizontal and vertical lifelines along with customized safety nets were provided as and when the height was raised to complete the works."

The power of pep talks

With a continuously 'moving' workforce, it was important to have daily connect which was easier said than done but the project team made good the power of the word through pep talks. "A simple but powerful motivating tool," exclaims Sujit, "We had specific team leads and stewards assigned to take forward this initiative which made a big difference in the behavioral attitude of the workmen."

In the midst of people

There are certain areas in this project where public interface is unavoidable such as canal structures, the approaches to which were right across villages. "The only safe way out was to thoroughly hard barricade the entire area and put in place signage boards at the respective work locations," informs Sujit. To control vehicle movement, the site team deployed signalmen across strategic locations. In addition, there was an EHS Walkthrough Committee entrusted with the task of closely monitoring critical work areas.

Gaining from the digital edge

For Sujit and his EHS team, proactive and preventive measures have largely enabled achieving their safety milestones. "Thanks to our digital measures we now have a system in place wherein all observations are captured on dashboards facilitating detailed analysis." With corrective actions becoming the order of the day and unlikely non-conformities being reworked to precision, safety is proving to be the vital enabler to achieve speed and scale across projects. ■

Safety

Roll of Honour

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

TRANSPORTATION INFRASTRUCTURE

25 **Dept Code - Central Office TI – RKJLRP (Jabalpur MP)**
Million Safe Man Hours
June 2015 to September 2018

21 **Four Laning of Kandla Mundra Road Project (NH-8A)**
Million Safe Man Hours
April 2011 to September 2018

18 **4 Laning of MH-KNT Border to Sangareddy**
Million Safe Man Hours
December 2015 to September 2018

15 **Delhi Agra Road Project**
Million Safe Man Hours
July 2016 to September 2018

15 **Development of Unnao to Lucknow Expressway**
Million Safe Man Hours
June 2015 to September 2018

11 **Western Dedicated Freight Corridor Project (CTP 1)**
Million Safe Man Hours
August 2017 to September 2018

10 **Airside Works At Kannur International Airport**
Million Safe Man Hours
December 2015 to September 2018

10 **Hospet Chitradurga Road Project**
Million Safe Man Hours
May 2017 to September 2018

10 **Ghoshpukur Salsalabari Road Project**
Million Safe Man Hours
December 2015 to September 2018

10 **Design & Construct Al Wakrah Bypass Road - P015**
Million Safe Man Hours
August 2017 to September 2018

8 **Yadgiri Warangal Road Project**
Million Safe Man Hours
June 2016 to September 2018

7 **Riyadh Metro Project**
Million Safe Man Hours
December 2015 to September 2018

7 **OPGC MGR Project**
Million Safe Man Hours
July 2015 to September 2018

7 **Manwath to Beed Road Project (EPC)**
Million Safe Man Hours
December 2014 to September 2018

7 **Jinzira Bazaar to Batanagar Flyover**
Million Safe Man Hours
November 2014 to September 2018

7 **Dholera SIR - Road and other Infra Works**
Million Safe Man Hours
July 2016 to September 2018

7 **Riyadh Metro Line 1 & 2 Track work**
Million Safe Man Hours
December 2015 to September 2018

7 **Local Road And Drainage Programme (LRDP-QS001-P06)**
Million Safe Man Hours
August 2015 to September 2018

Safety

Roll of Honour

6 **Mumbai Monorail**
Million Safe Man Hours
June 2013 to September 2018

6 **Western Dedicated Freight Corridor Project (CTP 2)**
Million Safe Man Hours
May 2018 to September 2018

5 **Hospet-Harlapur RC Project**
Million Safe Man Hours
January 2013 to September 2018

5 **Lucknow-Sitapur RC Project**
Million Safe Man Hours
November 2012 to September 2018

5 **Sambalpur-Barapali RC Project**
Million Safe Man Hours
April 2014 to September 2018

5 **Sindhudurg Airport, Maharashtra**
Million Safe Man Hours
February 2013 to September 2018

5 **Sambalpur Rourkela Road Project**
Million Safe Man Hours
June 2017 to September 2018

Safety

Roll of Honour

- 5 **Bijapur Gulbarga Homnabad Road Project**
Million Safe Man Hours
March 2015 to September 2018
- 5 **R1028: Extension of Tripoli & Improvement of Algeria Roads**
Million Safe Man Hours
February 2017 to September 2018
- 5 **R 10481&5- Improvements of Expo 2020 Roads Network**
Million Safe Man Hours
July 2017 to September 2018
- 4 **Mukkola - KL/TN Border Road Project**
Million Safe Man Hours
June 2016 to September 2018
- 4 **Barpali-Bolangir RC Project**
Million Safe Man Hours
April 2014 to September 2018
- 4 **WDFC EMP-4**
Million Safe Man Hours
May 2015 to September 2018
- 4 **ADAC – Mid Filed Terminal Complex**
Million Safe Man Hours
December 2016 to September 2018

POWER TRANSMISSION & DISTRIBUTION

- 8 **N-TL-765 kV D/C TL from Raipur to Jharsuguda - SPGV**
Million Safe Man Hours
January 2016 to September 2018
- 7 **HMRL PSS Package**
Million Safe Man Hours
May 2012 to June 2018
- 3 **765 kV D/C Angul Jharsuguda TL Project- PGCIL**
Million Safe Man Hours
July 2017 to July 2018
- 2 **220 kV Alusteng-Drass TL / 66 kV Drass-Bimbat T**
Million Safe Man Hours
June 2015 to July 2018
- 2 **TFL-ERSS-TL01 for 765 kV D/C Ranchi - Medinipur**
Million Safe Man Hours
November 2017 to July 2018

Safety

Roll of Honour

- 2 **IPDS Kanpur**
Million Safe Man Hours
November 2016 to September 2018
- 1 **D-IE-33 kV ASS DMRC Phase III-CE 08- LOT 2-DMRC-5**
Million Safe Man Hours
July 2014 to May 2018
- 1 **L-SS-Lucknow Metro-Ph-1 -PKG LKE 1 and 2-5**
Million Safe Man Hours
October 2015 to May 2018
- 1 **N-TL-400 kV DCDS Pithampur to Badnawar TL**
Million Safe Man Hours
January 2017 to May 2018
- 1 **D-SS-R-APDRP Amritsar (PKg-4)-PSPCL**
Million Safe Man Hours
April 2016 to June 2018
- 1 **44 MWp / 40 MW HFE - SPV Plant Aurad**
Million Safe Man Hours
July 2017 to September 2018

- 1 **100 MW (AC) SBE SPV Plant Bhadla**
Million Safe Man Hours
March 2018 to September 2018
- 1 **400 kV D/C Mundra Bhuj Transmission Line**
Million Safe Man Hours
December 2016 to August 2018
- 1 **TFL-ERSS-Transmission Line Package TL02**
Million Safe Man Hours
July 2017 to July 2018

HEAVY CIVIL INFRASTRUCTURE

- 35 **Doha Metro JV**
Million Safe Man Hours
- 30 **Riyadh Metro JV**
Million Safe Man Hours
- 14 **Kakrapar – Main Plant**
Million Safe Man Hours
- 12 **Hyderabad Metro**
Million Safe Man Hours

Safety

Roll of Honour

7 **Kudankulam Main Plant**
Million Safe Man Hours

7 **Singoli Bhatwari HEP**
Million Safe Man Hours

6 **Kalpakkam - WMP & Allied**
Million Safe Man Hours

6 **CMRL UG-03**
Million Safe Man Hours

5 **Kakrapar – IDCT**
Million Safe Man Hours

4 **DMRC CC-77**
Million Safe Man Hours

4 **Kachchi Dargah Bridge**
Million Safe Man Hours

4 **Mumbai Metro UGC07**
Million Safe Man Hours

3 **WDFC 15 A**
Million Safe Man Hours

3 **Hyderabad-AFA**
Million Safe Man Hours

3 **Kudankulam HTS Project**
Million Safe Man Hours

3 **Vizag Vessel**
Million Safe Man Hours

3 **RAPP, Rajasthan**
Million Safe Man Hours

3 **Khulna Mongla Bridge**
Million Safe Man Hours

2 **CMRL UG 02**
Million Safe Man Hours

2 **Kakrapar -CSP**
Million Safe Man Hours

2 **Barapullah Bridge, Delhi**
Million Safe Man Hours

2 **Punatsangchhu HEP, Bhutan**
Million Safe Man Hours

2 **Kakrapar – NDCT**
Million Safe Man Hours

1 **ZF Shillong Project**
Million Safe Man Hours

1 **Durgam Cable Stayed Bridge**
Million Safe Man Hours

1 **WDFC 15 C**
Million Safe Man Hours

1 **Medigadda Barrage Project**
Million Safe Man Hours

1 **Ahemadabad Metro**
Million Safe Man Hours

1 **MTHL Pkg1**
Million Safe Man Hours

METALLURGICAL & MATERIAL HANDLING

19 **Hot Strip Mill, RSP, Rourkela**
Million Safe Man Hours

17 **Coal Handling Plant, RRVUNL,
Chhabra**
Million Safe Man Hours

Safety

Roll of Honour

16 **EGA Projects, Abu Dhabi**
Million Safe Man Hours

6 **Coal Handling Plant,
Khandwa**
Million Safe Man Hours

5 **Pet Coke Evacuation Project,
IOCL, Paradip**
Million Safe Man Hours

5 **Coal Handling Plant, Lingaraj**
Million Safe Man Hours

5 **Slab Caster, Bokaro**
Million Safe Man Hours

4 **Coal Handling System, HMEL,
Bathinda**
Million Safe Man Hours

4 **Coal Handling Plant, NCL,
Nigahi**
Million Safe Man Hours

4 **LSAW, Abu Dhabi**
Million Safe Man Hours

Safety

Roll of Honour

**Coke Dry Quenching Project,
TSL, Jamshedpur**

4 Million Safe Man Hours

Coal Handling Plant. Khargone

4 Million Safe Man Hours

**Coal Handling Plant, NCL,
Khadia**

3 Million Safe Man Hours

**Material Handling System, RIL,
Jamnagar**

3 Million Safe Man Hours

LTEW, Kanchipuram

3 Million Safe Man Hours

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

2 Million Safe Man Hours

Coal Handling Plant, TANDA

2 Million Safe Man Hours

L&T GEOSTRUCTURE

**IOLPL LNG Terminal-Ennore
Chennai**

4 Million Safe Man Hours

**JSW Iron Ore Berth -Paradip
Port**

2 Million Safe Man Hours

**NPGC Thermal Power Station-
Nabhinagar**

1 Million Safe Man Hours

IWT Terminal - Sahibganj

1 Million Safe Man Hours

CLOSE CALL

Ensuring a firm footing!

Scenario

A workman was deployed in a coal stacking yard to monitor the conveyor operation as a 'Route-man' at a Stacker Reclaimer area during the night shift. Suddenly, when it started raining, the workman made a dash to the stair case fitted along with the equipment to descend and, in the process, lost his balance and slipped down sustaining lacerated injuries on nose and hands.

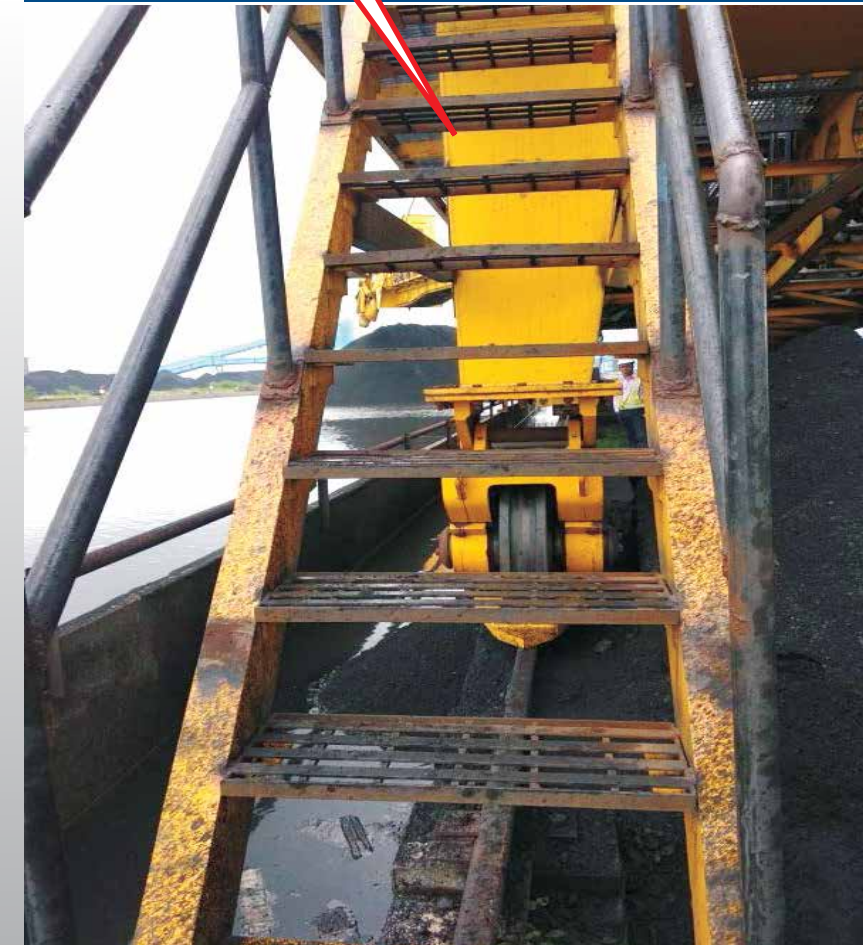
What was the cause?

1. Slip, possibly due to hurry and accumulation of mud on the shoes
2. Worker might not have held the handrail while descending the staircase
3. Gratings of the staircase were not slip resistant

What are the precautions to be taken to prevent recurrence?

1. Inculcate the habit of holding handrails while using stairs
2. Safety training on contributory causes of stair related incidents and remedial measures
3. Steps to be replaced with slip resistant gratings

WORKER WAS COMING
DOWN FROM HERE



PHEW!



WITH SIX SWORDS OF HONOUR
AWARDS, B&F IC'S SCABBARD
IS FILLED TO THE HILT!



DLF Cyber Park Project, Gurgaon - CBA SBG

ITC MXD Project - CBA SBG

Godrej Two Project, Mumbai - CBA SBG

Piramal Aranya Project - RBF SBG

Motera Cricket Stadium Project - CBA SBG

APTIDCO Projects - RBF SBG

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