

Construction Safety

The frenetic pace of construction in India is drawing international attention and many international agencies are making India a preferred destination for their investments. The size of the projects now need higher and faster funding, and the foreign investment is in greater demand today.

This increase in foreign funding and foreign participation brings an increased focus on Environment, Health and Safety (EHS), as a natural corollary.

The traditional practice with low focus on safety is fast giving way to the need to maintain and improve the focus on safety. Law too has caught up with this trend and stricter laws relating to workmen's compensation, employment of safety officers, changes to pollution control norms and stricter penalties for non-compliance have brought this subject into a sharp focus in the construction industry.

A look at the number of accidents reported in the press and the negative fallout of this on the developer, builder and contractors is now a harsh reality. Increased worker awareness, media obsession in tracking down default and stricter enforcement by agencies, is the norm today. Any accident can now no longer be kept quiet and wished away.

It is not that there was no focus on EHS prior to this change in funding pattern. It was just that it was not being taken very seriously. The focus on EHS has now become sharper.

How has this changed the industry?

Let us first look at the environmental factors that have given rise to this increased focus. A number of laws have set the tone for Construction Safety such as Workman's Compensation Act, Criminal Law proceedings, Building and Other Construction Workers

(BOCW) Act, Insurance Laws (Third party and Indemnity) not to mention political pressure when an incident occurs.

Historically, when Safety was not the focus, it was a given practice for the vendors to send in their bids sans budgets for this aspect. Even where expenses on account of safety were considered, the race to be the lowest bidder was achieved by compromising on EHS, first. When safety was insisted upon, the contractor would then make additional claims for making provisions for environmental health and safety.

As a practitioner in this field, we found a way to circumvent this tendency. We now take care of this at the tendering stage itself.

- a. Build in specific stringent provisions for safety as part of the general conditions of contract and make them non-negotiable. This could cover the use of Personnel Protection Equipment, safety provisions for scaffolding, provision of safety nets, maintenance norms for labour colonies, housekeeping etc.
- b. Besides specific provisions covering legal aspects are also included in the conditions of contract such as Contractor's All Risk Policies, Labour Licence, Workmen's Compensation Policy, PF, ESI, Hospital tie-ups, First Aid requirements etc.
- c. Relevant clearances for use of construction equipment (fitness, non-polluting, insurance) and third party certification & calibration for machines (tower cranes, hoists, bar-bending, rebar cutting etc.)
- d. The percentage of the quote to be kept aside for Safety is generally specified and can range between 2% to 5% of the bid amount. This forces the tenderer to quote for safety.
- e. When the contractor does not quote for EHS specifically, we overcome this by asking him to quote for the project without considering EHS. By doing this, we come to know EHS cost component of his quote. The difference in the price would be set aside as the amount related to EHS and would become non-negotiable.

- f. Building stringent penalty provisions for non-adherence to desired safety norms, including withholding amounts in Running Account bills for non-adherence.

Such provisions have been successfully used by us in a variety of projects. In all such projects, it is important to note that the client has been absolutely focused on ensuring that EHS norms are strictly enforced.

Some of the best safety practices that we have enforced and witnessed in projects are as follows:

Labour colony

It is important that the labour colonies are kept hygienic and disease free to enable the workers lead orderly lives and be productive. Some of the key things to take care in establishing labour colonies are:

- Labour Sheds need to be well ventilated and insulated from electrical cables
- Provision of clean drinking water facility
- Use of temporary or portable toilets / bathrooms to ensure hygiene
- Use of dustbins and means for disposal of household waste
- Provision of soak pit / STP for human waste segregation and treatment
- Some vendors also provide cooking gas to prevent smoke inhalation
- Provision of crèche for children and to prevent them from straying into work areas for below 5 years
- Some vendors even provide for education facilities for children

Safety & Logistic Plan

Safety starts with the mind. Hence, the first activity is developing a site-specific safety plan and logistics plan to ensure safe working conditions. The safety plan is comprehensive and covers the topics of occupational health & safety policy, EHS policy,

standard operating procedures, safe working methods, job safety analysis and hazard risk analysis. The document so drawn up is approved by all stakeholders for enforcement.

Emergency Handling Plan

Plans are drawn up for handling emergencies such as accidents, fire breakout, earthquakes, natural calamities (such as typhoons / hurricanes, landslides), structure collapse etc. Specific Emergency Response Teams (ERTs) are established and given clear instructions and charge of areas of the project for them to handle in case of an emergency. This includes elements of evacuation, logistics for fire tender movement, use of equipment to control disasters and movement to hospitals in case of emergencies.

Actual Implementation at Site

Signages: It is important to have clear signage explaining use of PPE; WIP; Hard Hat areas; instructions for specific works such as deep excavations, work at height, hot works, confined spaces etc., including instructions in case of emergencies are visibly maintained at site. It is important to note that the signages are displayed in more than two languages – local, Hindi and English. Where workers are brought from out of state, the predominant language spoken by that section is also used in displays.

Education: Keeping the workers educated on a regular basis about the importance of following safety norms and requirements is critical to achieve success in managing safety. This is done by regular PEP / Tool Box Talks which is done at the beginning of the day and before starting any activity. The Safety officers check the methods of work to be applied, assess risks, and develop safety mechanisms to prevent the occurrence of any lapse. Besides this, weekly safety meetings are held with safety committee members (belonging to all stakeholders), to identify possible risk areas and define the correct response.

Safety Execution: The various practices that cover excellence in EHS are as follows:

- Issue of work permits – all work is executed only after inspection by the Safety Officer and release of a work permit indicating the conditions of work are safe. This acts as the first line of defence in managing safety at work.
- PPE – use of hard hats, safety shoes, goggles, nose-masks and gloves as is relevantly required. In two of the projects, it was compulsory for all workers to use both goggles and gloves and work would be stopped if any worker was seen not using them at work.
- Proper barricading – this is of utmost important to protect workers from falls, guide them on the proper route along the work area, identification between work and non-work areas. The quality of barricading (commonly called barrication in safety), is critical and should be firm and non-yielding.
- Managing deep excavation – proper use of slope cutting, shoring, soil stabilization (such as soil nailing, shotcrete, piling, retaining wall) to prevent soil collapse, and use of ladders for easy access.
- Fall protection – this is to prevent inadvertent loss of balance and fall from heights by using safety harness and safety nets. The workers are trained on the use of these items and the nets are meticulously reviewed to ensure they are capable of handling falling weights.
- Protection for heights – proper scaffolding / staging, use of working platforms etc.
- Housekeeping – keeping the work area clean and free from dangers such as
 - Clearing debris in time to prevent dust and tripping
 - Proper stacking of materials in designated yards such as steel yard, cement sheds, gas cylinders, diesel / other fuel etc.
 - Proper stacking and removal of nails, jacks, spans and other such materials after de-shuttering to prevent injury.
 - Keeping work area free from water (especially where electrical welding is progress or electrical cabling runs or is in progress).
- Use of construction equipment
 - Preventing electrical hazards in case of use of bar bending, bar cutting, power tools etc.

- Tower Crane – ensuring appropriate clearance, licences and third party certification for use of equipment. Safe working beneath the boom movement area is ensured. Since they are also used at night, illumination is key. Workers on the ground are to wear reflective jackets and use walkie-talkies to communicate better with the crane operator.
- Moving equipment – Identifying specific routes and speeds for construction vehicular movement including provision of horn and reverse indicator with horn. Working lights of the vehicle for movement during night, with fitness clearance for the vehicle.
- Lifting equipment – items such as hoists, lifts, dumbwaiters, elevators etc. are properly calibrated and kept in high fitness conditions. The rules for loading are strictly enforced. Use of power breaks to prevent falls are also adhered to.

Defining safety process and subsequent audits with defined reporting and escalation mechanisms have helped in inculcating site level and corporate level seriousness for safety compliance.

Will this help us ensure **Zero Accidents** in our projects?

What are the pre-requisites to ensure our projects are “zero accident” projects?

The best way to ensure a high degree of safety is to follow the P-D-C-A-I cycle (Plan-Do-Check-Act-Improve). The first step as already indicated is in preparing a comprehensive safety plan, with pre-determined safety audits to evaluate the safety conditions. That does not mean that safety is an intermittent activity – in fact, safety is an every-moment activity and deserves high importance by everyone at site.

Some strategies adopted for ensuring “zero-accident” sites have been:

1. Carrying out a risk assessment rigorously
 - a. Identifying hazards and those at risk
 - b. Evaluating impact – on time, cost, morale and prioritizing risks

- c. Defining preventive action and educating workers on correct working methods
 - d. Taking decisive action on any aberration – swiftly and decisively.
 - e. Regular review of safety
- 2. It is very important for those at the top to not only exhort the use of safe practices, but to actually walk the talk. Nothing creates more apathy for safety than neglect by the people entrusted with defining safety.
- 3. Constantly speak about safety. In fact, most of our project meetings start with safety as the first item on the agenda. This clearly underscores the emphasis we place on safety.
- 4. Build in multiple escalation mechanisms – mails, SMS, notes, site instructions and NCRs to escalate and emphasize safe working conditions.

The number of industry-led seminars on environmental health and safety has certainly raised awareness of safety, and many companies are quickly adopting safety as a mantra to success.

What has this done to the accident rates? The available data in the market is quite inadequate. The International Labour Organization publishes periodic data about accident rates in different countries. Similarly the OSHAs (Occupational Safety and Health Assessment series) also publish data on work related accidents in construction and industry.

Instead of delving into the numbers, let us look at the change that the industry has seen. In the 1980s, safety was the privilege of the MNCs alone and was rarely taken seriously. Use of material that was not tested for safe working was quite rampant.

In the next fifteen years, the thrust by MNCs to expand their operations in India, has certainly seen a lot of importance being given to safety. The reason – the corporate governance and liability assessment that these MNCs were the driving force. It was quite normal for the MNC to resort to stopping work when safety was neglected and the Indian large contractors soon learnt to adopt safety practices to gain better paying business.

With the increased thrust and the learning that it makes economic sense to focus on safety, many large construction houses – builders, developers and contractors and project management companies have embraced safe working as the new normal.

The reported accidents you hear of are on account of new players who tend to mistakenly cut on safety to cut costs.

Overall, there has certainly been an improvement in adoption of safe working conditions and a consequent reduction in accidents.

Some of the practices used in industry to enforce EHS compliance have been:

- Stopping work in unsafe working conditions and no compensation due to idle labour unless safe working is resumed. This is a big deterrent.
- Withholding a portion of the payment till safety is complied with
- Imposing fines, including spot fine on the worker who refuses to use safe processes.
- Bonus mechanism for achieving uninterrupted safe man-hours.
- No claim bonus from insurance companies when the CAR / Workmen Compensation policy is not invoked to cover accidents. In fact continuous non-claims result in reduced premium for such policies.

Earlier we spoke about the use of Activity Hazard Analysis. This activity involves identifying risks, prioritizing them, defining preventive action, taking decisive action on non-compliance and constantly monitoring and reviewing safety. This is the core of safety planning and is regularly used by Indian Safety professionals in carrying out their responsibilities. In that sense, we mirror the advanced countries. This is a scientific approach to planning, organizing, and administering EHS and is the most important step for safety management.

While India is slowly but surely catching up with the Western world with regard to safety, there are many factors that contribute to the delay. Many accidents tend to be dismissed as the will of God / Karma and many more go unreported or simply hushed up.

Yet, one of the most difficult problems that the country faces, is in the worker population. Drawn from various backgrounds, with only the need to earn driving them to this industry, many are woefully untrained to handle work safely. Contrast this with the European and Western trend of having certified tradesmen, who have to not only know the skill but demonstrate safety in executing it to earn a certificate, and the reason for the continued incidents of fatality and loss of limb in India become apparent.

Let us now turn to looking at how safe design process helps in improving construction productivity. The recent trends outlined below show how this can be achieved.

1. Pre-designing guard rails and guard rail sockets and insisting on installation of guard rails along with execution rather than using flimsy steel rods as protection.
2. Designing fixed ladders to provide maintenance access rather than using temporary ones.
3. Casting anchors in roofs for fall protection latching.
4. Use of elevated platforms for external finishing work
5. Superior scaffolding design to suit the section being cast
6. Use of precast technology to prevent accidents at heights by minimizing long hours of work at heights.
7. Use of precast catwalks for ease of working in areas like shafts etc.

When the worker knows that the working environment is hazard-free or has sufficient protection, it will improve morale and help them achieve higher productivity.

In conclusion, we can see that Safety is a highly planned activity and requires the participation of every stakeholder in the project. The elements of education, motivation and control are key to achieving safety at site. The most important contribution comes from the top – be it the owner, consultant or vendor – their managements need to consistently and emphatically focus on safety. This will drive home the importance of safety and help manage it proactively. We are committed to this. Are you?