

Innovative safety approaches impresses GE India



Brand	: BUTLER® Building Systems
Roof System	: FM Approved MR-24® Roof System with BR-II™ Liner Panel
Special Features	: (i) 100 MT capacity crane and crane walkway and MEP cable trays (ii) Aluminium roof walkway with roof life line system
Project size	: 27,081 m ²
Consultants	: C. R. Narayana Rao
PMC	: Synefra Infrastructures Ltd.

Key requirements of the project: GE India Industrial Pvt. Ltd. was planning to set up a manufacturing facility at Chakan, Pune, India to manufacture a host of different products ranging from aviation components to turbo machinery components to measurement and controls and wind turbines.

GE, given its Environmental, Health and Safety (EHS) priorities was looking for an engineered steel building solution that would create a safe working environment while meeting all their operational requirements. During the vendor pre-qualification stage Tata BlueScope Building Solutions was identified as having strong safety credentials that were in line with GE's objective of completing the project safely.

Challenge: The height of building is 24m and working at height was identified as the critical risk.

Planning for 'Safe Execution' of the project:

Three months before the actual start of site activities, the Tata BlueScope Building Solutions Team identified critical safety requirements of the project and prepared a 'Safe Work Method Statement' for each activity as well as a Construction EHS plan.

The team started pre-order discussions with the certified builder and got his acceptance to follow 'all safety requirements without any deviations'. Keeping in mind the magnitude of the project, the team introduced some new policies such as 'No Supervision - No Work', 'No Night Work'.

The team conducted Risk Assessment for all of the activities and suggested innovative solutions to reduce the risks involved. Occupational Health and Safety hazard register and a mitigation action plan was also prepared.

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An EHS induction area for visitors, equipment parking area, safety park, emergency response plan, emergency contact numbers, arrangements of first aid and ambulance with paramedical staff were well thought of.

During the project concept stage some changes were suggested in the standard product design from the perspective of safe erection:

- a. Lifting holes were provided in the primary members from POD lifting.
- b. Additional holes and brackets were provided in rafters for fixing of life line posts around building periphery.
- c. Standard life line posts designed by Tata BlueScope Building Solutions were certified by a third party and a life line of steel wire rope was proposed.



Equipment parking at site

Inspection to ensure quality of resources deployed on site:

Tata BlueScope Building Solutions conducted a pre-entry inspection and green tag certification of all the equipment. Daily inspection check lists were displayed on each equipment. Third party inspection of the equipment on site was also conducted. Due to safety reasons, use of hydra for material loading and unloading was not allowed. A detailed site layout plan for safe storage of materials and equipment movement in the yard was prepared. Safety risks were involved in loading, unloading & stacking of structural steel therefore material stacking with the height indicators was proposed.



Weekly equipment inspection by third party on site



Material stacking in yard with height indicators

Display of visuals for safety management:

To constantly remind and highlight the importance of safety to workmen displays of safety cross, safety statistics, safety gallery were placed on site.



Safety gallery display



'Working at height' training for workers



EHS promotional activities, motivation programs

Monthly EHS trainings:

EHS trainings for staff, working at height training, safe lifting practices and fire fighting techniques for workmen, EHS recognition programs, EHS promotional activities, motivation programs were conducted as per monthly EHS calendar.

Safe Erection Methodology:

To achieve the objective of safe project completion the following approaches were adopted on site:

- a. **Reduce risk of working at height:** To ensure complete safety while working at height, three levels of protection were introduced
 - (i) working in boom lift for all work at height
 - (ii) mandatory use of full body harness with double lanyard
 - (iii) SKY-WEB® II Fall protection system was suggested to ensure safety during roof liner panel installation.

For instant identification of workers trained for specific work, induction stickers were provided to workers, e.g. red colour helmet with stickers were for the workers who would work at height and green colour helmet stickers were for workers working at ground level. Sitting on erected rafters, purlins, girts was not allowed.

To restrict unauthorised entry, the work area was barricaded and to prevent fall of tools from height all tools were tied while working at height. The roof access staircase of British scaffolding type for roof access & an access control system was implemented during roof installation. Edge protection was also provided at the roof edge. The erection of components such as brace rods, girts, flange braces, pipe struts, sag angles, SKY-WEB® II, crane platform, flashings were fixed using boom lifts and cranes. EHS tracker was prepared in advance by our team, it helped in mitigating safety risks before the start of each activity. 'One Activity - One Supervisor' principle was followed.

- b. **Innovative work methods to achieve safety:**

- (i) **POD erection methodology:** To reduce the critical risk of working at height, the team came up with a methodology of doing everything from ground - POD erection method. A 36m long POD containing 4 rafters was firmly fixed with purlins and was



Three levels of protection



Indication sticker provided to identify workers



Installation of SKY-WEB® II Fall Protection System



POD erection methodology

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lifted at one time, this reduced the risk of working at height since most of the erection activity was done at ground level. This method also helped in meeting construction schedules. At the onset of this activity unprecedented rains began flooding the entire site but due to the adoption of the above approach recovery from the situation was possible.

- (ii) **Purlin erection by using boom lift and crane:** The team devised a method to erect purlins using crane & boom lift. After a few initial hiccups, the team realised that it was helping them complete purlin erection faster and in a safer manner.
- (iii) **Canopy with roof sheeting erection:** A complete canopy with roof sheeting was installed on the ground and was then fixed in position with the help of cranes and boom lifts.
- (iv) **Strut pipe erection by using cranes & two boom lifts**
- (v) **Painting touch up at ground level and at height with help of boom lifts only**



Purlin erection with boom lift and crane



Canopy erection with sheeting



Strut pipe erection by using cranes & two boom lifts



Good co-ordination with the civil contractor was maintained and hence no conflicts arose during entire project completion.

After installation of the MR-24® roof system, aluminium roof walkway with permanent roof life line system was installed to ensure safe access to the roof in future.

Conclusion: Detailed 'Pre-execution EHS planning', effective use of risk mitigation techniques, rigorous implementation of EHS tracker, erection supervision by a dedicated construction safety team, use of boom lifts, SKY-WEB® II Fall Protection System, adoption of innovative construction techniques and Tata BlueScope Steel's zero tolerance approach to safety violations resulted in completion of the GE project safely.



Srikant Srinivasan
Director, Manufacturing
GE India, Pune

Customer feedback:

"It is with great pleasure that I congratulate Tata BlueScope Building Solutions Team for completing GE India Industrial Pvt. Ltd. Chakan project safely and to satisfaction. Tata BlueScope's dedicated construction safety team has supervised our building erection and followed latest construction techniques which have significantly reduced safety risks at our site. The EHS Partnership with the entire Tata BlueScope Building Solutions project team has been truly wonderful. A number of EHS Best Practices have been leveraged at our Chakan site. In addition to enhancing safety, the EHS team devised safe work methods to increase productivity and efficiency. I thank the entire Tata BlueScope Building Solutions team for their hard work and contribution in this achievement."