

HOW TO MAKE YOUR HIGH-RISE SITE FALL PROOF WITH COLLECTIVE PROTECTION

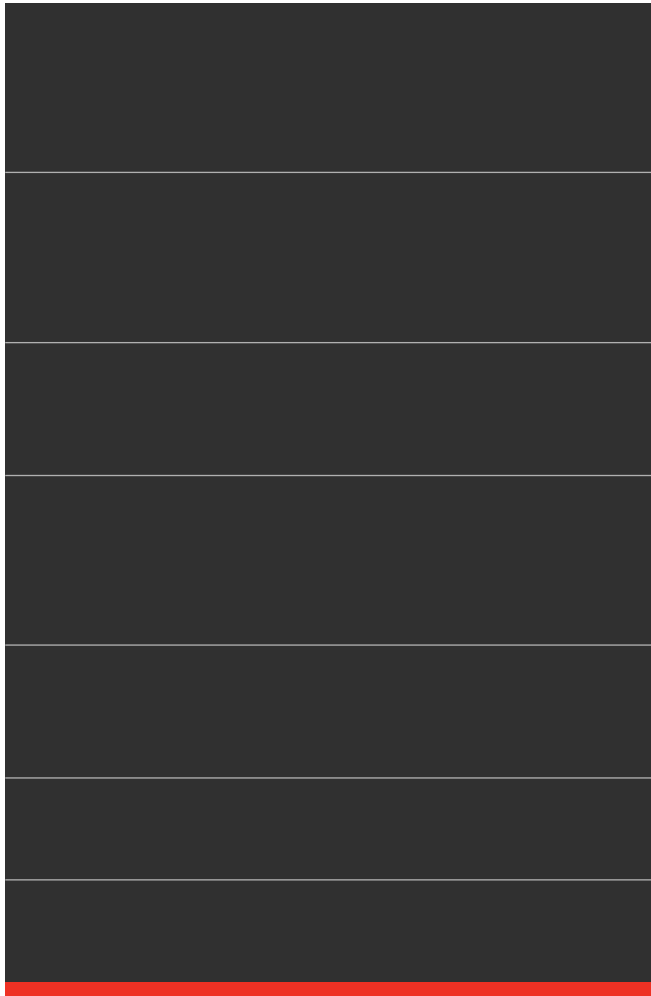


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INTRODUCTION

High-rise construction sites can be dangerous places to be. As our Risks eGuide illustrates, they pose a real threat to workers and the public alike, the two main risks being falls from height and falling objects.

Understanding the risks is one thing, but what protective measures are most useful to keep construction workers and the public safe? This How to Guide provides step-by-step guidelines for implementing a successful collective protection strategy on high-rise construction sites. It covers risk assessment through to installation and use of edge protection and safety nets.



STEP 1: ASSESS THE RISK IF YOU WANT TO FLY HIGH

Under EU law, employers are ultimately responsible for assessing the risks that workers may be exposed to¹. The assessment should highlight the major risks of a project along with protective measures that will protect workers and the public from injury. However, the legislation does not specify how it should be done.

It is good practice to assess risks at a project and task level for complex activities like high-rise construction. Analysing the project as a whole involves evaluating the high-level risks. For example: proximity to the public, major project phases like lifts and concrete pouring, as well as general safety precautions. A risk assessment at project level for the Horizon Office building in Düsseldorf, for example, led to the installation of 40 safety net fans around the building. This collective protection system was aimed at preventing falling tools and debris from striking workers and the public below.

Task based risk assessments offer a detailed review of what could go wrong with a specific activity and how to prevent it. For example, a risk assessment for installing edge protection should highlight the need for each worker to wear the appropriate personal fall protection equipment (PFPE)

including an anchor, bodywear and edge-tested connecting device such as a self-retracting lifeline (SRL).

Site procedures and work instructions may also flow out of risk assessments. In this way, preventive and mitigating measures are enforced as standard practices on the site. Worker compliance with procedures will help ensure their safety on the job.



STEP 2: TAKE PLANNING AND TRAINING TO NEW HEIGHTS

Research studies show that the single most effective tool for preventing accidents on a construction site is pre-project and pre-task planning². By including safety in the operational plans of a construction project, problems are anticipated, and solutions found before the task even begins.

Preplanning uses information generated by risk assessments to create an operational plan that minimises the number of tasks performed at height. For example, edge protection assembly can be done at ground level before lifting it for attachment to the structure. This operational plan radically reduces the number of people working at height and the number of tools and equipment carried to height for that task.

Providing workers with appropriate safety training is also paramount and is a legal obligation under EU law³. The EU-OSHA highlights training and information as a key measure for preventing injuries⁴.

Training can take the form of worker orientation when arriving on site for the first time, certification for compliance with regulations as well as informal toolbox talks and incident reports.

Studies have shown that an increase in communication about safety between workers and supervisors has a direct influence over the safe work practices on construction sites⁵. Training and communication thus help to develop a safety culture on a construction site and therefore plays a key role in the reduction of injuries.



STEP 3: DON'T FALL FOR AN EDGE

Because falling from height is the leading cause of fatalities in the construction sector, edge protection is a critical measure to counter this risk. Many work sites still use traditional edge protection systems like timber planks, but newer modular designs are safer and easier to install.

Systemised edge barriers normally come in one piece meaning no nailing is required. Consequently, less time is spent at height assembling edge protection and there is no need to carry tools and nails that might accidentally fall onto the workers below. The fact that toe boards are generally integrated also adds an extra layer of safety, stopping objects from falling.

Materials are another key consideration when selecting edge protection for high-rise buildings under construction. Barriers are often exposed to the elements for prolonged periods of time, so opting for a durable material such as steel generally guarantees a better performance over time. This in turn means a greater ability to protect workers over time.

Edge protection systems should also be fully tested to withstand high wind loads and prevent debris or objects from falling so ensuring they are EN 13374-certified is paramount.

Modular forms of edge protection come with multiple options in terms of posts and attachments so go for the one that matches your application. The table below outlines the key features and applications of some common types of edge barriers.

While edge protection prevents falls when properly installed, the actual installation and dismantling process involves some risk. The primary measure for mitigation of this risk is PFPE.

Collective protective measures like safety nets can also provide another layer of protection against falls when working on edge protection barriers. Assembling the edge protection system at ground level and then lifting it into position lowers the risk for workers even further.

EDGE PROTECTION SYSTEM	FEATURES	APPLICATIONS	EU STANDARD
Steel Mesh	Toe boards and guardrails combined with steel mesh	Where work is contained inside the edge protection system	EN 13374 Class A, B, C
Framed Barrier	Top rail, intermediate guardrail and toe board	Where work crosses the building edge (e.g. passing through rebars)	EN 13374 Class A
Net Barrier System	Net system covering overhangs of over 1.5 m	For roof installations, offers fall protection and material containment	EN 1263-1

Table 1 - Types of Edge Protection System



STEP 4: ENSURE NOTHING FALLS THROUGH THE NET

After falling from height, being struck by falling objects is the next highest cause of injury on construction sites⁶. Safety net fans help overcome this risk.

Safety net fans serve a dual purpose: catching falling debris and tools as well as providing secondary protection should a worker fall off the edge. Honeywell Combisafe Safety Net Fans, for example, have been used for high rise construction projects like the Horizon Office building in Düsseldorf and the Onyx Towers in Dubai⁷.

It is important for safety net fans to be adaptable and flexible. They should fit directly onto concrete or steel structures as well as have attachments for scaffolding. Wind loading must also be taken into account due to their profile, which is angled away from the side of the building. A helpful feature is their ability to fold back against the building for ease of lifting operations.

The most hazardous part of using safety net fans is the installation itself. The process requires workers to position themselves on the edge for attaching fans to the side of the building or scaffolding. At this stage, only PFPE protects a worker in the event of a fall. Due to the hazardous nature of this job, installers should be well trained on the task and the safety risks. Specialist installers could be brought in as part of the supply contract.

Safety nets for the construction industry in Europe are governed by the standard EN1263⁸. They must meet the criteria of arresting falls of up to 100 kg from a height of 6 m. There are also requirements in terms of the mesh structure - 60 x 60 mm is acceptable for fall protection but 20 x 20 mm is the maximum standard for falling debris.



STEP 5: CAST YOUR NET WIDE

Don't only consider the well-known collective protective systems like safety net fans and edge protection. Cast your net wide to examine other types of protection for maximising worker safety.

High-rise construction involves building of stairs, landings and returns. Custom barriers are time consuming and complex to erect. However, steel mesh barrier stairs easily connect with any type of stair structure. They integrate with steel mesh edge protection systems to provide a complete solution.

Construction sites sometimes protect permanent stairways from heavy use during construction. Use purpose built temporary stairs for safe transit of workers and materials from one level to another.

Using a combination of collective and personal protective elements provides the most holistic safety protection. It also contributes to creating a culture where everyone is responsible for safety on the site. Management and supervisors implement collective safety measures, but each worker takes care of their own safety through PFPE and safe work practices. Worker participation in safety programs is seen as a significant factor in their success⁹.

Seeking professional advice is another key factor in overall site safety. Trusted suppliers who understand the construction industry as well as the national and EU regulations can be an invaluable source of wisdom for risk assessments and preventive measures.



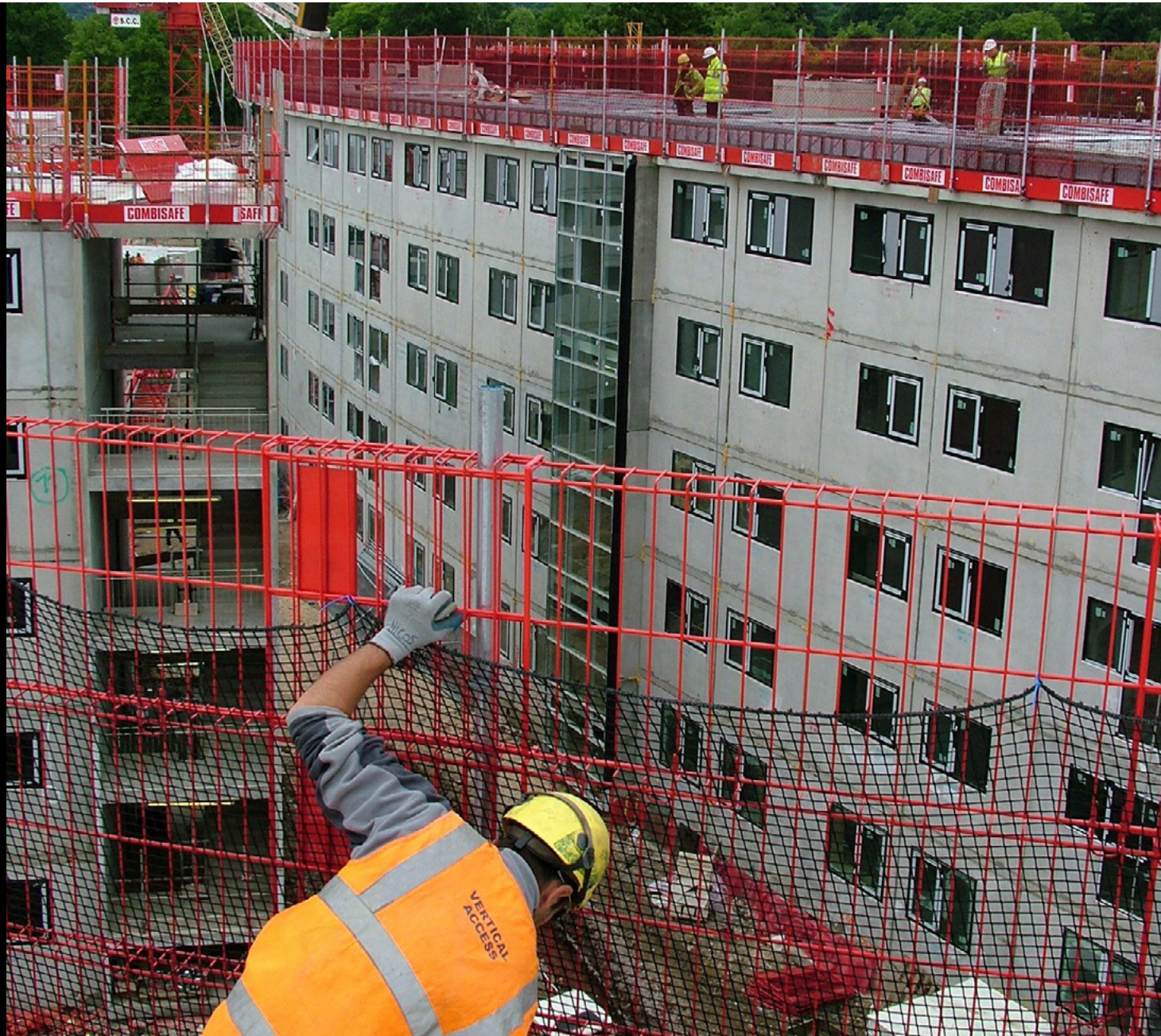
CONCLUSION

The risks of fatalities and injuries due to falls and other causes on high-rise construction projects make safety a high priority. However, a series of simple and practical steps can go a long way towards providing a safe working environment for workers and the public:

- Assess the risks
- Plan and train
- Protect the edges
- Set up a safety net
- Explore a wider range of options

Besides these practical steps of how to maintain safety in high-rise construction, keep your eye out for new technologies that will help. Honeywell Safety Suite, for example, keeps track of worker training records and equipment inspections. Many of Honeywell's PFPE products now come with an integrated RFID tag. Once scanned it becomes part of the cloud-based database, giving you constant availability of information about inspection status and flagging issues of non-compliance.

To learn more about how to implement a successful collective protection strategy click [here](#).



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