Man versus machine: who is responsible for safety in the warehouse?

What are the main safety concerns in the warehouse and how can logisticians manage them? **Maria Highland** investigates.

Within the warehouse the number one concern is to protect personnel from potential accidents, injuries and fatalities. A number of different factors can contribute towards safety in the warehouse. This can include the movement of people, machinery and products around one area. Therefore, there is not necessarily a singular solution to creating a safe warehouse.

"The warehouse can be a hazardous environment as it typically houses racking," says ELOKON's managing director, Alex Glasmacher. "And here are various and often many pieces of mobile equipment such as forklift trucks, order pickers, pallet trucks and AGVs travelling at differing speeds." Therefore, any "situation where personnel and machines work in close proximity poses particular risks," summarises Glasmacher.

The modern warehouse is now more advanced than ever with automated order picking, Automated Guided Vehicle (AGV) forklift trucks and robots whizzing around. "Technology in our sector moves forward at an astonishing speed," says FLTA chief executive Peter Harvey MBE. "In recent years, we've seen automation gain a lot of traction as more and more large companies choose to replace their fork lifts with automated alternatives."

Consequently, with new technology come new safety measures. Simon Clarke, head of transport sector, Health and Safety Executive (HSE) explains that "new technologies and general changes in industry processes both create new risks and eliminate or reduce old risks," and these changes should "be addressed through suitable and sufficient assessment of risks by those that create them and through the adoption of appropriate controls."

The main concern with an automated future is not one of machine error, but one of human error. Automation provides many benefits, such as reduced wage bills, optimal space utilisation, operational efficiency and no training costs. However, as outlined by Harvey, the biggest benefit is its effect on site safety: "While great strides have been made to make conventional materials handling equipment safer in recent years, the majority of accidents (and resulting – often life-changing – injuries) aren't due to technological failure – but human error."

Safety is the number one concern for the warehouse.

The greatest concern when it comes to protecting personnel in the warehouse comes down to the interaction between people and materials handling equipment says Food Storage and Distribution Federation chief executive Chris Sturman. "Warehouse safety is a combination of a range of factors, with management of materials handling and movement being in the centre – the core. The other main one is the storage media; it's capacity, design specification and use," states Sturman.

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>
> **Chris Sturman**

He exemplifies the various locations and scenarios where human and materials handling equipment interaction can impact warehouse safety: off-loading vehicles, the transfer of full pallets into racking systems, picking and order assembly, cross docking and out-loading. Sturman explains that "human beings and forklift trucks and other material handling equipment have to be carefully controlled and segregated as far as is reasonably possible" to ensure optimal worker safety. He also places emphasis on correct safety training.

The FLTA also agrees that protecting warehouse personnel can be attributed to a number of factors. Harvey summarises that "safe operations rely on four factors: safe operators, safe managers, safe trucks and safe sites." He adds that although "many employers are aware of the importance of safe

Operators and workers must be vigilant and aware of dangers.

operators, sites and trucks, many companies underestimate what is demanded from a 'safe manager'," noting that by equipping "managers and supervisors to be proactive in spotting and responding to poor operator (and colleague) habits, companies can prevent the risk of complacency setting in".

For example, fork lift trucks can pose a great danger to a work place if the operator and workers are not vigilant and aware of the associated dangers. "Every working day, five workers in the UK are seriously injured in accidents involving lift trucks," says Harvey. He adds that despite workers being trained to operate the forklifts, few companies "consider the importance of making colleagues on foot aware of the risks, as well as how they can respond appropriately to threats."

Combilift managing director Martin McVicar, outlines the main safety issues in a warehouse environment being the speed of forklift operations as well as driver/operator visibility and awareness of surroundings. He explains that such issues can be overcome by looking to use pedestrian trucks when load and circumstances allow it. "They work at slower speeds and operators are more aware of the environment when using these, compared to when they are in a cab of a motorised truck," explains McVicar.

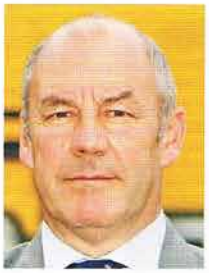
McVicar notes that when "using any forklifts (walk behind or ride on), unimpeded visibility of the loads, the forks and the surroundings is vital to reduce the risks of operators colliding with racking, obstacles or people in the vicinity." Then for "stand on or ride on models, maximum visibility for the driver with no blind spots is crucial to prevent accidents," he says.

Combilift recommend using multidirectional trucks when carrying long loads as this "is inherently safer than other types of trucks – there is less need for reversing – always a riskier manoeuvre than driving forwards – and loads can rest on the platform with no need for them to be lifted above obstacles (which is inherently dangerous as well as limiting visibility) when negotiating tight spaces," says McVicar.

"Using forklifts that are very easy to manoeuvre also reduces the risks of damage to racking which can weaken the structural integrity and lead to collapses, which makes for a hazardous working environment and potential injury to personnel," concludes McVicar.

Glasmacher agrees, noting that the combination of forklifts, driver behaviour and accountability, alongside an awareness of the surrounding environment are key contributors towards warehouse safety. He suggests that such issues can be solved by the use of the "latest RFID, radar and intelligent laser-based sensor technology". This "can be used to develop so called virtual "guardian angels" in the form of driver assistance, proximity detection and distance warning systems, as well as mobile personnel protection and speed control devices," says Glasmacher. He also adds that such innovations "reduce the instances of human error, promote better and more accountable driving behaviour."

Glasmacher provides a few examples of how to ensure that fork



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Peter Harvey

Mobile driver assistance systems can automatically detect the presence of personnel in a forklift's danger zone and send out warning signals.

failures," says Sturman. He adds that this can cause product damage worth millions of pounds but, more importantly, can cause workplace injuries and casualties.

"The need to ensure that initial equipment, vehicle and building specification is current and to appreciate the use to which the system will be used, is critical. Once installed, the need to provide the correct labelling and advice to operatives to ensure they know the tipping point between safe and overload is crucial," says Sturman. Therefore, training is then the next priority to ensure that staff acquire the right skills and competencies and can use equipment properly.

Alan Worrell of SEMA's technical committee believes that there are a few safety issues, and that the "trick is splitting the symptoms from the causes". He highlights these symptoms to be rack damage, alongside the "conflict between people and mechanical handling equipment – particularly in the loading/marshalling area."

Worrell expresses that the main factors affecting warehouse safety are the modification of a system for it to be used for something it was not designed to do, poor training and finally the act of rushing, improvising and taking shortcuts. He explains that this is an insidious problem and that "the short-cut becomes the established practice; further short-cuts might then be then made until, eventually, some sort of problem becomes inevitable."

Worrell says that the solution to avoiding any safety hazards that come from such behaviours lies with correct installation design, adhering to the correct design changes to systems as well as working within the limitations of a system to not overburden it. Good training is also key in such scenarios as "accidents and dangerous occurrences are often due to human factors," says Worrell.

SEMA places racking collapse as the biggest safety concern in the warehouse as it can seriously injure warehouse personnel or cause fatalities. However, SEMA acknowledges that there are other factors that contribute towards warehouse safety and "while racking collapse has surely got to be the most serious, responsible FLT driving, a fire-safe working environment and other industry best practices must be adopted in a robust and structured policy," says SEMA.

"Racking collapse and subsequent potential prosecution are simple to avoid where there is a safety culture and that correct protocols for inspection, maintenance and repair exist," explains SEMA. "It is the statutory duty of an employer to ensure that their staff have a safe place of work without risk to life or property and the employer must always be able to demonstrate that they have a safe system of work".

SEMA say that this is remedied by having a Person Responsible for Racking Safety (PRRS) appointed. This person would be responsible for "maintaining safe operation of the warehouse storage system, maintain rack inspection and maintenance records."

SEMA spokesman, Dagan Hyde supports this further by highlighting rack damage as one of the biggest concerns within a warehouse, noting that the rack must be designed for application. Likewise, he notes that truck and rack interface alongside driver competence are major issues when it comes to warehouse safety. This gives notion to multiple factors at play when it comes to warehouse safety. Hyde resolves that the issue can be easily avoided by "seeking expert advice to achieve the correct design from the outset".

Harvey supports this view, noting that although safety equipment can help to enhance safety and productivity, "high-quality safety training provides your operators with the necessary skills, awareness and good practice necessary to work safely and productively".

Harvey isn't alone in this belief. He says that "all available guidance makes it very clear that this is a view widely shared. Unlike safety equipment which may or may be necessary following a risk assessment, adequate training is a legal requirement."

Worrell also agrees that safety training is more important than equipment. He explains that the use of safety equipment "can help but only if it makes the job easier; if the safety equipment makes the job harder, or more time consuming, then the human factor comes into play as people will find a way around the equipment. The safe way should be the easy way."

Alongside safety equipment and training, another recommendation is a switch toward automation as it can help to take the human factor out of the equation. SEMA spokesman, Hyde highlights alternative measures that can be taken to ensure warehouse safety to include automation, training and truck-personnel separation zones.

Automation is an existing trend within the industry and is one that continues to grow. But, is automation the way forward to ensure warehouse safety?

"Automation is the way things are developing, and will improve safety, however, as we have seen recently with autonomous cars, the technology is still in its infancy," says Hyde. "Automation can be very safe and efficient, but users need to be aware of the potential limitations of flexibility," he adds.

Sturman elaborates on this, explaining "automation can play a major part in reducing risk of injury, simply by taking the people away and out of the operational environment." He adds that automated systems can help reduce handling and storage costs as well as minimising the opportunity for injuries.

Assistance systems help to reduce the instances of human error, promoting safer and more accountable driving behaviour.

"But even so," says Sturman, "these have interfaces too, even if you are using automatic vehicle loading and off-loading systems and conveyors. There will still be occasions when people are needed on an exceptional basis to go inside the envelope and these circumstances must also be planned for with written risk assessments and manuals and evidence of training."

Therefore, as highlighted by Worrell, automation may not be "a panacea but applied correctly it is cost effective and gives safe results. As with any system though the additional safety can be circumvented." Much like Hyde's comment about autonomous cars and automation being in an age of infancy, the same can be said for robotics. The growth of robotics alongside automation as a warehouse solution also comes with its own set of safety challenges. The use of robotics offer opportunity and challenges, says Hyde, noting that some key point to consider include flexibility, maintenance, life span and issues surrounding robot-personnel interfaces. ■