

Improving lift truck safety and reducing the number of lift truck-related accidents were the main themes of the recent **Fork Lift Truck Association (FLTA) Safety Conference** in the UK.

Safety in the spotlight

What causes accidents involving lift trucks? The answer may be more complicated than most people think, according to Jim Corbridge, principal specialist inspector of the UK's Health and Safety Executive (HSE).

Speaking at the recent FLTA Safety Conference in the UK, Corbridge suggested that accidents occur when 'gaps' in several different circumstances happen to align. There are hazards, he said, and protection systems managers can put in place to try and stop those hazards being realised as an accident. The trouble is, said Corbridge, that none of these protection systems are perfect: they

all have holes in them, a bit like cheese, and those holes can get bigger or smaller at different times and in different conditions. Most of the time, you get away with it because the holes don't align – but when they do, that's when you get an accident, Corbridge told delegates at the event.

There is never a single solution to reducing accidents, he stressed – managers always need to implement a combination of measures to raise safety levels.

Among the measures Corbridge recommended were:

- Carrying out thorough risk assessments;
- Eliminating the need for vehicles to

reverse wherever possible;

- Segregation of pedestrians from lift trucks;
- Segregation of small vehicles from larger ones (e.g. lift trucks and goods vehicles);
- Reviewing site layout;
- Reviewing lift truck fleets to ensure you aren't using bigger vehicles than necessary;
- Improving monitoring and supervision;
- Ensuring all vehicles are well maintained.

To underline the point, Corbridge told delegates about two recent examples of fatal accidents that could have been avoided if some of the steps shown above had been properly implemented.

The first involved a visiting lorry driver who was sheeting his load at a paper factory when he was killed by a lift truck driver reversing out of an aisle into the immediate vicinity of the lorry. A key problem here, said Corbridge, was that the reversing lift truck had no option but to penetrate an area marked out for pedestrians because of site layout. Low light levels were also identified as a contributing factor, he said. The company, which was prosecuted and fined £200,000 with £20,000 costs (around €300,000 with €30,000 costs), subsequently made numerous changes including rearranging stock, introducing a barrier system to protect pedestrians and ensuring visiting drivers were properly briefed on site rules.

"The reversing forklift had no option but to penetrate an area marked out for pedestrians because of site layout"

The second example involved a classic 'mousetrap' fatality at a pallet network depot, where a driver attempted to jump out of the lift truck as it tipped over. The tipover itself, said Corbridge, was caused by a vehicle – from which the driver was unloading – moving forward while the forks were still engaged in a load in the rear. Key factors in this accident were the lift truck driver's failure to wear a seat restraint, the lack of a designated point for marshalling staff who were directing the traffic, the absence of any traffic light system and the use of non-standard hand signals by the banksmen. This company was also prosecuted and fined £100,000 with £10,000 costs (circa €150,000 with €15,000 costs). Following the accident, the company realised it had actually outgrown the site and subsequently moved to a much larger site where there was more room to introduce safer operating procedures.

Looking to the future, greater use of sensor technology could potentially help avoid many accidents, suggested Corbridge. For example,

sensors in warehouse doorways and other key points might be used to interact with the pre-set speed and acceleration limiters that many modern vehicles already have onboard to ensure lift trucks slow down in highly populated pedestrian areas, he said.

Sensing danger

Picking up the theme of sensor technology, Dr Uwe Weiner, MD of Düsseldorf-based IWS Handling, described his firm's recent research into the lift truck-pedestrian interface, which has been sponsored by the University of Duisburg.

After analysing figures relating to lift truck accidents in Germany, Weiner's firm has concluded that there is a bow tie-shaped danger zone around trucks – an area around 10m long fanning out to the front, a similar area to the rear and two overlapping circles of around 4.4m diameter in the middle that allow for trucks' turning circles to left and right.

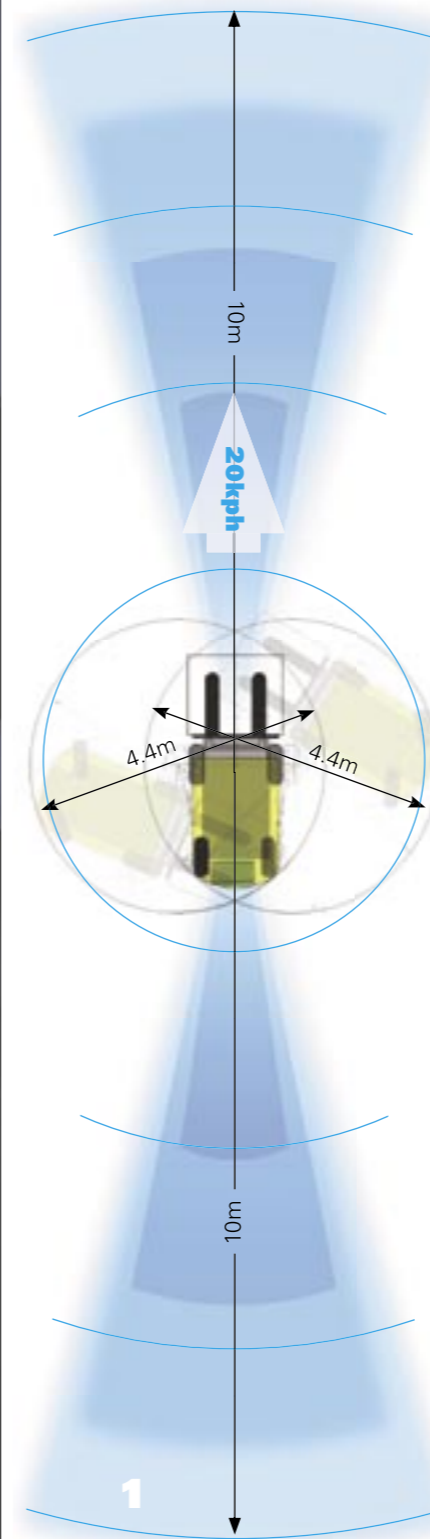
The areas to the front and rear are both 10m long because that's the typical maximum stopping distance of a truck at around 20kph, said Weiner.

Using sensors of some kind to monitor this danger zone could help reduce accidents between lift trucks and pedestrians significantly, he suggested – especially if such sensors were linked to audible warnings either on the lift truck or incorporated into the building infrastructure, or both. An analysis of several different sensor systems suggests that a combination of radar and passive infrared sensors would be most suitable and IWS is currently working on a prototype system that uses exactly this set-up, said Weiner.

Other safety concepts IWS is currently looking to develop include:

- A sensor system that detects when a lift truck is parked on a ramp and checks that the handbrake has been applied when no driver is present;
- A system based on ultrasonic sensors to detect when forward vision is obstructed by a load and restrict forward vehicle motion to a crawl in such conditions;
- A self-inflating air hose that would fit around the base of pedestrian trucks to ensure the operator's feet cannot be run over, with sensors to stop the truck immediately any impact is felt and move it sharply back the way it came by some 10-20cm.

The latter system is currently under test at a number of companies and will be debuted at the forthcoming Cemat show in Hanover in May, said Weiner. →



1. Weiner's firm has concluded that there is a **bow tie-shaped danger zone** around trucks – an area around 10m long fanning out to the front, a similar area to the rear and two overlapping circles of around 4.4m diameter in the middle that allow for trucks' turning circles to left and right.

→ Continued from page 9

Lift truck design

The design of lift trucks, of course, also formed a major part of the discussion about reducing accidents and Cat Lift Trucks' new NR-N reach truck was one of the focal points of this part of the conference.

“Driver comfort is an important part of raising safety because a comfortable and relaxed driver will be more focused on the job at hand.”

Martin McEntee, area sales manager for the UK and Ireland at Cat Lift Trucks distributor Briggs Equipment UK, outlined how the NR-N's PoweRamic mast – in which the hydraulic cylinders are incorporated in the mast profiles themselves – enhances forward vision for operators and results in up to 42% more mast rigidity. Buckling strength has also been raised by 500% as a result of the new design, said McEntee, and it has also reduced the risk of damage to hoses and cables as the lifting element is now central to the mast upright.



2

The more compact design also means that operators have 45mm more space in the cabin and this, combined with the enhanced forward visibility and improved comfort levels within the NR-N, contributes to making lift truck operation safer. Driver comfort, stressed McEntee, is an important part of raising safety because a comfortable and relaxed driver will be more focused on the job at hand.

Ancillary systems

Reducing accidents isn't all about lift truck design, however, and the conference also heard from a number of other speakers about a range of ancillary products and services to help enhance safety.

Among these other speakers was Dr Will Murray, research director of Interactive Driving Systems (IDS), who stressed the importance of appropriate driver training to safety. In association with the FLTA, IDS has just launched a new online operator assessment programme called Virtual Risk Assessment – FLT. Aimed at improving safety and productivity among lift truck drivers, it consists of a series of questions for operators to build up a profile of their attitude, knowledge, behaviour and hazard perception, before providing managers with a breakdown of risk ratings across their operators to help them plan future training needs.

Philip Alcoe, managing director of Looplifter, meanwhile, presented his firm's plastic sleeve system for use with flexible intermediate bulk containers (IBCs). The Looplifter sleeves fit into the top of any standard IBC, folding flat when any weight (like another IBC) is on top of them but popping open automatically at all other times to ensure the IBC can always be picked up easily. That, said Alcoe, means there is no need for additional staff to stand in front of an advancing forklift in order to hold the standard IBC apertures open for the forks, or for staff to climb up to the top of a stack of IBCs when a whole stack of them is being picked from – both obvious safety hazards.

Another innovative safety solution was presented by Sigma Squared Solutions in the form of the Pedestrian Alert Safety System (PASS). Developed by US firm Copar, it consists of a number of a battery-powered radio transmitters which are carried by pedestrian staff and a receiver system mounted on board each lift truck, connected to both visual and audible warning devices to alert drivers to the proximity of pedestrians whether or not they can actually be seen at the time.

Both parts of the system are self-testing,



3

according to Sigma managing director Bryan Allen – the forklift receiver checks itself constantly to ensure it can still receive signals and the pedestrian units are tested automatically when placed in a charging module.

The system can also be used to activate remote 'sky box' ceiling units that contain flashing beacons to warn pedestrians of an oncoming lift truck and in the future, it's possible that such sky boxes could in turn be used to communicate back to the vehicle to remotely slow it down where necessary, said Allen.

Monitoring and management

Demonstrating the big difference that appropriate monitoring and management can make to site safety levels, meanwhile, was a real-life example from British Nuclear Group (BNG) Sellafield.

The Sellafield site reprocesses spent nuclear fuel and as such is already handling a highly hazardous material. But despite the nature of the business, the managers in charge of waste reprocessing there said they believed goods vehicle and lift truck movements were easily the highest hazard of all on site.

Mike Palmer, senior lifting authority on the site, told the conference that three years ago, BNG realised it had quite a generic safety problem across the site and was handling over four 'significant' events a month that

involved potential or actual harm to staff. In one instance, for example, an electric powered pallet truck tipped over on an incline while unloading chemicals which, had they come into contact with the acid in the truck's battery, would have given off cyanide.

“An electric powered pallet truck tipped over on an incline while unloading chemicals which, had they come into contact with the acid in the truck's battery, would have given off cyanide.”

There were also issues with truck maintenance, traffic management and operator training, added Kevin Stilling, vehicle and lift truck safety advisor at the site. But an improvement programme put in place around 18 months ago that included elements of driver and supervisor retraining, enhanced maintenance, a review of traffic management and site layout and the establishment of common best practice standards across the site has now reduced the number of significant events to just one a month.

That's still too many, Stilling admitted, but it does represent a very significant reduction and shows how safety can be radically enhanced with the right approach. BNG continues, of course, to keep safety in the spotlight and to look for further opportunities to reduce the risks still further, he added. ■

2. Looplifter's plastic sleeve system is for use with flexible intermediate bulk containers (IBCs). (Image courtesy of Looplifter Ltd)
3. The enhanced forward visibility and improved comfort levels within the NR-N contribute to making lift truck operation safer.
4. Handling highly hazardous materials at British Nuclear Group (BNG) Sellafield. (Image courtesy of Sellafield Ltd)



4