We're on your radar – and much more

Ainsley Fraser looks at the sensors, sights and sounds of site safety.

Four flights of steel stairs and we are standing on a plant gantry walkway with a bird's eye view of a major waste site. Yes, we are clad in full safety kit including Hi-Vis jacket and trousers, hard hat with visor and reinforced rigger boots ... and it's brass monkeys (it's late April!). Below, the site is busy – and noisy, characterised by those essential (if sometimes ear-splittingly irritating) reversing bleepers, some of which sound like a half strangulated duck.

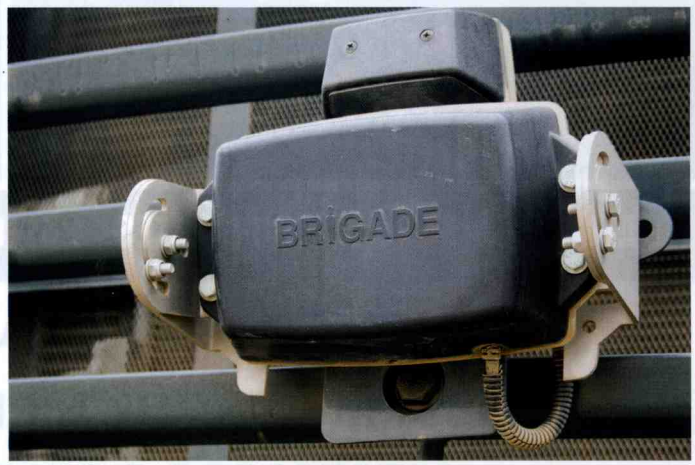
There are skip loaders and hook loaders, some with drawbar trailers, queuing to tip, but most of the activity is loading shovels, hydraulic excavator-loaders with big waste grabs – and a couple of off-highway dump trucks. Add to that a collection of high visibility and very conspicuous people. This is a safety critical environment – and the majority of the plant and equipment which is moving never leaves the site and never goes on the road – so a whole different raft of safety equipment and systems – and procedures apply.

With the pressure on, the machinery is not hanging about – this site is routinely handling eighty plus tonnes per hour ... and it has an exemplary safety and accident record. How?

There are basic audible and visible warning systems on all equipment – strobe and LED amber lighting and reversing bleepers. But there is a lot more too. The machine operatives and drivers sit in the comparatively isolated safety of their cabs. They are all highly professional, experienced operatives who have been through rigorous training and regularly do refreshers. They are all highly alert to their surroundings, with their eyes wide open all of the time... but this is where a range of technology can help to take that awareness to a completely new level.

Today's hazard detection proximity sensors, cameras and in-cab display systems can provide the operative with pretty much 360° visibility around his machine, including any blind spots. This is crucial, particularly as, in some cases, the physical height and size of the machine may mean that those blind spots can be in immediate proximity to the machine itself.

Currently, there are a number of different options, some stand alone and some combined. They all contribute to enhance safety and compliance – particularly in the



context of ISO5006, a standard for moving plant which requires that the operator must be able to 'see around the machine to enable proper, effective and safe operation'.

Currently, the most familiar systems use radar sensors to detect people and objects – stationary or moving in a defined zone. This triggers a visual and audible in-cab warning. Importantly, the systems still work effectively in harsh environments and in poor visibility, such as smoke, fog and darkness.

This basic radar 'sweep and bleep' can then be very significantly enhanced with the addition of cameras and in-cab display screens. The newest and latest camera systems use some revolutionary advanced software, effectively to 'knit together' the sector images from cameras mounted around the machine, to provide what is a continuous and uninterrupted 360 ° view of everything going on around the machine.

Then, from France, along comes a unique '3D stereoscopic technology' which can differentiate between the human form and other objects – whether they are stationary or moving. Typically, the stereoscopic camera is mounted on the back of a vehicle – and has a wide viewing area and a configurable detection zone. It recognises 'human form' using a combination of video recognition algorithms and image processing technologies. Should a pedestrian enter the selected danger zone, they will be detected in milliseconds and the machine operative will receive an alarm, supported by a view of the hazard on an in-cab monitor.

The French manufacturer (which has recently established a subsidiary in the UK) argues that historically, RFID and radar, the two most common technologies used thus far, can give rise to false alarms – which can risk the driver losing confidence in the alarm. My guess would be that most operatives would far rather have a few too many alarms than no warning at all. That said, there are obvious benefits (not least from a risk management and safety perspective) in being able to differentiate a 'life form' from a static object. In an ideal world – and maybe in future, the best of both technologies could be combined together?

A different solution to the problem involves effectively 'tagging' personnel when they are on site. Typically, a small transponder is carried on the person – maybe conveniently mounted in the hard hat. Then the on-board end of the system sets up an invisible and definable safety zone around the machine – and an alarm is triggered if and when a person with an active transponder comes within the designated zone. There is also an option for a vibrate alert in the hardhat transponder ... which could give you a buzz! These systems have been around for some time and are well established in a number of

world markets, particularly in the mining industry – but construction sites favour them too. Obviously, site discipline is paramount here – as clearly the system would not activate if a 'transponder-less' human being happened to be on site and in the wrong place at the wrong time.

So ... with a range of effective options for enhancing operative awareness of his surroundings and, most importantly, reducing and mitigating the risk of serious accidents or injuries, how big is the problem?

According to HSE, there are over 5000 accidents per year involving transport in the workplace ... and about 50 of these result in people being killed. The main causes of injury are people falling off vehicles – but also being struck or crushed by them.

Cue, return to recurring theme that waste industry safety and prevention of accidents is about training, awareness, constant vigilance, etc, etc. But this can all be backed up, supported and enhanced by the adoption and use of whatever effective and clever technology is out there to help. The harsh reality is that the waste industry features far too high up on virtually every risk list to be published ... and there are things we can all do about that.

In this feature, we are just scratching the surface of the safety systems that are available for plant which never leaves the site. So where is the boundary between road and the operating site? For me, it's the weighbridge. If the machine is operating the site side of the weighbridge – or the main gate, if there isn't one, then that is the home for this type of equipment.

As always, the Health and Safety Executive have a range of really useful information – and even a dedicated website 'Vehicles at Work', which can be found at www.hse.gov.uk/workplacetransport in addition, the HSE's leaflet 'Workplace Transport Safety – a Brief Guide' is available online at www.hse.gov.uk/pubns/indg199.htm. Another guide is produced by the CIC and CITB-Construction Skills Northern Ireland, working in partnership as the Sector Skills Council for Construction. It is part of the Skills for Business Network of 25 employer led Sector Skills Councils and okay, some parts of it are a step away from the waste industry, but it is well written and relevant nonetheless. The 140 page document can be found online at www.citbni.org.uk/CITB/files/88/88653bb6-ea0f-440e-854f-1b4dfe74ffe2.pdf

There are a number of key points of principle which can combine to make any site operate with greater safety. In our business of course, every site is different ... but the entry point is to segregate vehicles, plant and people. Establish routes and, wherever pedestrian and traffic routes cross, they should be properly marked, correctly used and, if necessary, controlled. Good visibility and clear line of sight is critical for plant equipment operatives ... and speed awareness and stopping distances play an important role too.

Around a quarter of all deaths involving vehicles in the workplace occur as a result of reversing – so if there is one factor which ought to justify the investment involved in fitting sensors, cameras, warning systems and in-cab displays, this is it. Banksmen are there too – and for good reason and it's just one of their jobs is to make sure that reversing areas are kept free of pedestrians. But the bottom line is that safety and good practice are our shared responsibility ... we're all in this together.