



MCT3158

IMAGE SOURCE: Motec GmbH

People recognition systems can prevent accidents and potentially save lives

24 February 2025 by Motec

- **Motec GmbH offers an easy-to-integrate people detection system based on HD-TVI technology to prevent accidents around mobile machinery.**
- **Occupational accident statistics highlight the high risk of serious injuries or fatalities involving agricultural, construction machinery, and forklift trucks.**
- **The increasing number of forklift trucks and fewer skilled operators necessitate the use of assistance systems for enhanced operational safety.**

- Motec's HD-TVI cameras provide high-quality, low-latency image transmission and are cost-effective, making them suitable for price-sensitive machines.
- The system includes integrated AI for reliable detection, visual and acoustic warnings, and user-friendly integration with existing analog technology.
- Motec also offers a 360-degree bird's eye view system for commercial vehicles to eliminate blind spots and enhance safety for road users.

Working around mobile machinery can be dangerous, as damage or serious injury can occur in the event of a collision. People detection systems that warn the machine operator of personnel in the vicinity can help to prevent accidents. The camera system experts at **Motec GmbH** offer a particularly easy-to-integrate solution based on HD-TVI technology.

Occupational accident statistics show that agricultural, construction machinery, and forklift trucks are among the leading types of machinery involved in serious accidents in the workplace. In view of the size of these machines and the limited visibility they afford, accidents occur more frequently and can lead to serious injuries or even death. According to DGUV statistics inadvertent contact between machinery and personnel is one of the most common causes of accidents.

Use Case Forklift

Forklift trucks make it clear why assistance systems are becoming increasingly important. According to Statista surveys, the number of forklift trucks in use worldwide is set to increase by around 50 percent by 2030. The number of skilled machine operators in the (intra)logistics sector is not expected to grow at the same rate, and full autonomy is not always practical either. . More forklift trucks operated by unskilled or inexperienced drivers is inevitably going to increase the risk of accidents. "The combination of more mobile machines and fewer skilled operators makes the use of assistance systems critical for maintaining the highest levels of operational safety," says Lutz Boettger, Vice President for Sales and Marketing at AMETEK ICVS.

One economic aspect that is of course not as important as the safety of personnel around heavy machinery is the consequential costs of work accidents. In addition to the obvious costs of lost working hours or increased insurance premiums, accidents can also impact the public image of the company.

User-friendly camera system

Manufacturers and operators of heavy machinery alike should consider assistance systems for several reasons. However, the costs of an intelligent assistance system plays a decisive role, especially for price-sensitive compact machines such as forklift trucks. Motec therefore offers an economical system that combines the cost efficiency of analog systems with the performance of digital solutions, thus offering the highest quality at a compelling price point. Dr. Stefan Wirtz, Director of Engineering at Motec GmbH, explains: "Fully digital systems are expensive and offer the inherent potential for latency or image artifacts in image transmission. What is the point of perfect image quality for the machine operator if the warning about an impending collision is received with a crucial delay? HD-TVI technology is therefore the best alternative, especially if the existing machine design is not to be changed."

HD-TVI cameras record digital images up to Full HD at 30 fps and then convert them into an analog signal for signal transmission. This allows the machine manufacturer to use existing analog technology for wired transmission with standard M12 connectors. Being able to utilize coaxial-based cable harnesses greatly simplifies the conversion of existing analog camera systems. The camera attachment points do not need to be changed either, as Motec's HD-TVI solution allows for height compensation and calibration using software. Only the camera(s) and the display need to be replaced with an HD-TVI-capable alternative. This makes integration very user-friendly and reduces the amount of spare parts required.



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Acoustic and visual warning for the machine operator

Motec HD-TVI cameras offer integrated artificial intelligence and algorithms that reliably detect people and objects in the monitored area. Motec's Development Center for Commercial Vehicle Assistance Systems (MENAS), in collaboration with various universities, has been working on innovative algorithms and systems for image analysis, object, pattern and person recognition for many years.

If the system detects people or objects in the pre-defined monitoring zone, it generates a visual warning on the display via colored overlays and triggers an acoustic alarm signal. Warning (yellow) and Danger (red) zones can be freely configured. Parts of the machine that may protrude into the field of vision, such as the lift mast of a forklift truck or the bucket of an excavator, can be excluded from monitoring via software to prevent

false alarms. The artificial intelligence integrated into the cameras also enables software updates to be installed.

Motec's people detection system based on HD-TVI technology can incorporate up to four cameras. The Heavy Duty TVI AI cameras deliver a full HD video signal at 30 frames per second and monitor a horizontal viewing angle of 158 degrees, while diagonal angles of up to 184 degrees are possible. The cameras have IP69K protection and are very compact with dimensions of around 5x4x3.5 cm. The compatible Heavy Duty TVI monitors enable the direct connection and display of up to four camera signals. The OEM's own look and feel and corporate design can be easily integrated using software.

Dr. Stefan Wirtz summarizes: "TVI technology is the perfect choice for machines where a digital system would be too expensive or would require considerable integration effort, but which still benefit from intelligent person and object detection. Better image quality than analog systems, intelligent algorithms, simple integration into the machine design and user-friendly calibration - these advantages speak for themselves. Machine manufacturers can use TVI systems to improve their customers' operational safety in a very cost-effective way."

Info box: 360-degree systems with TVI technology

In addition to people detection systems, Motec also offers a 360-degree bird's eye view systems for commercial vehicles based on the advantageous HD-TVI technology. The large blind spots of commercial vehicles can quickly lead to dangerous situations for other road users such as pedestrians or cyclists. The bird's eye view system from Motec combines up to four cameras, a powerful video controller and monitor. It provides a 3D view of the vehicle and automatically adjusts the viewing angle during turning or reversing maneuvers with heightened potential hazards. Eliminating blind spots helps maximize safety.

Source: Motec GmbH

FORKLIFTS

FORKLIFT TRUCKS