

Safeguarding workforce in Safety 5.0 era

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THE recent publication of the Garis Panduan Industri Robotik (Guidelines for Work in the Robotics Industry) 2025 by the Department of Occupational Safety and Health (DOSH) marks a proactive commitment by the government to manage workplace risks, especially the complex interaction between humans and advanced robotic systems.

The industrial landscape is shifting from conventional robots to autonomous and intelligent systems. Historically, robotics safety relied on physical isolation, where machines were confined within safety guards. Today, modern productivity requires humans and robots to share workspaces.

This evolution changes the dynamics of occupational safety and health (OSH), meaning that conventional engineering controls are no longer sufficient to protect the lives of workers.

A critical issue in this new environment is human-robot interaction (HRI). The use of collaborative robots (cobots) introduces new human factor and ergonomic and cognitive risks.

Repetitive monitoring tasks can lead to vigilance decrement. If this persists, it results in a decline in alertness, where operators may miss critical signals. This leads to complacency, which dulls a worker's perception of risk and increases the probability of human error.

Workers also face the risk of "automation surprise", which occurs when a robot acts unexpectedly, causing mode confusion. For instance, an operator might believe a robot is fully stopped when it is merely in a pause mode. Such misunderstandings can lead to failure in situational awareness, which may result in serious accidents.

To address these challenges, the Guidelines for Work in the Robotics Industry emphasises the principle of prevention through design (PTD). In line with Section 20 of the Occupational Safety and Health Act 1994 (Act 514), designers and manufacturers must ensure robotic systems possess intrinsic safety features.

The integration of smart features, such as Adaptive Safety Zones, is now mandatory. Using advanced sensing and computer vision, robots can detect human presence and automatically slow down or stop. This ensures safety is built into the DNA of the robot rather than relying solely on manual procedures.

Managing robotics safety requires a balance between technological advancement and human factor principles. The adoption of the guidelines and the Safety 5.0 framework is a strategic step towards a safe and sustainable work environment in line with our national aspirations.

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