

Article

Employment, Workplace Relations & Safety



Collaborating With Robots in the Workplace

Effectively managing the physical and psychological risk of persons working with autonomous collaborative robots and the legal considerations that arise out of these “blended” workplaces.

By Patrick Walsh

Currently, there is not a significant amount of guidance for organisations looking to implement safety measures for the use of robots in the workplace. However, a useful starting point is the Guidelines for Safe Collaborative Robot Design and Implementation published by the Centre for Work Health and Safety NSW. Any person who meets the definition of an officer within a person or business conducting an undertaking (**‘PCBU’**) that utilises autonomous collaborative robots (**‘Cobots’**) should familiarise themselves with these guidelines as part of their obligation to acquire and keep up-to-date knowledge of work health and safety matters (see section 27(5)(a) of the *Work Health and Safety Act 2011* (Cth) and the various state and territory Acts).

Automation of work tasks and managing the physical risks that arise out of the interaction between the machines carrying out those tasks and the workers who maintain and/or control those machines is not a new concept in occupational health and safety, but the level of complexity with which Cobots can interact with human workers is undergoing a step change with the accelerated rise in artificial intelligence and advanced robotics; sometimes referred to as the Fourth Industrial Revolution.

Importantly for PCBUs that utilise Cobots, this level of complexity requires careful consideration of the appropriate control measures to deal with the physical and

psychological risks to workers who interact with Cobots in the workplace.

Physical risk

In September 2020, the U.S. District Court for the Middle District of Alabama, Eastern Division ordered JOON LLC, trading as AJIN USA (**‘AJIN’**), to pay a \$500,000 fine and \$1,000,000 in restitution to a deceased woman’s estate after AJIN pleaded guilty to charges relating to the woman’s death in the workplace.

AJIN is a manufacturer that supplies parts to Hyundai and Kia and operates facilities in the U.S.A, South Korea, China, and Vietnam.

The woman and three co-workers entered a robotic cell on the assembly line to clear a sensor fault when a robot inside the cell restarted and crushed the woman. AJIN had developed lockout/tagout procedures to prevent this type of incident, but these had not been enforced by the company in the years before the woman’s death.

An example such as this, which utilised administrative controls to manage the risk, illustrates some of the critical physical threats posed by using Cobots in the workplace. One of the ways in which the risk can be effectively managed is to prevent access to the areas in which Cobots operate (i.e. the Cobots and humans involved

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in their operation do **not** work in collaboration with each other). However, it will still be necessary, from time to time, to access the area for maintenance or repair work. When access is granted, the complex nature of Cobots can make the processes and procedures used to make the area safe to work in challenging for human operators to follow.

The extent to which PCBUs will need to have controls in place and the nature of those controls will largely be dictated by the type of physical interaction between Cobots and human workers in the workplace. This can range from direct collaboration on particular tasks to no physical interaction because Cobots and human operators have separated workplaces.

Standards such as ISO/TS 15066:2016 specify safety requirements for collaborative industrial robot systems and provide helpful guidance for PCBUs, particularly regarding managing the physical risks associated with Cobots.

Psychological risk

An increasing issue for PCBUs that use Cobots is managing the psychological risk that Cobots pose in the workplace.

The Work Health and Safety Act 2011 (Cth) requires that organisations monitor the workplace “for the purpose of preventing illness or injury of workers arising from the conduct of the business or undertaking.” This means that consideration must be given to the potential for psychiatric injury or ill health that could arise from the interaction between human workers and Cobots.

It’s useful to consider the example of unmanned aerial vehicle (‘UAV’) pilots (highlighted in this [article](#) published by the ABC). By piloting their vehicles from a location remote from the UAV itself, the physical risk to the pilot of being shot down is eliminated. However, the fact that UAV pilots were suffering rates of psychiatric injury higher than traditional pilots would tend to suggest that, although the physical injury risk had been eliminated, the risk of psychiatric injury had been increased.

In *Redefining Safety in Light of Human-Robot Interaction: A Critical Review of Current Standards and Regulations*¹,

¹ Martinetti et al, 3:666237

the authors propose four different dimensions of safety with the use of robots and artificial intelligence, being:

1. interaction (social and physical interaction);
2. cyber (storage of personal information and cybersecurity);
3. temporal (changes to the nature/type of risks as updated software and machine learning change Cobot capability); and
4. societal (societal change as Cobots replace workers or change the nature of their jobs)

I have highlighted some of the risks associated with physical interaction above, but PCBUs also need to consider how to manage the risk of adverse consequences to workers’ mental health posed by their interactions with Cobots. Some of the examples considered by the authors of this paper include:

- the cognitive load on human operators as Cobots reduce cognitive load (consider airline pilots trying to remain alert while the aircraft is flown on autopilot) or increase the cognitive load (Cobots completing tasks more quickly than human co-workers can manage);
- dissociation between the human operators and the “real-world” consequences of the undertaking (as exemplified by the UAV operators);
- social isolation from human co-workers as interaction with Cobots and separation from human co-workers increases in the workplace; and
- the extent to which Cobots can collate data about the performance of their human operators/co-workers and the potential for misuse of that data.

To effectively manage risks to workers’ mental health, PCBUs will need to ensure they have adequate systems in place addressing the following:

1. Selection of workers who will interact with Cobots on a regular basis

Measures such as obtaining a mental health certificate or record and potentially psychological

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testing should be used to ensure that workers have the necessary attributes to perform their roles safely.

2. Training

Training ought to be used not just to ensure that workers are competent to perform their role because they have the necessary experience, skills and qualifications, but also to be sufficiently aware of the risks involved and the measures in place to manage those risks.

3. Monitoring

Use of quantitative and qualitative methodologies (such as regular audits, surveys, and consultation) to monitor the mental health of workers who regularly interact with Cobots to ensure potential risks to mental health are identified before the worker sustains a psychiatric injury.

Conclusion

Workplace safety is a very dynamic area of law. Although legislative change is infrequent, the risks that arise in the workplace are constantly changing and evolving as the use of new technologies, such as Cobots, increases. Businesses and PCBUs must keep pace with these changes by implementing new control measures that adequately manage the risks. The speed with which technology is evolving in the field of robotics makes this a challenging area of safety, particularly as the recent developments in AI (such as the infamous ChatGPT) have illustrated the potential for robots to interact with humans.

In designing and managing safe workplaces, PCBUs would be remiss not to ensure they adequately control not just the risk to the physical safety of their workers, but also the psychological safety.



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