

Making workplaces safer with behavioural science, digital tech

By Victor Seah and Narendranath PN

A RECENT spate of fatal accidents has thrust workplace safety and health into the spotlight. As of Sep 1, there were 37 workplace deaths this year, more than the 30 deaths in 2020 and equal to 2021's full-year total. For the first half of 2022, the construction sector accounted for the most workplace deaths and major injuries, while overall workplace deaths doubled to 28 from the previous six months, according to official statistics released on Sep 16.

This increase in workplace deaths, especially in construction, has been attributed to tighter timelines, manpower shortages, and complacency in the aftermath of Covid-19. The pressure to meet shorter deadlines on long-delayed projects may have resulted in safety being overlooked, longer working hours, and increased worker fatigue.

In response, the government has introduced measures to stem workplace accidents. These include the Ministry of Manpower's new code of practice on the workplace safety and health (WSH) duties of chief executives and boards, designed to hold employers accountable. The code makes it mandatory for companies to complete a safety time-out, and includes a revised demerit point system.

Such measures are important as they demonstrate a commitment to safety by both government and management – and have proven effective. In 2019, when setting a 2028 goal of being among the countries with the safest workplaces, the WSH Council noted how Singapore's workplace

fatal injury rate had declined by more than 75 per cent since the WSH Act was enacted in 2006.

Yet as the economy reopens post-Covid, accident rates have risen again – and this must be addressed.

Going beyond 'carrots and sticks'

Behavioural science offers ways to shape safety behaviour beyond the traditional carrot-and-stick approach, using our understanding of human forecasting and decision-making.

For example, Singapore Power seeks to reduce utilities consumption by providing graphs in utility bills that compare a household's usage with the neighbourhood and national averages. There is evidence that this can cause households to reduce their utilities consumption, especially for those who are shown to consume more than their neighbours.

Behavioural science has also been applied to reduce vehicle speeds for road traffic safety. For instance, the narrowing of roads encourages careful driving. Gradually reducing the distance between visual cues, such as roadside poles and road markings, also gives drivers the false perception that they are moving faster. There is evidence, outside of Singapore, that well-designed roundabouts can significantly reduce the frequency and severity of traffic accidents.

In situations with narrower roads and roundabouts, drivers are required to engage in deliberate and controlled thinking – for instance, is that person standing on the central divider about to cross the road? This is what researchers call System

2 thinking, as opposed to System 1 intuitive and automatic thinking, such as: "The traffic lights have turned green, I can drive off now." In the latter situation of automatically driving off, a driver may fail to keep a proper lookout and cause an accident such as driving into a jaywalker.

The same failure to think consciously and deliberately can explain many workplace accidents. Central to existing safety practices focused on safety culture, such as providing workers with written instructions on safe work procedures, is the assumption that workers think deliberately and consciously – in this case, that they will attentively read the instructions.

Building safer workplaces with behavioural insights

When workers are attentive and conscious, they are likely to also act safely. In fact, one approach to achieving workplace safety is to induce a perpetual state of active, conscious wariness towards risk.

In contrast, when workers engage in unconscious and automatic thinking, they are at heightened risk of accidents. Furthermore, the more practised and experienced the worker is, the greater the tendency for automatic thinking and complacency. Intervening to disrupt automatic thinking in high-risk situations – using well-designed reminders, for instance – can thus help to prevent workplace accidents.

However, even when workers consciously pay attention to safety reminders, they may still judge that they are at low risk of a workplace accident, thinking:

"This won't happen to me." This optimism bias, or the tendency to downplay the risk of negative events happening to us, can lead to complacency and reduce the effectiveness of safety messages.

Here too, behavioural science offers useful insights. There is evidence that optimism bias can be reduced by shrinking the perceived difference between the "target" in the message – say, the victim of a workplace accident – and the message "recipient", or the worker viewing the message.

Safety messages might thus be made more effective through personalisation: presenting a target that the message recipient is likely to see as similar, whether in age, gender, race, body size, or so on.

Clearly, such personalisation is only feasible at scale with technology. Singapore's WSH 2028 vision has three core strategies: strengthening WSH ownership, enhancing a focus on workplace health, and promoting technology-enabled WSH.

In line with that third strategy, digital transformation company Temus is developing "safety wearables": on-body devices that obtain data from sensors and give operators a remote view of their workers in action.

Safety wearables can identify when a worker is in high-risk situations, such as being in front of a heavy vehicle that is in operation. A just-in-time safety reminder can then be delivered, prompting both the worker and heavy vehicle driver to think deliberately and consciously, thereby avoiding accidents.

Digital technology can also make reminders more effective by making them

engaging. Safety messages can work only if the recipient reads them. Digitally delivered messages can be made visually varied to avoid the danger of "sensory adaptation" – the tendency to ignore a recurring message or sensation – and gamified to continually engage the worker.

The WSH 2028 vision recognises the need for systems that "empower workers to stop work in unsafe conditions". Cloud-connected safety wearables can do so by allowing for the easy and anonymous reporting of near-misses and unsafe conditions.

One way to create a culture of wariness is to encourage workers to act even on ambiguous or "weak" safety indicators. For example, workers who notice a clanking in their machine, or a slight tilt in a crane-lifted load, should be encouraged to report such incidents. Safety wearables can thus include a camera and a streamlined process for reporting unsafe conditions. The digital medium can also facilitate a sense of anonymity, especially if reports are sent to recipients other than the worker's immediate supervisor.

On their own, behavioural insights can inform workplace safety and health practices. Combined with digital technologies such as cloud-enabled safety wearables, such insights have the potential to disrupt workplace dangers and literally save lives.

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