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Can modern technology improve health and safety in the construction sector, and save lives?

The mining and construction sectors, historically, have been highly labour-intensive, with both being large-scale employers. Both sectors also consist of a diverse range of employers from small-scale operations all the way through to complex, multi-site operations. And both sectors have recently had to grapple with significant challenges, including the international and domestic economic downturn, significant retrenchments, escalating costs, and health and safety performance.

With the most significant number of fatal and other accidents in the mining sector being attributed to falls of ground and machinery-related accidents, the mining sector has been reviewing its medium to long-term mining strategy, with a strong emphasis on increased mechanisation, and ultimately, automation, which is becoming increasingly possible by the phenomenon referred to as the Fourth Industrial Revolution, the Internet of Things (IoT), and artificial intelligence (AI).

The mining sector has embraced the Fourth Industrial Revolution, IoT, AI, and the understanding that without technological progress, it is unlikely to achieve its target of zero-harm, and the successful implementation of health and safety programmes in support of this. The technology programmes in the mining sector are being accelerated, particularly those in relation to technology that avoids the exposure of employees to adverse ground conditions, and the interaction of persons and machinery, to address these two aspects which contribute significantly to fatal and other accidents in the mining sector.

The question is whether similar technology can be applied in the construction sector to address the significant hazards faced by construction workers daily. To address this question, it is important to focus on two aspects. The first of these is whether the primary causes of accidents in the construction section are broadly similar to the mining sector. And if not, are these unique causes, at the very least, capable of being addressed by technological advances. The second aspect is whether the construction sector, which will remain highly labour-intensive for the foreseeable future, can, because of the high levels of employees required, practically address health and safety through technological advances.

Most fatal and other accidents within the construction sector involve machinery, falling from height, and "handling" of construction materials (fingers, hands and other limbs). As with the mining sector, the machinery accidents in the construction sector relate to moving mobile machinery and interaction with personnel, but also include rotating machinery, lifting equipment such as cranes, and unguarded energy sources, including hydraulic, pneumatic and stored energy.

The basic systems that are implemented to avoid these accidents, rely heavily on action from the operators and the individual employees themselves, through for example, the implementation of the "3m Rule", which requires persons to be at least three metres away from moving mobile machines at all times. Lifting accidents rely on the operator of the crane and persons giving signals to the operator, and the individual employees, who are situated underneath the load or close to the load.

Where revolving machinery is involved, accidents often occur because the guarding is not adequate, or is removed, or is bypassed. The common theme is that several of the accidents can be attributed to human behaviour. The primary aim of implementing technological improvements is to avoid over-reliance on human behaviour and to implement what is commonly referred to as a "hard barrier" that excludes the need for human intervention. Examples include personnel/machinery warning and anti-collision systems that do not rely on intervention by the operator to bring the machinery to a stop before the interaction occurs.

While technological advances will assist, in the interim it is essential for all stakeholders (clients, agents, principal and other contractors and the employees) to "go back to basics". The back to basics programme should have as its starting point identification of the health and safety responsibilities that are placed on the stakeholders (including employees themselves) by the provisions of the Occupational Health and Safety Act 85 of 1993 (OHSA) and the various Regulations, which are in force in terms of the OHSA, such as the Machinery Regulations and the Construction Regulations.

It is, unfortunately, disappointing that there is often a lack of understanding of the legal responsibilities that are placed on employers and employees in terms of the OHSA and the Regulations and, critically, those persons who manage and supervise construction work. No health and safety programme is complete without a component that ensures that managers and supervisors are competent to hold the management and supervisory position, for example that they are fully familiar with the OHSA and its Regulations, the work sites, and know and understand the hazards to which persons are exposed, when allocating tasks.

The back to basics approach requires employers, in respect of their own employees, and other persons who may be affected by their activities, to at the very least focus on the following:

- conducting appropriate hazard identification and risk assessments comprising baseline, issue-based and continuous hazard identification and risk assessments;
- implementing appropriate measures to address the identified hazards and assessed risks, comprising codes of practice, standards, procedures and instructions;
- implementing a comprehensive health and safety training and communications system, aimed at communicating the hazards and the measures to address the hazards;
- appointment of competent supervisors whose task it is to implement the first three components;
- the implementation of an over-inspection system that is designed to "close the loop"; and
- the implementation of contractor management system, which is aligned with the previous five components.

It is possible, given the high-labour intensity of the construction sector, that the move to significant mechanisation and automation may not be practical in the near term, emphasising the need to implement health and safety programmes that focus on "back to basics" in the interim.

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