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PROSPECT AWARDS

CRITICAL MINERALS



THE MYTH OF 'GUARDING BY LOCATION'

MARTIN ENGINEERING PROVIDES A CASE FOR GLOBAL STANDARDS IN CONVEYOR SAFETY.



ALL MOVING OR ROTATING COMPONENTS SHOULD BE GUARDED, REGARDLESS OF LOCATION.

Safety regulations are rarely arbitrary. They are generally based on a history of reported injuries and fatal accidents caused by a set of circumstances that regulators and insurers deem dangerous enough to require explicit rules to prevent.

But rules can vary between countries (and within countries) to the extent that the definition of what is safe and unsafe can appear subjective and, in some cases, can present more design and safety issues than the regulation is attempting to remedy.

A key example is the concept of 'guarding by location' – ie guarding that is the result of the physical inaccessibility of a particular hazard under normal operating conditions.

Machinery may be safeguarded by location if the distance to dangerous moving parts is greater than the prescribed safety distance, which varies by jurisdiction.

Most people readily accept that conveyors and other machinery require safety guards when positioned near workers or walkways. Guarding by location is the assumption that when hazards are positioned beyond the normal reach of a worker, they don't require a guard. Yet they can still present a serious hazard.

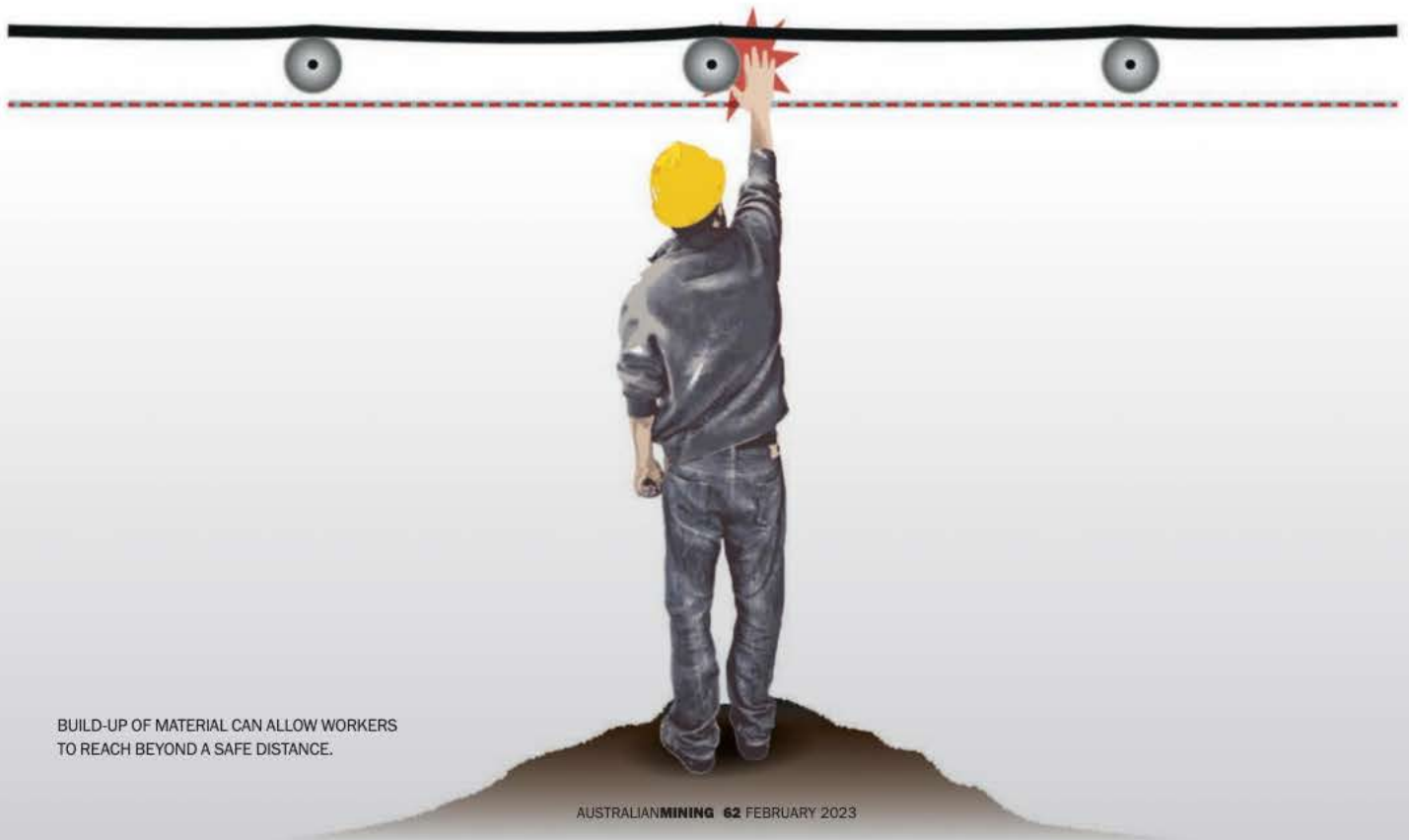
Hazards from above

By not requiring a physical barrier, guarding by location creates what can be considered an exception to the general requirements for the guarding of hazards in the workplace.

There are several hazardous locations that are beyond the normal reach of a worker when working or walking under or around elevated conveyors. These hazards are considered to be guarded by location, often found in or around nip points between the belt and return rollers or drive components such as pulley shafts, couplings, drive belts, gears and chains. Additional hazards from falling components may be inadvertently ignored if considered guarded by location.

Regulations and standards

Regulations usually stipulate the distance at which conventional barrier guards must be located. Some jurisdictions specify the hazard must be at least 2.1m from the work surface



BUILD-UP OF MATERIAL CAN ALLOW WORKERS TO REACH BEYOND A SAFE DISTANCE.

| COUNTRY | DISTANCE | SPECIFICATION |
|---------------|---------------------------------------|--|
| Australia | 2.7m | Any nip or shear point is considered accessible if it is located less than 2.7m above any floor, platform, goods, or materials. (AS/NZS 4024.3610) |
| Brazil | 2.7m | Exempted from guarding requirements over 2.7m provided there is no circulation nor permanency of persons in [the] hazardous areas. NR-12 (Section 12.85.1) |
| Canada | 2500-2700mm (depending on province) | From the floor or working platform. (CSA Standard Z432 [R2014] Safeguarding of Machinery) |
| Europe | Low risk - 2500mm; high risk - 2700mm | Clear height under moving parts. (DIN EN 620 - Continuous handling equipment and systems - Safety and EMC requirements for fixed belt conveyors for bulk materials) |
| South Africa | 3.5m | Any pulley or idler, which is 3.5m or more in height and therefore beyond an upward reach, may be regarded as being positionally safe and need not be guarded. (CMASA: Safety Around Belt Conveyors Guideline) |
| United States | 2.1m | Guards shall not be required where the exposed moving parts are at least seven feet (2.1m) away from walking or working surfaces. (MSHA regulations in 30 C.F.R. sections 56/57.14107) |

DISTANCE REGULATIONS BY COUNTRY
(FROM MARTIN ENGINEERING FOUNDATIONS FOR CONVEYOR SAFETY, 1ST EDITION, 2016)

or floor; other regulations require greater distances.

Worker risks from guarding by location

By determining a general safe height for all locations, some workers may be safeguarded while others are not.

For example, taller employees (1.82m or more) can easily suffer an injury reaching up into a moving component that is 2.13m above the ground. Working above machinery that is considered guarded by location exposes workers to increased severity of injury if they slip or fall to a lower level.

The absence of specific global standards is a fundamental problem for conveyor designers. Without such uniform standards, equipment that is manufactured in one country to be installed in a second country may not be compliant for transfer or resale in a third country. The variation on standards from 2.1-3.5m is too great to assure global compliance.

The overall conclusion is that issues which allow or even encourage risky behaviours around conveyors - usually in order to maintain production or prevent equipment damage - are generally not negated by location or position.

Most regulations do not account for the potential build-up of spillage underneath the conveyor or in walkways, which can easily change the distance between the working surface and a hazard. It is also fairly common practice to deliberately collect a pile of material or fill a bin to gain access for service or inspection of an elevated component.

Using tools and methods that extend a worker's reach while the belt is running is a hazardous activity that can contribute to serious - possibly fatal - accidents.

Best practice

Exemptions such as guarding by location do not fully address the dangers explained here. As a result, rules defining the practice become ineffective as a safety measure, especially where belt conveyors are concerned.

Despite its acceptance in various regulations, the practice of calling moving components on conveyors 'guarded' solely because their installation is at least a specific distance from the worker(s) is an outdated concept and ineffective in application. It should be discontinued.

The logical solution is to simply install guards and baskets to protect

workers from lateral and overhead hazards, while still offering safe and easy access.

For maximum risk reduction, all nip points, shear points and moving or rotating components should be guarded, regardless of location or access. Many vendors can fabricate and supply guards of all types to fit virtually any application needed.

However, there is also no global standard for guard mesh sizes and mounting distance from the hazard. Most standards use a gauge to measure the distance, which varies by mesh size, but these gauges were typically designed for the machine

tool industry, where a worker is placing and removing work pieces from a machine.

The use of the gauge is not necessarily appropriate for bulk material handling, where the purpose of guarding is to prevent inadvertent contact with a hazard. Most guarding standards allow alternate approaches if the reasons are documented through risk analysis.

The small mesh sizes required by the tool when a bulk material handling guard is placed relatively close to a hazard greatly reduces the ability to inspect components without removing the guard, thereby encouraging guard removal for routine inspections.

It would be far better (and safer) to standardise on a few mesh sizes and mounting distances, allowing maintenance workers to build guards to a short list of materials, using standard mounting distances and eliminating the use of the gauges.

Putting an end to the myth

Despite its nearly global acceptance as a concept in industrial safety, the practice of guarding by location remains a particular problem for overhead conveyor applications.

It's time to accept that as far as conveyors are concerned, guarding by location is a myth. As such, it's a concept that should be abandoned in order to make conveyors - and those who work on and around the equipment - safer. □



OVERHEAD BELTS AND ROLLERS SHOULD BE GUARDED TO PREVENT NIP POINT INJURIES AND FALLING COMPONENTS.

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