

DRY CARGO

international

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ISSUE NO. 274 NOVEMBER 2023



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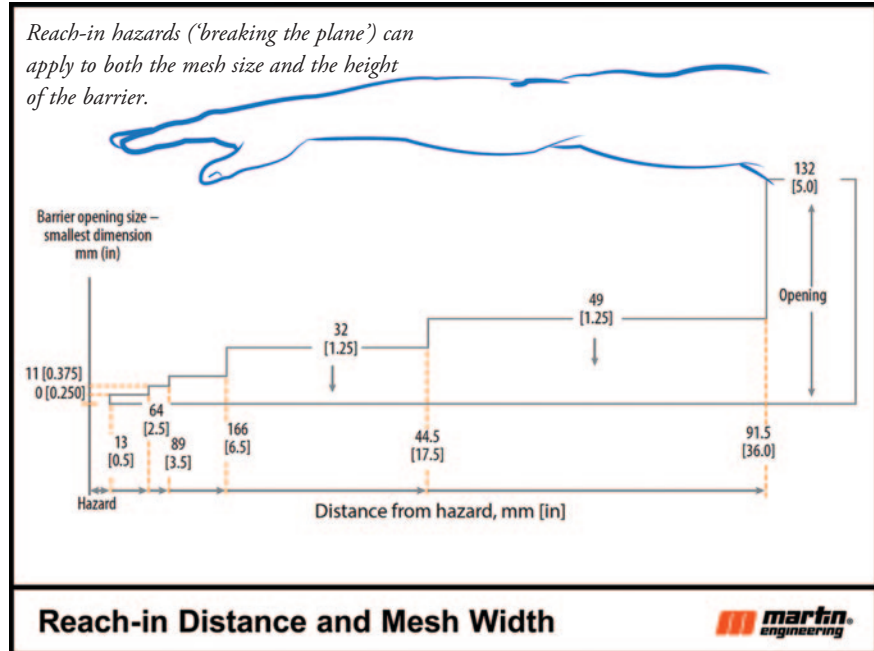
Guarding by location: danger and compliance

A global expert in conveyor safety is disputing the idea that putting conveyor equipment out of reach or inconveniently placed away from workers — known as ‘Guarding by Location’ — is a valid form of safety, write *R. Todd Swinderman, P.E./CEO Emeritus/Martin Engineering* and *Daniel Marshall, Process Engineer, Martin Engineering*. After decades of safe equipment design and comprehensive conveyor safety training in the bulk handling industry, Martin Engineering experts have witnessed where ‘guarding by location’ has led to a lapse in workplace safety, resulting in injuries and — in some cases — fatalities.

Most people readily accept that conveyors and other machinery require safety guards when positioned near



Unguarded return rollers over walkways can fall and produce a serious hazard (all pictures: ©Martin Engineering).

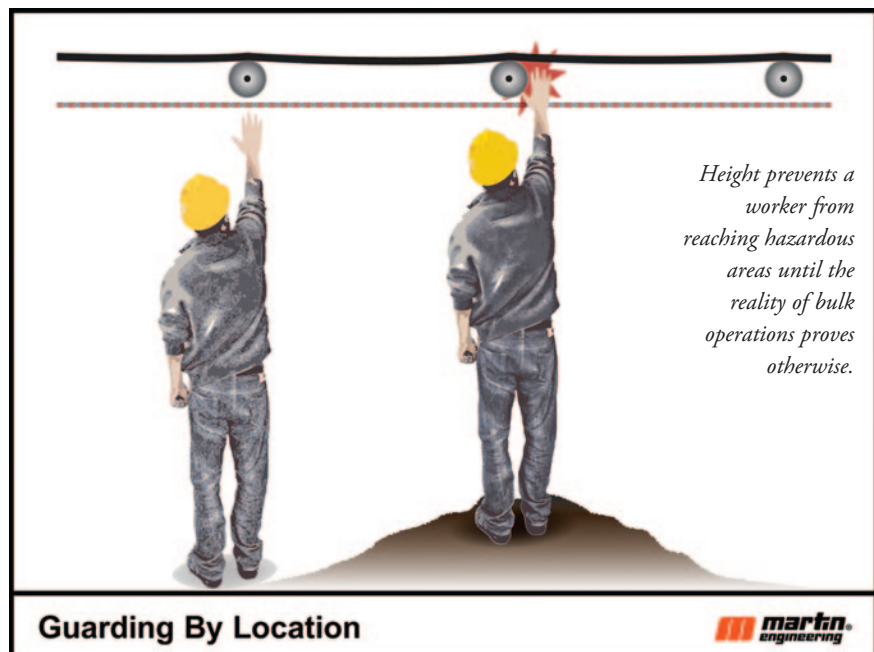


workers or walkways. Guarding by location is the assumption that when hazards, such as moving conveyor belts, are positioned beyond the normal reach of a worker they don't require a guard. Yet they can still present a serious hazard.

WORKER RISKS FROM GUARDING BY LOCATION

Some regulations define a general safe height for components based on the average height of workers. This means taller employees (1.82m/6ft. in height or more) can easily suffer an injury reaching up into a moving component that is 2.13m /7ft 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.

Most regulations do not account for the potential buildup of spillage underneath the conveyor or in walkways, which can easily change the distance between the working surface and a hazard. It's also fairly common practice to purposely 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 — and possibly fatal — accidents.



HAZARDS FROM ABOVE

By not requiring a physical barrier, guarding by location creates what is considered by some to be an exception to the general requirements for the guarding of hazards in the workplace. Several hazardous locations are beyond the normal reach of staff when working or walking under or around

elevated conveyors. These hazards are commonly 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.

GUARDING BEST PRACTICES

The logical solution to guarding by location 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



Return roller guards ensure detached rollers don't pose a hazard to workers or harm the system.



All moving or rotating components should be guarded, regardless of location.

points, shear points and moving or rotating components should be guarded, regardless of location or access.

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. When a bulk material handling guard is placed relatively close to a hazard it 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 standardize 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. Below is the recommendation included in Martin Engineering's book FOUNDATIONS for Conveyor Safety.

PUT 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.

ABOUT THE AUTHORS

R.Todd Swinderman served as President of the Conveyor Equipment Manufacturers' Association and is a member of the ASME B20 committee on conveyor safety. Swinderman retired from Martin Engineering to establish his own engineering firm, currently serving the company as an independent consultant.

Daniel Marshall has presented at more than fifteen conferences and is sought after for his expertise and advice. He was also one of the principal authors of Martin's FOUNDATIONS™ *The Practical Resource for Cleaner, Safer, and More Productive Dust & Material Control, Fourth Edition*, widely used as one of the main learning textbooks for conveyor operation and maintenance.

ABOUT MARTIN ENGINEERING

Martin Engineering has been a global leader in bulk material handling for more than 75 years, continuously developing new solutions to make high-volume conveyors cleaner, safer and more productive. The company's series of Foundations™ books is an internationally-recognized resource for safety, maintenance and operations training — with more than 22,000 print copies in circulation around the world. The 500+ page reference books are available in several languages and have been downloaded thousands of times as free PDFs from the Martin website.

Martin Engineering products, sales, service and training are available from 17 factory-owned facilities worldwide, with wholly-owned business units in Australia, Brazil, China, Colombia, France, Germany, India, Indonesia, Italy, Malaysia, Mexico, Peru, Spain, South Africa, Turkey, the USA and UK. The firm employs more than 1,000 people, approximately 400 of whom hold advanced degrees.

Nominal Guard Mesh	Mounting Distance from Hazard	Typical Applications
Woven Wire Mesh 12.7 x 12.7 x 2 mm [≈½ x ½ x 0.08 in.] wire	50 mm [≈2 in.]	Couplings, belt and chain drives, guard area of less than 0.5 m² [≈5.38 ft²]
Flattened Expanded Metal 13-Gauge 12.7 x 12.7 x 2 mm [≈½ x ½ x ½ in.]	50 mm [≈2 in.]	Couplings, belt and chain drives, guard area of less than 0.5 m² [≈5.38 ft²]
Welded Wire Mesh 2 x 2 x 0.12 or 0.16 in. [≈50 x 50 x 3 or 4 mm] wire	200 mm [≈8 in.]	General area guarding, barrier guards on idlers and pulleys, guard area of less than 0.5 m² [≈5.38 ft²]
Laser-Cut Sheet Metal Guard 11-gauge	200 mm [≈8 in.]	Floating guard panels designed for frequent removal, guard area of less than 0.5 m² [≈5.38 ft²]
Chain Link Fence 9-gauge woven fabric 2 x 2 in. normal size [4 mm wire, 50 x 50 mm normal size]	500 mm [≈20 in.]	Falling material guards up to 200 mm [≈8 in. in any dimension] minus nominal bulk material size. Use 6-gauge wire for larger lump sizes.

Guarding Mesh Sizes & Mounting Distances