

Conveyor hazards in shake and shingle mills

Conveyors are useful for moving materials quickly, but operating an unguarded conveyor can lead to serious injury or death. As an employer, you are responsible for ensuring that your conveyors have adequate safeguarding and that your workers are trained to work safely on and around conveyors. Sections 12.23 and 12.28 of the Occupational Health and Safety Regulation describe requirements for guarding and emergency stopping devices on conveyors.

Unguarded tail spool leads to amputation

While working with an unguarded tail spool, a worker used a stick to clear debris from the underside of the belt. When the stick got caught in the spool, the worker instinctively held on to the stick. His arm followed the stick into the nip point, leading to an amputation.

What are the hazards of unguarded conveyors?

There are two types of conveyors used in shake and shingle mills: belt/chain conveyors and roller conveyors.

Belt/chain conveyors

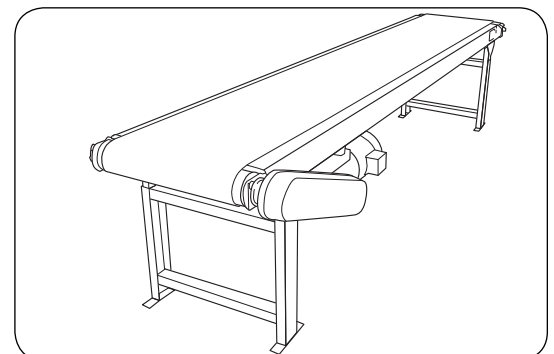
The main sources of injuries associated with unguarded belt/chain conveyors include:

- Power transmission drives (V-belt or chain-sprocket drive and transmission)
- Return non-powered rollers
- Parts of the conveyor belt around the head or tail spool

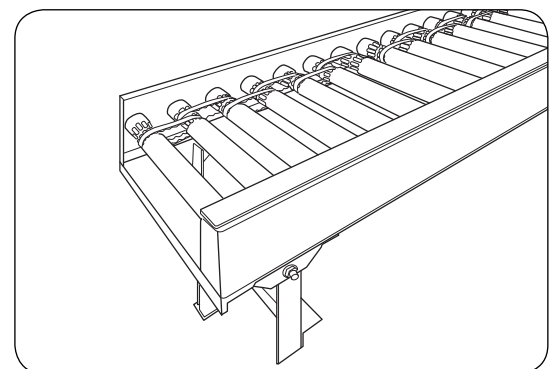
Roller conveyors

Roller conveyors have in-running nip points between the carrier rollers and belt, as well as between the chains and sprockets. The nip points are hazardous because they can snag and pull hands, hair, clothing, and loose jewellery.

Employers are responsible for protecting workers by providing safeguards that prevent contact with moving parts on machines.



Belt/chain conveyor



Roller conveyor

Safeguarding belt/chain conveyors

For belt/chain conveyors, hands and fingers must not be able to reach the pinch point. The V-belt or chain sprocket must be guarded by a fixed barrier guard made of wire mesh, with openings that meet *CSA Standard Z432-94, Safeguarding of Machinery*. The following requirements apply:

- Both the underside and backside of the guard must be enclosed to prevent contact with moving parts.
- The in-running nip point between the running belt or chain and the head or tail spool must be fully enclosed (with access to the belt and spool) for a minimum of 1 m back from the centre line of the spool.
- The spool must be designed and fabricated to allow tracking adjustments (which must be done when the belt is moving) to be performed without removing the boot guard.
- Unless worker access to the conveyor is completely prevented by guarding, an emergency stopping system must be installed. In case of accidental contact, an emergency pull wire running the length of the conveyor acts as the “first/last chance” to stop the machine.

Safeguarding roller conveyors

Where possible, roller conveyors should have permanent, adjustable barrier guards installed to protect workers from nip and shear points. Adjustable barrier guards allow the safeguarding of the unused section of rollers closest to the worker when transporting small items that do not require the use of the entire roller width.

When fixed guards are not practicable, there must be an emergency stopping system that meets the requirements of section 12.28 of the Regulation (for example, a pull wire running the length of the conveyor).

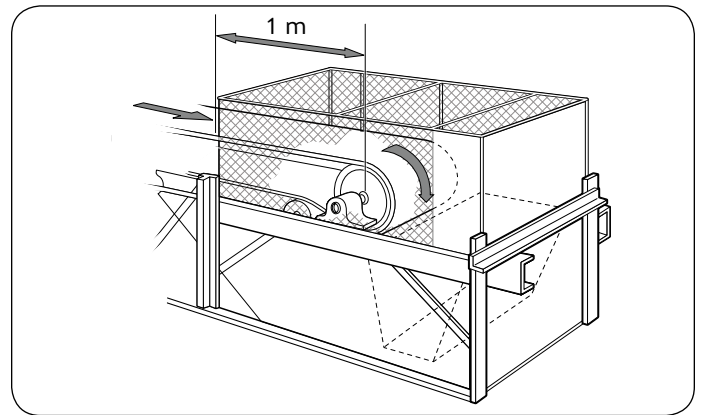
Fixed barrier guards

Fixed barrier guards must follow these requirements:

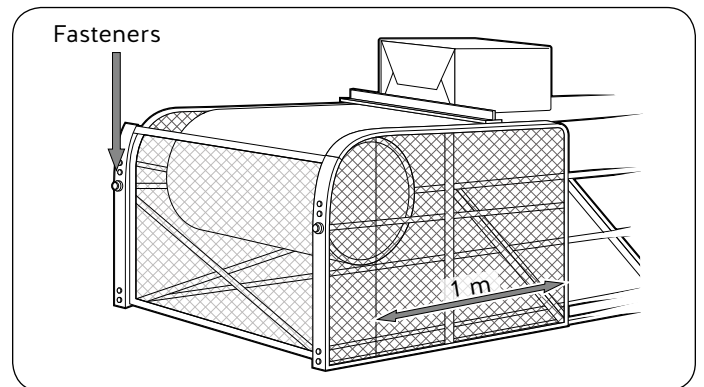
- Prevent access to the danger area from all directions
- Not create additional pinch points or other hazards
- Safely contain broken parts, such as belts and chains
- Be secured by at least one fastener that requires a tool for removal, unless properly interlocked with the machine control system

Note: Interlocks are devices that remove power to a machine if a barrier is removed. They are not to be used as lockout unless they have the integrity and reliability required for worker safety.

- Not be secured by quick-release latches
- Allow for safe lubrication and minor adjustments



Guarded head spool



Guarded tail spool

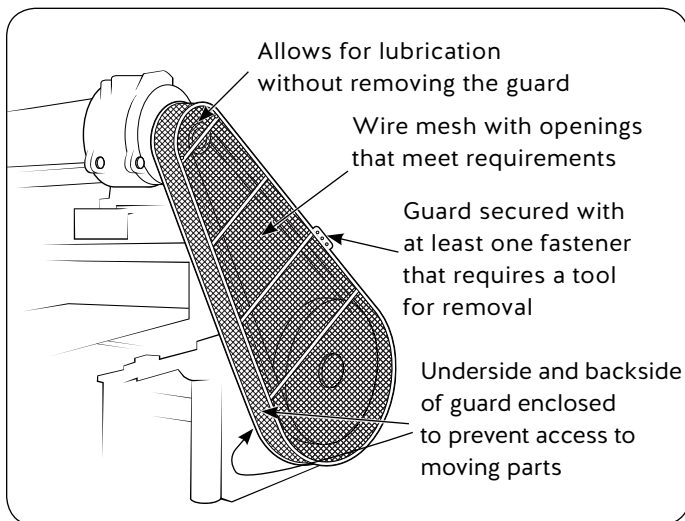
Note

Rotating parts that workers could come into contact with must be guarded. Rotating parts include friction drives, shafts, couplings and collars, set screws and bolts, keys and keyways, and projecting shaft ends. If the shaft projects a distance less than half the shaft diameter and is free of snagging hazards, a guard may not be required.

Power transmission guards

Power transmission parts typically consist of belt pulleys, chain sprockets, gears, shafts, and couplings. Contact with these moving parts accounts for a large number of injuries. Two very common machine guards are:

- V-belt/chain sprocket guards
- Power take-off (PTO) driveshaft guards



Typical fabrication design for a V-belt/chain sprocket guard

Lockout

In addition to safeguarding, it's important to lock out equipment before clearing a jam, cleaning the conveyor, or performing maintenance on it. Following a lockout procedure will ensure that the equipment won't accidentally start and injure a worker.

How to conduct a risk assessment

The best way to keep your workers safe is to conduct a risk assessment for your workplace. A risk assessment will help you identify specific point-of-operation and power transmission hazards, prioritize the risks associated with these hazards, and implement appropriate safeguarding controls. Conduct a separate risk assessment for each conveyor.

Step 1: Identify the hazards.

What are the dangers? Observe how the moving parts of a conveyor operate and how a worker could come into contact with those parts.

Step 2: Assess the risks.

Once you've identified potential hazards, assess the risks associated with each hazard. This will help you decide which hazards you should deal with first. Ask yourself the following:

- Who might be harmed by the conveyor?
- How likely is it that an incident will occur?
- If an incident does occur, how serious could it be? How could workers be harmed, and what injuries could result?

Step 3: Control the hazards.

What are you going to do about each hazard? Can you eliminate the hazard completely? If not, how can you prevent injuries? Consider how the work is organized. Can you change the placement of equipment to make the workplace safer?

Document your risk assessments.

Write down the results of your risk assessments, and share the results with your workers. Make an action plan — write down all the things you and your workers need to do. Put the most important things first.

Review your risk assessments.

Review your risk assessments regularly, and make any necessary changes. Ask questions, such as the following:

- Have there been changes in how work is done or who is doing the work?
- Have you installed any new equipment?

- Are there any new hazards?
- Have there been injuries or near misses? Why did these incidents occur?

If you answer yes to any of these questions, you must identify the new hazards and take steps to control the risks.

Include workers and supervisors in the risk assessment process. In addition, your risk assessments must consider the requirements of *ANSI Standard B20.1-1993*, which stipulates that all exposed moving machinery parts that are hazardous to workers must be guarded mechanically, electronically, or by location or position.

For more information

Go to worksafebc.com and search for “safeguarding.”