



Hydraulics safety



Equipment that uses hydraulics to assist in its movement has the potential to cause serious injury or death.

It is used across industries for trucks and transport, construction plant and equipment, farming machinery, manufacturing equipment and amusement rides.

The potential energy in hydraulic equipment can be extremely high as it is used to shift and support large loads. Serious crush injuries can result from normal movement of the hydraulic equipment and when the hydraulic systems fail, from falling loads or unexpected moving parts. Plant arms or equipment can cause injury through rapid movement or slow movement without the worker being aware of the danger.

A safe work procedure should outline the potential risks of working on or near hydraulic equipment and the likely consequences of hydraulic failure. Adequate control measures should be put in place to manage the risk. Businesses must also ensure their workers are trained and adequately supervised.

The following are examples of practical risk control solutions from actual incidents, which can be used to manage hydraulic hazards at your workplace.

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Tractor attachments



✘ Issues

Potential hazard

- ✘ Being crushed between the attachment and the loader arm.

! Contributing factors

- ✘ entering the crush zone to remove pins, hoses or bolts
- ✘ entering the crush zone with the engine running
- ✘ worn hydraulic control valves causing the hydraulics to creep.

✔ Solutions

- keep body parts out of crush zones
- turn the engine off and remove the key
- apply the park brake
- make sure parts can't move even with the engine off (i.e. hydraulic creep)
- secure parts adjacent to the crush zone with manufacturer's lock pins, props or chocks
- do the work with the tractor on flat level ground and chock the wheels.

Slashers on tractors



✘ Issues

Potential hazard

- ✘ Being crushed by the slasher body or being run over by the tractor when checking or changing the slasher blades.

! Contributing factors

- ✘ getting under the slasher without a prop
- ✘ hydraulic fluid leaking out of the system
- ✘ inadvertent activation of the tractor controls
- ✘ tractor rolling backwards
- ✘ operating the tractor without realising someone is under it.

✔ Solutions

- turn the engine off and remove the key
- apply the park brake
- do the work with the tractor on flat level ground and chock the wheels
- make sure safety prop(s) used to hold up the slasher will stay in place before getting under it.

Earthmoving plant



✘ Issues

Potential hazard

- ✘ Being crushed under the loader bucket when checking hydraulic lift cylinders.

! Contributing factors

- ✘ damaged and leaking hydraulic lines
- ✘ repairs or alterations to hydraulic lines and cylinders of a temporary nature or not using an original equipment manufacturer (OEM)
- ✘ entering the crush zone (under the raised bucket)
- ✘ bucket dropping from single line failure (even though twin cylinders are present)
- ✘ speed of the bucket dropping – within seconds.

✓ Solutions

- carry out inspections with the bucket lowered
- use manufacturer's lock pins or engineer designed stands/props to support the bucket before accessing the crush zone (under the bucket)
- where possible use OEM parts and avoid making up parts
- fit burst protection to cylinders if used in crane mode. (Note: loaders are not recommended for crane mode due to the soft ride control feature on the hydraulics).

Amusement rides



✘ Issues

Potential hazard

- ✘ Being crushed by the telescopic post when setting up or dismantling the ride.

! Contributing factors

- ✘ entering the crush zone to remove the lock bolts
- ✘ assuming the hydraulic lift cylinder will hold the load when the lock bolts are removed
- ✘ worn hydraulic components leading to leakage or incorrect operation
- ✘ insufficient time to follow procedures
- ✘ poor vision of the ride due to rain and fading light during dismantling process.

✓ Solutions

- keep body parts out of crush zones
- relocate the lock bolts out of the crush zone (so that workers do not need to work in the crush zone)
- use a back-up prop to secure any movable parts in the crush zone.



Plastic pipe welding machines



✘ Issues

Potential hazard

- ✘ Being crushed by moving parts when attempting to sling small sections of pipe.

! Contributing factors

- ✘ placing body parts in crush zones
- ✘ lifting (slinging) pipe sections in and out of the unit (Note: lifting pipe sections out of the unit is not normal practice for continuous pipelines)
- ✘ unintentional activation of controls
- ✘ perception that the level of risk is low due to slow-moving hydraulics.

✔ Solutions

- relocate controls – to minimise the risk of unintentional activation
- install guarding around the control levers
- avoid entering the crush zone by using a tool to pull the sling under the pipe.

Tipper truck bodies



✘ Issues

Potential hazard

- ✘ Being crushed between the tipper body and chassis rail.

! Contributing factors

- ✘ broken controls in the truck cabin
- ✘ entering the crush zone (i.e. leaning over the chassis rail) to activate the hydraulic valve
- ✘ working under the tipper body without a back-up prop.

✔ Solutions

- only operate the tipper using the cabin controls
- never operate broken or worn equipment
- use a back-up prop when working under the raised tipper body
- fit the tipper hydraulic cylinder with burst protection
- maintain the equipment.

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Vehicle loading cranes



✘ Issues

Potential hazard

- ✘ Being crushed between the crane boom and the truck, controls or stabilisers.

! Contributing factors

- ✘ lifting loads directly above the crane controls
- ✘ adding crane attachments (e.g. log grab) to the crane boom in confined areas
- ✘ unintentional activation of controls by the remote control attached to the operator
- ✘ proximity of crane attachments to stabiliser legs.

✔ Solutions

- use a vehicle loading crane (VLC) that has a manufacturer's crush reduction system fitted
- provide emergency stops (e-stops) at all control stations
- use VLCs with remote controls to allow operation away from the crush zone
- remove the remote control from your body and de-activate it when doing another task
- use a crane where the attachment can be kept on the crane at all times
- provide and document familiarisation training for operators on each crane make and model
- store the attachments away from the crush zone.

Truck and trailer ramps



✘ Issues

Potential hazard

- ✘ Being crushed by dropping truck and trailer ramps.

! Contributing factors

- ✘ entering the crush zone to pull ramps past the balance point
- ✘ hydraulic fluid leaking out of the cylinders
- ✘ damaged and worn components including internal hydraulic seals
- ✘ movement of the ramp when the ramp lock is released from its restraint
- ✘ excessive speed of the lowering hydraulics.

✔ Solutions

- use double acting hydraulic cylinders that remove the need to push the ramp
- use constant pressure (deadman) controls
- restrict the hydraulic fluid flow rate so that the ramps will lower at a slow speed
- never use 'dogs' to lock the ramps – ratchet type load restraints are safer
- provide warning signs to remain clear of ramps
- maintain the equipment.

Hydraulically pivoting induction furnace



Issues

Potential hazard

- ✘ Being crushed by the furnace if the hydraulics fail.

Contributing factors

- ✘ entering the crush zone
- ✘ hydraulic fluid leaking out of the system
- ✘ molten metal melting hydraulic hoses
- ✘ inadvertent actuation of the controls.

Solutions

- prevent access to the area with guarding
- add warning signs to warn against entering crush zone
- use a safe system of work if crush zone has to be accessed (e.g. use a back up prop)
- design the hydraulic system away from exposure to molten metal splash or protect it with guarding
- relocate controls or add guards to prevent inadvertent activation.



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