

## 30 MOUNTING AND DISMOUNTING

Each year, workers are hurt while getting on or off trucks, backhoes, and other construction equipment. Learn the safe way to mount and dismount.

### Regulations

The Construction Projects regulation (O. Reg. 213/91, s. 98) states that construction equipment must have a means of access to the operator's station that will not endanger the operator, and must have skid-resistant walking, climbing, and work surfaces.

Ensure that your equipment complies with the law. And keep runningboards, treads, steps, footholds, and platforms clear of mud, ice, snow, grease, debris, and other hazards. Housekeeping keeps you and your co-workers safe!

### Three-Point Contact

When getting on or off equipment, you need three points of constant contact with the machine. That means one hand and two feet, or two hands and one foot—at all times.

Anything less, and you're risking a fall.

Three-point contact forms a triangle of anchor points which changes in form while you mount or dismount (Figure 30-1). You have the most stability when the centre of this triangle is close to your centre of gravity. Your weight should be evenly distributed among the three contact points. This means that you should avoid sideways movement because it can put you off balance.

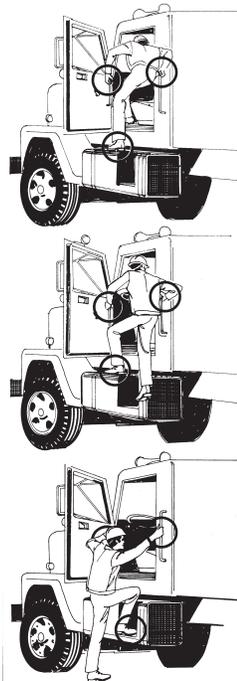


Figure 30-1: Three-Point Contact

### Safe Work Practices

- Always face in towards the machine or ladder.
- Mount and dismount only when the equipment is standing still.
- Break three-point contact only when you reach the ground, the cab of the vehicle, or a stable platform.
- Take your time.
- Take extra care in wet, snowy, icy, or other dangerous weather conditions.
- Avoid wearing loose or torn clothing that can catch on the equipment.
- Get on or off at the safest access position (normally designed by the manufacturer).
- Where necessary, retrofit equipment to provide safe access.

### Don't Jump Down

Jumping down is the quickest and easiest way to exit tractors, trailers, trucks and other heavy equipment. But the fastest way is not always the safest way. When jumping between two points, the body has to absorb the impact force on landing. This impact force can change significantly depending on the height of the jump and the characteristics of the landing area.

As demonstrated in Figure 30-2, the impact force of jumping from the bottom step of a truck compared with jumping from the floor level or seat level can increase from 1 - 1.5 times your body weight to 5 - 7 times your body weight. The impact force will also increase if the landing area contains a hard surface or is in a tight space compared to if it contains soft soil, mats or foams that allow the impact force to dissipate.

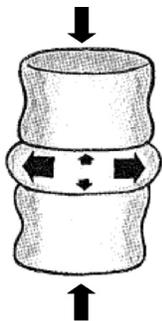


Figure 30-2: How Height of Jump Affects Impact Force'

## Spine and Joint Injuries

The high impact force of jumping down increases the risk of a serious injury to the lower back and lower limbs. The force of landing on the ground intensifies the shock or impact load on the spinal column, which can lead to increased bone-on-bone compression forces (see Figure 30-3).

Research has shown that repetitive bone-on-bone impact is a direct cause of spinal disc degeneration and other soft-tissue back injuries. The force of landing can also cause a similar bone-on-bone effect in your joints, such as the knees and ankles.

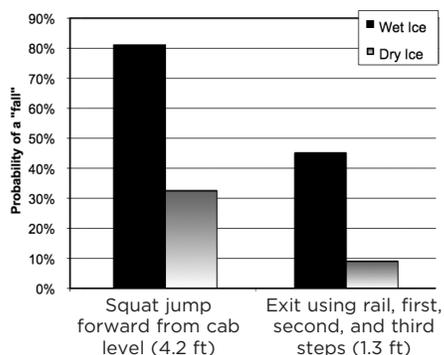


**Figure 30-3: How Greater Impact Force Increases Bone-on-Bone Compression Force**

## Slip and Fall Injuries

Another risk from jumping off a trailer or from a truck cab is a slip and fall injury after the landing. Landing force is a function of the height of the jump, so the higher the jump distance, the higher the landing force. In order to maintain balance and prevent a slip or a fall, the contact friction between safety boots and the ground must be high upon landing. If the friction is low, a slip or a fall can occur.<sup>2</sup>

The risk of a slip and fall injury can also increase if you land on a slippery surface such as ice, mud, or waste materials on the ground. Figure 30-4 shows that how the jump distance and the slipperiness of the landing surface can increase the probability of a fall. Landing awkwardly on an uneven surface can result in ankle and knee injuries from torn muscles and tendons.



**Figure 30-4: Probability of a Fall Based on Jump Distance and Landing Surface<sup>3</sup>**

## Prevention

Musculoskeletal disorders (MSDs), slips, and falls are among the leading causes of injuries in Ontario. To help prevent these injuries, make the following solutions part of your workplace health and safety program.

1. Take the time to take the few extra steps. Climb down from the vehicle rather than jump.
2. Provide proper ramps or ladders so workers can safely enter and exit trucks, trailers, and other heavy equipment.
3. Install slip-resistant steps and grab rails to help workers mount and dismount equipment safely.
4. When getting off or on equipment, always face the equipment and maintain three-point contact—keep either two hands and one foot or two feet and one hand on the equipment at all times (Figure 30-5).
5. If you can't avoid jumping down, get as close to the ground as possible. Sitting on the edge and jumping from a seated position will lessen the impact on your body (Figure 30-6).



**Figure 30-5: Maintain Three-Point Contact**



**Figure 30-6: Jump from a Lower Height**

<sup>1</sup> Fathallah and Cotnam (2000), "Maximum force sustained during various methods of exiting commercial tractors, trailers, and trucks". *Applied Ergonomics*, 31: 25-33.

<sup>2</sup> For the technical reader - the typical coefficient of friction (COF) from a jumping distance of 0.4 m is 0.15 and increases to 0.3 from a jumping distance of 1.25 m. Therefore "slip-resistant" safety boots should have a minimum COF of 0.3 (Fathallah et al, 2000).

<sup>3</sup> Fathallah et al. (2000), "Estimated slip potential on icy surfaces during various methods of exiting commercial tractors, trailers, and trucks". *Safety Science*, 36: 69-81.