

Powered Mobile Equipment Rollover Safety Precautions

Safety information for employers and workers

KEY POINTS

- A rollover is a type of incident where the mobile equipment tips over
- Rollover safety precautions are a system or structure intended to protect the operator from injuries
- Both the employer and operator have a role to play in the safe use of powered mobile equipment
- Rollover Protective Structures are required for certain types of powered mobile equipment over 700 kg (1,540 lbs) or if the employer identifies a potential rollover risk

Why should I be concerned?

A rollover is a type of incident where the mobile equipment tips over onto its side or roof. Without rollover protection, the operator can be crushed, and may result in severe to fatal injuries. Even rollovers involving smaller mobile equipment such as garden tractors can lead to severe injuries or death and should not be ignored.

Shared Responsibilities

The employer must ensure that:

- the powered mobile equipment is appropriate for the task and is in good working order
- the operator is aware of the worksite hazards and follows the identified controls
- the operator is competent (training and experience) to operate the equipment, including
 - has the required trade certification or other required certificates (e.g. crane and hoist operator)
 - reads, understands and follows the manufacturer's specifications and operating procedures
 - has awareness of the equipment's capabilities and limitations under various conditions

The operator must:

- take and follow the employer's training, including any site-specific safety procedures or measures
- use the equipment as designed
- assess how conditions at the worksite will affect the equipment's safe operation
- only operate the equipment if it is safe to do so

Rollover Safety Precautions

What factors contribute to a rollover?

These factors alone or in combination contribute to a powered mobile equipment rollover:

Factors	What to do
Sloped surfaces	<p>Always check the manufacturer's specifications and operating procedures for information on the maximum slope the equipment can cross. When a manufacturer provides safe slope information, it may be based on ideal conditions.</p> <ul style="list-style-type: none">• Not all manufacturers will provide this information, so care must be taken when travelling on slopes.
Uneven and unstable terrain	<p>Uneven terrain causes mobile equipment to tip to one side and can cause a side-to-side rocking action that can create enough force to cause a rollover, or cause the wheels or tracks of the equipment to sink to one side. Slippery slopes can cause equipment to slide and if the downslope wheels suddenly dig in a rollover can occur.</p> <ul style="list-style-type: none">• Where possible, avoid travelling on uneven, unstable and slippery terrain.
High loads	<p>The higher you have your load the easier it is for the equipment to rollover or flip, backward or forward.</p> <ul style="list-style-type: none">• Always keep your bucket or load as low as possible, particularly while travelling on slopes.
Unbalanced or heavy loads	<p>While travelling, heavy and/or unbalanced loads can cause a rollover.</p> <ul style="list-style-type: none">• Do not exceed the lifting capacity of the powered mobile equipment and center, balance and secure loads.• Avoid accelerating or decelerating too quickly, especially when carrying a load.
Narrow track width	<p>The narrower the width between the tires the easier it is for the equipment to rollover onto its side. Some powered mobile equipment come with automatic or manual stability devices, such as outriggers.</p> <ul style="list-style-type: none">• Use manual stability devices whenever possible and make sure they are functioning as designed.
Sharp cornering and high speeds	<p>The same forces that cause you to slide on the seat when taking sharp or fast corners in a vehicle can cause your equipment to rollover.</p> <ul style="list-style-type: none">• Reduce your speed and take wide angles whenever possible.

Rollover Safety Precautions

Factors	What to do
Rear axle torque	<p>If the rear wheels are unable to turn, which is common when they are stuck in deep mud or ice, torque from the drive system can cause the front end of the equipment to lift off the ground and flip backwards. The towing or trailering of equipment or objects can cause powered mobile equipment to backflip or rollover. This includes the towing of equipment or objects to break them free, such as towing equipment stuck in the mud or pulling out a stump. This can happen in seconds.</p> <ul style="list-style-type: none">• Use safe towing/winch techniques to dislodge stuck equipment.
Poor suspension systems and under / over inflated tires	<p>A poor suspension system and under- or over-inflated tires affects the ability of the powered mobile equipment to adjust to uneven and sloped surfaces, and affects traction and steering control. Soft tires and suspensions reduces jarring from uneven surfaces, but can cause excessive body roll. On the other hand, a stiff suspension causes a rough ride resulting in loss of traction or steering and possibly harm to the operator.</p> <ul style="list-style-type: none">• Always check and follow the manufacturer's recommended tire pressure and maintain the suspension system.
Trailer	<p>When trailering equipment, if the trailered equipment begins to roll over, the lead vehicle may follow. For example, a transport truck can flip over if the trailer it is towing begins to flip due to strong cross winds or a shift in its load.</p> <ul style="list-style-type: none">• Follow the equipment manufacturer's specifications for both the lead vehicle and trailer and regularly assess the hazards associated with the combined equipment.
Weather conditions (high winds, wet and icy surfaces)	<p>Bad weather conditions such as rain, snow and high winds can affect the stability and traction of powered mobile equipment, reduce the operator's visibility and affect the integrity of the terrain.</p> <ul style="list-style-type: none">• Do not operate powered mobile equipment under hazardous weather conditions.

Rollover Safety Precautions

What else do I need to consider?

Hazard Assessment (Part 2, OHS Code)

Perform a detailed hazard assessment that identifies all of the factors that may contribute to a rollover at your worksite and develop controls to address those factors. Repeat the hazard assessment as required.

Manufacturer's Specifications and Operating Procedures (Part 3, OHS Code)

Read, understand and follow the powered mobile equipment manufacturer's specifications and operating procedures.

Training and Experience (Section 15, OHS Regulation)

Make sure that operators are competent to operate the powered mobile equipment by ensuring they have or receive the appropriate training and gain the necessary experience.

Repair, Maintenance and Inspection (Section 12, OHS Regulation)

Keep powered mobile equipment in good working order and perform a visual inspection prior to each use. It is vital that all of the equipment's systems are kept in good working order, which requires regular inspection, testing, maintenance and repair. Never operate a piece of powered mobile equipment that cannot be operated safely.

What about rollover protective structures?

A Rollover Protective Structure (ROPS) is a strong cage, frame, roll bar, or other structure attached to powered mobile equipment to protect the operator and passenger in case of a rollover. It is the operator's and passengers' last line of defense against injuries resulting from a rollover.

Under the OHS Code, ROPS are required for certain types of powered mobile equipment that weigh more than 700 kg (1,540 lbs) or if the employer identifies a potential rollover risk (section 270, OHS Code). Due to the complexity of a ROPS, it must be supplied by the mobile equipment manufacturer, or certified by a professional engineer. Where ROPS are installed on or after July 1, 2009, they must comply with certain industry standards, and seat belts or other restraining devices must be installed (section 271, OHS Code). The combination of a ROPS and a restraining device gives the operator and passengers a high probability of surviving a rollover with limited injuries.

Currently, the OHS legislation does not require smaller powered mobile equipment, such as garden tractors, snowmobiles and quads to have ROPS unless they weigh more than 700 kg (1,540 lbs) or the employer identifies a potential rollover risk.

Rollover Safety Precautions

Contact Us

OHS Contact Centre

Edmonton & Surrounding area

- 780-415-8690

Throughout Alberta

- 1-866-415-8690

Deaf or hearing impaired:

- 780-427-9999 (Edmonton)
- 1-800-232-7215 (Alberta)

Website

work.alberta.ca/ohs-contact-us

Get Copies of OHS Act, Regulation and Code

Alberta Queen's Printer

www.qp.gov.ab.ca

Occupational Health and Safety

work.alberta.ca/ohs-legislation

© 2017 Government of Alberta

This material is for information only. The information provided in this material is solely for the user's information and convenience and, while thought to be accurate and functional, it is provided without warranty of any kind. The Crown, its agents, employees or contractors will not be liable to you for any damages, direct or indirect, arising out of your use of the information contained in this material.

If in doubt with respect to any information contained within this material, or for confirmation of legal requirements, please refer to the current edition of the Occupational Health and Safety Act, Regulation and Code or other applicable legislation. Further, if there is any inconsistency or conflict between any of the information contained in this material and the applicable legislative requirement, the legislative requirement shall prevail.

This material is current to June 2017. The law is constantly changing with new legislation, amendments to existing legislation, and decisions from the courts. It is important imperative that you and keep yourself informed of the current law.

This material may be used, reproduced, stored or transmitted for non-commercial purposes. The source of this material must be acknowledged when publishing or issuing it to others. This material is not to be used, reproduced, stored or transmitted for commercial purposes without written permission from the Government of Alberta.