WorkSafe BC

WorkSafe Bulletin

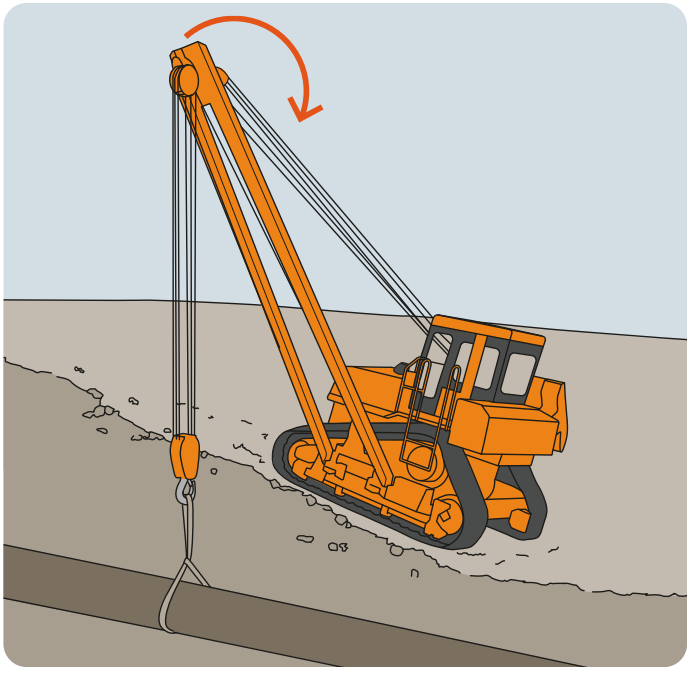
Fore-aft rollover hazard while using side-boom pipelayers on slopes

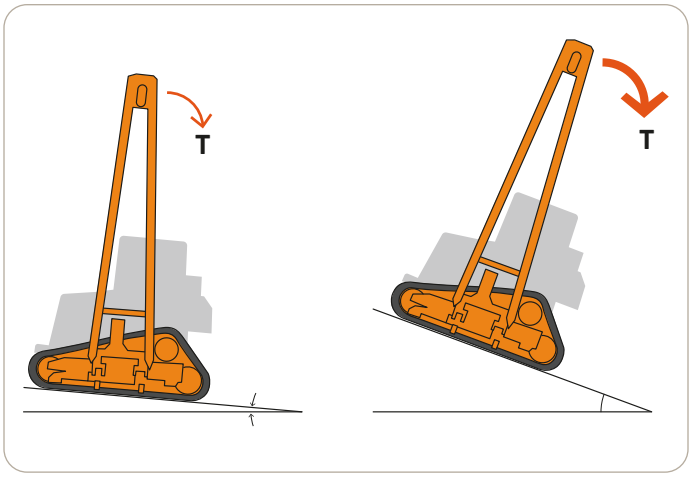
Side-boom pipelayers are used to lift and move pipes. They are an essential piece of heavy equipment for oil and gas operations. Side-to-side rollovers are a well-known hazard with these machines, but fore-aft rollovers can also occur when operating on slopes. Fore-aft rollovers can occur if the lift plan doesn't take into account the dynamic and static forces generated while travelling with and hoisting pipe on slopes.

Responsibilities

Employers are responsible for identifying work activities or circumstances that may cause significant risk of injury. They must also analyze those risks and implement safe work procedures if the activities or circumstances create a hazard.

If side-boom pipelayers will be operating on slopes, then employers, owners, prime contractors, equipment manufacturers, and suppliers need to be aware of the potential hazard and take steps to communicate and control the risks.





At left, a side-boom pipelayer on a slope. Lowering the boom angle and increasing overhang reduces fore-aft torque.

Above, when working on higher slopes, choose a lower boom length and/or greater boom overhang to reduce the torque.

Controlling the risks

The safe work practices in this bulletin will help you control the risk of fore-aft rollovers while working on slopes. They will also help ensure that you are in compliance with the requirements of section 23.5 of the Occupational Health and Safety Regulation.

Slope assessment

Hire a qualified person or a professional engineer to assess the slope conditions at the worksite. The slope assessment should take into account the following:

- Specific equipment being used and any equipment modifications.
- Condition of the right-of-way — for example, rocks, stumps, bumps, and other protrusions that may affect stability and traction.
- Type of surface — mud, snow, and ground that has been newly filled with earth may collapse from the weight of the machine.

Modified load charts

Ask the equipment manufacturer or a professional engineer for modified load charts with information on slope gradient and the corresponding decrease in a pipelayer's lifting capacity. Modified load charts should include the following variables:

- Travelling up or down the slope
- Height of the load
- Distance of the load from the machine (boom overhang), with incremental variations that identify the reduction in lifting capacity specific to the boom configuration, including stick length

Minimize stop-and-go on slopes to avoid load swing

Side-boom pipelayers lifting together should have suitable boom heights and braking systems. Ideally, the braking systems will be similar.

The operators and lift supervisor should maintain good communication.

Other safe work practices

- Consider micro slopes and how they will affect stability (e.g., rock outcroppings, loose materials, and sections that aren't flat). A micro slope is anything more than half the length and width of the track.
- Ensure that site-specific safe work procedures for handling pipe on slopes are available to and being used by equipment operators and lift foremen.
- Ensure that equipment operators and supervisors are sufficiently qualified, certified, and trained to work on steep slopes.
- Ensure that training includes information on tandem lifts and critical lifts as they relate to side-boom pipelayers.
- Carry loads at longer overhangs to improve fore-aft stability on slopes.
- Install load moment indication (LMI) systems for live monitoring of slope and carrying conditions. LMIs should have visual and audible warnings for when pre-set conditions are exceeded.

Regulatory requirements

See ANSI Standard ASME B30.14-2004 Side Boom Tractors.

In the Occupational Health and Safety Regulation, refer to the following:

- Section 14.13, Inspection, maintenance and repair
- Section 14.34, Operator qualifications
- Section 14.34.1, Operator certification
- Section 14.42, Tandem lift
- Section 14.42.1, Critical lift
- Section 23.5, Safe work procedures