



Towing Fatality

In July 2020, a Prince Edward Island worker was fatally injured when struck by an airborne broken chain.

An excavator was being used to try to tow the loader, which was stuck in soft soil. The two pieces of machinery were facing each other and a chain and rope assembly was attached to both for towing. The chain broke under pressure and became airborne, striking the worker who was still in the cab operating the loader.



The following hazards may have contributed to the workplace fatality and could have been managed to prevent the fatality:

- The chain used for towing was not strong enough for the conditions. The weight of the heavy equipment, plus the additional force required to move the stuck machinery, had not been adequately calculated.
- The tow rope and chains used at the scene of the accident were not marked or labelled with the maximum working load limit to determine if they were strong enough.
- Improper attachment of the chain to the excavator bucket created a pinch point causing the chain to fail.
- The location of the chain attachment on the equipment positioned the operators in the direct line of the tow. Operators were in a danger zone and at risk of injury should towing equipment fail.
- The connected chains and rope had different strength capacities. Different types of rigging should never be combined to complete a towing task.
- Neither pieces of equipment had engineered anchor points to allow chains, slings or straps to be attached.
- Workers lacked safe towing education, training and practices.

Legislated Requirements

The following legislative requirements under PEI's *Occupational Health and Safety (OHS) Act* relate to this hazard alert:

OHS Act, Section 12 (1)

- (a) An employer shall ensure that every reasonable precaution is taken to protect the occupational health and safety of persons at or near the workplace.
- (b) That any item, device or machinery provided for the use of workers at a workplace is properly maintained, and is properly equipped with safety features or devices, as recommended by the manufacturer or required by the regulations.
- (c) That such information, instruction, training, supervision and facilities are provided as are necessary to ensure the occupational health and safety of the workers.
- (f) That the employer's undertaking is conducted so that workers are not exposed to occupational health and safety hazards as a result of the undertaking.

Recommended Precautions

The following precautions are recommended when towing equipment:

- Ensure workers are adequately trained on safe equipment use and safe towing practices.
- Complete a hazard assessment, ahead of the towing process, to determine the risks and establish safety zones.
 - Consider soil and surface conditions. Assess the condition of the ground under the pulling vehicle and the equipment that is stuck.
- Complete an inspection of the chains, hooks, clevises, tow ropes, heavy machinery and any other equipment used in the towing process before and after use.
 - Ensure tow chains are clearly marked with the size and grade to allow for proper towing calculations.
- Ensure the maximum working load limit of the towing equipment before beginning the towing process.

- Consider the total weight of the stuck equipment and any attached implements.
- Consider the extra working load that the mud will create. The deeper the equipment is stuck the greater the suction force that holds it in place.
- Account for the resistance the stuck vehicle or equipment confronts when it is pulled forward against the soil pushed in front of the tires.

- Use one length of chain that is of adequate length and strength for the specific towing task. Avoid combining multiple chains or straps together.

Chain Working Load Limit in Pounds					
Chain size (inches)	Grade 30	Grade 43	Grade 70	Grade 80	Grade 100
1/4	1300	2600	3150	3500	4300
5/16	1900	3900	4700	4500	5700
3/8	2650	5400	6600	7100	8800
7/16	3700	7200	8750	-	-
1/2	4500	9200	11,300	12,000	15,000
5/8	6900	13,000	15,800	18,100	22,600

Source: WreckMaster Canada

- Attach chains, clevises, slings, tow ropes or straps to the machinery's engineered anchor points.
 - Use edge protectors any time ropes or straps touch part of the equipment.
 - Ensure the tip of the hook faces up. It will fall toward the ground if it breaks or comes off while pulling.
 - Do not attach horizontal tow chains at the same height or above the position of the operators.
- Ensure the operator of the towing vehicle and the driver of the stuck equipment are the only persons in the vicinity of either vehicle (Danger Zone) as it begins to tighten the strap, cable, or chain. Bystanders shouldn't be within 100ft of the area, under any circumstances, when towing is in progress.
- Ensure safe work procedures are followed and personal protective equipment is worn to decrease the risk of injuries.