



Ready Mixed Concrete
Association of Ontario

ROLLOVER PREVENTION

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Overview

Concrete Ontario is committed to developing and sharing safety information and best practices with all member organizations, not only improve their own internal performance, but also to ensure the health and safety of the general public in the communities in which we operate.

Rollover Prevention

Ready Mix truck drivers are professional drivers who face unique and ever changing challenges due to the design of their vehicles and the products they transport.

As an industry, we have seen several Ready Mix truck rollovers in the recent past. This document is designed to raise awareness amongst member companies by illustrating some of the hazards so that they can be identified early thus allowing the appropriate controls to be implemented. Its focus is to reinforce the importance of understanding and constantly monitoring vehicle dynamics and adjusting driving behavior.

Preparation

The first step in the safe operation of a Ready Mix truck and also Rollover Prevention, is ensuring that both the vehicle and the driver are fit for duty.

Completing and documenting a thorough Pre-Trip Inspection will help ensure that there are no major defects on the vehicle, and specifically that the steering, tires, and brakes are fully functional and in good working order. Those items will have a direct impact on vehicle dynamics and the driver's ability to react to changing conditions.

The driver must also assess his/her own condition ensuring that they are mentally and physically prepared for the task of driving. Being distracted, fatigued, or otherwise compromised (prescription medications...) can negatively impact a driver's ability to be fully engaged affecting their performance at detecting and reacting to changes in their operating environment.

Defensive Driving

Establishing an adequate space cushion around the vehicle has value and will provide the driver with increased visibility to detect possible problems early, and in turn allow the necessary time to react accordingly.

Maintaining a significant following distance from the vehicle in front and establishing escape routes to the side (where possible) can help compensate for the longer stopping distances that Ready Mix trucks require, and help prevent the need for sudden sharp turns and hard-braking as conditions change. The need for these sudden maneuvers can also be significantly reduced by constantly maintaining a 15 second eye lead time ahead of the vehicle to detect hazards or changes such as construction, broken down vehicles or sharp turns.

Dynamic Loads

Ready Mix trucks carry a dynamic load and have a high centre of gravity. The forces generated can be influenced by a number of factors such as: the slump of the concrete, the rotation speed of the drum, whether the drum is in charge mode or discharge mode, and the operating environment itself (such as road or jobsite conditions).

A Ready Mix driver must constantly assess these impacts on vehicle dynamics whether on-road or on the job site. The dynamic nature of the product being transported means that drivers must operate their vehicles in a slow, deliberate fashion avoiding hard braking, acceleration, or sharp turns. Gradual changes or adjustments ensure that the products reaction becomes more predictable and less harsh.

Slump

When the drum is not rotating, the concrete will sit at the bottom of the drum. The weight distribution is still high, however relatively centered over the middle of the truck.



High Centre of Gravity



Drum Loaded (Not Rotating)

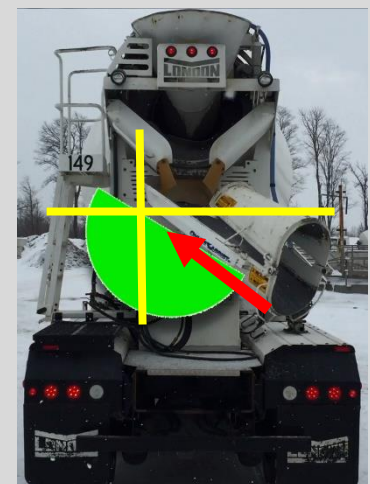
Higher Slump concrete will be pulled up the side of the drum by the fins as they rotate, increasing the forces to one side of the truck. Being more fluid in nature, it will also react quickly to changes such as sudden braking or sharp turns on a roadway.

Lower Slump concrete is thicker in nature and will be pulled farther up the side of the drum by the fins, thus significantly increasing the forces to one side of the truck.

The differences between high and low slump concrete and their effect on the trucks centre of gravity are shown below.



Higher Slump Concrete



Lower Slump Concrete

It is important to note that changing from charge mode to *discharge mode* will shift these forces to the other side of the vehicle (passenger side), therefore always assess your operating conditions and environment accordingly.

While understanding the affect concrete slump has on vehicle dynamics, the Ready Mix driver must also be aware of the affect that drum speed will have. Higher drum speeds will allow the fins to pull the concrete higher up the side of the drum, thus further shifting the centre of gravity to one side of the vehicle or the other. While in-transit, a drum speed of 1-2 RPM is recommended.

Once arriving at the job site, the same Defensive Driving techniques apply to ensure that hazards are identified. Scanning the entire area and keeping space around the vehicle will provide time to assess hazards and react accordingly.

Walking the site to assess ground conditions will help ensure that they can withstand the forces generated by the fully loaded Mixer (whether in charge or discharge mode). Identifying freshly back-filled areas and other site changes (traffic...) can be an indicator of potential problems.

Soft Shoulders and Excavations

Ready Mix trucks can weigh up to 80,000 lbs. or more when fully loaded, therefore it is critical that the driver maintain a safe distance from the edge of any road or ramp. Changing weather conditions, freeze/thaw cycles and previous activities can all compromise the integrity of the edge of the roadway, increasing the possibility of a rollover. Staying as close to the crown of the road will maximize the distance between the Ready Mix truck and the road's edge.



Excavations can be even riskier due to the fact that in most cases the ground has recently been disturbed and therefore possibly unstable. It is always preferable to reverse towards an excavation at a right angle vs. being parallel to the trench. Approaching at a right angle will constrain the forces to single point instead of stressing a wider area. As mentioned in the **Concrete Ontario JOB SAFE Policy**, all Ready Mix trucks must maintain a minimum 1 meter setback from all excavations and ramp edges to reduce the chances of cave-ins and in turn, Ready Mix truck rollovers.

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