TruckingHR Canada
Learning and Development Centre

National Occupational Standard – Commercial Transport Truck Operator

SUPPLEMENT #1
Driving Steep Inclines

TruckingHR Canada

APRIL 2024

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As a national, non-profit organization, Trucking HR Canada (THRC) advances modern HR solutions for the trucking and logistics workforce. One of our strategic priorities is to make a company's job easier by delivering a comprehensive collection of up-to-date guides, reports, templates and more to support effective human resources management and recruitment and retention efforts.

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BACKGROUND

Trucking HR Canada (THRC) publishes a National Occupational Standard for Commercial Transport Truck Operators (NOS-O). The NOS-O defines the knowledge, skills, and abilities ("competencies") required for this occupation.

This document is a supplemental resource to the NOS-O. For the full suite of supplemental resources, visit truckinghr.com.

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Canada

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TABLE OF CONTENTS

PURPOSE OF THIS STANDARD

This standard is a supplement to the National Occupational Standard for Commercial Transport Truck Operator. It sets out the additional occupational competencies needed for individuals to successfully operate commercial vehicles on steep roads and highway inclines such as mountainous terrain.

WHO CAN USE THIS STANDARD

This standard is designed to be used by training developers and training providers.

HOW TO USE THIS STANDARD

This standard consists of five blocks of competencies. The first block contains knowledge competencies; the remaining four contain applied competencies. Together, these blocks inform the complexity, duration, and learning environment of training content and delivery methods for all aspects of training curriculum on the topic of driving steep inclines.

If you have questions or are interested in more information, contact **info@truckinghr.com**

BACKGROUND

Short stretches of steep inclines exist in every Canadian province and territory. A substantial portion of the Canada's highway system passes through regions with mountainous terrain, particularly in the western provinces of British Columbia and Alberta. These highways include steep inclines, winding sections, and large elevation changes to navigate through mountain ranges.

Ascending and descending steep inclines is among the most challenging environments for commercial transport truck operators. This reality is displayed by common incidents of transport trucks losing control during long steep descents – some resulting in fatal incidents.

While a commercial transport truck operator licence permits operation in all types of terrain, having the following additional competencies is helpful.

COMPETENCIES

There are five blocks, a knowledge block (in blue) and four practical skills blocks (in orange) that make up the competencies needed to operate on steep inclines safely and successfully.

BLOCK 1 UNDERSTAND RISKS

The commercial transport truck operator that drives on steep inclines understands the risks involved.

This means the operator knows:

1) Road surface condition and visibility can change dramatically as road elevation changes on steep inclines.

2) Vehicle control can be lost during steep descents due to excessive descent speed.

3) Safe descent speed varies based on the vehicle being driven, the load being transported, road surface condition, weather, and visibility.

4) Descent speed and gear selection differ based on a vehicle's drivetrain.

5) Correct use of a vehicle's drivetrain is a critical element of a safe descent on a steep incline.

6) The importance of understanding the unique characteristics of each vehicle's engine, drivetrain, transmission shifting, and speed control methods, and how to access reliable information that ensures they are using proper methods for ascending and descending.

7) A descent on a steep incline is risky when a vehicle has a service brake or drivetrain defect.

8) Overuse of service brakes can cause brake overheating resulting in loss of brake force.

9) During descents less than one km in length, service brakes should only be applied briefly to reduce speed to a safe level and then released to allow them to cool.

10) When the exhaust system of a commercial vehicle is modified, damaged, or removed, engine brake use can cause excessive noise that is prohibited in certain areas.

11) Speed control through the drivetrain only produces drag on drive axles and when traction is poor, descent speed must be reduced based on the traction available at the drive axles.

12) Proper methods for tire chain installation, usage requirements and locations where tire chains can be installed.

FOR DESCENTS 1 KM IN LENGTH AND LONGER:

13) Mountain descents can include extended sections with grades of 6% and more and drivers should familiarize themselves with the route, terrain, and steepness of ascents and descents, as well as alternate routes or detours, before driving any route that includes steep inclines.

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14) Shadowing an experienced driver is a helpful way to develop experience before driving steep inclines alone.

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15) The location and proper use of emergency runaway mitigation resources such as arrestor beds, escape ramps, pull outs, etc.

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16) Descent speed must be controlled by proper gear selection and use of the drivetrain.

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17) Service brakes must not be used to control descent speed.

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18) Service brakes must remain cool to be fully effective in an emergency.

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19) When descent speed can't be controlled with the drivetrain, descent speed must be reduced by downshifting, which requires a brief service brake application.

BLOCK 2 PLAN

The commercial transport truck operator that drives on steep inclines plans their trip before departure

This means the operator will:

1) Plan their driving route and check weather forecasts and road condition reports.

2) Familiarize themselves with routes that include steep inclines by using maps, guides, navigation systems, dispatchers, and other drivers.

3) Understand the source and meaning of official road, highway, and driving condition reports.

4) Understand the potential alternate and detour routes associated with their planned route.

5) Anticipate and understand road signs, signals, and notifications that may be encountered on their planned and possible alternate routes.

6) Know the location of emergency pull-out areas, and runaway lanes on their planned and possible alternate routes.

7) Carry the required emergency attire and equipment.

8) Know vehicle gross weight and the weight of their load.

9) Check weather forecasts and road condition reports before departing.

10) Know the best engine speed range for ascending inclines for the vehicle being operated.

11) Know the engine speed and engine brake settings that provide maximum descent control for the vehicle being operated.

12) Know how to correctly use the transmission during ascents and descents for the vehicle being operated.

13) Plan every descent.

BLOCK 3 PREPARE VEHICLE

The commercial transport truck operator that drives on steep inclines prepares their vehicle before departure.

This means the operator will:

1) Confirm their vehicle is carrying required tire chains that are the correct size and type, are in good working order and install the chains when conditions warrant, or local laws require them to be used.

2) Conduct inspection of vehicle to confirm critical operating components are in optimal working condition.

3) Inspect tire tread to ensure it is suitable for anticipated weather conditions.

4) Confirm any required follow-up repair or maintenance work on wheels, tires, and brakes has been completed.

5) Confirm required emergency equipment and supplies are present and in good condition.

6) Confirm correct adjustment of rearview mirrors.

BLOCK 4 ASCEND

The commercial transport truck operator that ascends steep inclines in a safe, efficient, and courteous manner.

This means the operator will:

1) Ascend steep inclines with engine operating at the speed where it produces the most torque, as recommended by the manufacturer.

2) Monitor engine and transmission, select correct gear, and check for signs of loss of tire traction.

3) Operate vehicle at a speed that is suitable for weather and visibility.

4) Execute lane changes and passing of other vehicles maintaining safe following distance.

5) Increase following distance and reduce speed as required for operating conditions.

6) Show courtesy to other motorists, make space when needed, and avoid crowding other vehicles.

7) Maintain appropriate following distance.

8) Activate 4-way warning flashers when vehicle is likely to obstruct other vehicles, when visibility is poor, or there is a large differential in speed between their vehicle and other traffic.

9) Respond immediately to traffic congestion, reduced traction, or reduced visibility.

10) Check weather forecasts and road condition reports periodically when stopped.

11) Install, periodically check, and tighten tire chains when required.

12) Operate at suitable vehicle speed when tire chains are installed.

13) Remove tire chains when road surface is not covered in snow or ice.

14) When road surface traction is reduced due to rain, snow, or ice, operate the engine as recommended by the manufacturer, to minimize the risk of tire spinning.

BLOCK 5 DESCEND

The commercial transport truck operator that descends steep inclines in a safe and efficient manner.

This means the operator will:

1) Descend in the correct gear and change gears as required to allow engine to be at suitable operating speed for engine brake performance as recommended by the manufacturer.

2) Select suitable engine speed, gear and brake setting for slope severity as recommended by the manufacturer.

3) Identify when vehicle descent speed must be decreased or can be increased, by monitoring vehicle speed, engine speed, and gear selection.

4) Make brief service brake applications to reduce speed when required, during a descent of less than one km, and avoid dragging service brakes.

5) Maintain appropriate following distance.

6) Activate 4-way warning flashers when vehicle is likely to obstruct other vehicles, when visibility is poor, or there is a large differential in speed between their vehicle and other traffic.

7) Respond immediately to traffic congestion, reduced traction, or reduced visibility.

8) Install, periodically check, and tighten tire chains when required.

9) Operate at suitable vehicle speed when tire chains are installed.

10) Remove tire chains when road surface is not covered in snow or ice.

FOR DESCENTS 1 KM IN LENGTH AND LONGER:

11) Initiate descent at the speed that is appropriate for vehicle weight, road conditions, and visibility.

12) Control descent speed using only the drivetrain.

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13) Downshift when required to reduce speed and use service brakes only to facilitate a downshift.

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14) Retain some reserve capacity while using the drivetrain to control descent speed.

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15) Avoid use of the service brakes except in an emergency or in conditions with very poor traction.

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16) When descending in conditions with poor traction, that risks loss of traction at the drive axle tires caused by engine brake use, reduce speed significantly and control descent speed with periodic service brake application on all axles.

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17) Pull into a safe location, after any heat-inducing use of the service brakes and allow brakes to cool down before proceeding.

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18) Pull into a safe location if any problem develops that prevents descent speed from being controlled by the drivetrain and seek technical help.

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19) Stop at brake check areas to comply with local laws, review provided information signs and confirm vehicle brake system is in proper working order.

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20) Check weather forecasts and road condition reports periodically during inclement weather when stopped.

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21) Review the descent after completion, as well as the methods used to control speed, and use this information to plan future descents.

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