



# Committee addresses the safety

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To avoid sensitive soils in coastal British Columbia, steep road pitches are often constructed, making forest road-building a challenge. However, several accidents have occurred on these steeper sections (sustained grades of 18–30%), raising concerns throughout the forestry community. To address these safety concerns, a steering committee of industry and WorkSafe BC representatives was formed. This article documents the formation of this committee and its development of new risk assessment procedures for steep forest roads.

## Involvement of FPIInnovations, Feric Division

The committee's first priority was coastal "fat" trucks. These large logging trucks have the greatest carrying capacity, frequently hauling loads in excess of 120 tonnes. The committee gained the expertise of **Séamus Parker** of FPIInnovations, Feric Division, who undertook scientific research for the project. Parker and the committee focussed on three guidelines for safely descending steep grades (initially with off-highway trucks and later with highway logging trucks): haul configuration, load, and road grade.

To develop steep slope descent guidelines, Parker developed a computer model (Parker 2007) to simulate steep-slope descents after obtaining data for the three focus areas. The following are a sample of Parker's concluding results:

- Road surface friction is a limiting factor.
- Brakes must be adjusted and maintained.
- Gear selection is critical—use of a retarder is related to how much the service brakes get used.
- Average grades and length of descent affects the brake temperature and corresponding fade.
- Steering brakes offer potential to improve stopping performance in these applications.

## Involvement of WorkSafe BC

In addition to industry representatives such as Parker, WorkSafe BC has become more involved with steep slope issues. In the past, WorkSafe BC had general requirements for logging roads and related operations. Part 26 of the WorkSafe BC Occupational Health and Safety Regulation (OHSR) covers forestry operations. Section 26.2 of the OHSR states that: "the management of forestry operations must plan and conduct such operations in a manner consistent with this Regulation and with recognized safe work practices." The OHSR also states in section 26.79 that, "roads, bridges, elevated platforms, and other structures used by vehicles transporting workers, logs or other forest products in forestry operations must be constructed and maintained to a standard which will permit safe transit." Although all of this is beneficial, nowhere does the OHSR address issues pertaining to road grades. Traditionally, the BC Ministry of Forests and Range played an active role with its own road construction and grade guidelines. However, with recent policy changes, today's *Forest Range and Practices Act* (a results-based forestry system) has removed the requirement to check and approve forest road plans before road construction.

The absence of forest road plan approval requirements brought WorkSafe BC Engineering's **Olaf Knezevic** into the process. Working alongside Parker, and with the support of WorkSafe BC, Knezevic began establishing some new guidelines. These focus on two categories of road grade: below 20% and above 20%. Both categories would be subject to one fundamental question: "If there is a failure in the driveline, can the vehicle be brought to a safe stop?" This question is addressed using a Risk Assessment Template that provides work procedures to plan log-hauling operations. An interactive spreadsheet tool, developed by Parker, assists in the risk assessments.

The Risk Assessment Template includes several

Typical steep road pitch in coastal British Columbia.



Séamus Parker photo



# of trucks hauling on steep forestry roads

factors that must be addressed when roads contain descent slopes above 20%, such as:

- grade
- load
- speed
- length of pitch
- road surface (identification of road surface friction changes such as snow, rain, etc.)
- alignment
- road relief
- curve radius
- terrain hazards
- road maintenance

The analysis of these variables leads to the development of a guideline for an acceptable or unacceptable road rating.

## Working Group

Following the involvement of industry and WorkSafe BC, a Feric/FORREX trucking workshop in Campbell River took place in March 2006 at which a working group was formed. This working group, chaired by **MaryAnn Arcand** of TruckSafe, consists of drivers, engineers, contractors, licensees, and representatives from Feric, BC Timber Sales, and WorkSafe BC. The group focussed on integrating the existing policies and standard operating procedures for off-highway trucks with Feric's research and the OHSR (section 26) guidelines to create a standardized Steep Slope Operating Procedure. The first draft was completed in September 2006.

This procedure considers factors for all road construction and grades, including:

- traction conditions,
- road grade and alignment,
- side slopes,
- average descent length or pitch length,
- braking capacity,
- payload and truck configuration,
- descent speed, and
- driver skill and expertise.

The working group upgraded this list by including factors for safe hauling on maximum road grades. These factors include:

- type of truck,
- braking configuration,
- driver skill and expertise,
- traction condition, and
- length of grade (referred to in descent tables in Parker [2007]).

The Steep Slope Operating Procedure also includes specific definitions for steep road, pitch, and traction conditions, and engages the use of the Risk Assessment Template, which includes specific hazards and risk warnings.

## Conclusion

By combining the work of Séamus Parker of FP Innovations, Feric Division, Olaf Knezevic of WorkSafe BC, and the creation of the working group, the steep slope descent issue has been addressed in a way that recognizes all forestry sector participants. The new risk assessment procedures will lead to safer hauling on the roads of coastal British Columbia. These new guidelines ensure that road construction and descent grades adhere to standards. 🌲

## Reference

Parker, S.P.S. 2007. Development of guidelines for descending steep grades: British Columbia coastal off-highway truck applications. Feric, Vancouver, BC Advantage 8(5). <https://www.feric.ca/en/index.cfm?objectid=BD4178F5-C09F-3A58-EA141F36D933A0B8>

## More Information

For further information on the steep grade descent guidelines for log trucks go to: <http://www.feric.ca/en/?OBJECTID=B23D3957-C09F-3A58-EABEB43AA7E2719B>

The interactive spreadsheet tool for risk assessment is available at: <http://www.feric.ca/download.cfm?DownloadFile=B2442EF5-C09F-3A58-EAAB0AA9BAD7C32>

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Seamus Parker photo

Coastal "fat" truck used in off-road hauling.