**Enhancing the mobility of B-train log trucks in Saskatchewan using TPCS**
**Summary of 2003 Field Demonstration**

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## Introduction

Tire pressure control systems (TPCS) to optimize (reduce) and maintain tire pressures[1] are an effective method for improving mobility and traction of logging trucks in off-road conditions. In addition, when all trucks using a forest road operate at optimized/reduced tire pressures, numerous road-related benefits result including: less rutting, washboarding, dust and gravel loss. In the fall of 2003, the Forest Engineering Research Institute of Canada (FERIC) and Weyerhaeuser Company Ltd. conducted a short operational trial with TPCS–equipped log trucks to demonstrate the mobility gains afforded by the use of optimized tire pressures. This evaluation included monitoring rut development and soft surface mobility on a newly constructed in-block road.

## Objective

The objective of this work was to demonstrate whether optimized tire pressures could improve the mobility of B-train log trucks under Saskatchewan field conditions. Particular tasks necessary to achieve this objective included:

- Compare rut development on soft forest roads for log trucks operating with high versus optimized tire pressures.
- Evaluate the ability of log trucks operating at high and at optimized tire pressures to traverse a newly constructed, in-block road.

## Methodology

For this demonstration, the optimized tire pressures were set to 45 psi in the drive tires and 40 psi in the trailer tires while 95 psi was used in both the drive and trailer tires for the high tire pressure tests. A test road was built with three sections, the first for optimized tire pressure rutting, the second for high tire pressure rutting and the third for soft road mobility (Figure 1). There were a total of 15 loaded B-train passes over each rutting section and 19 loaded B-train passes over the mobility section.

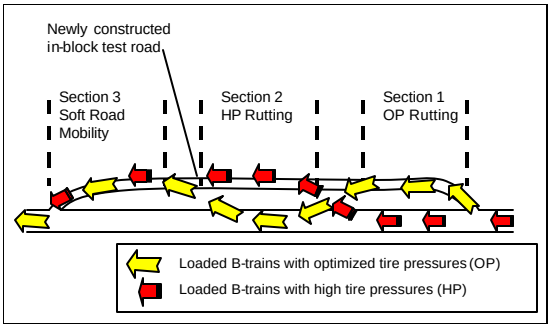


**Figure 1: Parallel test road**

## Rut Development

The rut development for both the optimized tire pressure and high tire

[1] Manufacturers recommend setting cold tire inflation pressure according to the tire load and travel speed in order to optimize tire performance. TPCS offer a safe and convenient method to vary tire inflation when speed or loading changes during the duty cycle.

pressure sections of the test road are presented in Figure 2.

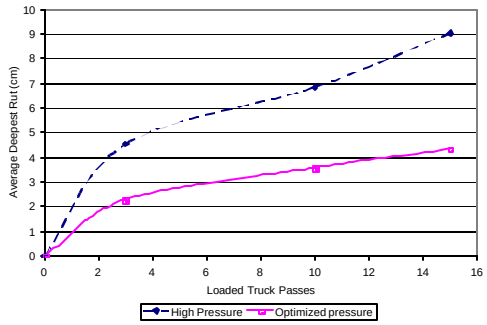


**Figure 2: High and optimized tire pressure rut development**

B-train log trucks using optimized tire pressures rutted the newly constructed in-block road at less than half the rate than similarly loaded B-trains using high tire pressures. The slower rutting is expected to reduce in-block road maintenance requirements, vehicle assists, and sediment production and road strength loss due to heavy rains.

## Mobility Testing

The first pass through the soft road mobility section was by an 8-axle B-train operating with optimized tire pressures and it successfully negotiated the test section. The next two trucks were 8-axle B-trains operating with high tire pressures and both trucks became stuck when negotiating the test section. After becoming stuck in the soft patches of mud and loose sand, these trucks used their TPCS to reduce their tire pressures, backed out of the holes they had created, and then both drove forward through the section where they had been stuck. The two high tire pressure trucks left deep ruts where they attempted to negotiate the soft road mobility section with high tire pressure (Figure 3).

**Figure 3: Mobility section rutting after two high tire pressure passes**

Having lower contact pressures often permits TPCS-equipped trucks to “heal” existing ruts by varying their wheelpath and riding down the raised edges of the ruts without cutting new ruts in the soft surface. These trucks were able to form a compacted surface crust that was capable of carrying optimized-tire-pressure traffic without extensive rutting or grading (Figure 4).

**Figure 4: Healed mobility test section**

However, after four consecutive passes by high-tire-pressure trucks, the mobility section was again deeply rutted and required grading. This illustrates how the use of optimized tire pressures are likely to improve in-block operations and reveals that optimized tire pressures are most beneficial when the entire fleet is operating with TPCS.