



## Analysis of Alberta's pavement capacity to support winter weight premiums

<https://library.fpinnovations.ca/en/permalink/fpipub49858>

Author: Thiam, Papa-Masseck

Bradley, Allan

Date: May 2018

Material Type: Research report

Physical Description: 57 p.

Sector: Forest Operations

Field: Fibre Supply

Research Area: Transportation Infrastructure

Subject: Roads

Transport

Trucks

Weight

Alberta

Temperature

FOP Technical Report

FPI TR

Series Number: Technical Report ; TR 2018 n.28

Language: English

Abstract: FPInnovations, in cooperation with Alberta Transportation and the Laval University i3C Chair, undertook a review of the starting threshold for initiating winter weight hauling in Alberta. The objective of this project was to conduct an engineering analysis of freezing pavements to determine the minimum frost depth at which log hauling at winter weight premiums (WWP) in Alberta could start without compromising pavement service life. The report describes literature on freezing pavement engineering, Canadian winter weight policies, a controlled trafficking simulation of an instrumented pavement as it was frozen, and subsequent modeling to validate results and extrapolate results of a wider range of pavement structures. It was recommended that the current 1.0 m starting frost depth threshold be reduced to a depth of 700 mm.

### Documents



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Analysis of Yukon highways  
pavement damage caused  
by permitted overload  
trucks

## Analysis of Yukon highways pavement damage caused by permitted overload trucks

<https://library.fpinnovations.ca/en/permalink/fpipub52892>

Author: Bradley, Allan  
Thiam, Papa-Masseck

Contributor: Highways & Public Works, Yukon

Date: March 2020

Material Type: Research report

Physical Description: 43 p.

Sector: Forest Operations

Field: Fibre Supply

Research Area: Transportation Infrastructure

Subject: Highway  
Pavement  
Roads  
Trucks  
Vehicles weight  
FPI TR

Series Number: Technical Report ; TR 2020 n.5

Language: English

Abstract: In publication

### Documents

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FPInnovations  
Analysis of Yukon highways  
pavement damage caused  
by permitted overload  
trucks

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## Cours d'usine repensées

<https://library.fpinnovations.ca/en/permalink/fpipub8279>

Author: Mercier, Guyta  
Thiam, Papa-Masseck

Date: 2016

Material Type: Technical note

Physical Description: 1 p.

Sector: Forest Operations

Field: Fibre Supply

Research Area: Forestry

Subject: Drainage  
Geosynthetics  
Geotextiles  
Reinforcements  
Cour d'usine  
Contamination  
Logistique  
Asphalte  
Béton  
Renforcement mécanique  
Stabilisation chimique  
Géotextile  
Membrane géosynthétique  
Géocellule perforée  
Géogrille tri-axiale  
Enrobé bitumineux  
Cendres volantes  
Indice de plasticité du sol

Series Number: OT 235

Language: French

Abstract:

The soil of factory yards, due to its multi-layer structure, is very similar to that of very similar to that of roads. However, its drainage is much more and surface contamination is problematic. The transport logistics are difficult, the speed of movement is reduced and the and the route of the vehicles is variable. All this has as consequences loss of equipment productivity, wood storage problems, high maintenance costs and even negative impacts on the quality of the processed wood. Negative impacts on the quality of the processed wood. Faced with this reality, a team of researchers from FPInnovations' Roads and Infrastructure Group infrastructure group of FPInnovations set out to find solutions.


**Abstract:** Le sol des cours d'usine, de par sa structure multicouche, ressemble beaucoup à celui des routes. Toutefois, son drainage est beaucoup plus complexe et la contamination de la surface est problématique. La logistique de transport y est difficile, la vitesse de déplacement est réduite et le trajet des véhicules est variable. Le tout a comme conséquences une perte de productivité des équipements, des problèmes d'entreposage du bois, des coûts élevés d'entretien et même des impacts négatifs sur la qualité du bois transformé. C'est devant cette réalité qu'une équipe de chercheurs du groupe Routes et infrastructures de FPInnovations a entrepris de trouver des solutions.

## Documents

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Défis et recommandations de l'entretien hivernal des chemins forestiers

Papa-Masseck Thiam, Ing. Jr., M.Sc.  
Chercheur - Routes d'accès aux ressources

## Défis et recommandations de l'entretien hivernal des chemins forestiers

<https://library.fpinnovations.ca/en/permalink/fpipub7822>

**Author:** Thiam, Papa-Masseck  
**Date:** juin 2019  
**Edition:** PIF  
**Material Type:** Presentation  
**Physical Description:** Video : 0:51:08  
**Sector:** Forest Operations  
**Field:** Partnerships  
**Research Area:** Forestry  
**Series:** PIF ; 2019  
**Language:** French  
**Abstract:** Une présentation de Papa-Masseck Thiam pour PIF (Partenariat Innovation Forêt)

## Video Tracks

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# Ensuring access for Canadian forestry operations with wet and weak resource roads

<https://library.fpinnovations.ca/en/permalink/fpipub8044>

Author: Gillies, Clayton  
Thiam, Papa-Masseck  
Bober, Francis  
Bradley, Allan

Date: March 2021

Material Type: Research report

Physical Description: 24 p.

Sector: Forest Operations

Field: Fibre Supply

Research Area: Transportation Infrastructure

Subject: Forestry  
Roads  
Road construction  
Planning  
Water

Series Number: Technical Report TR 2021 N26

Language: English

Abstract:

Forest operations across Canada are encountering increasingly difficult road conditions and more frequent access interruptions related to wet and weak road sections. Resource roads are considered a liability by many forest companies and their business model has been to create the lowest cost, lowest standard, resource road network possible that also will provide tolerable levels of access (i.e., some but not too many failures and hauling disruptions). Increasingly difficult operating conditions and frequent access interruptions, however, drive up costs and threaten the economic sustainability of forest operations.

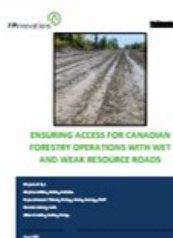
Starting in 2017, FPInnovations has launched a project to provide its members with techniques and strategies that will offer more reliable and strong road sections and reduce overall road costs. A state-of-practice survey of FPInnovations members provided researchers with a comprehensive understanding of conventional means of responding to wet, weak road conditions in Canada. The report summarizes the responses to wet, weak resource road sections that were identified in the state-of-practice survey and provides an overview of the chief causes and related site indicators for wet, weak road conditions.

Recommended best practices are provided for a variety of conventional industry responses to wet, weak road sections. These address common misconceptions and knowledge gaps that reduce the effectiveness and increase the overall cost associated with the industry responses. These best practice recommendations were based upon findings from a literature review, product manufacturer information, and from researcher expertise.

The report also considers improvements to conventional practices, and advanced solutions that are potentially more effective and economic than the state-of-practice but are not widely exploited by industry. Eleven potential solutions from these two categories were compared and ranked in order of potential. The practice improvements selected for further study were soil compaction, and corduroy and access mats. The advanced solutions selected for further study were geosynthetics that offer both soil reinforcement and enhanced drainage, geocells, and TPCS, a technology to improve truck road-friendliness. Starting in 2021, FPInnovations will initiate field trials and life cycle cost analyses of these technologies.


Documents

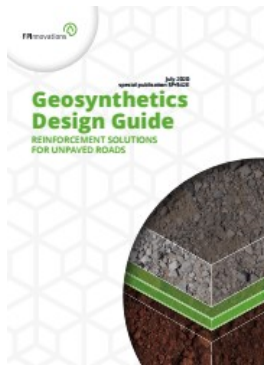
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# Geosynthetics design guide. Reinforcement solutions for unpaved roads

<https://library.fpinnovations.ca/en/permalink/fpipub53008>

Author: Bober, Francis  
Thiam, Papa-Masseck

Date: July 2020

Material Type: guide  
Research report

Physical Description: 47 p.

Sector: Forest Operations

Field: Fibre Supply

Research Area: Transportation Infrastructure

Subject: Geosynthetics  
Soil  
Roads  
Reinforcement

Series Number: Special Publication ; SP542

Language: English

ISBN: 9780864886002

ISSN: 19250506

Abstract: This guide provides users with easy to use charts to assist with the design of geosynthetic-reinforced unpaved roads over weak soils. It permits the estimation of key input parameters through simple procedures and judgment based on experience. Further optimization of designs may however be possible through detailed calculations and lab testing which are encouraged whenever feasible.

## Documents

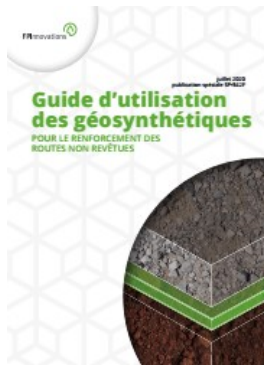
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# Guide d'utilisation des géosynthétiques pour le renforcement des routes non revêtues.

<https://library.fpinnovations.ca/en/permalink/fpipub53009>

Author: Bober, Francis  
Thiam, Papa-Masseck

Date: Juillet 2020

Material Type: guide  
Research report

Physical Description: 50 p.

Sector: Forest Operations

Field: Fibre Supply

Research Area: Transportation Infrastructure

Subject: Geosynthetics  
Soil  
Roads  
Reinforcement

Series Number: Special Publication ; SP542

Language: French

ISBN: 9780864885999

ISSN: 07094523

Abstract:

Ce guide propose des graphiques simples d'utilisation afin d'aider les utilisateurs dans la conception de routes non revêtues renforcées avec des géosynthétiques. Il permet d'estimer les principaux paramètres d'entrée à travers des procédures simples et le recours au jugement découlant de l'expérience. Lorsque possible, le recours à des essais en laboratoire est préconisé pour l'obtention de certaines données d'entrée.

## Documents



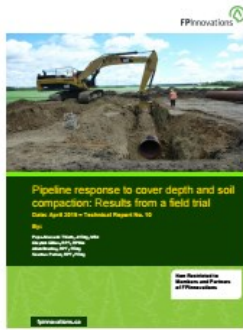
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Pipeline response to cover depth and soil compaction:





## Results from a field trial

<https://library.fpinnovations.ca/en/permalink/fpipub48925>

Author: Thiam, Papa-Masseck  
Gillies, Clayton  
Bradley, Allan  
Parker, Seamus

Date: April 2015

Material Type: Research report

Physical Description: 23 p.

Sector: Forest Operations

Field: Fibre Supply

Research Area: Transportation Infrastructure

Subject: Roads  
Pipe lines  
Trucks  
Weight  
FOP Technical Report  
FPITR

Series Number: Technical Report ; TR 2015 n.10

Language: English

Abstract: FPInnovations, with funding from the Canadian Forest Service, is currently investigating the feasibility and form of standardized road - pipeline crossings. FPInnovations and Access Pipeline Inc. jointly conducted a field trial to evaluate the structural responses from heavy vehicle traffic to large (National) pipeline segments buried within a native earth road. This field trial was intended to contribute to the general knowledge of the industry, and more specifically to document the structural performance of large diameter, stiff-walled (pipeline) pipe buried under roads that are crossed by heavy equipment.

### Documents

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# Pourquoi construire des chemins forestiers d'avance? = Why build logging roads in advance?

<https://library.fpinnovations.ca/en/permalink/fpipub8141>

Author: Mercier, Guyta  
Thiam, Papa Masseck

Date: 2021

Material Type: Pamphlet

Physical Description: 1 p.

Sector: Forest Operations

Field: Fibre Supply

Research Area: Forestry

Subject: Construction  
Road construction  
Gravel  
Chemins d'avance  
Bénéfices  
Capacité portante  
Coûts  
Mise en forme  
Matériaux granulaires  
Gravier  
Cycle de vie  
Routes

Series Number: OT 290


Language: French


Abstract: The load-bearing capacity of forest roads is often reduced by excess water combined with harsh weather conditions. This decreases the reliability of these roads and has an impact on the cost and access to fiber. In order to overcome this challenge, the construction of feeder roads is one of the most used solutions. This technique involves shaping the road and allowing it to consolidate for a period of time to reduce its moisture content prior to the placement of granular materials. Although this practice is widespread, its effectiveness had never been quantified. With this in mind, FPInnovations, in collaboration with several members of the forest industry, evaluated the technical, financial and functional benefits of this practice.

Abstract: La capacité portante des chemins forestiers est souvent réduite par un excès d'eau associé à des conditions climatiques difficiles. Ceci diminue la fiabilité de ces routes et a un impact sur le coût et l'accès à la fibre. Afin de pallier ce défi, la construction des routes d'avance est l'une des solutions les plus utilisées. Cette technique consiste à faire la mise en forme de la route et à la laisser consolider pendant un certain temps pour diminuer sa teneur en humidité avant la mise en place des matériaux granulaires. Bien que cette pratique soit répandue, son efficacité n'avait jamais été quantifiée. C'est dans cette perspective que FPInnovations, en collaboration avec plusieurs membres de l'industrie forestière, a évalué les avantages techniques, financiers et fonctionnels de cette pratique.



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## Predicted pavement damage from widebase steering tires: a methodology to estimate widebase steering tire load equivalency

<https://library.fpinnovations.ca/en/permalink/fpipub19842>

Author: Bradley, Allan  
Thiam, Papa-Masseck

Contributor: Canadian Forest Services (CFS)  
National Resources Canada (NRC)

Date: March 2020

Material Type: Research report

Physical Description: 33 p.

Sector: Forest Operations

Field: Fibre Supply

Research Area: Transportation Infrastructure

Subject: Roads  
Tires  
Trucks  
FPI TR  
Weight

Series Number: Technical Report ; TR 2020 n.12

Language: English

Abstract:

Canadian regulators utilize the ESAL concept for vehicle impact evaluations and(or) pavement design. Unfortunately, TAC's ESAL equations do not account for tire size and, consequently, overestimate steering axle impacts when those axles are equipped with widebase steering tires. Many new vehicles proposed for use in Canada feature tridem-drive tractors and heavily loaded steering axles—these heavy loads necessitate the use of widebase steering tires. In order to optimize high efficiency truck configurations in Canada, therefore, accurate estimates of widebase steering tire ESALs are needed. This work describes a methodology to estimate ESALs for widebase steering tires. These ESAL equations were used to justify an increase in steering axle weights for B.C. 9-axle log B-trains.

## Documents

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