



Construction moisture management, nail-laminated timber

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Auteur: Wang, Jieying
 Date: March 2021
 Genre du document: Research report
 Description physique: 6 p.
 Secteur: Wood Products
 Domaine: Sustainable Construction
 Champ de recherche: Advanced Wood Materials
 Sujet: Laminate product
 Performance
 Wood frame
 Moisture content

Série: InfoNote 2021 N 15
 Langue: English
 Résumé: Nail-laminated timber (NLT) is a large built-up member often used as interior structural members for floors, roofs, walls, and elevator/stair shafts. Because prolonged wetting of wood may cause staining, mould, excessive dimensional change (sometimes enough to fail fasteners), and even result in decay and loss of strength, construction moisture is an important consideration when building with NLT. This document aims to provide technical information to help architects, engineers, and builders assess the potential for wetting of NLT during building construction and identify appropriate actions to mitigate the risks.

Documents



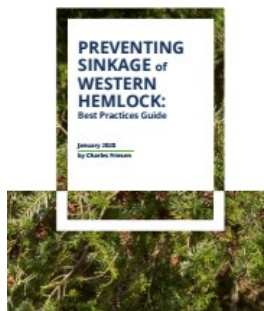
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Preventing sinkage of western hemlock, Best practices guide

<https://library.fpinnovations.ca/fr/permalink/fpipub53003>



Auteur: Friesen, Charles
 Date: January 2020
 Genre du document: Research report
 Description physique: 12 p.
 Secteur: Forest Operations
 Domaine: Fibre Supply
 Champ de recherche: Forestry
 Sujet: Trees
 Moisture content
 Water
 Transport

Série: Special Publication ; SP 538

Langue: English

ISBN: 9780864885890

ISSN: 19250509

Résumé: Hemlock can have higher moisture content than most other native trees, causing them to sink. Hemlock lumens have large pits (valves) that allow easy transport of water into the wood. Bigger rings = bigger lumens. Younger hemlock or hemlock tops are more susceptible to sinking. The bigger the rings the more likely to take on water.

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Drying of balsam and subalpine fir: for a better understanding

<https://library.fpinnovations.ca/fr/permalink/fpipub52906>



Auteur: Lavoie, Vincent
Date: November 2019
Genre du document: Research report
Description physique: 4 p.
Secteur: Wood Products
Domaine: Wood Manufacturing & Digitalization
Champ de recherche: Advanced Wood Manufacturing
Sujet: Air drying
Balsam
Drying
Fir
Logs
Lumber
Moisture content
Performance
Sawmills
Subalpine fir
Wet pockets
Wood yards

Série: FPI WP 2019


Langue: English

Résumé: The findings of recent studies from both eastern and western Canada have shown that the drying behaviour of subalpine fir (*A. lasiocarpa*) and balsam fir (*A. balsamea*) is similar, which allows common solutions to be applied based on research conducted on one species of fir or the other. This article summarizes previous research findings and good practices that can be adopted in the short term to improve the drying of fir.

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Séchage du sapin baumier et subalpin: pour une meilleur compréhension



<https://library.fpinnovations.ca/fr/permalink/fpipub52907>

Auteur: Lavoie, Vincent
Date: November 2019
Genre du document: Research report
Description physique: 4 p.
Secteur: Wood Products
Domaine: Wood Manufacturing & Digitalization
Champ de recherche: Advanced Wood Manufacturing
Sujet: Air drying
Balsam
Drying
Fir
Logs
Lumber
Moisture content
Performance
Sawmills
Subalpine fir
Wet pockets
Wood yards

Série: FPI WP 2019


Langue: French

Résumé: Des travaux récents tant dans l'est que dans l'ouest du Canada ont montré que le comportement au séchage du sapin subalpin (*A. lasiocarpa*) et du sapin baumier (*A. balsamea*) est similaire, ce qui permet une application de solutions communes à partir de travaux effectués sur l'une ou l'autre variété de sapin. Le présent document se veut une revue sommaire de résultats de travaux antérieurs et de bonnes pratiques pouvant être adoptées à court terme pour améliorer le séchage de cette essence.

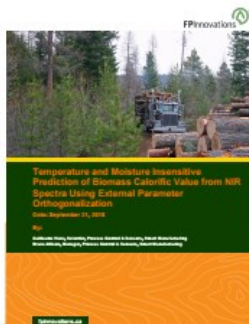
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Temperature and moisture insensitive prediction of biomass calorific value from NIR spectra using external parameter orthogonalization

<https://library.fpinnovations.ca/fr/permalink/fpipub52660>

Auteur: Hans, Guillaume
Allison, Bruce J.

Collaborateur: Natural Resources Canada. Canadian Forest Service

Date: September 2018

Genre du document: Research report

Description physique: 27 p.

Secteur: Wood Products

Domaine: Bioproducts

Champ de recherche: Biomass Conversion

Sujet: Biomass
Optimization
Spectroscopy
Temperature
Moisture content

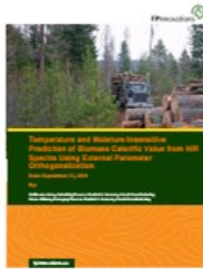
Série: Transformative Technology ; TT 2018

Langue: English


Résumé: In the pulp and paper and biofuel industries, real-time online characterization of biomass gross calorific value (GCV) is of critical importance to determine its quality and price and for process optimization. Near-infrared (NIR) spectroscopy is a relatively low-cost technology that could potentially be used for such an application. However, the NIR spectra are also influenced by biomass temperature (T°) and moisture content (MC). In this paper, external parameter orthogonalization (EPO) is employed to remove simultaneously the influence of T° and MC on the spectra before predicting GCV. EPO is of particular interest when one desires to transfer information from one modeling experiment to another, such as when developing a calibration model for a new property from the same material, or when it would be more efficient to divide the experimental effort. EPO was found to be an effective method for desensitizing a PLS calibration model to the influence of T° and MC, enabling robust and accurate prediction biomass GCV. Partial least squares (PLS) regression models developed with EPO always provided equal or better performance than models developed without EPO. The paper shows that experimental efforts and costs can be reduced by approximately one half while maintaining prediction accuracy and model robustness.

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Mill trial of log storage age effects on veneer production and using Logdry™ to predict douglas fir log residual moisture contents

<https://library.fpinnovations.ca/fr/permalink/fpipub52647>

Auteur: Semple, Katherine
Dai, Chunging

Date: August 2018

Genre du document: Research report

Description physique: 27 p.

Secteur: Wood Products

Domaine: Sustainable Construction

Champ de recherche: Building Systems

Sujet: Logs
Storing
Aging
Veneer
Moisture content

Série: Industry Partnership

Langue: English

Résumé:

This study was conducted with the aim of assessing the effects of log storage time and conditions at a BC mill yard on veneer production under mill production conditions. The second objective was to validate the FPInnovations Logdry™ drying model for developed for wood piles in Eastern Canadian mills. The software was used to generate drying rate predictions under the BC mill's prevailing weather conditions and storage times for comparison with some measured residual moisture contents of Douglas fir logs kept in storage at the mill for six and nine months, sampled and peeled in a laboratory trial in 2016.

The 2016 lab trials suggested little effect of lengthy (winter) storage up to 9 months but mill experience suggests this is excessively long and logs deteriorate in terms of veneer production and quality considerably earlier. Unfortunately due to experimental circumstances the mill peeling trials for the 9 month stored logs were unable to provide an accurate assessment of the true effect on production. Mills trials indicated % heavy sap had remained fairly stable largely within the mill target of 14% to 17% over the storage periods. During the mill trials there were unavoidable heavy confounding effects of different average diameter for log groups and peeler knife condition affecting the expected veneer production variables.

The trials also demonstrated how pile size and height play a major role in protecting logs from drying; with very dry logs having a deleterious effect on veneer production. Logs held in small piles for 12 months or more, even with artificial 'drying retardants' such as end sealant and tarping were too dry for reliable peeling, causing very rapid knife wear, spinouts, veneer break-up and line blockages and significant lost recovery. The % heavy sap offtakes from these trials were just 2% to 4%.

LogDry™ provides a fairly good estimate of likely drying rate trends of mid-sized (35 cm/14" to 41 cm/16" range) Douglas fir under the BC mills historic weather conditions over 6 and 9 months.

LogDry™ (Birch setting) was closest to measured log MC in large diameter (46 cm/18") logs but the Aspen setting was closer to measured MC in small logs (<30 cm/12"). In the limited sample of logs available from the mill in 2016 the 12" logs were much drier after 9 months storage than the model predicted, even on the Aspen setting. Further sampling of piled logs in the small diameter range is needed to verify this observation.

LogDry™ was used to estimate drying rates of logs stored before or after Summer. Modelling indicated a shorter viable storage window for logs delivered before Summer compared to just before Winter, especially in the 6-month range. Residual log MCs were very similar after 12 months regardless of start time.

Further work is required to better calibrate Logdry™ for major Western Canadian species, particularly Douglas fir, Spruce and Lodgepole pine, and reduce the calculation time for simulations. Further adjustment may be needed for simulating real drying rates in very small logs. The model assumption of similar residual MC after 12 months regardless of start time also needs to be verified.

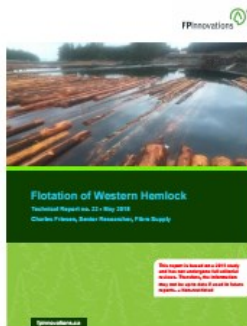
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Flotation of western hemlock

<https://library.fpinnovations.ca/fr/permalink/fpipub52863>

Auteur: Friesen, Charles
Date: May 2018
Genre du document: Presentation
Description physique: 12 p.
Secteur: Forest Operations
Domaine: Fibre Supply
Champ de recherche: Forestry
Sujet: Trees
Moisture content
Water
Transport

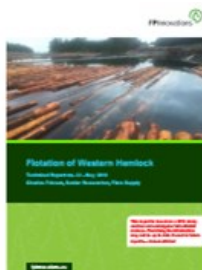
Série: Report

Langue: English


Résumé: There was no change to the moisture content of any of the western hemlock log sample sets during the study period between 1 Dec 2014 and 5 mar 2015. It seems that this lack of change is related to stability in environmental humidity experienced by the logs. Whether or not time since cutting influences the ability of Hw logs to change moisture content could not be conclusively determined by the study.

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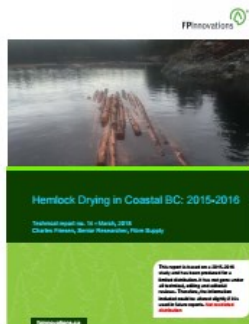
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Hemlock drying in coastal BC: 2015-2016

<https://library.fpinnovations.ca/fr/permalink/fpipub49817>

Auteur: Friesen, Charles
Date: March 2018
Genre du document: Research report
Description physique: 25 p.
Secteur: Forest Operations
Domaine: Fibre Supply
Champ de recherche: Forestry
Sujet: Wood
Drying
British Columbia
Moisture content
FPI TR

Série: Technical Report ; TR 2018 n.14


Langue: English

Résumé: Based on the data from this study and a literature review, there are two distinct trajectories for hemlock wood moisture content, depending on if the tree was felled before or after May. Hemlock trees felled before May gain the full benefit of spring drying according to the ambient conditions of their local micro-climate. Trees felled after May suffer from a physiological spike in moisture content that the tree generates to promote its growth and survive the summer soil drought.

Documents



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Hemlock drying update: 2016/17

<https://library.fpinnovations.ca/fr/permalink/fpipub49818>


Auteur: Friesen, Charles
Date: March 2018
Genre du document: research report
Description physique: 2 p.
Secteur: Forest Operations
Domaine: Fibre Supply
Champ de recherche: Forestry
Sujet: Wood
Drying
British Columbia
Moisture content

Série: InfoNote ; 2018 n. 7
Langue: English
Résumé: The problem of second-growth western hemlock (*Tsuga heterophylla*) sinking when watered continues to plague the coastal logging industry of British Columbia. A study conducted by FPInnovations in 2015-16 concluded that felled hemlock logs took two distinct trajectories in their drying patterns through time, depending on whether they were felled before or after May.

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Wicking to reduce moisture content in Western Hemlock: Vancouver Island study

<https://library.fpinnovations.ca/fr/permalink/fpipub49848>

Auteur: Friesen, Charles
Date: March 2018
Genre du document: Research report
Description physique: 25 p.
Secteur: Forest Operations
Domaine: Fibre Supply
Champ de recherche: Forestry
Sujet: Wood
Drying
British Columbia
Moisture content
FPI TR

Série: Technical Report ; TR 2018 n.26


Langue: English

Résumé: The idea that a wicking treatment – leaving tops, branches, and needles attached to the stem after felling – would reduce stem moisture content and lead to reduced loss of western hemlock logs from sinking during watering was tested. This study did not show that wicking produces a different result from normal bucking in average stem moisture content if both groups are treated equally. Further, after curing for two months logs did not increase in moisture content during watering.

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