

Firefighter Wood Product and Building Systems Awareness

A Resource Guide



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Introduction

The construction industry continues to be a growing economic sector in Canada. Within this market, various stakeholders are exploring traditional building products as well as innovating with these and other products. Numerous jurisdictions are exploring reformative measures that have the potential to enhance opportunities for the wood industry to respond to various economic, sustainability, environmental, and safety challenges and opportunities. This resource guide focuses on some of those safety issues by providing links to both general and more specialized information sources regarding various fire safety factors related to wood building construction.

Firefighting Awareness and Response Resources: An Introduction

Building Construction Awareness

General

[*Manufacturing and Industrial Fires: Do You Know What You're Getting Into?*](#)

The article discusses several significant issues that fire departments should consider when looking at manufacturing and industrial facilities. Fire departments with very old buildings in their jurisdiction are required to have an understanding of what heavy timber construction is and how fire affects it. Additionally, it is noted that a building's purpose needs to be incorporated in any operational assessment as manufacturing and industrial processes may involve raw material substances.

Wood-frame Construction

[*Fighting Fires in Disposable Structures*](#)

In this article, the author explains the methods that firefighters should adopt when engaging with fires in timber-based buildings. Topics explored include situational awareness and various procedural recommendations associated with responding to burning timber buildings.

[*Modern Wood-Frame Construction: Firefighting Problems and Tactics*](#)

This article discusses the main challenges for the firefighting community in the rise of light-weight wood-frame construction. The author discusses the relationship between the spread of fire and the building's design and associated information regarding firefighter safety.

[*It's Not Lightweight Construction, It's What Happens When Lightweight Construction Meets Fire*](#)

Exploring modern methods of light-weight wood construction, this article discusses concerns within the firefighting community related to risk and awareness associated with fire safety and wood buildings. Building code regulations, sprinkler systems and training techniques are strategies investigated in the article.

[Enhancing Public and Firefighter Safety: What is it Going to Take?](#)

The author discusses various dimensions of accountability in relation to firefighter safety given the increase in wood-based buildings.

[Residential Frame Dwelling Fire Injures Firefighter and Yields Important Lessons](#)

Referencing a residential fire in which he sustained injuries, the author discusses what can be/should be learned from the incident and what areas of building design and construction require further education of firefighters. Increasing the knowledge of emergency crews and the correct use of protective gear are some of the strategies presented as effective in mitigating risk to firefighters.

[Collapse and Fire Extension in Wood-Frame Construction](#)

When approaching a building engulfed in flames, the type of building construction plays a key role in shaping how firefighters should respond. The author argues that improving firefighter knowledge of construction designs, particularly in wood-frame buildings, is vital to responding effectively.

[A Side-by-Side Comparison of New and Old Construction](#)

Using a variety of examples, this article discusses key differences between new and old building constructions and how these differences impact the efforts and risk factors of firefighters. Focusing primarily on light-weight wood construction, the article explains different strategies and techniques that could be applied based on the structural design of the building.

[A Guide to Firefighter Safety and Modern Structural Firefighting](#)

This guide is designed to increase firefighter awareness and safety when responding to modern constructions, with a focus on residential buildings. The secondary purpose of this guide is to develop local training programs and increase awareness of the potential hazards and risks when responding to modern building structure fires.

[Engineered Wood Products Primer Awareness Guide](#)

This guide provides a review of the history and development of engineered wood products (EWPs) in the marketplace and provides definitions that assist in the identification of these lightweight products as they are used in building construction.

Mass Timber Construction

[The World's Most Advanced Building Material is...WOOD and It's Going to Remake the Skyline](#)

Concentrating mainly on newer mass timber construction methods, such as cross-laminated timber, the author discusses how wood and timber materials have increased in popularity as building components. The article compares CLT reaction to fire and its fire resistance ratings to that of steel and concrete.

Construction Site Awareness

[Construction Site Fire Response: Preventing and Suppressing Fires During Construction of Large Buildings](#)

In this study, vulnerable aspects of wood buildings in the construction phase is examined. The study concludes that prevention strategies on construction sites are the most effective measure of fire safety standards, and it offers suggestions for how planning and fire personnel should develop better communication with respect to security, inspection and monitoring to improve prevention tactics.

[Construction Site Fire Safety](#)

Since construction sites are most vulnerable to fire and weather damage, it is useful for fire fighters to understand the fire risks and site safety procedures during various stages of construction. Fire safety in construction sites is vital especially considering the recent changes within building code regulations that permits taller wood-frame building projects. This report provides information on fire safety plans, as well as prevention and protection practices for construction sites.

Wood Buildings and Fire Safety

Fire Protection And Statistics, Building And Fire Codes, Structural Design

Fire Protection and Statistics

[Fire Safety Design of Multi-Storey Timber Buildings](#)

This paper examines fire protection and safety requirements for multi-storey lightweight wood-frame (referred to in this paper as “light timber frame”) and heavy timber buildings. It is most useful for differentiating between lightweight wood-frame and heavy timber construction, and breaks down the various materials, structural components and active fire systems that act to protect the building structure in the case of a fire.

[Taller Wood Buildings and Fire Safety: Existing Evidence about Large Wood Construction](#)

This comprehensive research project examines the increased use of wood materials in high-rise constructions, as well as the current concerns, risks and benefits surrounding wood-based building safety. The study finds that non-combustible building materials are commonly perceived as safer, yet new technologies have allowed wood buildings to meet or exceed the fire protection ratings of non-wood buildings. This study demonstrates that combustibility levels of materials is not the most critical safety factor, but that “the contents and behaviour of the tenants (smoking, cooking and having open fires) poses the gravest danger”. New mid-rise and taller wood building constructions are designed with active and passive protection mechanisms (such as sprinkler systems) that make them as safe as non-combustible buildings.

[Fire Protection in Wood Buildings](#)

The rise of wood products in mid-rise buildings is a growing phenomenon across North America. This educational article outlines the basics of fire protection in wood buildings, including the principles of the International Building Code, active and passive fire protection mechanisms, allowable wood use in buildings, tested fire-rated wood-frame assemblies, and, calculating fire endurance using the Component Additive Method (CAM).

[Tall Wood Takes a Stand](#)

The increased safety measures and environmental impacts in tall and mid-rise wood buildings are highlighted in this resource. The article explains that despite a public fear of fire risk, wood buildings are being designed that can actually lead to better passive fire protection measures. The article highlights the performance and efficiency of wood buildings in seismic events, thermal pressure and acoustic impact as well.

[Fire Safety, A Wood-Frame Building Performance Fact Sheet](#)

This short fact sheet provides an overview of Canadian fire safety standards in wood-frame buildings, particularly in relation to its structural design and passive fire safety measures. It explains how fire prevention and safety is developed throughout various design facets, and that the development of stricter building codes has changed the ability of fires to spread.

[The New Mid-Rise Wood Opportunity](#)

This article provides an overview of the potential opportunities, initiatives and impacts for communities through the increase of mid-rise wood buildings across Canada. Explaining how building codes and active fire protection tactics are the most crucial safeguards in fire protection, this article is useful for those interested in the merits of this increase in this construction type in urban environments.

[Fire Safety of Wood Buildings is Not on Trial](#)

Through detailing the essential technical aspects of fire safety in new wood-based buildings, the article sheds light on the misconceptions that tend to be emphasized in public awareness and media campaigns.

[Fire Safety Challenges of Tall Wood Buildings](#)

This comprehensive research study examines some of the missing links in awareness and education in the construction of tall wood buildings. Noting that building codes often limit wood or timber-based tall and mid-rise constructions, the study examines various framing and assemblage blueprints for these types of buildings. It explains scientific tests that were completed to evaluate the strength and durability of wood constructions during a fire and compares those results to common assumptions of wood buildings. The report highlights a number of successful tall and mid-rise wood constructions around the globe. Finally, this report lists various recommendations associated with fire safety measures and the increase in wood building construction.

[The Wood-Frame Conundrum](#)

This article highlights the importance of working sprinkler systems and how they minimize the risk of fire spread in mid-rise wood buildings. The authors point to a recent study that did not find evidence to support the assertion that mid-rise wood structures were at a higher risk than older models of wood-based buildings. Stricter building code requirements and the use of sprinkler systems decrease death and injury rates, reduce the spread of fire and enhance efforts of firefighters.

[Residential Fire in Surrey, BC](#)

This report provides an extensive examination of fire causation patterns and prevention and safety measures undertaken in Surrey BC. A key finding was that smoke alarms were not functioning in many homes involved in fire incidents. The study stresses that increasing public awareness of fire safety measures can significantly decrease the risk of residential fires.

Building and Fire Codes

[Fire Safety Design in Buildings](#)

This publication provides detailed information on the techniques and materials used in wood building construction in relation to fire safety and protection requirements in the National Building Code of Canada. While the document references the 1995 National Building Code of Canada, many of the fire safety requirements remain the same and much of the discussion of code assumptions and objectives, as well as basic concepts such as fire resistance, flame spread and the NFPA Fire Safety Concepts Tree, are still relevant today. It explains the advantages of various wood assemblies and employs illustrations to guide readers through the techniques and methods used in reaching national standards.

[Wood Meets Code](#)

This website provides information regarding how wood meets the current fire safety requirements in building codes in Canada and the US. Supplying additional resources including relevant videos, illustrations and presentations, this site provides information on the latest construction technologies and industry developments that ensure wood constructions meet safety and performance standards for customers and other stakeholders.

[Fire Design & Code](#)

This short video outlines fire-resistance ratings for the main types of building projects found in the United States. The video details the International Building Code's Table 601, which highlights the basic fire protection requirements for buildings depending on size. It provides details of fire testing schemes for cross-laminated timber structures, as well as what other types of construction materials have been used in wood structures to enhance, and in many cases surpass, the minimum fire protection requirements.

[Wood-frame Construction, Fire Resistance and Sound Transmission](#)

This brochure provides background information on fire safety concepts in wood-based lightweight framing systems, including statistical data and modern examples of fire protection in building designs and codes. The use of images assists readers who may not be familiar with construction units to comprehend the particulars of wood-frame construction.

[BC Residential Mid-Rise Wood-Frame Code Change](#)

In May of 2008, Minister Rich Coleman announced government's intention to increase the maximum height for wood-frame residential construction from four to six storeys. These new BC Building Code requirements were approved in January 2009 and become effective April 6, 2009 giving the residential construction sector time to prepare for implementation.

[2015 Reference Guide: Mid-Rise Wood Construction in the Ontario Building Code](#)

This report presents the 2015 amendments to the 2012 Ontario Building Code that permit some mid-rise buildings to be of wood construction. Features, including those related to fire safety, that are required to be provided for these buildings are identified, along with any conditions on the use of wood in these buildings relative to the new code provisions.

[Construction Code – Revised Regulation Published](#)

The revised Building Chapter of the Quebec Construction Code permits, under certain conditions, buildings of combustible construction up to six storeys in building height for Group C (residential) or Group D (business) occupancies to be built. (Available in French only)

Structural Design

[Structural, Fire Protection and Building Envelope Professional Engineering Services for 5- and 6-Storey Wood-frame Residential Building Projects \(Mid-Rise Buildings\)](#)

The purpose of the bulletin is to provide basic technical and practice guidance on structural, fire protection and building envelope professional engineering issues related to mid-rise buildings. An important component is the explanation of enhanced requirements for fire safety with respect to building materials and fire suppression systems. Though the bulletin is directed to engineering professionals, the discussions of fire safety are informative for firefighters concerned with building code requirements and more technical and specialized structural information.

[Five-Story Wood-Frame Structure over Podium Slab](#)

This structural design example provides general information on one type of mid-rise wood building, as well as specific information on seismic and wind resistance as they relate to various design issues.

[Fire Outcomes by General Construction Type: A Retrospective Analysis of British Columbia Reported Fires](#)

This paper examines fire incidents that occurred from 2008-2013 in British Columbia including all reported fires regardless of the building type. The results indicate that fire spread and containment were mostly related to the efficiency of active fire systems (i.e. sprinklers, alarms) rather than building type.

[Taller Wood Buildings and Fire Safety: Existing Evidence about Large Wood Construction](#)

Exploring the merits of using wood in taller buildings, this report offers a look at this construction type and associated fire safety issues. The authors discuss how typical residential and mid-rise wood constructions use fire protective and resistant properties and how these practices are transferable to tall-rise wood-frames. The research findings conclude that abiding by minimum building codes requirements, responsible occupant behaviours, and active fire safety systems all contribute to proper management of fire risk.

Elements Of Fire Safety In Wood Building Construction

General Fire Performance: Charring, Flame Spread and Fire Resistance

[Fire Performance of Wood Products](#)

This guide provides an overview of the fire performance characteristics of wood building products, including charring, flame spread and fire resistance

[Fire Safety: An Introduction](#)

This webpage offers introductory information on fire safety concepts related to wood buildings.

[Design for fire](#)

This webpage discusses fire rating in timber products and provides basic information that would be valuable to firefighters and fire prevention personnel. By detailing information on charring tests on specific timber products, this site provides an overview of a number of different codes and regulations for timber and wood-based building types in an Australian context.

[Fire Performance](#)

This webpage is useful in providing a brief introduction to charring basics in regards to fire performance.

[Fire Safety of Wood Construction](#)

This document is a crucial resource for firefighters and lumber industry professionals. Covering many general aspects of fire safety of wood products, including charring and fire resistance, fire testing standards, construction types and flame spread, this document is an essential framework on the latest technology and safety standard requirements.

[Flame Spread Performance of Wood Product](#)

The interior of all buildings is vulnerable to surface flame spread, yet the type of interior finish product and any flame retardant technology used with these products will all contribute to flame-spread ratings. This document discusses American test methods, as well as charts the flame-spread rating determined for a variety of wood products.

[**Fire Resistance**](#)

Fire resistance and fire-resistance testing is a complex field of engineering and scientific study. This webpage offers a summary of fire-resistance rating information related to wood products, as well as testing methods in a language that is accessible and understandable to a variety of audiences. It also includes information about fire-resistance test standards, which is useful as a reference and in developing a better understanding of the issues for training and educational purposes.

[**Flame Spread**](#)

This webpage offers an overview of the concept of surface flame spread and flame-spread rating information related to wood products, as well as testing methods in a language that is accessible and understandable to a variety of audiences.

Lightweight Wood-frame Construction – Including Trusses, I-Joists, Gypsum Board

[**Solid Sawn Lumber Awareness Guide**](#)

This guide provides information on the types and properties of solid sawn lumber and how it is used in residential construction.

[**Preventing Injuries and Death of Firefighters Due to Truss System Failures**](#)

This study examines the history of truss systems in wood buildings in relation to safety and awareness for firefighters. Based on the study, it is recommended that firefighters be able to identify the particular roof and floor truss systems of buildings to address potential hazards during a fire. This study explains that the ability to plan and utilize defensive strategies when the structural stability of a building's roof and/or floor truss system is suspect or is being attacked by fire is essential to the safety of firefighters.

[**Wood Truss Awareness Guide**](#)

This document explains the fundamentals of wood truss design and use in wood buildings. By providing images and demonstrations, it describes the various truss structures in different parts of a residential building. A firefighter's ability to understand the roof truss structure while inside a building is critical to enhancing safety and awareness in fire emergencies.

[**Quick Facts: I-Joists and Fire**](#)

This document includes the basic facts in relation to I-joists and fire safety and provides information to firefighters regarding I-joist manufacturing, protection options, and firefighting safety information. It includes information on code amendments and links to other related information sources.

[**Preventing Deaths and Injuries of Firefighters Working Above Fire-Damaged Floors**](#)

This report examines the potential hazards to firefighters in the area of the floor joists of a building. In the event of a fire, a building's floor can be one of the areas most vulnerable to destruction. The protection of firefighters begins with awareness and understanding of floor systems as well as communicating fire safety procedures in floor alertness. This document includes recommendations to the firefighting community for how to best prepare in consideration of floor vulnerability.

[**Fire Safety**](#)

This webpage provides a brief summary fire safety information related to wood I-joists.

[**Wood I-Joists and Firefighter Safety**](#)

This presentation examines wood I-joists from the perspective of firefighter and fire safety. It provides firefighters with information on issues related to training and education.

[**Wood-frame Construction, Fire Resistance and Sound Transmission**](#)

This bulletin includes a detailed section about gypsum board that employs photos, graphs and diagrams to educate the reader about the role that gypsum board plays in both the fire and acoustic performance of wood-frame wall and floor assemblies.

[**Drywall and Performance Wallboards**](#)

For a comprehensive understanding of fire-rated gypsum board, this webpage details the fire-resistant reaction of gypsum board to heat and fire, explaining how its chemical properties retard heat and flame transmission.

[**Fire Resistance and Sound Transmission in Wood-Frame Residential Buildings**](#)

In the section of this document entitled Fire-Rated Construction, the protection properties of gypsum board are discussed. It offers key facts on why gypsum board is the most commonly used material to deter fire spread. As well, other products related to fire safety and techniques important to minimizing fire risks are examined.

Wood Panel Products

[**Wood Structural Panel Awareness Guide**](#)

The purpose of this guide is to provide information on the types and properties of wood structural panels and how they are used in residential construction.

[**Meeting Fire Codes with OSB**](#)

Orientated Stand Board (OSB) is a common material used in many wood building structures. This presentation discusses a specific proprietary fire-retardant-coated OSB in detail, including the product's advantages in regards to fire safety.

Heavy Timber Construction – Solid-sawn Timber and Glued-laminated Timber (Glulam)

[**Fire Safety**](#)

This webpage includes information about how specific wood member sizes and design features work together to minimize fire risk in heavy timber construction. It is useful in understanding how size and design in wood construction are comparable to non-combustible materials, such as steel. One of the areas discussed relates to how carefully-engineered wood members can maintain strength differently in a fire compared to non-combustible counterparts.

[**Heavy Timber Construction**](#)

As one of the oldest types of construction methods used around the globe, heavy timber construction is diverse and varied, as well as having its own unique properties of fire protection and fire safety standards. This comprehensive resource package explains the logistics and principles behind heavy timber structural design. This resource is most beneficial for those seeking greater detail on various uses and protection properties of heavy timber construction.

[**Glulam Resource Kit**](#)

Through a series of articles, case studies and product information, this online resource kit increases understanding of stock glulam properties.

[**Fire Safety Challenges of Tall Wood Buildings**](#)

This document focuses on tall buildings offering a detailed discussion of various types of construction methods in heavy timber construction. Section 1.5 Timber Building Fundamentals, explains the key fire safety differences between lightweight wood-frame and heavy timber construction, as well as fire protection and fire safety benefits and challenges in wood structures.

[**Cross Laminated Timber**](#)

This webpage offers an introduction to the fundamentals of cross-laminated timber and provides links to a variety of other websites, articles and information sheets regarding CLT and its fire-resistant properties.

Cross-Laminated Timber

[**Introduction to Cross Laminated Timber**](#)

This article provides an introduction to the fundamentals of cross-laminated timber.

[**Full-Scale Fire Resistance Tests on Cross-Laminated Timber**](#)

CLT is a relatively new form of wood construction; therefore, research was conducted to explore its fire resistance. This webpage explains the government-led testing on CLT and highlights that results demonstrate that cross-laminated timber performs well in fire-resistance rating tests.

[**Fire-Performance of Cross-Laminated Timber \(Fire Research and Testing\)**](#)

This presentation details the specifics of fire-resistance testing for cross-laminated timber through a step by step outline. It utilizes charring and testing charts to help audiences better understand the processes involved in fire testing and the consequent results. It also highlights how CLT is constructed and used in building construction.

[**Cross-Laminated Timber: Fire Protection**](#)

This detailed package examines CLT from an engineering standpoint and provides highly technical information related to fire-rating testing in a European context.

[**Building with Cross-Laminated Timber**](#)

This document offers detailed information on the manufacturing and construction aspects of cross-laminated timber in a European context.

[*Cross-Laminated Timber: Taking Wood Buildings to the Next Level*](#)

This article discusses CLT in the new era of mid-rise wood construction. Cross-laminated wood is a relatively new form of wood assemblage in North America, although it has been commonly used across Europe for a couple of decades. Explaining the benefits, construction procedures and fire-resistance ratings, this document offers a broad exploration of CLT.

Structural Composite Lumber

[*Structural Composite Lumber \(SCL\)*](#)

This webpage includes fundamental definitions and information on SCL products and their uses. It categorizes the various SCL products and provides examples and photos to assist readers with less experience in the engineered wood industry. This site will be beneficial to those firefighters who want to learn more about the basic structural elements of wood buildings.

[*Engineered Wood Products \(EWP\)*](#)

This document provides in-depth information on building and manufacturing information for laminated veneer lumber (LVL), parallel strand lumber (PSL) and wood I-joist products. For every product that is described, an overview of fire safety information is included.

[*Structural Composite*](#)

This website offers readers a clear introduction to the most basic SCL products in the contemporary lumber and construction industry. It includes information about those aspects of a building's structure that are best suited to each type of engineered wood product.

[*Mass Timber and Fire Performance*](#)

This website provides an overview of mass timber and fire performance and includes a number of links to related articles, videos and presentations. It offers diverse education materials and would be beneficial for anyone within the fire service and associated industries seeking more information and fire testing results.

Fire Protection – Products And Systems

Fire-Retardant-Treated Wood

[*Fire-Retardant Treated Wood*](#)

This webpage provides information about fire-retardant-treated wood (FRTW), including the basic concept behind the reduction of surface flame spread using fire-retardant treatment, the use of FRTW in the National Building Code of Canada, and the difference between FRTW and fire-retardant-coated wood.

[*Fire Retardant Treated Wood*](#)

Bridging the benefits of wood utility and fire-retardant characteristics, this article highlights FRTW testing techniques and the ability for wood products to resist combustion when treated with fire-retardant technology.

[**Fire-Retardant Treated-Wood \(FRTW\) For Commercial and Residential Structures**](#)

This presentation outlines the properties of fire retardant-treated wood, surface flame spread and the specifics of pressure treatments. It distinguishes between terms that are commonly misused, such as flame spread and fire resistance. For any fire safety and emergency personnel interested in FRTW, this resource provides an informative framework, in the context of American building codes and standards.

Fire-Retardant-Coated Wood

[**Fire-Retardant-Treated Wood**](#)

This webpage about fire-retardant-treated wood (FRTW) includes a discussion of the difference between FRTW and fire-retardant-coated wood.

[**Fire Retardant Treated Wood, Residential Use**](#)

This website discusses how FRTW retards the spread of fire, how it is applied to products, and how it is fire tested. The information provided specifies FRTW in residential constructions.

[**Fire Retardant-Treated Plywood**](#)

Focusing on fire-retardant treated plywood, this site gives insight for how these products are manufactured and used in a buildings' design.

[**Fire-Retardant Treated Wood: The Basics**](#)

Outlining the basic facts and uses of FRTW, this document includes how to identify FRT products, correct installment and application processes, and building code requirements. It also provides information on how FRT products provide fire protection.

[**Fire Retardant Treated Wood for Commercial & Residential Structures**](#)

This course outline discusses the features of FRT wood and various application types. It explores how it used in building codes related to fire safety.

[**Treated Wood News \(USA\)**](#)

This newsletter locates fire-retardant treated wood is outlined in the 2010 California building code.

[**FAQ's: Fire Retardant Treated Wood \(USA\)**](#)

A very brief description of FRTW is provided on this webpage and provides readers with access to more information on its use in the US.

Fire-Resistant-Coated Wood

[**Wood Coatings and Fire Retardants**](#)

This technical document explores the chemical functioning and foundational make-ups of high performance fire coatings and retardants.

[Fire Retardant & Fire Resistant Coatings](#)

A brief description of fire retardant and resistant coatings is provided in this website. Included are different definitions for retardant and resistant coating types.

[Passive Fire Protection](#)

How certain treatments and coatings can increase fire resistance is explored in this document. It summarizes how FRTW products react when in contact with fire and includes the advantages of its use in wood-based construction and materials.

Encapsulation

[NRC Fire Researchers Making Strides in Mid-Rise Wood Research Project](#)

The concept of encapsulation is discussed in this article. It explores how the encapsulation approach in construction design is used to deter or limit the susceptibility to burning in the event of a fire.

[Fire Safety of Multi-storey Wood Buildings](#)

This document illustrates how encapsulation works on products and throughout building designs through the use of images gives readers the ability to visualize how these techniques are used in construction.

[Chapter 13: Encapsulation](#)

Detailing encapsulation manufacturing components, performance and system uses, and general requirements, this source provides readers with a wide range of information on encapsulation.

[Canadian Codes and Wood Buildings](#)

A portion of this presentation (pages 37-41) illustrates how encapsulation techniques are used in fire testing using images.

Sprinkler Systems, Fire Alarms, Smoke Alarms

[The Wood-Frame Conundrum](#)

This article discusses the importance of sprinkler systems in reducing fire risks in wood-frame buildings. It outlines key findings of a study that examined the positive impact automatic sprinkler systems have on human safety, fire spread and property damage. The study found that a wood building with a sprinkler system can be safer than a non-combustible building with no sprinkler system.

[Fact Sheet: Fire Sprinkler](#)

This webpage includes the latest building and fire code requirements in British Columbia with regards to mandated sprinkler systems. It offers key information in relation to recent changes and amendments in building sprinkler system requirements, as well as links to other resources and contact information.

[*Sprinkler System Installations and Annual Inspection Services*](#)

This webpage provides a comprehensive summary of the latest sprinkler system technologies available. It also offers information on the design, installation and components of various wet and dry sprinkler systems, as well as alarm systems, fire extinguishers and safety services.

[*Fire Alarms & Sprinklers is More Important for Safety than Residential Construction Materials*](#)

This news article explains how the use of active fire protection mechanisms, such as sprinklers and alarm systems, are the most important aspects of fire safety, regardless of the types of materials used in the building's composition.

[*Sprinkler Systems and Residential Structure Fires*](#)

This research project explores the impact sprinklers have on safety and the spread of fire in wood buildings. The study found that “residential sprinkler systems significantly reduced fire-related casualties, reduced the significance of fire spread, and reduced the demand placed on fire department resources”. Other evidence explores the significant impact that sprinkler systems and smoke alarms have on reducing the risk to human life. The data gathered for this study illustrates that in the absence of both of these, mortality and injury levels of building occupants increases during fire events.

[*New BC Fire Code Provisions*](#)

This webpage outlines smoke alarm requirements as a result recent fire code changes in British Columbia.

[*Sprinkler Systems and Fire Outcomes in Multi-Level Residential Buildings*](#)

By examining the effectiveness of sprinkler systems in multi-level residential buildings across BC, this report demonstrates the reliability of sprinkler systems and how they contribute to setting high fire safety standards in wood-based multi-level buildings. The report compares fires in buildings with and without sprinkler systems and provides insight as to how the NFPA 13 standard mitigates fire risk, regardless of the structures material base.

[*Smoke Alarms Work, but Not Forever*](#)

This report explains the importance of smoke alarms and includes data that represents the argument that smoke alarms save lives while highlighting that smoke alarms are not distributed equally among many Canadian cities and their communities. The report offers goals and strategies to improve the coverage of smoke alarm installation including more rigorous dating, maintenance and management.

Developments And Studies In Wood Construction

National - Canada

[*The Historical Development of the Building Size Limits in the National Building Code of Canada*](#)

This report provides a detailed account of how the building height and area restrictions contained in the 2010 National Building Code of Canada evolved, as well as providing the historical context for Canadian building codes.

[***21st Century Wood Design, Building and Construction Solutions***](#)

This resource provides an overview of the latest wood engineering trends, including the products and structural systems used in modern wood building construction.

[***The Case for Tall Wood Buildings***](#)

This study differentiates between typical lightweight wood-framed construction and modern techniques used with mass timber products. It summarizes how these structural changes are informing the case for the rise of tall wood buildings in the Canadian construction industry.

[***Evaluating Stakeholder Concerns with Wood-Frame Buildings and Fire Risk***](#)

This report discusses stakeholder concerns related to increasing the height maximum in Ontario's building code to six storeys for wood buildings. The report discusses various aspects of Bill 52 (a private member's bill seeking approval for taller wood buildings in Ontario), as well as how fire safety standards and procedures in similar cases have proven to be effective and successful.

[***The World's Most Advanced Building Material is Wood***](#)

This article discusses the architectural and construction industries' growing reliance on wood materials and uses examples from around the world of modern wood-based buildings. In particular, it examines CLT (Cross-Laminated Timber) based apartment towers and the sustainability, economic and fire-resistant benefits. Explaining how wood members, particularly in CLT, are at least as fire safe as steel and other non-combustible materials, this article is beneficial for firefighters in enhancing their knowledge base of the latest and most innovative engineering designs for wood buildings in relation to fire safety.

British Columbia

[***Wood First, Building with Wood***](#)

This website explores British Columbia's wood products and wood manufacturing industry. Building codes, engineered wood products and local research and development are some of the areas explored. This website is particularly informative for BC's firefighter community in search of local information and resources.

[***BC Building Info***](#)

For a wide range of resources, links and partner organizations, this website provides easy access to a diverse array of issues related to the materials used in buildings in BC.

[***Historical Perspective on Building Heights in BC Building Code***](#)

Information regarding the historical perspectives of BC's building height restrictions and information on recent amendments that allow six storey wood-frame constructions in BC.

[**Mid-Rise Construction in British Columbia**](#)

This publication details a case study examining the Remy Project in Richmond, BC which was the first six-storey lightweight wood-frame construction built after BC's revised building code permitted its development. It details the rise of such developments in BC. For any firefighting personnel interested in the basics of lightweight wood-frame construction, including what equipment, building techniques and designs are used to increase fire protection, this document offers clear and illustrative examples of the strategies used to improve fire and safety levels in modern wood developments.

International - USA

[**Multi-Storey Wood Construction: A Cost-Effective and Sustainable Solution for Today's Changing Housing Market**](#)

This presentation explains how wood construction is environmentally efficient and economically sound for home-buyers, construction companies and the lumber industry. The approval of wood-based five-to-six storey multi-family housing units by the International Building Code has increased the green initiatives and versatile construction designs available on the market. An important aspect of this article is the discussion of mandatory fire protection requirements in the building code that must be followed in all new constructions. While written in the context of the United States, much of the general information is relevant to Canada, as well.

[**Construction Methods: What are Your Options?**](#)

This website outlines the basic methods for building construction using the three main types of materials – wood, steel and concrete – and briefly explains the primary differences between what is commonly referred to as heavy-frame and light-frame methods and design. As a basic overview, this site would be useful to those less familiar with residential and commercial based buildings.

Additional Resources

Videos

[**Fire Safety Challenges in Tall Wood Buildings Webinar**](#)

This webinar offers firefighters and fire experts an overview of fire safety concerns in tall wood buildings. It discusses the various building components of timber buildings, construction blueprints, recent building examples, regulation summaries and fire behaviour.

[**How to Engineer Buildings for Fire Safety**](#)

This video explains how to predict smoke behaviour and provides estimations of escape time for occupants fleeing a building on fire.

[Benefits of Wood in Building Construction](#)

This video highlights the benefits of wood-based building constructions. It highlights the many benefits and positive attributes of wood, as well as how wood structures are strong, durable and resilient.

[Timber Skyscrapers: Innovations in Wood Architecture and Design](#)

Leading Architects present their latest wood and forest products & designs at a Yale University presentation. This unique project highlights some of the latest building ideas, methods and designs possible using a variety of wood products.

Media Releases and News Articles

[Future of wood-frame homes is looking up. The Star, April 3 2014](#)

The author explains how building code amendments will allow six-storey wood-frame constructions in Ontario. Given that wood is a renewable, recyclable and durable material, the article discusses the advantages of this change.

[Developers call on province to okay larger wood-frame buildings, The Star, May 23, 2013](#)

The article discusses the potential growth in affordable housing units since mid-rise wood buildings were approved. Fire safety concerns are discussed by Canada's top fire chiefs.

[North America's tallest wood building to be built in B.C., Global News, March 22 2012](#)

Prince George may acquire a new landmark and the tallest wood building in BC. This article discusses the proposed development, fire safety concerns and the structure's purpose.

[Are mid-rise buildings safe? New West Record, July 29 2011](#)

This article focuses on New Westminster's development and fire services concerns in mid-rise wood-frame buildings and the 2009 building code regulations that permit these types of construction.

[The future points to manufactured wood buildings, Vancouver Sun, February 3 2015](#)

Pointing to the fact that prefabricated wood products have been used extensively across Europe in new building structures, this article highlights the technological advances in lumber engineering that can illustrate how mid-rise structures will be built and perform in Vancouver developments.

[Code changes allow for taller wood-framed buildings in Calgary. The Calgary Herald November 12 2014](#)

This article discusses the recent building code changes in the City of Calgary in regards to firefighter safety and projected six storey wood-frame building developments.

[Green light for taller wood construction a game changer. the Star, Published on September 26 2014](#)

This article highlights the reasons for the rise in mid-rise wood buildings in Ontario communities.

[***Ontario to allow taller wood-frame buildings with new fire safety requirements, Canadian Underwriter, 2014***](#)

This article focuses mostly on the building code amendments in Ontario after increasing height size for wood buildings was approved.

Presentations

[***The Evolution of Fire Life Safety in Building Codes***](#)

Focusing primarily on building codes given the recent changes in height restrictions, this course outline discusses techniques to mitigate fire damage and the spread of fire. The authors use examples of previous fires in tall-rise buildings and compares them to the recent changes in technology, safety equipment, sprinkler systems and fire reaction procedures, all of which mitigate risk to a much greater extent than in the past. Discussing the current context of firefighting abilities and innovative fire safety schemes, the presentation provides insight to how advancements have changed typical understandings of fire patterns and behaviour in new buildings.

[***Building Enclosure Design and Best Practices for Wood-Frame Buildings***](#)

This presentation focuses on design options for building energy efficient and durable mid-rise structures when using light-weight wood-framing techniques in construction. It also includes building designs when using or including mass timber products.

[***Canadian Codes and Wood Buildings***](#)

This presentation offers extensive coverage of the changes and amendments in building codes, as well as fire resistant mechanisms, CLT fire performance and current mid-rise research projects.

[***Innovations That Make Mid-Rise and Tall Wood Buildings Possible***](#)

Through this presentation, audiences learn about some of the latest technology and developments in the construction of mid-rise wood buildings across Canada. Information on fire safety improvements and research activities associated with these developments is provided. This is a useful resource for anyone looking for more information on the recent activities in mid-rise construction, as well as for firefighters seeking information on current trends in fire testing and other fire-related issues.

[***British Columbia Fire Chiefs***](#)

This presentation includes discussion of recent fire trends and strategies for reducing fire rates. Some of the priorities included in this briefing are related to creating stronger communication networks among all stakeholders in regard to mid-rise wood-frame constructions and improving firefighter training.

[***Canadian Design Guide to Tall Wood Buildings***](#)

This presentation examines the building and design trends in tall wood buildings in Canada. It includes information about the FPInnovations guidance package around fire and protection advantages.

Training Resources And Programs

Training Resources

[Knowing Your Buildings: A Firefighter's Reference Guide](#)

This reference guide is useful for developing an understanding of fire safety and building specific language.

[Collapse of Burning Buildings: A Guide to Fire Ground Safety](#)

This guide to firefighting safety is a useful resource for firefighters who are searching for descriptive information on wood-based structural hazards, roof and timber collapse training and safety information on light-weight building structures.

[First Nations Emergency Services: Basic Firefighter Training Program](#)

This resource is a complete training program for firefighters, with a specific focus on First Nations communities.

[BC Housing: Fire Safety Procedures](#)

This document covers provincially mandated fire safety procedures. The information in this document will be useful for fire departments seeking education and training resources.

[FireHall - BC](#)

A comprehensive webpage for BC's fire service industry, including information related to upcoming events and conferences.

[Firefighting- Alberta](#)

Information and registration for firefighting training program in Alberta, Canada through the Emergency Services Academy.

[Firefighting in Canada](#)

This website offers a wide array of training programs and information sources for fire services in Canada. It includes upcoming training programs around the country and online tutorials.

[Exam Prep: Building Construction for the Fire Service](#)

This exam booklet aims to help those in the fire service who are training or specializing in the building construction field. It covers a wide array of topics and offers readers in-depth information, examples and practice tests.

[Brannigan's Building Construction for the Fire Service](#)

This book raises the awareness of firefighters through education and training in relation to wood-frame buildings. It includes information on fire codes, a history of building codes and clarifies the most typical construction elements in everyday residential and commercial buildings.

[Building Codes Illustrated: A Guide to Understanding the 2006 International Building Codes](#)

For any fire service professional interested in buildings around the globe, this illustrative book makes the complex field of building structures and codes accessible.

Informative USFA Coffee Break series postings related to Building Types & Fire Resistance

This five piece 'coffee-break' series from the US Fire Administration includes unique learning objectives per segment. The series discusses building construction safety and fire procedures and training tips. They are useful to fire service professionals for a deeper glimpse into fire patterns and challenges in construction.

[Coffee Break Series- 45: Building Construction: Part 1: Understanding Construction "Types"](#)

[Coffee Break Series- 46: Building Construction: Part 2: Where Fire Resistance May Be Required](#)

[Coffee Break Series- 47: Building Construction: Part 3: Fire-Resistive Assemblies](#)

[Coffee Break Series- 48: Building Construction: Part 4: How Fire Resistance Ratings are Measured](#)

[Coffee Break Series- 49: Building Construction: Part 5: Understanding Construction: Fire Test "Survival"](#)

April Newsletter by Vincent Dunn Deputy Chief FDNY (Ret): Structural Fire Spread

Deputy Chief Vincent Dunn offers insight into structural fire spread specific to different types of buildings. The newsletter provides comprehensive descriptions of important terms, as well as a practice test.

October-November Newsletter by Vincent Dunn-Three Story Wood-frames

In this newsletter, Vincent Dunn discusses three storey wood-frame buildings. From the perspective of firefighters, Dunn provides emergency examples of wood-frame collapses during a fire.

Training Programs

Alberta

[Lakeland College, Fire & Emergency Services](#)

British Columbia

[Justice Institute of British Columbia](#)

[College of the Rockies, Fire Services Training](#)

Manitoba

[Manitoba Emergency Services College](#)

[Southern Manitoba Academy of Response Training](#)

New Brunswick

[New Brunswick Fire Investigator Training](#)

Newfoundland and Labrador

[Fisheries and Marine Institute, Memorial University](#)

[Fire and Emergency Services, Certification](#)

[Fire and Emergency Services, Training](#)

Nova Scotia

[Nova Scotia Firefighters School](#)

Nunavut

[Nunavut Municipal Training Organization](#)

Ontario

[Algonquin College, Police and Public Safety Institute](#)

[Eastern Ontario Fire Academy](#)

[Ontario Fire Academy](#)

[Seneca College, Firefighting](#)

[Firefighting and Fire Systems Programs at Ontario Colleges](#)

[Humber College, Pre-Service Firefighter Education and Training \(2015/16 Program\)](#)

Prince Edward Island

[Holland College, Basic Firefighting](#)

[PEI Firefighters Association: Training Schedules](#)

Saskatchewan

[Parkland College, Professional Firefighter Qualifications](#)

Yukon

[Department of Community Services, Ember Fire Academy](#)

[Department of Community Services, Firefighter Training](#)

Websites

Wood Industry

Canada

Canadian Wood Council: <http://www.cwc.ca/>

Woodworks: <http://wood-works.ca/>

Wood Preservation Canada: <http://www.woodpreservation.ca/index.php/en/>

Canada Wood: <http://www.canadawood.org/>

FPInnovations: <https://fpinnovations.ca/Pages/home.aspx>

United States

American Wood Council: <http://www.americanwoodcouncil.org/>

reThinkwood: <http://www.rethinkwood.com/>

Wood Aware: <http://www.woodaware.com/>

APA – The Engineered Wood Association: <http://www.apawood.org/>

Building and Fire Codes

National – Canada

Canadian Codes Centre: http://www.nrc-cnrc.gc.ca/eng/solutions/advisory/codes_centre_index.html

National Building Code of Canada 2010: http://www.nrc-cnrc.gc.ca/eng/publications/codes_centre/2010_national_building_code.html

National Fire Code of Canada: http://www.nrc-cnrc.gc.ca/eng/publications/codes_centre/2010_national_fire_code.html

Alberta

Alberta Municipal Affairs – Building Codes & Standards:

http://www.municipalaffairs.alberta.ca/cp_building_codes_standards

Alberta Municipal Affairs – Fire Codes & Standards:

http://www.municipalaffairs.alberta.ca/cp_fire_codes_standards

Alberta Safety Codes Council: <http://www.safetycodes.ab.ca/Council/Pages/default.aspx>

British Columbia

British Columbia Codes 2012: http://www.bccodes.ca/fire-code.aspx?vid=OPLEGALEZE:bccodes_2012_view

BC Building, Fire and Plumbing Codes:

http://www.bccodes.ca/default.aspx?vid=OPLEGALEZE:bccodes_2012_view

BC Office of Housing and Construction Standards: <http://www.housing.gov.bc.ca/building/>

City of Surrey, BC Fire Prevention: <http://www.surrey.ca/city-services/675.aspx>

Manitoba

Manitoba Office of the Fire Commissioner – Codes and Standards:

<http://www.firecomm.gov.mb.ca/codes.html>

The Buildings and Mobile Home Act: <http://web2.gov.mb.ca/laws/regs/index.php?act=b93>

New Brunswick

New Brunswick – Building Regulation: <http://laws.gnb.ca/en/showpdf/cr/2002-45.pdf>

Newfoundland & Labrador

Fire Protection Services Regulations under the Fire Protection Services Act:

<http://www.assembly.nl.ca/legislation/sr/annualregs/2012/nr120045.htm>

Nova Scotia

Nova Scotia – Building Code: <http://novascotia.ca/lae/buildingcode/>

Nova Scotia – Fire Safety: <http://novascotia.ca/dma/firesafety/>

Northwest Territories

Fire Prevention Act:

<http://ccinfoweb2.ccohs.ca/legislation/documents/nwt/ntefp/ntafire0.htm>

Nunavut

Nunavut Municipal Training Organization: Protection Services:

<http://www.nmto.ca/course/protection-services-firefighter-gsar>

Ontario

Ontario Building Code: <http://www.mah.gov.on.ca/Page7393.aspx>

Ontario Fire Code:

<http://www.mcscs.jus.gov.on.ca/english/FireMarshal/Legislation/FireCode/FireCode.html>

Quebec

La Régie du bâtiment du Québec (RBQ) – Chapitre Bâtiment du Code de construction et Chapitre Bâtiment du Code de sécurité:

<https://www.rbq.gouv.qc.ca/batiment/la-reglementation/ce-qui-sapplique.html>

Saskatchewan

Saskatchewan - National Building and Fire Code Information:

<http://www.saskatchewan.ca/work/building-standards-and-licensing/national-building-and-fire-code-information>

Yukon

Yukon Government – Building Safety: http://www.community.gov.yk.ca/building_safety.html

Yukon Government – The Fire Marshal’s Office:

<http://www.community.gov.yk.ca/fireprotection/about.html>

International - US

International Building Code: <http://publicecodes.cyberregs.com/icod/ibc/>

Firefighting Associations and Other Information

National Organizations - Canada

Aboriginal Firefighters Association of Canada: <http://www.aadnc-aandc.gc.ca/eng/1412773535811/1412773604061>

Canadian Association of Fire Chiefs: <http://cafc.ca/en/>

Canadian Association of Fire Investigators: <http://www.cafi.ca/>

Canadian Fallen Firefighters Foundation: <http://www.cfff.ca/EN/index.html>

Canadian Fire Safety Association: <http://canadianfiresafety.com/>

Canadian Volunteer Fire Services Association: <http://www.cafi.ca/>

International Association of Firefighters Canada: <http://www.iaff.org/canada/index.htm>

Emergency Services Association Canada: <http://www.esacanada.com/>

Fire Marshal’s Public Fire Safety Council: <http://www.firesafetycouncil.com/>

Maritime Fire Chiefs Association: <http://www.mfca.ca/>

Alberta

Alberta Fire Chiefs Association: <http://www.afca.ab.ca/>

Alberta Firefighters Association: www.albertafirefighters.com

Alberta Industrial Fire Protection Association: <http://www.aifpa.org/>

Fire Investigation Association of Alberta: <https://www.fiaa.ca/>

Foothills Firefighters Association: <http://foothillsfire.tripod.com/>

British Columbia

British Columbia Fire Training Officers' Association: <http://bcftoa.com/>

Fire Chiefs' Association of BC: www.fcabc.ca

Fire Prevention Officers' Association of BC: <http://www.fpoa.bc.ca/>

Vancouver Island Firefighters Association of BC: <http://www.viffa.org/>

Manitoba

Manitoba Association of Fire Chiefs: www.mafc.ca/

Manitoba Association of Native Fire Fighters: <http://www.manff.ca>

New Brunswick

New Brunswick Association of Fire Chiefs: <http://www.nbafc.ca/>

New Brunswick Association of Fire Prevention Officers: <http://www.nbafpo.org/>

Capital District Firefighters Association: <http://www.cdffa.org/>

Fundy Firefighters Association: <http://www.ffa.20fr.com/>

Newfoundland & Labrador

Newfoundland & Labrador Association of Fire Chiefs and Firefighters:

<http://www.nlfireservices.com/>

Nova Scotia

Fire Service Association of Nova Scotia: <http://www.fsans.ns.ca/>

Clare Firefighters Association: <http://www.cffans.com/>

Ontario

Firefighters Association of Ontario: <http://www.ffa.on.ca/>

Ontario Association of Fire Chiefs: <http://www.oafc.on.ca/>

Ontario Professional Firefighter's Association:

http://www.opffa.org/index.cfm?section=1#.UK_9I4fxYo4

Ontario Association of Fire Training Officers: <http://www.firetraining.ca>

Ontario Fire Communicators' Association: <http://www.firecommunicators.com>

Ontario Municipal Fire Prevention Officers Association: <http://www.omfpoa.com/>

Ontario Industrial Fire Protection Association: <http://www.oifpa.org/>

Prince Edward Island

PEI Firefighters Association: <http://www.peiffa.com/>

Quebec

Quebec Association of Fire Chiefs: <http://www.acsiq.qc.ca/cms/>

Quebec Association of Fire Instructors: <http://www.lapiq.org/>

Association des Pompiers Professionnels de Québec: <http://www.pompiersquebec.org/>

Saskatchewan

Saskatchewan Association of Fire Chiefs: <http://www.safc.sk.ca/Home/tabid/38/Default.aspx>

Saskatchewan Professional Fire Fighters Association: <http://www.spffa.com/>

Saskatchewan Volunteer Firefighters Association: <http://www.svffa.ca/>

Yukon

Whitehorse Professional Fire Fighters: <http://whitehorsefirefighters.org/index.cfm?section=1>

International

International Association of Firefighters: <http://www.iaff.org/>

National Fire Protection Association: <http://www.nfpa.org/>

General

Fire Engineering: <http://www.fireengineering.com/index.html>

Firefighter Nation: <http://www.firefighternation.com/>

Firefighting in Canada: <http://www.firefightingincanada.com/>

Fire Hall: <http://www.firehall.com/>

Fire Prevention Canada: <http://www.fiprecan.ca/>

Fire House: <http://www.firehouse.com/>

Fire Rescue1: <http://www.firerescue1.com/>

Firefighter Close Calls: <http://www.firefighterclosecalls.com/>

Safe at Home: <http://www.safeathome.ca/>

Other Resources

Wood Handbook, Wood as an Engineering Material (All Chapters)

- [Chapter 01: Wood as a Sustainable Building Material](#)
- [Chapter 02: Characteristics and Availability of Commercially Important Woods](#)
- [Chapter 03: Structure and Function of Wood](#)
- [Chapter 04: Moisture Relations and Physical Properties of Wood](#)
- [Chapter 05: Mechanical Properties of Wood](#)
- [Chapter 06: Commercial Lumber, Round Timbers, and Ties](#)
- [Chapter 07: Stress Grades and Design Properties for Lumber, Round Timber, and Ties](#)
- [Chapter 08: Fastenings](#)
- [Chapter 09: Structural Analysis Equations](#)
- [Chapter 10: Adhesives with Wood Materials- Bond Formation and Performance](#)
- [Chapter 11: Wood-Based Composite Materials-Panel Products- Glued-Laminated Timber, Structural Composite Lumber, and Wood-Nonwood Composite Materials](#)
- [Chapter 12: Mechanical Properties of Wood-Based Composite Materials](#)

- [Chapter 13: Drying and Control of Moisture Content](#)
- [Chapter 14: Biodeterioration of Wood](#)
- [Chapter 15: Wood Preservation](#)
- [Chapter 16: Finishing of Wood](#)
- [Chapter 17: Use of Wood in Buildings and Bridges](#)
- [Chapter 18: Fire Safety of Wood Construction](#)
- [Chapter 19: Specialty Treatments](#)
- [Chapter 20: Heat Sterilization of Wood](#)

Glossary

Active Fire Protection: “Active fire protection is characterized by detection and response. Detection of a fire through smoke or heat sensors initiates a chain of events that reduces threats from the fire. Once a detection system is activated, other programmed [protective] actions ensue, including: sounding of alarms, closure of smoke and fire dampers, closure of automated fire doors through de-energizing of magnetic door stops, and opening of fire sprinklers or other fire suppression system”.

Building Area: “The maximum projected horizontal area of the building at or above grade within the outside perimeter of the exterior walls or within the outside perimeter of exterior walls and the centre line of firewalls”.

Building Code: “A set of regulations that defines the health and safety, functionality, accessibility, egress and other requirements for building construction”.

Charring: The action of decomposition due to chemical processes that occur when wood is exposed to high temperatures, resulting in carbon-based residue. “The load carrying capacity of a structural wood member depends upon its cross-sectional dimensions. Thus, the amount of charring of the cross section is the major factor in the fire endurance of structural wood members”.

Combustible and non-combustible material: “Generally, combustible material is any material that burns, while non-combustible material does not burn. [In Canadian building codes, the term non-combustible is generally applied to materials that meet the acceptance criteria of CAN/ULC-S114, “*Test for Determination of Non-Combustibility in Building Materials*”, which include limits on flaming, heat output and mass loss. (CWC)] Materials are classified as combustible or non-combustible within the range of temperatures that may occur in a building either normally or under fire conditions.”

Cross-Laminated Timber (CLT): “Cross-laminated timber refers to large engineered wood panels manufactured by cross laminating three [or more] layers [usually an odd number of layers] of softwood lumber and bonding the laminations with adhesives”. [Similar panels that use fasteners rather than adhesives to connect the laminations are called nail-laminated timber. (CWC)]

Dwellings, Multiple: “A building or part of a building designed for residential occupancy and consisting of more than two units. Multiple dwellings include triplex, row and group houses, stacked townhouses, and apartment buildings”.

Engineered Wood Product: “A term used to refer to manufactured composite wood products made up of a combination of smaller wood members, wafers or fibres bonded together with adhesives to make larger structural products.”

Fire Compartment: “Means an enclosed space in a building that is separated from all other parts of the building by enclosing construction providing a fire separation having a required fire-resistance rating”.

Fire Detector: “A device that detects a fire condition and automatically initiates an electrical signal to actuate an alert signal or alarm signal and includes heat detectors and smoke detectors”.

Fire Load: “The combustible contents of a room or floor area, including furnishings, finished floor, wall and ceiling finishes, trim, and temporary and movable partitions, expressed in the average weight of combustible materials per square metre”.

Fire-Protection Rating: “The time in hours or minutes that a *closure* will withstand the passage of flame when exposed to fire under specified conditions of test and performance criteria, or as otherwise prescribed in the [provincial] Building Code”.

Fire Resistance: “The property of a material or assembly to withstand fire or give protection from it.”

Fire-Resistance Rating: “The time in hours or fraction thereof that a material or assembly of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria”.

Fire-Retardant Treated-Wood: “A wood product whose surface burning characteristics are reduced by [pressure]-impregnation with fire-retardant chemicals”.

Fire Wall: “A wall of non-combustible construction that subdivides a building into limited fire areas or separates adjoining buildings to resist the spread of fire, and that has a prescribed fire-resistance rating and the ability to remain structurally intact for the required fire-rated time”.

Flame Spread, Surface: “The propagation of a flame away from the source of ignition across the surface of a material or assembly of materials.”

Flame-Spread Rating: “An index or classification indicating the extent of flame spread on the surface of a material or an assembly of materials as determined in a standard fire test”.

Framing: “The rough timber work of a house, including the flooring, roofing, exterior walls, interior partitions, ceiling and beams”.

Gypsum Board (Drywall): “A panel product made from gypsum plaster with a paper covering on the front and back”.

Glulam: “A beam or column made by gluing laminations of dimension lumber. Also called glued-laminated timber”.

Heavy Timber Construction: “Means that type of combustible construction in which a degree of fire safety is attained by placing limitations on the sizes of wood structural members and on the thickness and composition of wood floors and roofs and by the avoidance of concealed spaces under floors and roofs”.

I-Joists: “An engineered wood product formed by two dimensional lumber or LVL flanges (the horizontal members at the top and bottom of the joist) that are adhered to the edges of an OSB or plywood web (the vertical portion of the joist). I-joists are used to construct floors and may also be used as rafters”.

Mass Timber Construction: “Mass timber construction uses large prefabricated wood members such as CLT, LVL, and LSL for wall, floor, and roof construction. Glulam can also be used in beam and column applications”.

Mid-Rise Building, BC: “Starting on April 6, 2009, builders are able to build up to six storeys out of wood for residential buildings. The code change also allows 'hybrid' buildings with wood-frame upper storeys on top of a concrete or steel lower storey(s), provided the overall building height doesn't exceed the 18-metre height limitation”.

Non-Combustible Construction: “Type of construction in which a degree of fire safety is attained by the use of non-combustible materials for structural members and other building assemblies”.

Laminated Strand Lumber (LSL): “A wood product made by gluing wood strands into a billet that is then cut to size for uses such as headers, rim-joists for floor systems, columns, joists and studs, headers, lintels and rim boards”.

Laminated Veneer Lumber (LVL): “Lumber made of veneers of wood glued together using exterior grade glue”.

Oriented Strand Board (OSB): “A structural panel product manufactured by gluing and high-temperature pressing of layers of thin wood strands, with each layer oriented at a right angle to adjacent layers”.

Parallel Strand Lumber (PSL): “A structural wood product made by gluing long, thin strands of wood”.

Passive Fire Protection: “The passive fire protection system is part of the building's overall construction and is meant to work in [parallel] with the building's active fire protection system. This

system works to slow the spread of fire and smoke through a building with the use of fire and smoke barriers to compartmentalize and contain the fire to a specific area. Through the use of fire-rated walls, ceilings and floors in combination with fire stopping materials, fire and smoke dampers and fire and smoke doors, this system allows the fire to be contained so that firefighters can concentrate on a fire before it has the ability to spread to other areas of the building”.

Plywood: “A wood panel made of layers of veneer joined with glue and usually laid with the grain of adjoining plies at right angles”.

Smoke Alarm: “A combined smoke detector and audible alarm device designed to sound an alarm within the room or *suite* in which it is located upon the detection of smoke within that room or *suite*”.

Smoke Detector: “A fire detector that is part of a fire alarm system and is designed to operate when the concentration of airborne combustion products exceeds a predetermined level”.

Sprinkler System, Fire, Automatic: “An assembly of pipes and fittings and nozzles that conveys water from the water service pipe or fire service main within the building to automatically or upon detection control a fire within a building”.

Structural Composite Lumber (SCL): “Generic terms for solid structural engineered wood products created by layering wood veneers, strands or flakes with exterior type adhesives into blocks of material known as billets. The billets are cured in a heated press and sawn to consistent sizes that are easily worked in the field using conventional construction tools. Includes products such as laminated veneer lumber (LVL), parallel strand lumber (PSL), laminated strand lumber (LSL)”.

Structural Lumber: Lumber “used in construction to bear [structural] loads and therefore graded on the basis of the suitability of the entire piece for that purpose”.

Truss: “A rigid, open web, metal or wood framework used to support floors or roofs. Trusses can also be used in the walls of highly energy efficient houses as a way to provide increased wall thickness for insulation”.

Wood-frame Construction: “A type of construction using small, repetitive members in which the predominant structural parts are of wood or are dependent upon a wood frame for support”.

Acknowledgments

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Paul Maxim obtained his MA in criminology at the University of Ottawa and his PhD in sociology at the University of Pennsylvania where he specialized in criminology and research methods. He is currently a professor in the Department of Economics and the Balsillie School of International Affairs at Wilfrid Laurier University in Waterloo, Ontario. His primary areas of research interest are population and labour economics.

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...the fourteenth of the ...

...the fifteenth of the ...

...the sixteenth of the ...

...the seventeenth of the ...

...the eighteenth of the ...