Canadian Wood Council
Conseil canadien du bois

wood WORKS!
A Canadian Wood Council Program

A Guideline for Insuring Timber in Canada

CWC
Publications

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Introduction

Insurance Best Practices Guide

To ensure that the financial investment of a construction project can be protected in the event of unexpected circumstances and project derailment, builders are required to obtain Builder's Risk Insurance, also known as "Course of Construction" insurance.

In Canada, timber construction is utilized primarily in the residential market, with notable applications in low-rise industrial, institutional, and commercial buildings. The insurance rates for timber, classified as combustible construction, are generally much higher than that of non-combustible alternatives. Since timber applications have been consistent in the aforementioned markets, the associated insurance has not been substantial relative to overall project budget. However, with recent code changes and advancements in mass timber products, we can build larger and taller with timber than ever before, leading to changes in insurance rates as well.

The methodology for determining insurance rates for taller wood buildings is similar to that of low-rise builds. Combine that with the relatively new nature of these building typologies and the nuances of a stressed insurance market, we are seeing policies that are becoming a significant cost of the overall project budget.

This document is intended to support your timber builds by outlining practical steps to ensure that your application for insurance is favourable, and that your project is maximizing the potential to mitigate risk. Developed with the input of insurance stakeholders, we are confident that this insider insight will increase the success of your project.

Timber in Construction

The Business Case

As social and economic values evolve to prioritize sustainability and climate action, timber construction is well positioned to demonstrate responsible and resilient resource management.

Timber, as a building material, is gaining momentum based on its infinite renewability, the capacity to sequester carbon, along with its aesthetic appeal and indirect wellness benefits. Consumers and tenants are recognizing these benefits and the demand for sustainable alternatives in construction is growing.

In recent years, timber construction, especially in North America, has experienced rapid advancements. Canada's National Codes currently allow for 6 storeys in wood construction and will expand to 12 storeys for encapsulated mass timber in the near future. Regions in the United States allow for up to 18 storeys. In recent history, timber projects that are 10+ storeys have been constructed by proving equivalency to existing codes. For example, in Canada, buildings of 18 and 13 storeys have been occupied for years and additional projects of 7, 8 and 10 storeys are currently under construction.

We expect the use of timber in multi-storey and tall buildings to increase exponentially as efficiencies in the supply chain grow. This is being seen already with more timber suppliers exploring the market and expanding production, while crews are rapidly becoming more familiar with the assembly of timber.

According to the 2021 International Mass Timber Report, it is expected that the number of mass timber buildings will double every two years. It is expected that:

By 2034, the North American building sector will "store more carbon than it emits," if this market trend in timber construction holds true.

In order to maintain a competitive advantage, meet client demand, and apply tangible sustainability practices, it is in the best interest of property developers, building owners, and actors in the insurance industry to adopt timber construction and associated policies. We recognize that timber construction can only reach mainstream implementation when the economics align with key stakeholders in the supply chain. While insurance rates for mass timber may currently be an obstacle for many projects, we have an opportunity to mitigate this by educating stakeholders on best practices, continually learning from existing and future projects, and facilitating dialogue across sectors. We believe a consistent strategy in these efforts will increase the efficiency and potential for cost savings in timber buildings.

Steps You Can Take

1. Engage an experienced design team and identify it from day one, this includes experienced brokers and risk engineers. Not all brokerages are created equal. A larger brokerage with 10-15 domestic insurers in their office will have a better opportunity to place timber course of construction. Especially if they specialize in construction risks

2. Innovative projects are different and require different methods to their building process. Integrated project delivery, or IPD, involves forming your design and construction team early in the process to ensure maximum efficiency in delivery and construction. Up-front design time may be increased, but this is offset by efficiency and performance of the finished building. Providing this nuance to insurance can be helpful.

3. When designing a timber building, be committed to the differences in the structural material. This material is unique which leads to unique characteristics in the building. Identify that.

4. Have open lines of communication. Keep an open mind while erasing assumptions. I.e. in speaking with an insurer, we discovered there is often an assumption that a mass timber building will be built entirely in timber, e.g. the entire floor assembly is only timber, the envelope walls are timber, the cladding is timber etc. Clearly identify what you are building, what the assemblies look like and how the building will perform.

5. Engage the authorities having jurisdiction (AHJ) early. This will include municipal and fire services. Get their support by having constructive discussions about concerns. Letters of support from fire officials, the municipality, timber supplier and design team can be invaluable.

Insurance

The Insight

In recent years, the Canadian Wood Council has spoken with numerous actors in the insurance sector, including brokers, underwriters, reinsurers, and actuaries, with the goal of better understanding insurance rates for timber. Critical to this knowledge is understanding why and how buildings are currently classified. The insurance industry does not classify buildings in the same way as building codes.

> The difference is rooted in risk assessment — the insurance industry focuses on property loss, while the building code focuses on occupant safety.

Building Classifications for Insurance

Buildings are categorized according to one of six classifications developed by the Insurance Services Office (ISO), Inc. in its Commercial Lines Manual. These classifications are currently based on susceptibility to damage by fire:

1. **Frame** – Exterior walls of wood, brick veneer, stone veneer, wood ironclad or stucco on wood (Construction Code 1)
2. **Joisted Masonry** – Exterior walls of masonry material (adobe, brick, concrete, gypsum block, hollow concrete block, stone, tile or similar materials) with combustible floor and roof (Construction Code 2)
3. **Noncombustible** – Exterior walls, floor and supports made of metal, asbestos, gypsum or other non-combustible materials (Construction Code 3)
4. **Masonry Noncombustible** – Same as joisted masonry except floors and roof are of metal or other non-combustible materials (Construction Code 4)
5. **Modified Fire Resistive** – Exterior walls, floors and roof are of masonry or fire-resistive material with a fire-resistance rating of at least 1 hour but less than 2 hours (Construction Code 5)
6. **Fire Resistive** – Exterior walls, floors and roof are of masonry or fire-resistive materials with a fire-resistance rating of at least 2 hours (Construction Code 6)

While the insurance industry recognizes the differences between mass timber and light wood frame, most timber buildings, including mass timber, are currently classified under the category of "Framing." Upon interviews with actors in the industry, it was revealed the logic behind this classification is based on suitability - there is simply no other classification that best represents timber. The increased safety measures for larger light frame and mass timber buildings have not yet translated into rate reductions - the sample size is simply too small.

Currently, the insurance industry is in a "hard market" cycle, which is a period of time when there is a higher demand for insurance, but a lower supply of coverage available. In other words, companies are extremely risk adverse. Several factors can lend to a hard market, including an increase in severe weather events and catastrophes, low investment returns, and inflation. Add to that, the "Framing" category is perceived as higher risk. As such, there is limited capacity in this particular category, leading to the cumbersome process of having multiple insurers involved in order to satisfy total capacity required for any given project. This can be time consuming and add cost to the insurance policy.

The task in reducing timber construction rates is daunting, but not insurmountable. It is important to understand the process is not as simple as explaining the safety of the project, but rooted in many systemic factors within the insurance sector that cannot be solved overnight.

Did You Know?
Structures that may apply to more than one building classification are rated based on the most vulnerable of the two classifications.

Steps You Can Take

1. Select the right brokerage - and the right insurer. Many specialist insurers like to participate on the design phase of a project. They would provide recommendations that would make the construction more palatable for the construction phase and for the operational phase. An insurer that is willing to review the design (labour hours) is also one willing to take the risk Start your process for finding construction insurance early with your selected brokerage and broker. If you are currently working with a brokerage or insurer who is unfamiliar with mass timber, education may be necessary. Ask your broker what they need, and provide it to them.

2. Presenting the body of work of the design and construction team is recommended. The more successful projects that can be referenced the better. If you are struggling to find typologies or examples, talk to CWC and your mass timber supplier.

3. Building precedents are also encouraged, even if in different geographic locations. Although it may be an accomplishment to be the first timber building of a specific typology in a specific area this will not help you achieve desirable insurance rates.

4. Send us a letter of interest in addressing classifications of buildings. We need to have a large voice to add or change existing categories. Talk to CWC, our role is to be Canada's voice in the timber products industry!

Structural Systems

The Insight

Light wood framing methods are largely standardized throughout North America, with quality, spacing and types of lumber use varying little between buildings. Assemblies to achieve fire resistance and sound transmission ratings are also largely similar.

Timber assemblies are complex and meet and exceed the building codes. Mass timber systems vary widely in their grid spacing, assemblies, component sizing and composition. It is important to clearly identify what is being used and how to achieve the desired structure. Mass timber components can be used in all applications of a building, including columns, beams, bracing, floors, walls, roofs, envelope walls and more.

Steps You Can Take

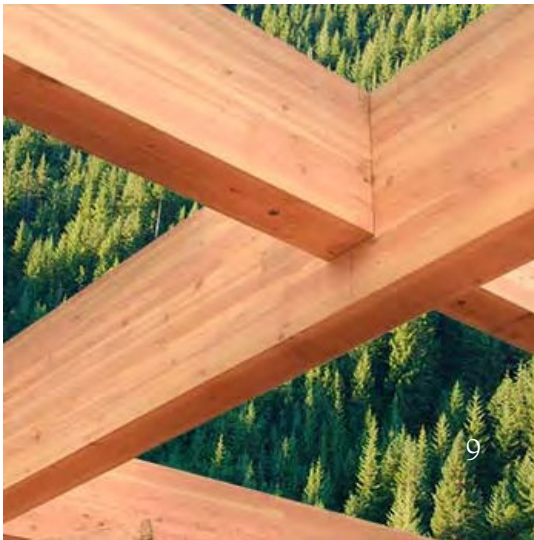
1. Experience is an asset. This goes from the design team to the installation team. Having all the parties involved identified clearly with their respective bodies of work can go a long way.

2. As mentioned, an integrated design team can lead to savings. It is important to identify that. What is the schedule of construction going to look like and can you provide that to the insurance company? The speed of installation in timber can be weeks or months faster than the erection of other building materials - indicate this. When are timber components arriving on site? How long will they be on site? When will they be installed? When thinking of schedule, can this be leveraged to minimize the risk of fire. A shorter construction schedule can also help minimize other risks, such as moisture exposure and damage, exposure to arson and vandalism, theft, etc. Prioritize installation of sprinklers and activate them as soon as possible. Prioritize the installation of fire barriers, separation walls and fire doors on each floor.

3. Coordinate with the building systems (mechanical, electrical and plumbing (MEP) and fire protection) engineers and subcontractors. Careful detailing of mass timber systems can go a long way to mitigating risk. Including MEP and fire protection systems can help realize savings during construction and minimize construction conflicts.

4. If the building is BIM modelled or using other 3D software can this be shared with the insurer? Some timber buildings have modelled complete mechanical, electrical and plumbing system installations. This is extremely helpful to the insurance application.





Construction Site Considerations

The Insight

Timber is combustible, but that doesn't mean it is particularly vulnerable to fire; it simply means it will ignite at a certain temperature.

As a prefabricated product, mass timber leaves little to no waste on site. Timber construction sites can be clean, quiet and require fewer crews members on site. Many of these structures are carefully designed to ensure minimal or no change orders, and end at on site adjustments as necessary.

However, end cuts, wood waste, small block pieces, coupled with construction waste, can be vulnerable to an on site fire scenario. This vulnerability can be mitigated with proactive and simple on site practices.

Case Study: Site Safe

The UK's Structural Timber Association has recognized the need for regulation and safety on timber construction sites. Their Site Safe program ensures projects are registered with the Association, meeting their rigorous standards for safety. The program also automatically notifies nearby fire officials of the ongoing timber build near by. The program has been an overwhelming success and has resulted in a more positive public perception of these projects. The Canadian Wood Council aims to introduce a similar program. Stay tuned!

Steps You Can Take

1. Prior to the start of construction, the entire site should be fenced and secured. Site safety is paramount to the success of your building and the success of your insurance.

2. Security services to be introduced upon initial development of the project. Other options can be considered, such as monitored cameras and other technologies, such as security using drones. 24 hour security would be valuable and at times in a hard market - critical. Remember, the security helps to obtain the insurance coverage and it gives added protection against vandalism, arson, and other human element based losses.

3. All sites should be clearly identified and readily accessible to the responding fire departments.

4. Indicate length of storage. An organized site is a safe one. Take advantage of prefabrication in wood framing and manage waste on site by ensuring elements are cut to size prior to arrival. If possible, ensure timber is delivered in a "just in time" fashion. If not, ensure timber is protected, kept away from ignition sources, off the ground and clearly identified. Have the appropriate bins and refuse receptacles. Ensure site is regularly cleared of refuse, debris and other hazards. Conduct daily clean-up of work sites to remove waste materials and unnecessary combustibles. Prepare guideline on waste handling instructions. No burning on site.

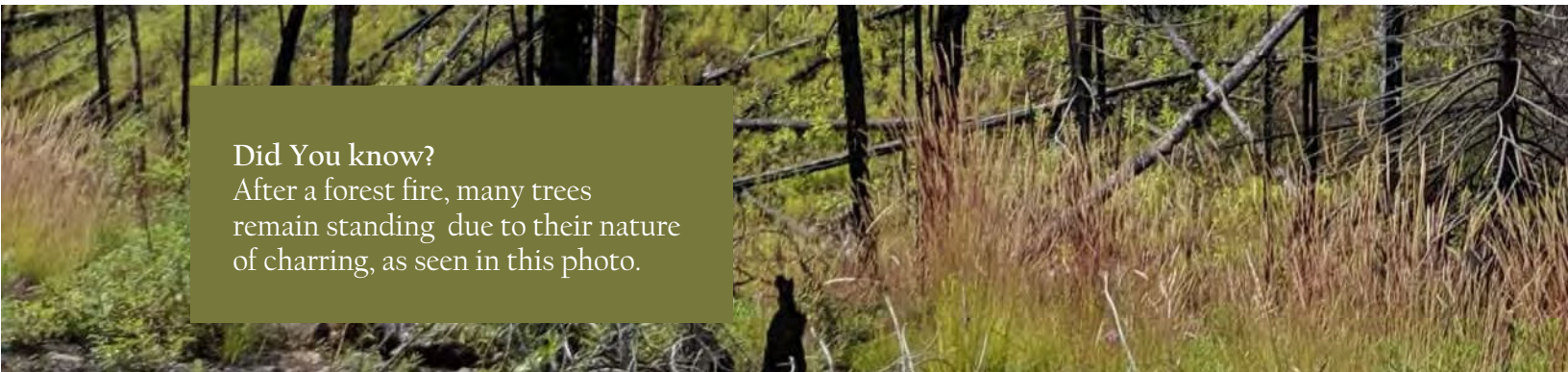
5. Consider the establishment and enforce "No Smoking" rules. Implement a site specific "Hot Work Permit System".

6. Work closely with the crews and subtrades. Ensure they are on the same page with the designers and timber suppliers. Open communication is key.

Fire Safety

The Insight

It is critical to understand that if timber was not safe to build with, it would not be allowed in the building codes. Canada's building codes are very strict in ensuring the safety of the occupants. Extensive research and testing have been done to establish the safety of timber buildings. Check out our website for a sample inventory of this information. Any of the buildings that the Canadian Wood Council endorses and promotes, including those built with an alternative solution to the code, meet or exceed the rigorous requirements of the building code. That being identified, timber is combustible construction - there is no way around that. It is important to note that construction materials of all types have vulnerability to intense heat. Concrete will experience spalling, steel will melt, timber simply has a different reaction to fire. The way that timber burns is different than people think. Think of a campfire, the fire must be started with paper and kindling to grow. The larger logs added to the fire will slowly char, taking a long time to burn. This is the inherent nature of wood products in their finished state as well. Light weight frame elements can ignite. This is a known fact and fire resistive elements are added to the building's assemblies to achieve the necessary fire resistance ratings. However, timber will not ignite in the same fashion when in a massive form, which allows us to meet and exceed building codes with the timber alone. The timber will slowly char at a predictable rate and allow designers to building in sacrificial layers to maintain the structural integrity of the build. In addition to fire resistive elements, most large buildings require fire protection through sprinklers.



Did You know?
After a forest fire, many trees remain standing due to their nature of charring, as seen in this photo.

Steps You Can Take

1. Every mass timber building should engage an experienced fire engineer as an initial part of the team. Whether or not you are delivering an IPD model, the fire code consultant should always be present.

2. A formal written Fire Safety Plan should be prepared prior to construction and a copy provided to the fire department. The plan should be readily available in the site office and all members of the team should be trained to adhere to the plan. Your fire code consultant can prepare a detailed plan.

3. All trade groups should be trained and required to sign off that they have read, understood and will comply with the plan.

4. Ensure the local fire safety officials and the insurer understand the type of building you are assembling and the way that the structure and other elements will resist and combat a potential fire event.

Water & Moisture

The Insight

In addition to fire safety, moisture and water management is important to timber structures. Water damage claims exceed that of fire damage in the insurance industry.

Some course of construction policies do not cover natural events related to moisture, such as rain storms. It is assumed that the timber will be properly allowed to dry. Insurers are often concerned around the performance of timber buildings, and the potential for timber damage, during the construction phase. E.g. if there is an accidental sprinkler activation or burst pipe, what are the potential damages? This is something that needs to be addressed so that insurers can anticipate accurate claim amounts in the unlikely event of these occurrences.

Timber is dried to specific moisture contents for building materials to ensure long term performance that will not subject the building to any long term issues. Careful detailing and assembly ensure that moisture content will be maintained. We must note that timber can indeed get wet, but it must be allowed to dry.

Steps You Can Take

1. A formal moisture management plan should be prepared prior to construction.
2. All trade groups should be trained and required to sign off that they have read, understood, and will comply with the plan.
3. Identify where there are water sources in the construction process. Clearly identify and familiarize all crews with the locations of appropriate shut offs. Although there should be a prioritization of installing fire suppression systems, this should not be at the expense of their performance. New fire suppression systems that use mist technologies instead of large quantities of water and can suppress the fires just as effectively without saturating the buildings.
4. Consider additional drainage where timber could be vulnerable. Kitchens, bathrooms etc.. If installing additional drainage indicate that clearly.
5. Consider using sensors to track the moisture content of the timber, even post occupancy.
6. What type of concrete topping will be used on the floor assemblies. Consider concrete curbs around wall assemblies to direct potential water away. As mentioned, unknowns are a concern, indicate to your company that your assembly is not necessarily completely timber.
7. Are any temporary protection measures being used? Temporary tents to protect the building as it is assembled should be considered. When considering water release at the site consider the construction phase in the design as well as the occupant phase.

Repair & Rehabilitation

The Insight

Repair and rehabilitation information is a concern for the insurance industry. This should be understood that it is not a concern because of susceptibility to damage, but because of the unknowns surrounding the methodology of the repair. What does it cost? What does it look like? How long does it take? Because of the lack of insurance claims data for timber buildings, it is extremely difficult to determine. The insurance industry has thousands of historical claims for light wood frame houses and other small buildings, but little data for larger wood and mass timber buildings. The assumption is that the products again behave like their light wood frame components, which is not necessarily the case. This results in many timber buildings being insured as a total loss, instead of factoring in the potential for repair. Testing and information from FPInnovations have led to the production of a report addressing this (Ranger, 2019). There are additional studies being undertaken by FPInnovations in this area. CWC is working closely with them to support these studies. The private sector is also conducting its own research.

Steps You Can Take

1. Have discussion with your timber supplier about repair and rehabilitation options. If there is a plan for repair or restoration in the unlikely event of a damaging event, have it ready to present with your insurance application.
2. Undertake testing and research data if possible. Present it to your insurance company.

Conclusion

This document is intended to introduce you to the nuances of timber construction. By no means is it somewhere to stop, but it is certainly somewhere to start. We encourage you to embrace the resources listed following this overview, and be thoughtful and consider the unique nature of timber construction.

Mass timber buildings are tried, tested and true - they are the future of the construction industry. We encourage you to educate yourself on the typologies and speak to CWC and your design teams openly. We are all in this together and can make your project a success!

Resources

Canadian Wood Council
cwc.ca

Contact us to find a Mass Timber Supplier near you! Or Contact your regional Wood WORKS! technical leads for assistance at https://wood-works.ca/contact-us/

Interested in publications on timber builds? Visit our webstore at https://webstore.cwc.ca/ to access the following publications, and more:

- Wood Design Manual 2017
- Introduction to Wood Design 2018
- Engineering Guide for Wood Frame Construction
- Fire safety in security, Ontario, and BC Editions

For links to resources and more information see: https://cwc.ca/how-to-build-with-wood/insurance/

WoodWorks Wood Products Council, USA
woodworks.org

- Insurance for Mass Timber Construction: Assessing Risk and Providing Answers
- Mass Timber Cost and Design Optimization Checklists

For links to resources and more information see:
https://www.woodworks.org/mass-timber-building-insurance/
https://research.thinkwood.com/
https://info.naturallywood.com/masstimber

Ontario's Tall Wood Building Reference
https://www.ontario.ca/page/building-with-wood

Structural Timber Association – UK
https://www.structuraltimber.co.uk/
https://timefortimber.org/insurance-industry-guide-to-mass-timber-structural-timber/

FPInnovations
fpinnovations.ca

Visit the research library: https://web.fpinnovations.ca/publications/

- CLT Handbook – 2nd addition
- Mid-rise wood-frame construction handbook
- Technical guide for the design and construction of tall wood buildings in Canada
- Rehabilitation of Mass Timber Following Fire and Sprinkler Activation 2019

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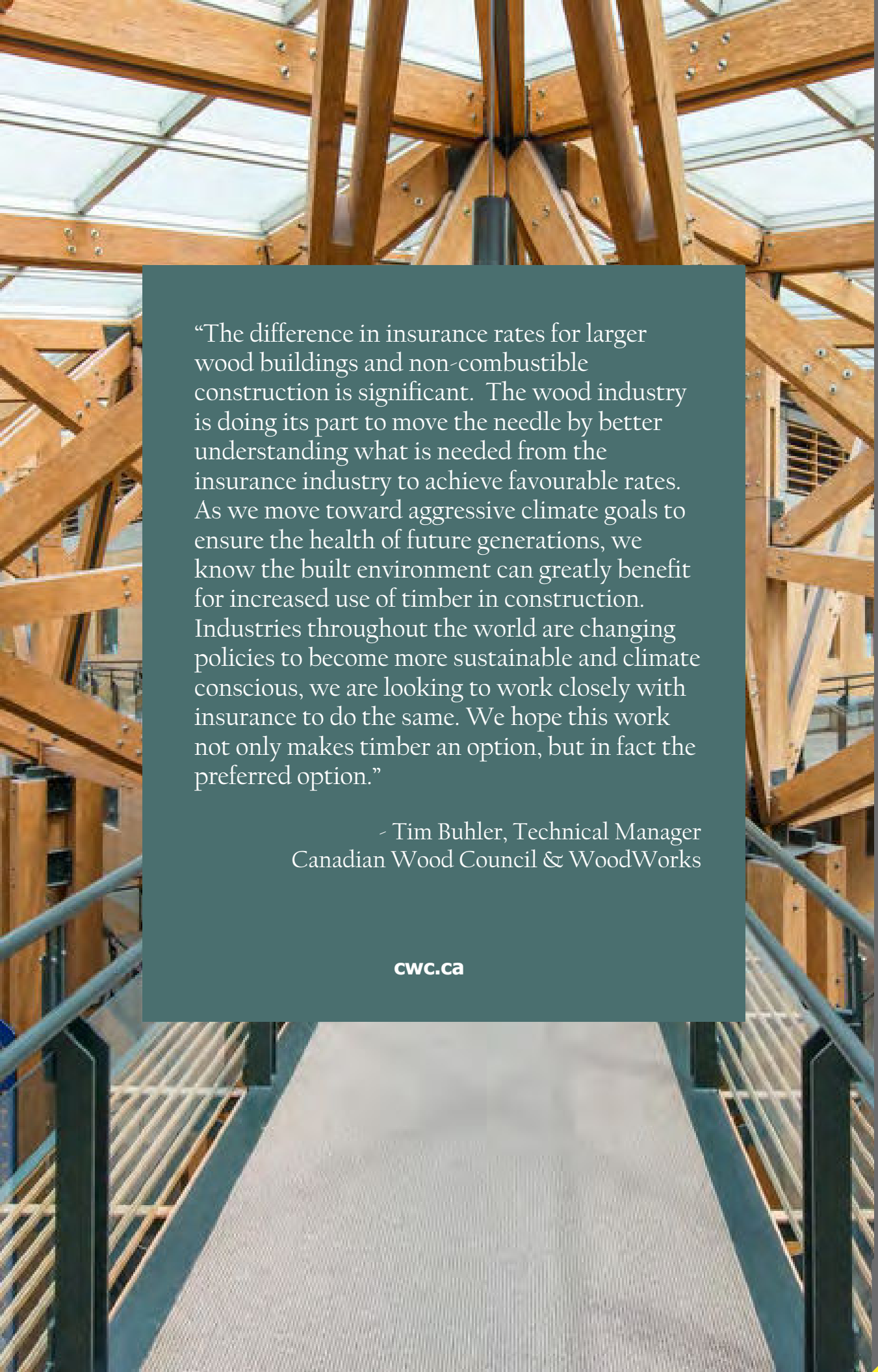

"The difference in insurance rates for larger wood buildings and non-combustible construction is significant. The wood industry is doing its part to move the needle by better understanding what is needed from the insurance industry to achieve favourable rates. As we move toward aggressive climate goals to ensure the health of future generations, we know the built environment can greatly benefit for increased use of timber in construction. Industries throughout the world are changing policies to become more sustainable and climate conscious, we are looking to work closely with insurance to do the same. We hope this work not only makes timber an option, but in fact the preferred option."

- Tim Buhler, Technical Manager
Canadian Wood Council & WoodWorks

cwc.ca