

WoodWorks Mass Timber Industry Roundtable

November 15, 2023
Vancouver, BC







Introduction and Background

The Mass Timber Industry Roundtable (MTIR) is an industry forum led by the Canadian Wood Council (CWC) as part of its WoodWorks Program. The Roundtable is a platform for strategic discussions designed to accelerate the adoption of mass timber within Canadian construction markets – identifying critical barriers, assessing risks, and developing actionable strategies to mitigate them.

The 3rd Roundtable session convened in Vancouver, BC, on November 15, 2023, building upon previous sessions held in Toronto and Banff. The first roundtable held in British Columbia offered a unique opportunity to engage experts from across the province with the most completed mass timber structures in Canada – 355 of 830 according to Natural Resources Canada's State of Mass Timber Map.

As of March 2024, an estimated 509 of the 832 (61%) mass timber buildings completed in Canada are within the public sector. As such, the conversation here focused on residential and commercial building sectors and expanded to engage the perspectives and insights of property owners and developers as key decision-makers. The six sessions covered a wide variety of focus areas, combining quantitative survey data and discussion questions to enhance industry engagement. The sessions featured introductory presentations, fireside chats, and panel discussions by experts in order to foster dialogue.

Comprising approximately 100 industry leaders from development, architecture, engineering, construction, mass timber supply, and supporting sectors – including government, education, forestry, and auxiliary products – the MTIR offers diverse perspectives from all parties involved in project decision-making.

This report provides a detailed analysis of results, highlighting key findings and suggesting potential focus areas for standards, processes, and education. Key outcomes of this report can be utilized by industry and government to prioritize initiatives and significantly accelerate and sustain the growth of the mass timber industry across Canada.

About the Author

Whirlwind Consultants specializes in value added wood products with a specific focus on mass timber and over 15 years of prefabricated timber construction experience. The firm plays a key role in launching cross-laminated timber products in North America and redeveloping glulam markets, including promoting new standards for applications with modern design and production processes. Nicholas Sills is the Principal of Whirlwind Consultants, which was launched in 2022.



Summary of Key Findings

Based on the quantitative survey results and discussion and analysis presented later in this report, the key findings to advance mass timber in residential and commercial construction markets are:

Financial Performance Drives Decision-Making and Market Adoption

To bring mass timber into the mainstream and increase further adoption it must financially outperform other building types. Cost was identified as the most important attribute for users/buyers in both commercial and residential markets, and efficiency/speed of construction was identified as the number one motivation for developers actively using mass timber, and as the most attractive element of the business case.

Mass timber adoption appears to be limited by real or perceived financial barriers, with developers indicating that over 50% of commercial and greater than six-storey residential market share could be built out of mass timber if costs were neutral with steel or concrete.

Potential Initiatives and Focus Areas

- Develop comprehensive financially focused case studies showcasing project performance metrics, including pro-forma performance, to establish a robust business case for mass timber.
- Document and communicate the advantages of mass timber in terms of construction speed. Identify optimal construction methodologies to ensure holistic time savings across the entire development process.
- Introduce incentives to facilitate the transition to mass timber within key construction markets until the market matures and becomes self-sustaining.



Municipalities Can Incentivize/ Simplify the Use of Mass Timber

During roundtable discussions, participants identified several strategies that local governments can implement to promote the widespread adoption of mass timber construction. Flexibility in building form and massing emerged as the most impactful measure, with all respondent groups rating it highly (4.5/5.0). Offering flexibility in parking requirements, balcony provisions, and housing mix scored slightly lower (3.5/5.0), showing promise as incentives to encourage mass timber usage.

The concept of density bonuses or additional storeys for mass timber projects, similar to the model established by the City of Vancouver, was widely discussed among developers as a highly promising initiative not included in the survey. Additionally, creating new land use categories tailored to accommodate mass timber building forms, as permitted by code (12 or 18 storeys), was identified as crucial for fostering market growth.

Potential Initiatives and Focus Areas

- Municipalities seeking to enable mass timber should consider offering density bonuses and align zoning/floor space ratio with building code allowances for mass timber.
- Providing flexibility in balcony requirements, parking minimums, and unit mix can aid developers in ensuring project viability as the mass timber market matures.
- Developing specific design guidelines for mass timber that address the challenges related to building form and massing is essential. Existing studies and guides from institutions like SFU Renewable Cities and municipalities such as the City of Vancouver can serve as valuable references.

Focus on Promising Opportunities in the Residential Rental Market

There seems to be a significant opportunity for mass timber in the residential rental market for buildings greater than six storeys. Developers identified this as the market segment with the largest potential (61% market share) if costs were neutral with other building materials. Additionally, low-income housing was identified by attendees as the number one building sector in need of standardization.

Potential Initiatives and Focus Areas

- Development of standardized mass timber low-income rental housing design and construction systems.
- Development of a highly targeted demonstration program to leverage the potential of the low-income rental housing market, initiating real projects, sharing lessons learned, and identifying best practices for this building type.

Exposing Mass Timber May Not Be Critical

Exposing mass timber structures may not be critical for market acceptance. Roundtable attendees ranked aesthetics/biophilia as the least influential aspect of the mass timber business case. Developers similarly assigned minimal value to exposed mass timber, with only 40% suggesting that it should command a premium over concrete construction in commercial or residential markets.

These findings suggest that the primary benefit of exposing mass timber could lie in simplifying construction and potentially reducing costs compared to encapsulation or other ceiling types. However, the added expense for appearance-grade mass timber may outweigh the benefits, making encapsulation with industrial-grade mass timber a more cost-effective option.

Potential Initiatives and Focus Areas

- Conduct cost and construction comparisons between encapsulation and exposed visually graded mass timber to understand the financial implications of different systems.
- Optimize encapsulated mass timber and related provisions to enhance viability in the residential rental market.

Simplify Design and Project Delivery for Mass Timber

The roundtable highlighted the need to streamline design and construction complexity in mass timber projects. While standardization in design and connection types remains limited, there's a growing consensus among industry stakeholders on the benefits of standardization. Standardizing building types and connections can accelerate design and approval processes, and reduce costs, though it may constrain architectural creativity if not implemented with care.

Effective and targeted use of standardization can mitigate project risks, expand market options, and improve stakeholder coordination. Notably, standardizing connections offers substantial benefits by promoting industry-wide adoption of efficient solutions. Standardizing the procurement and design processes by utilizing tools like 3D BIM models can enhance collaboration, accelerate approvals, and minimize risks across the value chain, ultimately optimizing efficiency.

Potential Initiatives and Focus Areas

- Develop and disseminate best practices for mass timber procurement and project delivery methods.
- Establish a guide for standardized mass timber connections through collaborative focus group efforts to develop best practices.
- Prioritize expediting permitting and approvals by creating digital tools for municipalities to facilitate faster processing.



Future Sessions

The roundtable workshop yielded valuable insights into current perspectives on the barriers to mass timber construction systems, and pathways to enhance success. The atmosphere at the event was overwhelmingly positive, with significant collaboration among all parties involved. However, questions and challenges remain on further developing the supply chain for mass timber products. Additional work on addressing challenges within the forestry and manufacturing sectors will be critical to support advancements in building demand and construction industry capacity.

Future roundtable sessions should delve deeper into specific issues identified for mass timber or explore other underdeveloped wood construction markets, such as prefabricated, panelized, or modular systems, as well as opportunities in light-wood framing for Canadian markets with a lower rate of adoption. Based on the favourable feedback received, actionable steps can be taken from the insights gathered, showcasing the effectiveness of the roundtable format in supporting industry advancement and fostering collaboration among stakeholders in the development, construction, and forestry sectors.

Analysis & Discussion

The following sections provide detailed analysis and results of attendee survey feedback, and key insights from roundtable conversations.

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Session Overview and Attendance Breakdown

The industry roundtable workshop featured a full day of insightful discussions with numerous speakers, sessions, and discussion topics. The agenda included the following sessions led by industry experts.

Introduction: Rick Jeffrey – President and CEO, CWC

MC: Rocky Sethi – Managing Director, Stryke Group

Session 1: Market Trends and Value

Dr. David Fell – Director of Research and Analysis,
Forestry Innovation Investment

Session 2: Navigating Development Risks

Sarah Bingham – VP Development and Sustainability, Adera
Graham Brewster – Director of Development, Wesgroup

Session 3: Zoning and Development

Dylan Kruger – City Councilor, City of Delta

Session 4: Design and Permitting

Thomas Noissis – Associate, ZGF Architects

Session 5: Production and Procurement

Andre Lema – Manager of Business Development,
Western Archrib

Nick Milestone – Director of Project Execution, Mercer

Andrew Stiffman – Director of Design and Construction,
Kalesnikoff

Session 6: Construction Process

Scott Comfort – President, Seagate Mass Timber

The roundtable surveys garnered insights from 64 respondents, including contractors, engineers, architects, educators, government policy advisors, mass timber suppliers, and related professionals. To understand why mass timber construction predominantly favours public projects, the roundtable expanded its engagement with developers and public property owners. Private and public owners were openly invited and encouraged to join, while representatives from other groups were invited based on their involvement with existing committees and partnerships.

Attendees have been categorized into the following groups for streamlined analysis:

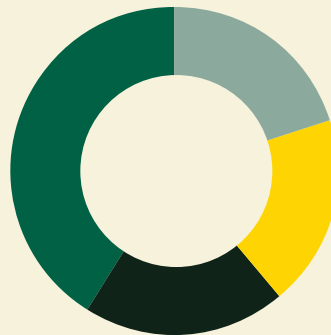
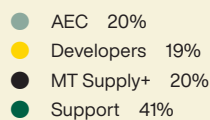
AEC: Architects, Engineers, and General Contractors. This group consists of users, designers, direct clients or secondary clients of mass timber construction systems. They are expected to have the broadest education and experience in mass timber design and construction.

MT Supply+: Direct mass timber suppliers and groups that provide installation or related products specific to mass timber (i.e., fasteners, acoustic solutions, etc.). Most individuals in this group were mass timber suppliers, likely possessing specific knowledge about mass timber, but may have limited understanding of surrounding processes affecting product and process adoption.

Developers: Encompassing developers and public sector property owners, or private developers. This is a crucial focus group due to their significant role in project decision-making.

Support: Educators, Lumber Industry, Government Policy, Research/Codes, Support services, and other. These industries are critical to the success of mass timber; however, their knowledge is generally expected to be specific and they are not often involved directly in construction projects to understand the impact of various processes.

Figure 1
MTIR
Attendance



Various sessions, ranging from 10 minutes to one hour, were held, with panel discussions providing additional context. Summaries of sessions with significant results are provided below.

Topic 1:

Market Trends and Value

Q1: Commercial Office Attribute Importance

Commercial Office Sector: Rank the level of importance for users/buyers (0 = minimal importance, 5 = very important).

Figure 2
Commercial Office Attribute Importance



Cost emerges as the primary concern universally, with space flexibility ranking second. Least significant among users/buyers in commercial office construction are amenity space requirements. Developers prioritize cost, followed by floor plan flexibility and acoustic performance.

Space flexibility often correlates with large open grids, typically 9m x 9m (30' x 30') in steel or concrete office buildings. However, accommodating flexible unit types within fixed column grids poses challenges. While mass timber can accommodate large grids, it may lack cost efficiency compared to smaller spans. Hybrid timber concrete composite systems, prevalent in Europe, can help address this issue.

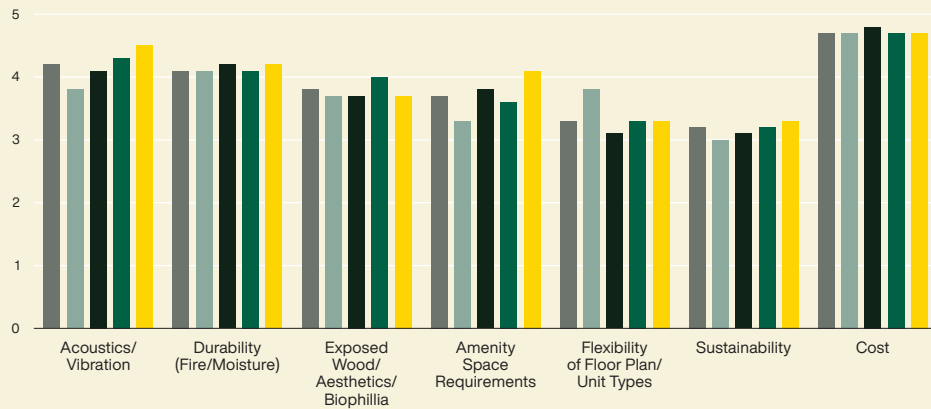
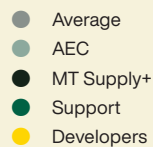
Takeaway Notes

- Cost competitiveness is imperative for sector growth.
- Commercial tenants demand space flexibility, often necessitating hybrid floor construction and complex value-chains.
- Exposed wood ranks lowest among Developers, indicating potential gains for encapsulated mass timber construction (EMTC) with cost reductions.

Q2: Residential Attribute Importance

Residential Sector: Rank the level of importance for users/buyers (0 = minimal importance, 5 = very important).

Figure 3
Residential
Attribute
Importance



Residential considerations primarily revolved around cost, followed by acoustics and durability, including fire performance. Notably, achieving cost-effective acoustic performance for various mass timber assemblies remains a challenge for building designers, highlighting a critical area for improvement. Developers emphasized the importance of costs and acoustic performance in residential construction, warranting potential focus for future initiatives. However, the roundtable discussions did not delve deeper into addressing this issue.

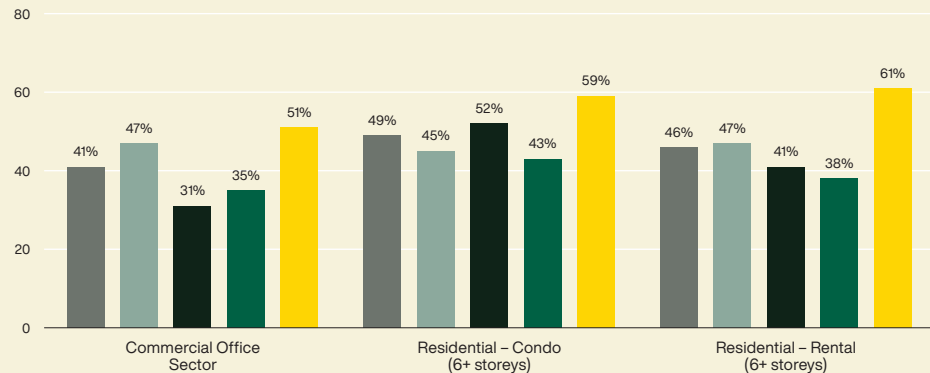
Takeaway Notes

- Cost competitiveness is imperative for sector growth.
- Developers prioritize acoustic/vibration performance more than designers, signalling a need for education and development in this area.
- Standardization of floor layouts shows promise in this sector.
- Sustainability considerations may have diminished in significance or become perceived as standard practice.

Q3: Market Share

What is the maximum percentage of market share you see mass timber taking in a cost neutral world?

Figure 4
Estimated
Maximum
Market Share
of Mass Timber



In terms of market share, there is considerable variability in responses, with a standard deviation of 25% and a range of 5–100% across all categories, showing low correlation to occupation focus cohorts. This indicates that the perception of market share varies greatly based on role and experience, making it challenging to conceptualize without hard data.

Both AEC and Developer groups identified residential rental as having higher potential market share, while MT suppliers and support groups were less optimistic about this sector. Overall, the residential markets seem to hold the most potential in the near future. Therefore, focusing on market development and project support in the residential sector would be the most strategic approach to capitalizing on this optimism.

If mass timber construction were to approach anywhere near these market share values in Canada, there would be a significant need for increased manufacturing capacity and lamstock fibre supply. While the feasibility of this volume remains uncertain, the roundtable participants expressed a belief in its high potential feasibility. This underscores the importance of investing in reducing the costs of mass timber products, which could lead to substantial market returns.

Takeaway Notes

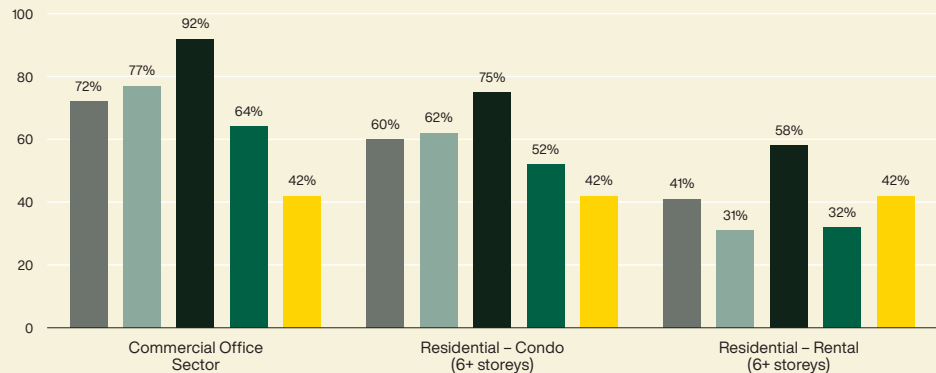
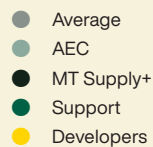
- There is substantial market potential for mass timber construction, especially if cost neutrality can be achieved. The assumption that private developers are uninterested may be incorrect, and any hesitancy in private sector adoption likely stems from real or perceived cost issues.
- Educating stakeholders on the financial viability of mass timber construction with real business case examples would be beneficial.
- Residential construction, including both rental and condo sectors, holds the most promise.
- Developers exhibit the highest level of optimism regarding mass timber market share.

Q4: Exposed Mass Timber Pricing

Do you think exposed mass timber should demand a premium for pricing vs. concrete?

Figure 5

Exposed Mass Timber Value – % of “Yes” Responses



A significant percentage of respondents indicated that commercial projects should command a premium for exposed mass timber; these percentages declined for residential condos and rentals, with only 41% believing exposed mass timber should justify a market rental premium. Mass timber suppliers tended to lean towards higher premiums across all sectors, likely due to bias and/or understanding of the explicit costs associated with higher-grade lumber, coatings, and handling care required for delivering architectural-grade solutions.

Developers rated commercial construction market share potential highest among all groups but did not perceive enhanced value in exposed mass timber for this, or any other, segment. Responses varied among the 12 developer participants, but the average was 42% across all three categories.

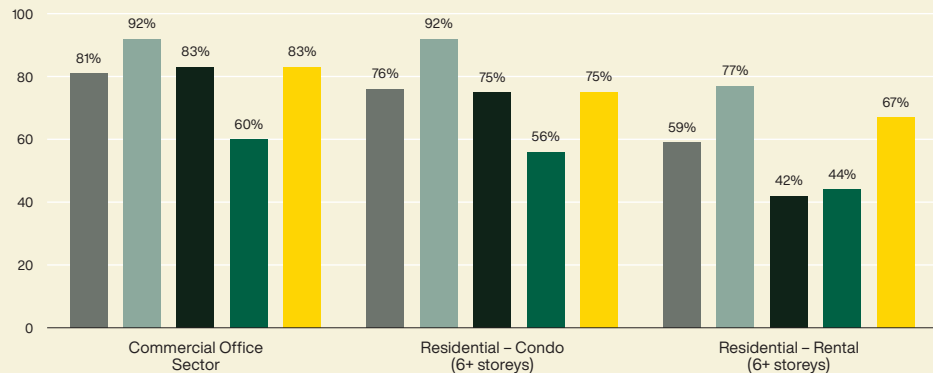
Takeaway Notes

- Developers appear to be unsold on exposed mass timber demanding a premium.
- Commercial projects, followed by market condos, show the most potential for exposed mass timber premiums.
- Residential condo projects may not benefit from exposed mass timber without a shift in perspective from the real estate community.
- Residential rental projects could become more cost-effective with encapsulated mass timber construction (EMTC) solutions and likely offer greater growth potential.

Q5: Six-Storey Mass Timber Value

Do you believe six-storey mass timber construction has more market value than six-storey light wood frame (LWF) construction (perceptions of durability, fire resistance, acoustics, etc.)?

Figure 6
Mass Timber Value vs. LWF – % of “Yes” Responses



While all groups expressed a preference for mass timber construction over light wood frame (LWF) construction, the construction professional groups – contractors, architects, and engineers – rated mass timber solutions significantly higher compared to other focus groups. Conversely, supply and support groups did not see substantial value in mass timber over LWF construction for residential rental markets, despite this being a key market for mass timber historically. Residential purpose-built rental units, often the first choice for mass timber conversion, were favoured by developers due to quicker build times, sound mitigation, improved fire performance, and overall higher quality. This preference was reflected in the developer group, rating market rental projects significantly higher in value compared to support and supply cohorts.

Takeaway Notes

- AEC and Developers perceive higher quality value in mass timber compared to LWF.
- General industry/support groups and the general public may not fully understand the increased performance value of mass timber over LWF, indicating a potential marketing/education opportunity.

Q6: Mass Timber Value Variations

How does the value of mass timber vary between commercial office and residential markets?

The roundtable discussion session on mass timber construction yielded valuable insights into the diverse perspectives shaping the sector's future. Value, a subjective notion, emerged as a multifaceted concept, encompassing embodied carbon, aesthetic appeal, cost considerations, end-user preferences, and sustainability. In the commercial realm, value was relatively easier to discern, driven by trends such as the return to office and an emphasis on sustainable practices. Mass timber, with its tangible environmental impact and ability to enhance office aesthetics, proved attractive to clients seeking a distinguishing product. However, challenges were noted post-pandemic, with slow office occupancy and a shift towards creating desirable spaces rather than focusing solely on square footage.

In commercial real estate, the group-thinking effect played a significant role, with companies researching and educating others on mass timber benefits. Exposed timber, particularly in open office floor plans, demonstrated potential cost reductions and aligned with ESG (environmental, social and governance) goals. The discussion notes recommend a focus on the emotional appeal of exposed timber, recognizing that its impact might not be universally understood. Furthermore, a nuanced approach is essential, considering variations in office tenant preferences and the need for owner-driven mass timber office projects. Many commercial mass timber office projects are owner driven in their desire to use mass timber.

The residential sector displayed individualistic drivers, with cost being the primary consideration, along with a larger discussion about the perceived privilege of using wood in North America contrasted with the sustainability priorities in other regions. While there was a desire among developers to expose wood in residential projects, challenges arose with cost-effectiveness, code regulations, acoustic performance, and aesthetic concerns. The focus group notes recommend comprehensive education efforts to clearly illustrate the potential benefits of mass timber construction, and specific pathways to achieving these benefits.

Identifying promising markets and owners in mass timber construction requires a nuanced understanding of regional cultures and preferences. While British Columbia showed a strong focus on wood, Ontario faced challenges due to the perceived "gimmicky" nature of mass timber. The focus groups suggest tailoring strategies based on local markets, understanding the regulatory landscape, and considering incentives, such as increased building allowances for mass timber structures. This is aligned with recent density announcements for British Columbia around transportation hubs, and the possibility of increased height allowances for mass timber buildings. This highlights a need to align mass timber building types with zoning categories that further enable its construction and support consistency across municipalities.

General comments highlighted the need for public sector involvement to advance mass timber construction, with a call for repeatability in finding models that work for both commercial and residential projects. Challenges in the retrofit market, market survey misconceptions, and the importance of positive experiences for realtors were also discussed. Many discussion groups emphasized the importance of simplifying standard mass timber systems, engaging in public-private collaborations, and addressing regional variations to foster the growth of mass timber construction in both commercial and residential sectors. BC Housing, for instance, has a significant potential opportunity to work as a massive demonstration for cost-effective mass timber housing solutions.

Takeaway Notes

- Engage zoning and planning authorities to align mid-rise construction with jurisdictional goals, ensuring zoning aligns with building code construction typologies.
- Understanding the differences in commercial and residential real estate drivers for value is important, and may require education with the real estate professional community.

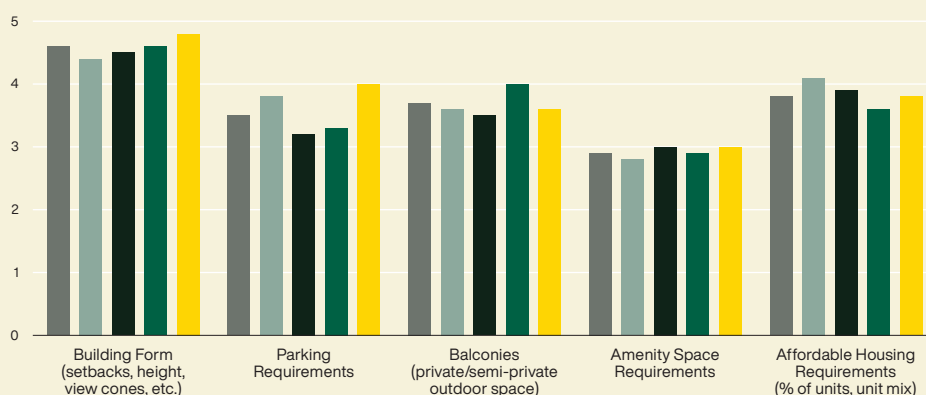
Topic 2:

Zoning and Development

Q1: Municipal Process Impact

*Where is flexibility in the municipal approval process most impactful?
Rank the level of impact of the following items
(0 = minimal impact, 5 = very impactful).*

Figure 7
Municipal
Process Impact



Building form, encompassing setbacks, height, and view cones, emerged as the most impactful aspect for potential modification in municipal processes, according to focus group feedback. Conversely, adjustments to amenity spaces were deemed least impactful, although it's noteworthy that these spaces often entail different structural grids, necessitating expensive transfer systems in mass timber constructions. Hence, careful consideration of amenity space implementation is crucial. It's important to acknowledge that each municipality faces unique challenges, potentially resulting in varying rankings based on subjective experiences.

Secondary areas for potential process modification include parking requirements, highlighted by developer focus groups, and adjustments to affordable housing requirements, noted by AEC professionals. Other notable areas discussed during focus group sessions included:

- Balconies, which introduce complexity and cost while posing moisture penetration risks. Private balconies are suggested to be underutilized, with emphasis placed on high-quality amenity spaces to foster community.
- Parking, identified as a significant issue in many jurisdictions, albeit not directly linked to mass timber.
- Code compliance challenges persist in several jurisdictions, underscoring the importance of establishing clear pathways to minimize approval process delays.

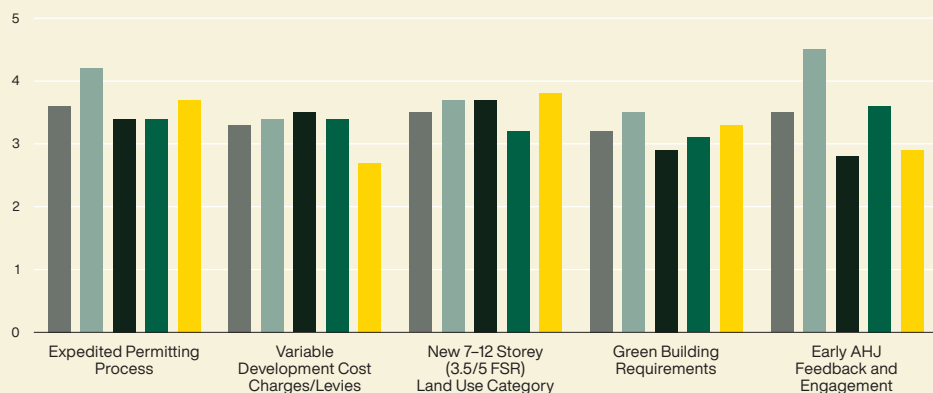
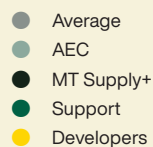
Takeaway Notes

- Building form is the key area for process variation.
- Balcony requirements should be reviewed due to their significant costs and complexities.
- Efforts should be made to expedite permit approval times and resolve code compliance issues.

Q2: Most Impactful Incentives

Rank in order the incentives you believe would be most impactful in greater adoption of 7-12 storey mass timber buildings (1 = least impactful, 6 = most impactful).

Figure 8
Impactful Incentives



The small deviation in rankings suggests there's no clear frontrunner among the incentives deemed substantially impactful by focus groups. Developers favoured mass timber-specific land use categories and an expedited permit process, while ranking variable development charges lowest in potential impact. AEC professionals highlighted the significance of early AHJ (Authority Having Jurisdiction) feedback and engagement, recognizing the challenges of implementing construction projects, particularly those involving new technologies like mass timber.

Green building incentives received lower rankings, possibly due to a focus on projects already designed with mass timber, rather than converting steel or concrete buildings. However, as jurisdictions plan to implement embodied carbon construction requirements favouring mass timber, penalties on high embodied carbon buildings could incentivize low embodied carbon solutions like mass timber.

In the "Other" category for this question, a significant number of developers identified density bonuses for mass timber as the most impactful incentive.

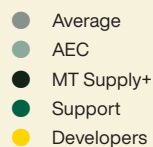
Takeaway Notes

- Developers prioritize density bonuses and new land use categories supporting mass timber as the most impactful incentives.
- Expedited permit processes and early AHJ engagement are top priorities for AEC professionals.
- Developers ranked a new land use category supporting mass timber as the most impactful incentive with municipalities.
- Green building incentives, while not highly ranked, could encourage the shift from concrete or steel to mass timber.
- Variable development cost charges are not seen as effective incentives.

Q3: Provincial Code and Policy to Support Mass Timber

What provincial building code or policy revisions would most effectively support mass timber development (1 = least, 4 = most)?

Figure 9
Provincial Code
and Policy to
Support Mass
Timber



Building height or number of storeys emerged as the building code advancement to best support mass timber according to AEC professionals. Subsequently, BC announced provisions to allow 18-storey mass timber structures within the province. Interestingly, developers did not prioritize this provision, focusing more on exposed wood requirements and construction course specifications. The thickness of mass timber assemblies, dictated by acoustic needs, often limits building heights and risks, compromising the top floor's integrity, potentially leading projects to consider steel or concrete alternatives. Therefore, flexible building height regulations are crucial for accommodating mass timber solutions.

Occupancy types were not considered a high priority across all focus groups, suggesting they are adequately addressed in current code provisions or not yet relevant for mass timber product utilization.

Discussions also highlighted the reliance on out-of-province or international materials for many mass timber projects in government buildings. Implementing heavier requirements for Leadership in Energy and Environmental Design (LEED), Living Building Challenge (LBC), embodied carbon, or Life Cycle Assessment (LCA) could incentivize the use of regional materials or consider transportation carbon in project assessments. Additionally, discussions emphasized the need to enhance BC's Wood First Act, potentially by demonstrating wood solutions' viability or including Life Cycle Assessments in schematic design considerations.

Takeaway Notes

- Building height variance or storeys emerged as the most effective solution for enabling mass timber development.
- Consider implementing LCA, LEED, LBC, embodied carbon, or other green building systems across jurisdictions, with clear quantitative requirements and guidance.
- Enhance BC's Wood First Act with stronger enforcement mechanisms or requirements for viability demonstration. Consider implementing similar acts in other jurisdictions.

Topic 3:

Design and Permitting

Q1: Importance of Standard Building Types

Is there importance in creating standard building types for mass timber construction? Make a list of the benefits and downsides of standardization.

Importance

First we need to define what a standard building type means. Does it mean each building is physically the same in shape and form? Does it mean the structural grid is the same? Are connections the same? There are many levels of variability that can be applied to standard building types and a solution that is adaptable between these extremes would likely be most fitting. With these questions answered, it appears that the focus groups believe this would have relative importance, but the “how you achieve this” is a large question that does not appear to have a clear set of answers.

Clearly there is an importance; the question is how to rank the importance and feasibility of each category for standardization, then assign resources and systems to be able to deploy this process. Discussion of the following will provide further insight on this complex goal.

Benefits

- Speed of design
- Faster approval process assumed
- Cost savings in design process
- Confidence in minimized project risk
- Cost savings in construction, with trades knowing what to expect and how to expertly deploy construction systems
- Surety in building insurance and possibly reduced premiums
- Increased market options assuming the system is well adopted
- Schedule production and construction with more confidence
- Earlier coordination of mechanical, electrical and plumbing with standardized approaches
- Traditional innovative construction route can still be open to those who choose it

Downsides

- Stifles innovation
- Lack of architectural creativity
- Difficulty in coming up with a standard

Discussion

A discussion was held on this question that covered more than just building standardization but also included product and process standardization. Each type of standardization has different potentials for effectiveness and potential tradeoffs or difficulties resulting in specific downsides. Some of the discussed topics, and the consultant's comments on them, are detailed below.

Panel Size

There are significant misconceptions about effect of panel size on building design or cost effectiveness. For typical construction these effects are minimal and manufacturers will develop optimized panels based on their wood fibre availability and manufacturing equipment. For point support structural solutions (with no supporting beams) panel size is critical to the economical and structural performance of the building. This is currently a very small market segment for mass timber, and not a controlling industry factor. However, second-generation manufacturing operations have maximized their panel sizes based on transportation limitations. This means that within several years most new suppliers should have similar maximum panel dimensions.

Connections

Another comment was made that trying to standardize mass timber product offering was pointless, but that standardizing connections would bear a lot of fruit. We are currently in a renaissance era of mass timber connections. The advent of self-tapping screws, which are only just being added to the code, have brought forward many potentially more economic and high-performing connection systems. Engineering firms, along with mass timber manufacturers and connection suppliers, are trying to develop the winning solution; however, there are limitless possibilities on the market and in an engineer's imagination today. It would be extremely beneficial to create a ranked set of standard focus group connections for best practice, helping nudge industry to build more experience with effective connection solutions.

Process

One of the easiest ways to further standardize mass timber would be to clearly outline a standardized process so that all players in the value chain understand how to interact and draw the largest value from the given process. Many traditional general contractors attempt to work with mass timber construction in the same way as commodity materials such as concrete and steel, which tends to be non-collaborative and provides extremely poor information communication transfers. A standardization of this process would speed up design, approval, and production time, minimizing risk while enabling involved groups to better work within the ecosystem.

Procurement Process: Provide a clear standard overview of different sales engagement types and associated contract services. Provide the benefits of each model for different priorities.

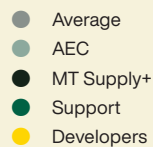
Design Process: Subject to sales type, enable 3D BIM models as standard for AHJ approval and require teams to work in 3D in a meaningful manner (as the contract documents) to work directly from shared models in lieu of 2D contract drawings.

Construction Process: Allow submittals and construction correspondence (RFIs, Site Instructions) to be processed within software that allows for digital review and markup.

Q2: Standardization Target Areas

Rank critical sectors for need for consistency/standardization
(1 = low priority, 5 = high priority).

Figure 10
Building Types
for Standardization



The top three project types rated highest by both Developers and AEC professionals were Low-Income Housing, Student Dorms, and Hotels, closely followed by Condos. Despite sharing program similarities, each project is often treated as unique due to varying client requirements and site regulations.

Low-Income Housing, particularly rental housing, is in high demand across Canada. Government-supported or minimally supported projects with pre-approved designs could leverage mass timber systems to quickly supply large quantities of rental units. Potential bottlenecks, such as MEP and HVAC trades, could be addressed through integrated design methodologies to simplify implementation.

Institutional buildings ranked low in priority for standardization; however, there have been instances of standard rural fire halls and expandable school systems in different jurisdictions.

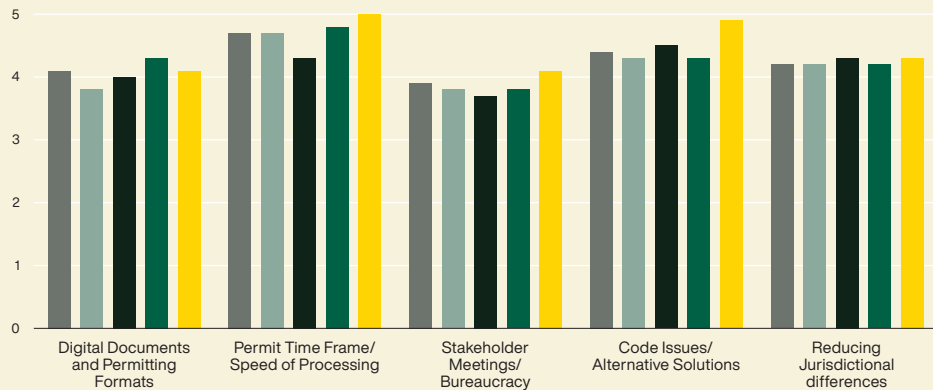
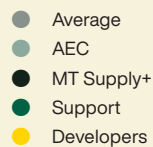
Takeaway Notes

- Government support could facilitate the development and demonstration of mass timber solutions for low-income housing, addressing a significant market need.
- A rental housing shortage in BC and various other regions in Canada presents an opportunity for public bodies to commission mass timber projects.

Q3: Permitting Priorities

Rank permitting priorities
(1 = low priority, 5 = high priority).

Figure 11
Permitting
Priorities



Improving permitting time frames emerged as the key priority, followed by addressing general code issues and exploring alternative solutions. A notable shortage of regional construction staff, both in the market and government sectors, complicates the approval process. Solutions may involve increasing approval staff, streamlining approval processes, adopting more efficient tools like 3D models, or implementing pre-approved building designs for quicker deployment.

Takeaway Notes

- Efforts to reduce the time for permit processing will have significant impacts on building viability. Studies of jurisdictions using digital processes could quantify these time savings and support adoption in other jurisdictions.

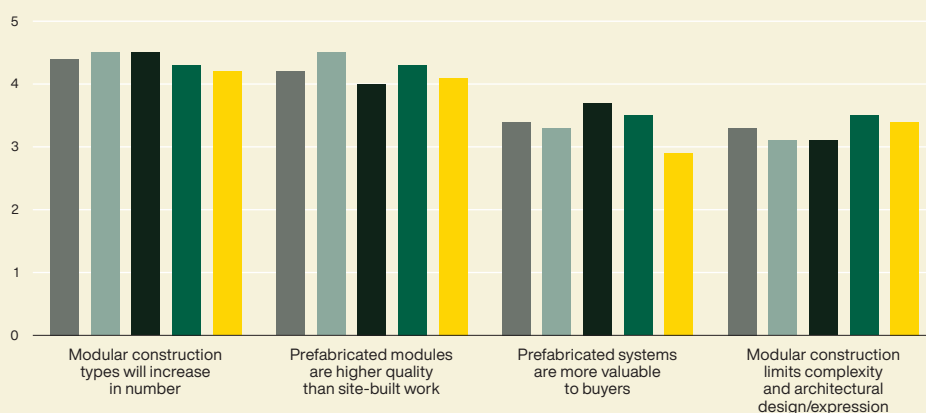
Topic 4:

Construction Process

Q1: Views on Prefabrication

*Provide your views on prefabrication
(1 = strongly disagree, 5 = strongly agree).*

Figure 12
Views on
Prefabrication



There is a general consensus that modular construction types will increase in number over the coming years, and that prefabricated modules are higher quality than site-built. This second-highest ranking indicates that perceptions have changed over the last five years, or that the focus groups already think of prefabricated construction as high quality while some of the general public may associate it with lower quality, rapid housing, temporary work camps or trailer-style homes. This change in perception could be understood as a positive industry perception development, especially considering support groups also ranked this high.

Prefabricated systems in general were not considered more valuable to buyers so their merits would likely need to stand on their own in terms of costs, speed, availability, and quality.

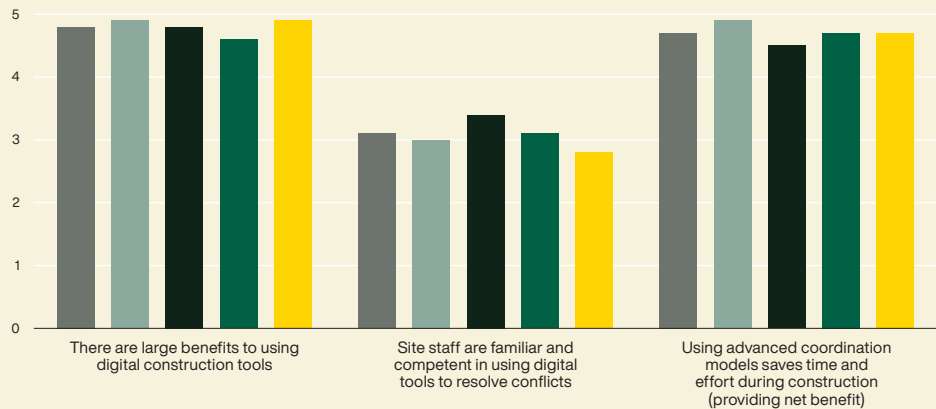
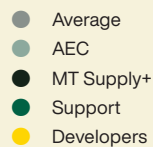
Takeaway Notes

- Prefabricated and modular construction is predicted to increase over the next several years. How can this industry be best supported?
- The value perception of prefabricated modular construction was high among all roundtable attendees.

Q2: Views on Digital Construction

Provide your views on digital construction
(1 = strongly disagree, 5 = strongly agree).

Figure 13
Views on Digital Construction



Views on digital prefabrication revealed a high benefit understanding across the board, and that using advanced coordination models saves time and effort on site. However, responses clearly demonstrate across the focus group that site staff are not familiar with or openly able to use digital tools on the construction site.

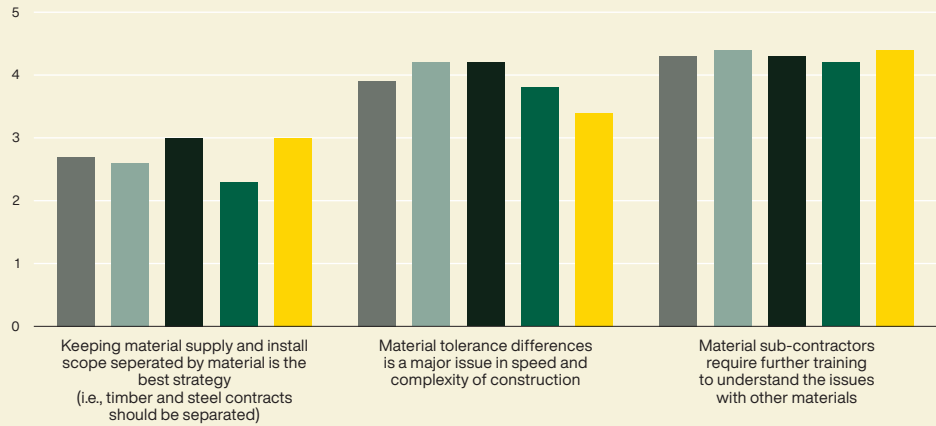
Takeaway Notes

- Education focused on workforce training should include digital tools and coordination in the curriculum. Training programs, tools, and incentives for contractors should be made available to upgrade site working skills to integrate with digital tools.
- Enabling AHJs to work with 3D BIM models will help transition construction site drawings to 3D models and also force downstream adoption.

Q3: Views on Hybrid Structures

Provide your views on hybrid structure challenges
(1 = strongly disagree, 5 = strongly agree)

Figure 14
Views
on Hybrid
Structures



There is strong consensus that material sub-contractors require further training or experience to understand construction within hybrid material contexts. There is also a relatively strong consensus that material tolerances vary significantly depending on the materials being worked with, and that stronger understanding of tolerances and how various materials can work together is required.

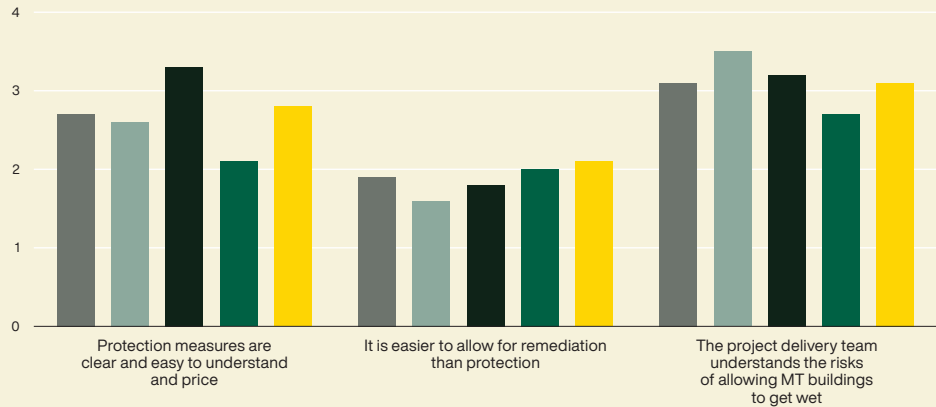
Q4: Views on Moisture and Weather

Provide your views on weather and moisture mitigation risk
(1 = strongly disagree, 5 = strongly agree).

Figure 15

Views on Moisture and Weather

- Average
- AEC
- MT Supply+
- Support
- Developers



Mass timber suppliers believe that protection measures have been communicated clearly, although that same understanding does not follow with AEC professionals, developers or support teams. Scope documents for this area may not be consistent across the industry or address the needs of each stakeholder, and associated contract documents, terminology, as well as best practice guides are not standardized.

All teams believed that remediation was more difficult than allowing adequate protection, although from the consultant's experience many strategies were based on reducing risk through construction speed, and carrying a remediation budget, as all projects tended to have some form of weather or damage issue, which could be from UV exposure, rain, or work completed on site. More education on solutions available for weather protection will reduce remediation costs and the contingencies carried through early estimates.

Most groups were overall neutral around the project team understanding risks of moisture on site, indicating that better training might be available, but overall, it was not deemed a critical area for education or risks.

Proposed Areas of Focus

A number of key focus areas, as well as discussion trends or themes, came to light through the workshop. These included standardization of some formats, and process optimization for permitting, design, and construction. For recurring themes, many discussions occurred in the following areas:

- The importance of costs as a key decision driver
- Needing new zoning types that match building code types for mass timber
- Sustainability targets for the built environment
- Standardization of sales, design, and procurement processes

The process of determining which areas to potentially provide a standardization framework within, and how to develop those standards, will likely be lengthy and difficult on the manufacturing side. Thus, significant effort in a framework and system to help create this would be required. It is suggested to focus on zoning and permitting standards and advisory guidelines to help build consensus among industry professionals while providing clear educational tools as an easy way to implement some change. Along with this, there are many areas where education can be increased and demonstration projects for process-specific goals can be deployed. Key focus areas included the following:

- Standardization of connections and process
- Standard building kits for rapid approval
- Focus on residential rental markets and low-income housing
- Develop better digital tools and encourage adoption
- Focus on upskilling understanding of mass timber for AEC, and AHJ groups
- Acoustic assembly systems to ensure high performance and value perception in future builds

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