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Tony Evers, Governor
Dan Hereth, Secretary

VIRTUAL/TELECONFERENCE
MASS TIMBER TASK FORCE
Virtual, 4822 Madison Yards Way, Madison
Contact: Brad Wojciechowski (608) 266-2112
December 3, 2024

The following agenda describes the issues that the Task Force plans to consider at the meeting. At the time of the meeting, items may be removed from the agenda. Please consult the meeting minutes for a record of the actions of the Task Force.

AGENDA

9:00 A.M.

OPEN SESSION – CALL TO ORDER – ROLL CALL

A. Adoption of Agenda (1-2)

B. Approval of Minutes of October 31, 2024 (3)

C. Introductions, Announcements and Recognition

D. Reminders: Scheduling Concerns

E. Administrative Matters
1) Department, Staff and Task Force Updates

F. Administrative Rules Matters – Discussion and Consideration

G. Alternative Procedures for Design of Mass Timber Tall Buildings – Discussion and Consideration (4-13)
1) Developing Content for Alternative Procedures for Mass Timber Guidebook
2) ICC Performance Code for Buildings and Facilities Review
3) Relating Mass Timber to Other Alternative Building Procedures

H. Public Comments

ADJOURNMENT

NEXT MEETING: MARCH 4, 2025

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MEETINGS AND HEARINGS ARE OPEN TO THE PUBLIC, AND MAY BE CANCELLED WITHOUT NOTICE.

Times listed for meeting items are approximate and depend on the length of discussion and voting. All meetings are held virtually unless otherwise indicated. In-person meetings are typically conducted at 4822 Madison Yards Way, Madison, Wisconsin, unless an alternative location is listed on the meeting notice. In order to confirm a meeting or to request a complete copy of the board's agenda, please visit the Department website at https:\\dsps.wi.gov. The board may also consider materials or items filed after the transmission of this notice. Times listed for the commencement of any agenda item may be changed by the board for the convenience of the parties. The person credentialed by the board has the right to demand that the meeting at which final action may be taken against the credential be held in open

session. Requests for interpreters for the hard of hearing, or other accommodations, are considered upon request by contacting the Affirmative Action Officer or reach the Meeting Staff by calling 608-267-7213.

VIRTUAL/TELECONFERENCE
MASS TIMBER TASK FORCE
MEETING MINUTES
OCTOBER 31, 2024

PRESENT: Justin Gavin *(arrived at 9:04 a.m.) (excused at 10:03 a.m.)*, Laura Hasburgh, Jordan Komp *(arrived at 9:01 a.m.)*, Jason Korb, Marco Lo Ricco, Richard Paur, Erich Roden

EXCUSED: Michael Mazmanian, Alexander Timmer

STAFF: Brad Wojciechowski, Executive Director; Joseph Ricker, Legal Counsel; Dialah Azam, Board Administration Specialist; and other Department Staff

CALL TO ORDER

Richard Paur, Chairperson, called the meeting to order at 9:00 a.m. A quorum was confirmed with five (5) members present.

(Jordan Komp arrived at 9:01 a.m.)

ADOPTION OF AGENDA

MOTION: Marco Lo Ricco moved, seconded by Korb, to adopt the Agenda as published. Motion carried unanimously.

APPROVAL OF MINUTES OF JUNE 11, 2024

MOTION: Laura Hasburgh moved, seconded by Erich Roden, to approve the Minutes of June 11, 2024 as published. Motion carried unanimously.

(Justin Gavin arrived at 9:04 a.m.)

(Justin Gavin excused at 10:03 a.m.)

ADJOURNMENT

MOTION: Laura Hasburgh moved, seconded by Erich Roden, to adjourn the meeting. Motion carried unanimously.

The meeting adjourned at 10:24 a.m.

1. **Analysis, Design, and Detailing**

For Type IV construction, beyond the prescriptive requirements of the adopted building code, it is noted that an alternate, performance-based, pathway is available for design and permitting.

The goal of this chapter is to provide guidance on design parameters, as well as any necessary supervision by third party professionals (where required), to meet the projects performance goals. These performance goals/objectives, which should be agreed to between all project stakeholders (design team, ownership, AHJ…) early in the approval process; and could include (among other topics) design load combinations, fire endurance ratings, serviceability criteria, and structural load path (including redundancy/progressive collapse mitigation).

1.1 Structural Design Considerations

The structural design should follow, at a minimum, the requirements of the National Design Specification referenced by the current version of the Wisconsin Commercial Building Code; however, performance-based design objectives may be set higher than typically required by code to minimize damage to the structure, architectural and/or mechanical systems, and building contents.

Standard code required load combinations (e.g. ASCE/SEI 7) should be addressed, at a minimum, clarifying if supplemental or enhanced requirements are being considered (similar to the performance-based design approach taken for high seismic regions of the country). These additional considerations/enhancements could consider structural redundancy (progressive collapse) and structural integrity (rotational compatibility/ductility, structural and non-structural) depending on the site/project specific requirements.

The design (and documentation) should clearly define the structural load path and system, including defining primary, secondary, and main lateral force resisting members (including the role, or multiple roles, each individual members may serve). At this time, it is worth noting that as of the original writing of this document, current building codes and design standards contain very few prequalified mass timber lateral systems. Additionally, innovative structural systems such as hybrid and composite mass timber are being developed; emphasizing the need for an alternate (performance-based) design approach (beyond the limited prequalified systems currently referenced in building codes).

Given continual/ongoing updates/revisions to national design standards, it is recommended the design team utilize and/or at least consider/review, the additional requirements of these updated design standards and state of the art research (e.g. considering the lateral design requirements of 2021 Special Design Provisions for Wind and Seismic (SDPWS), even for building codes referencing earlier versions of IBC). It is also noted that this state of the art research may come from sources outside of the United States. Refer to Chapter X for recommended references/design guides associated with many of the topics discussed above.

Commented [KJ1]: Better title than “Structural”?

Commented [KJ2]: Better way to phrase?

Commented [JK3]: Reference chapter

1.2 Non-Structural Design Considerations

Commented [KJ4]: Need to find a better title than "non-structural".

What other none-structural considerations do we want to add?

Serviceability considerations, including lateral drifts, floor deflections, and floor vibrations may often control, or at least provide significant guidance towards, the overall design of a structure (beyond standard strength designs/calculations). Additionally, due to the lightweight nature of mass timber construction, there are frequently additional non-structural design principals (e.g. acoustic design, sound mitigation, and thermal/energy performance) that need to be considered during design.

The reader is once again encouraged to review Chapter X for additional references associated with the topics above.

1.3 Fire Endurance Considerations

Performance-based fire designs may choose to modify the fire endurance durations/requirements from the code required minimum ratings, for a given occupancy/structure type. The design team should provide clear documentation noting what structural elements are considered exposed, concealed and/or partially concealed, and the associated fire rating of each element. Structural calculations provided to the AHJ should include calculations for both the standard design scenario and for any fire scenario(s), particularly where members rely on charring of the structure to achieve this rating.

For elements where the fire protection is provided by a combination of a non-combustible material and a wood charring layer, the contribution of each towards the overall fire rating should be documented; with the contribution of the non-combustible materials (where applicable) providing a minimum of 2/3 of the overall required fire rating.

Any supplement testing to be completed (potentially as part of the project's variance process), should be certified by an independent, accredited 3rd party testing agency. The testing procedure and results should be reviewed for approval by Project AOR, EOR, Fire Engineer, and AHJ.

1.3.1 Minimum Fire-Resistance Rating (FRR's) Recommendations

Element	Minimum Fire-Resistance Rating
Primary Structural Frame:	
Buildings up to 180'-0" or 12 stories	2 hours[1]
Buildings taller than 180'-0" or 12 stories	3 hours[1,2]
Bearing Walls	Refer to primary structural frame[3, 4]
Non-Bearing Walls and Partitions	0 hours
Floor Construction and Associated Secondary Structural Members	2 hours
Roof Construction and Associated Secondary Structural Members:	
Buildings up to 180'-0" or 12 stories	1 hour
Buildings taller than 180'-0" or 12 stories	1.5 hours
Structural Connections	FRR to match, at a minimum, the lower of the connection member(s) FRR

[1.] Roof support rating is permitted to be reduced by one hour where supporting a roof only (not including additional occupancies/loading)
[2.] For buildings not greater than 420 feet in building height, the fire-resistance rating of floor framing elements (e.g. CLT slabs and glulam beams) shall be permitted to be reduced to 2 hours.
[3.] No reduction for roof framing is permitted
[4.] Minimum fire-rating for exterior walls to be based on fire separation distance

1.3.2 Mass Timber Fire-Resistance Rating Validation

1.3.2.1 National Design Standards (Char Method)

Primary and Secondary Structure:

The utilization of NDS provisions and calculations for the determination of char rates is a well-established and industry recognized procedure. For the scope of this guideline, it is recommended the following (additional) items be considered:

- Load Resistance Factored Design Fire Factors: 2022 Fire Design Specification (FDS) for Wood Construction has included additional Fire Factors (not currently covered in NDS) for the use of Fire Factors with LRFD provisions (Table 3.2.5).

- Extreme Event Loading: For loading in a fire scenario, the designer is referenced to the 2022 Fire Design Specification (FDS) for Wood Construction section 3.1.3.4.

- Char Calculations Beyond 2 Hours: For members requiring fire ratings beyond the current NDS provisions, it is recommended the design team provide specific testing, verifying the char rates utilized for design. It is recommended that the char rates not be reduced beyond those calculated based on extrapolation of the current NDS equations.

For projects utilizing Douglas Fir, American Spruce or European Spruce, the design team is advised to refer to the 3-hour testing provided by the USDA Forest Product Laboratory for the Ascent project.

Connections of Primary and Secondary Members:

- Bearing type connections should utilize noncombustible protection, or require load testing (under a fire event) to achieve the FRR noted in section 2.1.1.
    - Connections utilizing intumescent paint for noncombustible protection should be load tested (under a fire event) to confirm compatibility between materials
    - At the AHJ's discretion, the use of engineering analysis could be provided to validate the fire-resistance rating of connections per section 2304.10.1 of IBC 2021
- All other mass timber connections should be load tested (under a fire event) for the specified fire rating.
- Testing should meet the requirements of Section 2.1.3

1.3.2.2 Non-Combustible Protection

Gypsum detailing requirements to follow IBC 2021 section 722.7.

Sealants: Sealing of adjacent mass timber elements per 703.7. Sealants shall meet the requirements of ASTM C920. Adhesives shall meet the requirements of ASTM D3498.

Fire Blocking: Materials to meeting the requirements of 718.2.1

1.3.2.3 Fire Testing/Certification Requirements:

Testing to be completed, and results certified, by an independent, accredited 3rd party testing agency. Testing procedure and results to be reviewed for approval by Project AOR, EOR, Fire Engineer, and AHJ.

1.3.3 Exposure

Primary and Secondary Structure:

The floor assembly should contain a non-combustible material no less than 1" in thickness above the mass timber floor. No additional limits are directly required of the primary and secondary structural exposure, contingent on meeting the fire-resistance ratings specified in Section 2.1.1.

Concealed Spaces:

It is the committee's opinion that mass timber should not be permitted in concealed spacings with the following exceptions: (1) non-combustible protection is provided within

Commented [KJ5]: Typical comment: Can we use the word "should"?

Cannot require, but should we say "recommend"?

Commented [KJ6]: Confirm Reference

Commented [KJ7]: Confirm reference

Commented [KJ8]: There was a lot of discussion on this topic, but it needs to be resolved/finalized. I would recommend Jason Korb (KA) work with Laura (FPL) to make any recommended updates:

Korb previously noted some general concerns regarding discrepancies in the IBC 2021 code (section 722.7). It is recommended that the guideline specify specific detailing requirements in lieu of relying on a reference to IBC 2021

Has a lot more that is codified? General requirements. Sealant. ASPM requirements. Specific materials for fire protection. Gypsum must be met. 2 years ago implemented. Special inspections required based on building officials. Who is appropriate qualifications? Daily/monthly/yearly reports. Up to the special inspector to work with owner, contractor.

"Proposal FS81-18 (new IBC 722.7) defined the level of noncombustible protection required and how to achieve this level, including a prescriptive method recognizing 1/2" Type X gypsum board providing 25 minutes of protection and 5/8" Type X gypsum board providing 40 minutes of protection. Proposal FS5-18 (new IBC 703.6) defined methods to determine the level of noncombustible protection provided by other applied materials through using the E119 test procedure. FS73-18 (IBC 718.2.1) added mass timber as a fire blocking material."

Minimum 2/3 rating from non-combustible materials (if utilized?)

Commented [KJ9]: A new code section, IBC 703.7, was included in proposal FS6-18. It required that certain adhesives be applied at abutting edges and intersections of fire resistance-rated mass timber elements unless the assembly has been shown to provide the required FRR without utilizing sealants.

Commented [KJ10]: Any additional guidance/recommendations required? (I don't necessarily think so, but just confirming)

Commented [KJ11]: Committee to consider if we want to discuss exposure of mass timber walls (not columns) and slabs (e.g. separation of 15 feet if exposing walls/ceilings in a dwelling unit

the interior (mass timber) space or (2) significant project specific testing/data is obtained and approved by the AOR/EOR, AHJ, and independent third party peer reviewer.

Exterior Walls (Façade):

The committee would note the following recommendations, consistent with the XXXXXXX

- *"Exterior side of exterior walls protected by a non-combustible material—e.g., 5/8" Type X gypsum sheathing"*
- *"No combustible exterior wall coverings except for certain water-resistant barriers"*
- *"No exposed mass timber on the inside and outside surfaces of exit enclosures and elevator hoistways in high-rise buildings (occupied floor > 75 feet from lowest fire department access)"*
- *"Noncombustible construction only for exit enclosures and elevator hoistways greater than 12 stories or 180 feet"*

1.3.4 Additional Recommendations:

Water Supply:

- Dual water supply for buildings 120 feet and above, in accordance with IBC 403.3.2 (2021), and including the following exception:
    i. *"Exception: Two connections to the same main shall be permitted provided the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through no fewer than one of the connections"*
- Water supply in accordance with 2021 IFC 3313 and 2021 IBC 3313

Sprinklers:

i. Building fully sprinklered with an NFPA 13-compliant sprinkler system

Smoke Evacuation: Fire Department thoughts?

Type 1A Construction?

1.4 Fire Engineering Consultant:

TT Thoughts:

For buildings higher than 12 stories or 180' (only)
Qualifications and Selection
- Previous Mass Timber Experience
- Selected by Ownership/Design to be approved by AHJ

-Scope

1. Review mass timber framing and connections protection in concealed areas

Commented [KJ12]: Committee wanted a strong and clear stance.

Additional Korb Commentary:

Prohibition of concealed spacings in Type IVHT has been removed. However, the concealed spaces language in the IBC and its commentary are not in agreement. Further discussion required.

Provide additional commentary on gypsum detailing.

Lean on prescriptive method: gypsum detailing requirements have been defined by Fire Design Specification for Wood Construction (WPC)

Commented [KJ13]: What document are these from?

Commented [KJ14]: Any additional clarification required (I don't necessarily think so, just want to make sure)

Commented [KJ15]: Is the committee comfortable with TT's thoughts/recommendations below? If so, I can "formalize" the language.

Commented [BW16R15]: May reference other guides that have been published.

2. Review mass timber connections in exposed connections
3. Review gypsum detailing per requirements of Section 3.2.2.2.
4. Smoke evacuation
5. Review testing provided by manufacturers for compliance with relevant standards

1.5 Peer Review

Qualifications and selection

For each project higher than 12 stories or 180', a Mass Timber Peer Review Panel (MTPRP) shall be convened. The MTPRP shall be a panel or a structural engineering firm with at least three (3) members with previous experience in relevant mass timber buildings.

The MTPRP shall be selected by the Building Official based on their qualifications applicable to the Mass Timber Peer Review of the project. The Building Official may request the opinion of the Project Sponsor and EOR on proposed SPRP members, with the Building Official making the final decision on the MTPROP membership.

The MTPRP shall bear no conflict of interest with respect to the project and shall not be part of the design team for the project.

The MTPRP provides their professional opinion to and acts under the instruction of the building official.

3.4.2 Review scope

To provide an independent, objective, technical review of those aspects of the building design that relate to the structural performance of the building according to the requirements and guidelines described on this building, and to advise Building Officials whether the design generally conforms to the intent of this documentation and other requirements set forth by the Building Official

Review structural calculations, under normal conditions and under a fire scenario; including the use of foreign codes, where applicable.

The MTPRP shall be convened as early in the structural design phase as practicable.

XXXXXXX

Commented [KJ17]: These are TT's thoughts. Originally there were differing opinions on the peer review, but I believe the concensus was that a peer review is valuable, but the team wanted to make it clear what types of projects required these peer reviews.

If the committee agrees, I can formalize the thoughts below.

Commented [KJ18]: I believe the following concerns have already been addressed/clarified above, but want to keep for the record:

Performance based approach. To verify prescriptive limitations. Requirements are peer review acting on behalf of the building owner. Due diligence for beyond code. Acting on part of city or building officials reviewing on their behalf. Foreign to DSPS practices. Contract that out? Would have to go through a petition. Special inspections – On the ownership team to run. The reviewer would not be from the state – independent reviewer. (For discussion – the EOR for Ascent performed the Sis. Pros and cons?) It could be a different structural firm outside the state. State could create the committee. Expertise – Not an additional ask for the plan review. Special inspections, the building owner/reviewer. The building official reviews and approves - selected

Joe Ricker
We do have to remember work within the rules we do have. Existing systems or legislative action.

Korb
Peer review seems excessive. Everyone will have opinions. The data must speak for themselves.

Lo ricco
Prescriptive measures are approved. We do not need peer review. Peer review intended for performance-based route. More general approach.
Roles
Peer review
Technical. Review responsibilities
Building Officials - Enough data, qualified, threshold for substantial evidence. Standard of care. Justifying analysis
1 example: Exposed area. 18 story timber structure. Fully encapsulated. How much exposure would trigger a peer review. May be based on occupancy.
1. For areas outside the code. Needs to have some technical judgment in concert with the building review with the engineers. Backstop for building official for technical knowledge on the job.
2. Mazmanian
Common practice? Always the option to use this approach for comfort. Always thresholds in the code. If you can use the codified approach, then it is not needed. If you exceed requirements, you must use a performance based approach should have a peer review is required.

2. Construction and Post-Occupancy

Mass Timber construction to follow the general requirements of Type IV Construction, unless otherwise noted in this guide.

2.1 During Construction

Construction requirements per 2021 IFC 3303.5

Standpipes

Dual water supply

Non-combustible protection installed on levels 4 stories below the active mass timber construction

Required wall coverings shall be installed on levels 4 stories below the active mass timber construction

1. The Mass Timber Guidebook shall reference 2021 IFC 3303.5. To establish preliminary meeting to review planned measure and timeline for implementation throughout the course of the project. Outline regular meeting and inspection schedule. This may involve the inspection field staff and construction staff as it relates to Mass Timber construction.

- Should we include an inspection schedule, and would this be considered useful in the guidebook.

- Deviations and Field Modifications – Any substantial field modifications or deviations from the approved construction drawings should be reviewed with field inspector prior to implementation. (Example: structural modifications due to field variation – flange extension, component modification, etc.)
- If there are ~~substantial~~ field modifications from approved plan review the building construction, the initial plan review shall require a secondary plan review. or AHJ plan reviewer (CBC chapter 361 JG) or delegated associate before implementation.
- We are not requiring anything beyond the current WI commercial building code.
-

NFPA 33 – Mass Timber construction.

4.2 Special Inspections

Mass timber special inspections

Follow the requirements of IBC 2021 (1705.5.3)…recommend including these requirements specifically in the guideline

Mass timber inspector qualification and selection

Previous experience in relevant mass timber buildings

Submit credentials to the city

Commented [KJ19]: These were TT's original thoughts

Commented [KJ20]: These are additional thoughts from the committee throughout our meetings

Provide access to the plans prior the start of construction

Submit monthly reports to the city

- Strongly recommend requiring special inspections for all mass timber projects, but specifically in accordance with the goals of the task force, for any project designed outside the parameters of the prescriptive code path shall require special inspections
    - (Note: the only way we can require this in Wisconsin is as a condition of approval associated with a variance. Any project designed outside of the prescriptive path would require a variance as a path to approval.)

This Guidebook shall follow the requirements of IBC 2021 (1705.5.3) to recommend including these requirements specifically in the guideline.

In final document, DPD legal will have to reference table

Post Occupancy Inspection Guidance: Icc and American Wood Council.

Reference IBC and Fire Code. G7 ICC safety Guidelines for inspection. Wood construction in general

Currently adopt 2015. Recommendations for unique instances. Will have a variance for a new code, or agree to certain criteria.

Executive summary; 4 or more stories

2.2 Post Occupancy

The owner shall ensure that required passive protection remains in place over the life of the building, section 701.6 of the IFC.

DO WE WANT AN ADDITIONAL SECTION OF FIRE SAFETY?

Standpipes – Do we need to define standpipes?

Dual water supply

Non-combustible protection installed on levels 4 stories below the active mass timber construction

Required wall coverings shall be installed on levels 4 stories below the active mass timber construction

Commented [KJ21]: These were TT's original thoughts

Commented [KJ22]: These were additional comments from the committee throughout our meetings

Commented [KJ23]: This section needs some work:

Committee Questions:

What lessons learned from post-occupancy evaluations of Mass Timber Buildings are different from standard construction practices?

Buildings should be maintained and inspected as part of an annual fire inspection program.

Reference WI statue or local jurisdiction for commercial buildings. Aesthetically would be prudent.

Distinction between fire inspection and structural inspections (typically not required) could be considered during a regular maintenance program.

Other factors that should be considered specifically related to mass timber buildings?

Reference specific codes, and site in our bibliography?

Post occupancy inspections are recommended, however, they are not required.

Commented [KJ24]: Comments from prior committee meetings

I. Closing Remarks

Commented [KJ25]: Need to select committee members to develop a first draft