



CANADIAN ASSOCIATION OF FIRE CHIEFS  
*Fire Chiefs on the Hill, November 2018*

Chair of the CCBFC  
C/O of Ms. Anne Gribbon  
Secretary, Canadian Commission on Building and Fire Codes  
The NRC Construction Research Centre  
National Research Council Canada  
Ottawa, Ontario K1A 0R6

Ref: 1515708765766

January 12, 2018

Dear Chair of the CCBFC

On behalf of the Canadian Association of Fire Chiefs (CAFC), we are writing to provide feedback to the Public Review of Proposed Changes to the Building and Fire Codes. Please find attached a copy of our feedback which was also entered on our collective behalf by CAFC staff into the online system.

Founded in 1909, the Canadian Association of Fire Chiefs (CAFC) is an independent, non-profit organization representing fire departments across Canada. The primary mission of CAFC is to promote the highest standard of public safety in an ever changing and increasingly complex world to ensure the protection of the public through leadership, advocacy and active collaboration with key stakeholders. The attached was prepared by the CAFC Building Codes Committee.

We would like to begin by expressing our appreciation for the additional time allotted to the CAFC and others to provide a thoughtful review and response to the proposed changes to the Building and Fire Codes. We commend the Codes Commission and staff for the thoughtfulness of the material presented.

You will see from our review that our major concern is related to the introduction or codification of Encapsulated Mass Timber Construction (EMTC). While we appreciate the constant need to modernize and address economic and possible environmental needs, we have serious concerns that the introduction of EMTC into the national code is premature. We were not convinced by the position paper posted of the rationale for needing to introduce EMTC into the national code nor did we see sufficient evidence to justify this type of risk-taking.

As such, in nearly all the sections on EMTC, you will note that we “strongly disagree”. For maximum clarity, we are not opposed to any of the safety measures being associated with EMTC, we are opposed to EMTC itself. For example, we obviously strongly support sprinklers, chimney safety, etc. However, if the clause referred to EMTC we indicated that we are opposed to it.

This comment also applies to our proposed changes to the Fire Code. We are obviously in favour of all safety measures, but because we are not supportive of the introduction of EMTC into the National Code,

we do not support any of the changes related to EMTC, although the measure if EMTC were supported might be desirable.

In closing, we would like to request the opportunity to attend the meetings at which these changes are being discussed. We are looking forward to supporting you in your effort to balance cost, quality, safety and efficiency perspectives.

Thank you again for the opportunity to partake in this review. If you would like to reach us or have any comments or questions, please contact the CAFC Executive Director Dr. Tina Saryeddine at [tsaryeddine@cafc.ca](mailto:tsaryeddine@cafc.ca) or 613-695-8462.

Sincerely,



Chief Ken Block  
President Canadian Association of Fire Chiefs

*CC: Members of the CAFC Board of Directors: CAFC President, Chief Ken Block (Edmonton); Chief Pierre Voisine (Cornwall); Chief Ken McMullen (Calgary); Chief Keri Martens (Lake Louise); Chief Daniel Perron (St. Levis); Chief Vince McKenzie (Grandfalls-Windsor). Members of the CAFC Building Codes Committee: Chief Sean Tracey (Co-Chair CAFC Building Codes Committee); Chief Gaetan Morinville (Co-Chair CAFC Building Codes Committee); Chief Shayne Mintz; Chief Kevin Lefebvre; Chief Cameron Bardas. Members of the National Advisory Council: Chief Dan McCoy (NAC Chair); Chief Cameron Ambrey (NAC Co-chair); Chief Duane Antle (NL); Chief Ken Stuebing; Chief Kevin Eskra (SK); Chief Mike McKenna (CFFF); Chief Rick Arnel (ON); Chief Phil Lemire (BC); Chief Rod Nielson (NS); Chief Jim Sawkins (NT); Chief Martin Gravel (DND); Chief Peter Krich (AB); Chief John Lane (Canadian Metro Chiefs); Chief Richard Amnotte (QC).*

# Summary of CAFC Comments to the Building Code Review

**Support level note:**  
 1. Support  
 2. Support with Comment  
 3. Support with modification  
 4. Do not support  
 5. No opinion

Change #	Support Level (see note)	Comments
1023	4	Definition - Encapsulated Mass Timber - CAFC does not support the introduction of the definition "encapsulated mass timber". This introduction implies a separate category of construction material that in our opinion is still combustible or mass timber. RBQ guide "Mass timber buildings of up to 12 storeys" does not include this definition. It is believed that insufficient research has been presented publicly. If this is to be pursued we would like to see the evidence upon which this is based.
1024	4	Encapsulated Mass Timber - New Subsection - CAFC does not support any of the proposed changes to see the incorporation of Encapsulate Mass Timber into the main body of the code. First, we'd like to note that the discussion paper providing the problem and solution on which the Encapsulated Mass Timber changes are being introduced is (1) written from the perspective of industry, it does not give adequate consideration to other points of view. (2) The assertions throughout the document are not referenced and the list of references does not include peer reviewed evidence. (3) Many of the assertions in the paper appear to have flawed logic leading to a conclusion that the building code is out of date and requires these changes. Encapsulate Mass Timber can be utilized in any jurisdiction by following a performance-based design approach. Guides such as the RBQ's "Mass timber buildings of up to 12 storeys" are available for such jurisdictions to follow. It is our position that codifying such changes is premature as there have been no publicly available published studies on the fire performance of this method of construction and experience in North American jurisdictions with this method of construction. The introduction of these changes can be delayed after a "trial" period where local jurisdictions can implement these designs and sufficient studies can be undertaken to determine the buildings performance. Experience from the UK with timber-frame has resulted in many changes and recommendations for fire safety practices over the life span of the building and during construction. CAFC remains concerned that corresponding changes to the NFC have not been considered that would reflect the need to protect the integrity of these components over their life span. No studies or experience have been provided on how these structures may perform post fire. After a fire has been experienced in a compartment how are the compartments rehabilitated? Are the walls planed down? What happens to structure performance? What will home owners experience for insurance premiums in these structures? Furthermore, necessary changes to the NFC to protect construction sites from large scale combustible fires have not been uniformly adopted across the country. Ontario has no Fire Code provisions for the reduction of fire loss on construction sites.

Change #	Support Level (see note)	Comments
		<p>Increasing building heights and thus combustibles on site should not be supported without corresponding Fire Code changes.</p> <p>There remain many technical issues with the way this built form has been proposed in the Acceptable Solutions of the NBCC. Many of the shortcomings are represented in current research on this topic, substantially that from the FPRF "Fire Safety Challenges of Tall Wood Buildings" Phase 1, as well as the uncompleted Phase 2 (a summary of some of the tests from this phase were presented by NRC this past September demonstrating the need for additional testing to determine extents of certain features). One of the fundamental challenges of tall structures is the importance of structural resistance to fire. While this is relatively easy to establish in non-combustible structures with Fire Resistance Ratings, and where contents make up the extent of fuel loads, the concept of compartment burnout assures structural safety, as well as safety for occupants far from a compartment fire, and safety for responders assisting occupants. Standardized FRR tests assume a time temperature curve that exaggerates real-life conditions, predominantly because of the expected fuel loading and decay phase, which in real-life generally occurs early relative to the testing curves. However, it has been demonstrated through testing that when EMTC members contribute to compartment fires, both the duration and intensity of a fire can be increased, along with eventual structural failure. One of the fundamental problems with the EMTC construction prescribed solutions is that this connection to burnout has not been established. There is nothing with respect to connectors in the acceptable solutions, and current testing indicates that some configurations of EMTC can prevent burnout from occurring. Although this risk is generally abated by automatic sprinkler systems, there exists enough of a risk with tall buildings to make the consequence of this unlikely event unacceptable (FPRF Phase 1). Unlike the evaluation possible with a project specific alternative solution where performance of specific compartments and components can be evaluated, the current proposed changes to the NBCC do not offer a holistic solution to safe, tall wood buildings. These issues are addressed individually in the following comments to PCR 1024.</p> <p><b>3.1.18.3.(2).</b></p> <p>The descriptions provided in this sentence create ambiguity as to what is considered a concealed space, and what is "essentially smooth flat. . .with no thin sections or sharp projections" Being in the prescriptive acceptable solutions these terms should be encapsulated with limits to provide reference for "concealed" "smooth" "flat" "thin" and "sharp". If there are no limits or performance objectives associated to these geometric descriptors, they are not quantitative and should be omitted.</p> <p><b>Table 3.1.18.3.</b></p>

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		<p>It is not clear what the limiting dimensions are within this table with respect to cross-section/area. Beam, Column, and Arches minimum dimensions should also be expressed in one-dimensional states to remove ambiguity - i.e. no less than 192/224mm in section width or depth. For example, would a 2-side exposed beam 180mm x 205mm be permissible, as it shares the minimum cross section, which is the stated applicable dimension.</p> <p><b>3.1.18.4.(2)(d)</b> This clause is redundant with clause (c)</p> <p><b>3.1.18.4.(3) through (6)</b> These sentences do not appear to have any technical backing (allowances for exposed EMTC elements) despite research indicating that the performance of EMTC components and the contribution to compartment fires. The reference materials for this PCR and the EMTC summary document in the package do not support this direction. Further, research indicating what may be an acceptable limit for exposed EMTC components is still underway, and preliminary results shared by Dr. Su reinforce that burnout of compartments with exposed EMTC elements is not likely to occur without consumption of those components. Further there does not appear to be any work addressing the contribution of EMTC components from a geometric perspective. This is relevant in this construction type as it is being applied to tall buildings. Performance requirements for tall buildings should include provisions to ensure structural collapse from fire alone is not possible, and shelter in place strategies can be accommodated. These concepts were best outlined in the work of the FPRF Phase 1.</p> <p>We believe sentences 3.1.18.4.(3) to (6) should be deleted. The relaxations rely on the belief that all building occupants are aware of the limitations of the amount of exposed mass timber elements, and will not unknowingly, or even knowingly, violate the code requirements. These relaxations also rely on the fire service to enforce. In our experience, it is extremely difficult to inspect all rooms within all occupied suites, especially if a suite is residential. Even if all rooms within all suites were able to be inspected, it is not practical to measure and calculate, on the spot, the maximum percentages of wall and ceiling surface areas permitted to be exposed. To allow the proposed exceptions would introduce a high risk of a major fire and collapse because structural elements are at fire risk, while the benefit is small.</p> <p><b>3.1.18.7.</b> This article significantly reduces the construction requirements for non-combustible cladding in EMTC which would not be permitted on other tall buildings (i.e. the exception of 3.1.5.5.(1)(a)) Similar to other comments from this PCR,</p>

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		<p>there appears to be no analytical or empirical reason for this deviation. In addition it does not address the performance of the wall system similar to what would be required of CAN/ULC S134 (clause e/S134 is optional in this PCR). Given the current experience with exterior fire on tall buildings and that this construction type will be used predominantly for residential buildings presumably with operable windows, this section needs greater scrutiny. What is the contribution expected from this proposed acceptable solution to the risk of exterior fires on tall wood buildings, and how does this article prevent the use of highly combustible materials which may not be interpreted as "cladding" but which make up the wall system?</p> <p><b>3.1.18.7.(2)(e)</b> This clause implies that a wall system can be a hybrid of an acceptable S134 system (clause d) and clauses a-c. This represents a departure from what S134 is testing, which is a wall system. How can a wall be partially S134, and partially something else? Wouldn't S134 need to be tested on any components added to incorporate clauses a-c? This is a similar situation as to what contributed to the Grenfell fire, where components or parts of walls are considered to be acceptable to a full-scale standard, but are modified with other components which negate that performance.</p> <p><b>3.1.18.8.</b> This article permits forgoing requirements of other tall buildings with combustible exterior wall components. Specifically the referenced requirement (3.1.5.6.(1)(b)) applies in addition to a 3-storey limit (3.1.5.6.(a)) Why is the requirement for the exterior components at least as robust as that for other tall buildings (i.e. 3.1.5.6. entirely).</p> <p><b>3.1.18.10.</b> Similar to the opening comments for this PCR, the concept of compartment burnout should be included as the intended performance of EMTC buildings as it relates to the performance of floor systems. In other words, structural elements should be able to remain in place until compartment burnout, which isn't necessarily the same as other real-world fires, or the correlation between FRR's from standardized tests relative to actual fires. For example, testing has shown that unprotected EMTC components can significantly contribute to both the duration and intensity of compartment fires, resulting in eventual structural collapse. If the elements are not completely encapsulated, what is the correct fire size/duration when the components required to have the FRR are the ones on fire.</p> <p><b>Unaddressed</b> Continuity of EMTC encapsulation is not addressed in the proposal, and there does not appear to be any research or testing at this point to address protection of</p>

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		<p>connectors either through prescriptive means or reference to a standard for installation/inspection. These are fundamental issues that create a prerequisite for support of this PCR.</p> <p>Although workmanship is not generally considered under the NBCC, and maintenance is covered in the NFCC, these issues may not be limited in their impact to fire performance of EMTC buildings. In order to be applicable to prescriptive acceptable solutions, further research is required to address the sensitivity of EMTC buildings to these items. This is particularly true given that many of the modifications which would not generally initiate a permit may in fact result in an unexpected drop in fire performance of an EMTC building. While an alternative solution process may easily address these items for AHJ's to maintain, these tolerances should be well understood prior to being adopted in the acceptable solutions. If the intention is that AHJ's are intended to enforce and inspect these systems more frequently than typical built-forms, there could be a considerable impact on these resources.</p>
1025	4	<p>EMTC - Exterior Balconies - see comments re 1024. Additionally, the justification states that exposed mass timber balconies "are not expected to contribute significantly to the spread of fire". This statement has not been supported by any research or testing. As balconies serve as an area of protection for residents during a fire this statement cannot be accepted without valid testing of these assemblies. Further, this would permit combustible balconies on 12 -storey buildings. Addition of combustible components to the exterior of tall buildings should be prohibited unless they can demonstrate acceptable performance to CAN/ULC S134 to prevent vertical fire spread on tall buildings. Such a scenario can contribute to failure of the fire sprinklers in buildings, particularly given that balconies are associated with operable windows/doors.</p>
1027	4	<p>Test Methods for Encapsulation Ratings - The detailed descriptions of testing methods should not be in the body of the code but instead should be a standard developed using the rigorous processes by a standards body such as ULC or CSA and under the purview of the Standards Council of Canada and meeting ISO requirements. This would ensure that the testing would meet national requirements for a test standard as well as ISO requirements. Encapsulation should have a standardized test methodology. It is not appropriate for CCBFC to develop technical specifications for new standardized tests as part of the code language. The proposal is unclear on whether the process of developing a standardized test is forthcoming, however that begs the question as to how this "standard" is being developed in tandem. Standardized test should precede adoption as acceptable solution in the NBC.</p>
1029	4	<p>Encapsulated Mass Timber Combustible Construction - Group C - see comments re 1024</p>

<b>Change #</b>	<b>Support Level (see note)</b>	<b>Comments</b>
1030	4	Encapsulated Mass Timber Combustible Construction - Group D - see comments re 1024. This also creates redundancy and confusion in the code with respect to article 3.1.3.2
1031	4	EMTC Multiple Major Occupancies - see comments re 1024
1032	4	EMTC Superimposed Major Occupancies - see comments re 1024
1033	4	Separation of Occupancies - EMTC - do not support the introduction of this technology - see comments as per 1024. Adopting arbitrary separations without technical guidance creates another issue in that it is challenging to support retaining or removing these restrictions in the future. What is the technical basis for requiring a greater FRR between C-D based on the construction type of the building?
1036	4	Fire Blocking in EMTC - see comments as per 1024. We support fire blocking, but not the introduction of EMTC.
1039	4	Interior Finishes in EMTC - see comments as per 1024. We do not support the introduction of EMTC and thus do not support this change.
1040	4	Roof coverings EMTC - see comments as per 1024. We do not support the introduction of EMTC and thus do not support this change.
1042	4	Storage Garages EMTC - see comments re 1024. We do not support the introduction of EMTC and thus do not support this change.
1065	4	Combustible Construction - Superimposed Major Occupancies - this change is proposing to permit the construction of storage garages of combustible construction in mid-rise construction. This change is not supported. It states that this was never intended to be a prohibition but no substantiation is presented to show that this was an oversight. This change can be permitted in jurisdictions presently through an alternative based design and therefore there is no reason to codify this. Without either research or testing or experiential data this change cannot be supported. The companion PC 184 revises Part 4 Clause 4.4.2.1.(1) which currently calls for all storage garages to conform to the CSA S413 Parking Structures Standard. The change essentially limits the application of S413 to concrete and steel storage garages only and exempts wood parking structures from adhering to any design standard other than the general CSA O86 Wood Design Standard. Integrating the occupancy prohibitions within the respective 3.2.2. articles creates a redundancy in the code (i.e. occupancy prohibitions will be located in two distinct locations). Occupancy prohibitions are covered in this article (3.1.3.2.) and should stay there simply for clarity. If the prohibitions are not applied correctly, fix article 3.1.3.2. Please see comments at 1024 and 1065.
1066	4	Combustible Construction - Group C, up to 6 Storeys - this proposed change would permit the construction of combustible storage garages within the 6 storey mid-rise assemblies. See related comments in 1070.
1067	4	Combustible Construction - Group D, up to 6 Storeys - this proposed change would permit the construction of combustible storage garages within the 6 storey mid-rise assemblies. See comments re 1070. Non-support due to non-support of preceding PCR's dealing with prohibition of occupancy combinations.



<b>Change #</b>	<b>Support Level (see note)</b>	<b>Comments</b>
1068	4	Combustible Construction - Deletion of References to Sentences 3.2.2.7.(3) and (4) in Subsection 3.2.2 - see related comments in 1070. Non-support due to non-support of preceding PCR's dealing with prohibition of occupancy combinations.
1070	4	Combustible Construction - Multiple Major Occupancies - this change is proposing to permit the construction of storage garages of combustible construction in mid-rise construction. This change is not supported. It states that this was never intended to be a prohibition but no substantiation is presented to show that this was an oversight. This change can be permitted in jurisdictions presently through an alternative based design. Without either research or testing or experiential data this change cannot be supported. Integrating the occupancy prohibitions within the respective 3.2.2. articles creates a redundancy in the code (i.e. occupancy prohibitions will be located in two distinct locations). Occupancy prohibitions are covered in this article (3.1.3.2.) and should stay there simply for clarity. If the prohibitions are not applied correctly, fix article 3.1.3.2.
1016	3	The change to introduce farm buildings is supported; however the determination of the 600 m2 limitation is seen as arbitrary and solely as a convention for industrial occupancies. Instead a more detailed analysis/comparison should be made to codes or standards regulating these structures such as NFPA 150. This standard assigns a classification at 280 m2 and is usually at this limit where fire alarm systems are required. A review of insurance industry losses can also support a more appropriate size for when the code should apply. More detailed review needs to be done on this. In addition, sleeping accommodations for farm workers should be required to be protected with sprinklers.
1018	3	See comments for 1016
1015	1	Defined Terms - Agricultural Buildings –
184	1	Structural Provisions for Storage Garage
434	1	Visible Alarm Signals in Locations Other than Sleeping Areas
1001	4	Type of Voice Communication Systems Required in Buildings Other than that we would like to see how the intention of the previous changes were documented, we completely disagree with the assumption that fire services will not use the equipment - there is no information to support that conclusion. Sentence 7 was included to require voice communication systems in buildings with large numbers of people and shelter in place potential (2-stage alarm). We disagree with the content of the proposal, and do not support the changes.
1107	1	Hot Surface Applications
1026	4	EMTC - Construction of Exposing Building Face – See comments on 3.1.18.7 in PCR 1024. Propagating the issues around S134 and combustible exteriors is problematic - S134 does not look at cladding, it looks at wall systems. The justification for this PCR states that no exceptions are given for EMTC in this regard, but 3.1.18.7.(2).(e) does exactly that.
1034	4	EMTC - Application of High Building Requirements.

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		Note that this only really applies to D EMTC buildings - C's still require 3.2.6. after 18 m above grade.
1043	4	EMTC - Walkway between Buildings due to disagreement with the introduction of EMTC.
1044	4	EMTC - Automatic Sprinkler System Required, due to disagreement with the introduction of EMTC. We do support automatic sprinkler systems.
1069	4	Combustible Construction - Construction of Exposing Building Face. This change further promotes Grenfell-like scenarios where the combustibility of wall systems is linked to cladding and not the wall system as a whole. In particular the change to reference 3.1.5.6. in Clause 3.2.3.7.(4)(e) creates major ambiguity in how cladding regulations are applied.
1072	1	Emergency Power Supply
1080	1	Combustible Refuse Storage
1081	1	Separation of Public Corridors
1082	1	Temperature Rise Limits for Doors
1083	1	Combustible Pipe Penetrations
1085	3	Emergency Power Supply for Fire Pumps Serving Sprinklers Changing "firefighting" to fire suppression could have the negative impact of discrediting water for manual firefighting. The provisions in 3.2.5.7. are specifically for firefighter water, not fire suppression systems. In addition, fire pumps are required to be on emergency power via 3.2.5.18. - NFPA 20 requires emergency power for fire pumps (Section 5.5) 5.5 Auxiliary Power. Where electric motor-driven fire pump(s) are used, a reliable emergency source of power in accordance with Section 9.6 or a back-up fire pump in accordance with Section 9.3 shall be provided for the fire pump installation. We would support this if it were modified if it were firefighting/fire suppression.
1090	1	Fire blocks in Combustible Construction
1095	1	Combustible Refuse Storage
1097	1	Measurement of the Sound Pressure Level of Fire Alarm Signals
1125	1	Fire Alarm and Detection Systems
1126	1	Minimum height of door released hardware
1127	1	Other — Use and Egress
1130	1	Floor and stairwell identification on both sides of stairwell doors
1144	1	Updating of Reference Standards
393	1	Determination of area of glazed openings for houses
824	1	Determination of area of glazed openings for houses
1047	4	see comments as per 1024
1048	4	see comments as per 1024
1049	4	see comments as per 1024

Change #	Support Level (see note)	Comments
1064	4	Combustible Construction - Permitted Occupancies – This is confusing and no clear explanation provided for this change.

## Summary of CAFC Comments to the Building and Fire Code Review

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997	1	Inspection, Testing and Maintenance Requirements for Residential Fire Warning Systems
1028	4	EMTC- Damage to Encapsulation Materials. We do not support introduction of EMTC into the code. It is unrealistic to ask an owner to inspect this.
1054	3	Additional Requirements for Residential and Business and Personal Service Occupancies. We do not support the introduction of EMTC. 5.6.3.4 is supported.
1059	4	Definition - Encapsulated Mass Timber - CAFC does not support the introduction of the definition "encapsulated mass timber". This introduction implies a separate category of construction material that in our opinion is still combustible or mass timber. The RBQ guide "Mass timber buildings of up to 12 storeys" does not include this definition. It is believed that insufficient research has been presented publicly and there is little or no experience in North America to support the introduction of this new category other than within the definition of combustible construction.
1074	1	Defined Terms - Agricultural Buildings
1075	1	Additional Fire Protection Equipment
1076	1	Rooms or Enclosed Spaces
1077	1	Inspection, Testing and Maintenance of Hydrants
1078	4	EMTC - Clearances Between Chimneys, Flue Pipes or Appliances and Combustible Construction. We support the considerations regarding chimney safety, but we do not support the introduction of EMTC.
1079	4	EMTC - Chimneys, Flues and Flue Pipes. We support the considerations regarding chimney safety, but we do not support the introduction of EMTC.
1088	3	Damage to Fire-Rated Elements. This needs an additional definition for fire protection materials.
1108	1	Hose Stations and Portable Extinguishers
1109	1	Flammable and Combustible Liquids
1132	1	Other — Use and Egress