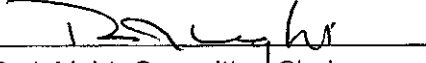


**BC BUILDING CODE INTERPRETATION COMMITTEE**  
**AIBC, APEGBC, BOABC, POABC**

**File No: 06-0014B**

**INTERPRETATION**

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Interpretation Date:	April 15, 2008
Building Code Edition:	BC Building Code 2006
Subject:	Continuity of equivalent vertical fire separation through floor assembly horizontal service / concealed spaces
Keywords:	Floor assembly, horizontal service / concealed space, equivalent fire separation continuity, concealed space fire block, combustible construction
Building Code Reference(s):	3.1.8.3, 3.1.11.5, 3.1.11.7
<b>Questions:</b> Given for example, a 4 storey wood framed building (Part 3) with multiple residential suites served by a public corridor, horizontal concealed spaces (containing building services) are formed within the fire rated floor assemblies. The floor assemblies typically have a 1h fire resistance rating based on ULC listed assemblies. <ol style="list-style-type: none"><li>1. Must the floor area vertical fire separations extend through the floor assembly concealed spaces continuously upward to the underside of the floor sheathing, to create a smoke tight joint?</li><li>2. Is it acceptable to use fire block materials or systems referenced in Articles 3.1.11.5 and 3.1.11.7, within the floor assembly horizontal concealed space and in the plane of the vertical fire separation below, as an alternative to vertical fire separations, in order to achieve the required vertical fire separation continuity?</li><li>3. What is the basis for achieving an 'equivalent' vertical fire separation using 38mm thick wood blocking, plywood or engineered wood products within the floor assembly horizontal concealed space, in the plane of the vertical fire separation (without using fire rated gypsum board assemblies to continue the vertical fire separation within the horizontal concealed space)?</li></ol>	
<b>Interpretation:</b> <ol style="list-style-type: none"><li>1. Yes. Sentence 3.1.8.3.(1) indicates that if a <i>horizontal service space</i> or other concealed space spans over a vertical fire separation, an 'equivalent' vertical fire separation must be provided within such a concealed space to divide the space, along the line of the fire separation. The Building Code defines <i>horizontal service space</i> as "a space such as an attic, duct, ceiling, roof</li></ol>  R. J. Light, Committee Chair	
<small>The views expressed are the consensus of the joint committee of AIBC, APEGBC, BOABC, and POABC, which form the BC Building Code Interpretation Committee. The purpose of the committee is to encourage uniform province wide interpretation of the BC Building Code. These views should not be considered as the official interpretation of legislated requirements based on the BC Building Code, as final responsibility for an interpretation rests with the local <i>Authority Having Jurisdiction</i>. The views of the joint committee should not be construed as legal advice.</small>	

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or crawl space oriented essentially in a horizontal plane, concealed and generally inaccessible, through which *building* service facilities such as pipes, ducts and wiring may pass." This often occurs where a false ceiling for example, is dropped below a structural floor assembly in order to accommodate building services. Fire rated floor assembly cavities are also often used to contain various building services, in which case it becomes a horizontal service space.

Clause 3.1.8.3.(2)(a) further indicates that this 'equivalent' fire separation within the concealed space must terminate at smoke tight joints where it abuts an assembly. The respective intent statements are "To limit the probability that fire will spread from one fire compartment to another fire compartment through concealed spaces located above a vertical fire separation, which could lead to harm to persons" and "To limit the probability that smoke will spread from one fire compartment to another fire compartment through gaps where the fire separation abuts other assemblies, which could lead to harm to persons".

Some methods of achieving the 'equivalent' vertical fire separation within the horizontal service space are discussed further on below in the answer to question 3.

Possible exceptions to the requirement for extending the equivalent vertical fire separation vertically within the horizontal service space are as follows:

- Sentence 3.6.4.2.(2) and its related Appendix A commentary indicates it is not required if a 1h membrane derived rating is specifically used for the ceiling independently of floor assemblies, such as based on Appendix D Table D-2.3.12. However many ULC listed floor assemblies typically used cannot provide the required 1h fire resistance rating for the ceiling membrane independently.
- If the full width of the fire separation is fire blocked and the cavity is not used for the passage of building services, there would actually be no horizontal service space present, as contemplated under Sentence 3.1.8.3.(1). However it is often found necessary to run electrical wiring or piping through this width of space in wood frame construction, thereby creating a horizontal service space.

2. No.

Not necessarily. All the fire blocking materials and systems referenced in Article 3.1.11.7 are specifically intended for compartment fire blocking under Subsection 3.1.11., and are designed to satisfy the 15 minutes remain-in-place criterion in Sentence 3.1.11.7.(1). Some of these assemblies, combinations of assemblies or thicknesses of assemblies may not necessarily be sufficient to satisfy the fire resistance and / or fire separation integrity required under Subsection 3.1.8. Refer also to answer to question 3 further on.

3. The basis for materials used to achieve the 'equivalent' fire separation required by Sentence 3.1.8.3.(1) is implied in Sentence 3.1.8.1.(2) which indicates "Openings in a fire separation shall be protected with.....other means....". Sentence 3.1.8.3.(4) and its related Appendix A commentary further indicates that "The continuity of a fire separation where it abuts against another fire separation, a floor, a ceiling or an exterior wall assembly is maintained by filling



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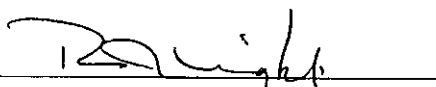
all openings at the juncture of the assemblies with a material that will ensure the integrity of the fire separation at that location." There is no specific detailing information in the current Code for the floor assembly example under discussion, however several technical publications provide guidance on achieving the equivalent fire separation integrity within the horizontal concealed space. This includes the June 2007 NRCC publication *Best Practice Guide on Fire Stops and Fire Blocks and their Impact on Sound Transmission*, which is based on the upcoming NBCC code change addressing fire blocks in concealed spaces. A complete copy of the NRCC publication *Best Practice Guide on Fire Stops and Fire Blocks and their Impact on Sound Transmission* is available for download at <http://irc.nrcnrc.gc.ca/pubs/fulltext/nrcc49677/nrcc49677.pdf>. Various wood products research organizations such as APA The Engineered Wood Association, as well as engineered wood products manufacturers have also performed fire tests of rim joists within floor cavities above vertical fire separations. Guidance is also provided in the Canadian Wood Council's *Fire Safety Design in Buildings* (see attached sample detail).

The attached sample detail illustrates 2 sets of double solid blocking to achieve the required equivalent fire separation within the floor assembly. This could be used at fire separations between multi-level suites where the floor assembly may not require a fire resistance rating, or where the floor assembly finish membrane rating is insufficient to exempt the requirement to provide the equivalent vertical fire separation within the horizontal service space (floor assembly cavity). This would also be a suitable detail where the wood structure is parallel to the fire separation.

Based on extrapolation of this detail, other design and installation details could be devised to address situations where the support structural members are perpendicular to the plane of the vertical fire separation, and where the sample detail would not be feasible due to interruption by structural members. For example, if 2 rows of single solid blocking is provided because of the structural members running perpendicular to the vertical fire separation, the ceiling should be provided with an adequate fire resistance rating in lieu of the 2 sets of double solid blocking shown in the sample detail. This can also address separation of single level suites on top of each other.

The attached detail is only one example; other details can be derived depending on the construction systems and materials chosen.

Note that this interpretation addresses only fire resistance and fire separation issues. There are also other issues such as relating to durability / maintenance, security, continuity of acoustic barrier and environmental separation that have to be considered in addressing the continuity of the vertical demising barrier within a floor assembly horizontal service space.

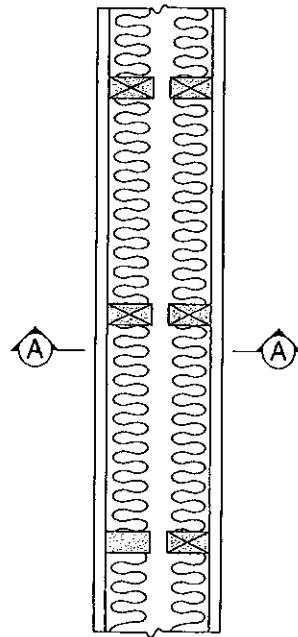
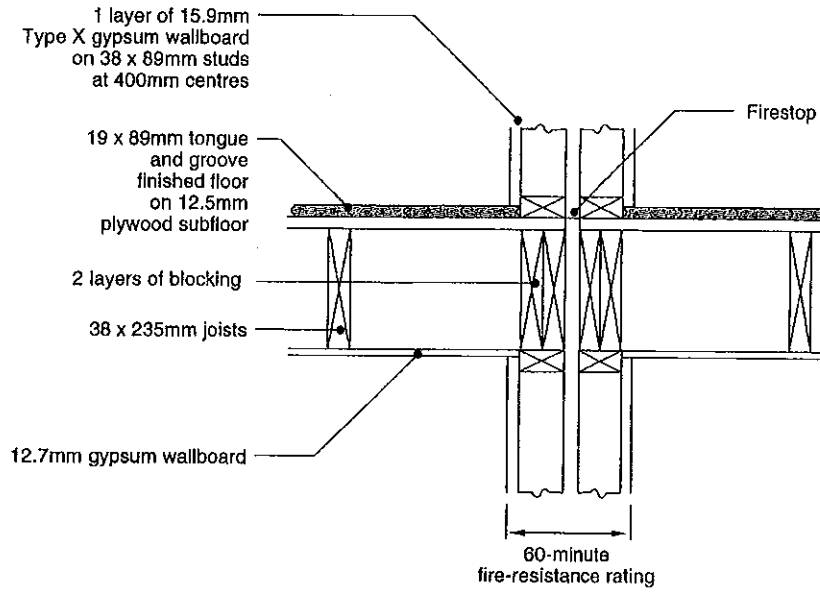


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**FIGURE 5.18**  
**Continuity of fire separations**



Note: The two layers of blocking are required when joists are parallel perpendicular to the wall.