

memorandum

DATE: September 23, 2014

TO: Board of Building and Fire Code Appeals

FROM: Tom Sloan, Secretary to the Board
By Lukas Quach, Senior Plan Check Engineer
Mario Osuna, Senior Plan Check Engineer

SUBJECT: **Appeal to the Decision of the Assistant Community Development Director/Building Official Regarding Suitability of Alternative Methods and Types of Construction Required by the Building Code and Interpretations of the Building Code for use of Intumescent Paint**

PROJECT: Hilton Garden Inn
401 S. San Fernando Blvd
Burbank, CA 91502
Applicant: Palmetto Hospitality of Burbank, LLC
Permit: BS1315034

PURPOSE

The purpose of this report is to present an appeal application to the Board of Building and Fire Code Appeals from Palmetto Hospitality of Burbank, LLC, owner of the above referenced Project, to use intumescent paint as an equivalent means of providing fire retardant treatment in lieu of the required pressure process treatment, or manufactured process, that is integral to the wood framing members as stated in the California Building Code (CBC).

The project was submitted to Plan Check November 11, 2013, under the 2010 CBC. The appeal is submitted under the provisions of CBC Section 104.11 permitting alternative materials and methods of construction, and Section 113, describing the authority of the Board of Building and Fire Code Appeals.

Section 104.11 states that “the provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved.” An alternative may be approved when the material and method proposed offer the equivalent of that prescribed in the CBC in quality, strength, effectiveness, fire resistance, durability and safety.

Section 113.2 grants authority to the Board to approve “an equally good or better form of construction,” when it is proposed, without waiving the requirements of the CBC.

BACKGROUND

The proposed construction type of the hotel structure is Type IIIA construction. Type IIIA construction requires 2-hour fire-resistance rated exterior walls, as specified in CBC Table 601. Section 602.3 further specifies the construction materials permitted in Type III construction. The section states that “Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. Fire-retardant-treated wood framing complying with Section 2303.2 shall be permitted within the exterior wall assemblies of a 2-hour rating or less.” The fire-retardant-treated wood framing is permitted by the code as an alternative to noncombustible materials in Type III construction.

Section 2302.2 defines fire-retardant-treated wood as “any wood product which, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, *Tests for Surface Burning Characteristics of Building Materials*, a listed Flame Spread Index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 10 1/2 feet beyond the centerline of the burners at any time during the test.” The Flame Spread Index calculated is a relative indication of the flammability of the test material with respect to a red oak standard, with a lower number representing a better performance.

ISSUE

The exterior walls of the project will be constructed of fire-retardant framing per the above referenced CBC provisions. However, some proposed framing members within the exterior walls include pre-manufactured laminated wood products such as glu-laminated beams, parallam beams, laminated veneer lumber (LVLs), and parallel strand lumber (PSLs). These particular types of framing members cannot be easily fire treated using the pressure treated method or treated as an integral part of the manufacturing process as prescribed in Section 2303.2.2.

APPLICANT PROPOSED ALTERNATIVE

The Applicant is proposing the use of intumescent paint as an equivalent alternative to the pressure-treated process prescribed in the code. Intumescent paint is a substance that swells as a result of heat exposure. This swelling increases the volume and decreases the density restricting the transfer of heat to provide fire protection. The Applicant’s proposal and justification are included in staff report Exhibit 2, which is further broken down into Exhibit A and product data. The proposed application of the topical treatment of the intumescent paint would be as follows:

- Apply 2 coats of Flame Stop IM, intumescent paint, a topical (surface applied) product to laminated wood products to achieve the fire protection required. Flame Stop IM does not alter the structural integrity of the laminated wood lumber and after application achieves a 30-minute rating which is considered equivalent to fire-retardant lumber.
- Installation of this type of fire-retardant treatment will be monitored and tested by a certified testing company. The Applicant's proposed inspection service protocols are included in Exhibit A.

APPLICANT JUSTIFICATION

Section 602.3 of the 2010 CBC states Type III construction is that type "in which the exterior walls are of noncombustible materials and the interior of the building elements are of any material permitted by this code."

Flame Stop IM, intumescent paint, is a field-applied, 30-minute-rated retardant that achieves a flame spread of 0 and a Smoke Developed coefficient of 110 with 2 coats, per ASTM E84. As such it meets the code definition of non-combustible. It does not alter the structural integrity of laminated wood members as it is surface applied. This meets the intent of the code requirement. See Exhibit A.

STAFF ANALYSIS

The 2010 CBC provides two options to comply with the fire-resistive requirements for exterior walls for Type IIIA construction: A) Section 602.3 for Type IIIA construction requires the exterior walls to be constructed of noncombustible material; or B) Section 602.3 provides an allowance for installing fire-retardant-treated wood framing complying with Section 2303.2 to be used in exterior wall assemblies of 2-hour rating or less as a permitted alternative to noncombustible material.

A. Noncombustible Materials

Noncombustible material, as defined in Chapter 2 of the CBC, is a "material which, in the form in which it is used, is either one of the following:

1. Material of which no part will ignite and burn when subject to fire. Any material passing ASTM E136 (*Standard Test for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees*) shall be considered noncombustible.
2. Material having a structural base of noncombustible material as defined in Item 1 above, with a surfacing material not over 1/8 inch thick which has a flame-spread index of 50 or less."

The code definition also emphasizes that no material shall be classified as noncombustible which is subject to increase in combustibility or flame spread index, beyond the limits established in the code, through the effects of age, moisture, or other atmospheric

condition.

Intumescent coatings are strongly hygroscopic, which causes the coated surfaces to be very sensitive to humidity. This can easily result in the coating breaking and dropping away, leaving the wood surface unprotected. Because of this susceptibility to atmospheric conditions, considering the vulnerability of the exterior wall to possible moisture penetration, lumber treated with intumescent paint does not meet the definition of noncombustible in the CBC. Additionally, there is no documentation that the intumescent coating applied to combustible framing members has passed the ASTM E136 testing. Meeting the requirements of ASTM E84 or providing an acceptable flame spread rating do not, alone, meet the code definition of noncombustible.

B. Fire-Retardant Treated Wood

Section 2303.2 defines fire-retardant-treated wood as any wood product that is impregnated with chemicals by a pressure process, or other means during manufacture, and has a listed Flame Spread Index of 25 or less and shows no evidence of significant progressive combustion when the test is continued for an additional 20-minute period per ASTM E84 or UL 723.

Intumescent paint, according to the supporting test data, while meeting the flame spread requirement, does not meet the standards developed for the impregnation process. The code is specific in defining the pressure process during manufacture to ensure the quality of the fire protection. During the impregnation process, the air is removed from the wood cavities to create space for the fire retardant solution, which is then forced into the wood under high pressure for a deeper profile of fire retardation throughout the wood member. Intumescent coatings are surface applications, typically applied through painting, spraying, rolling, or dipping into a solution of the fire-retardant material. The associated field re-application and repair requirements due to surface damage during installation, and the potential inability to identify or correct some surface damage after the member is installed may also result in inadequate, and incomplete, fire-resistance of the framing member.

The properties of intumescent paints affect their application. An intumescent coating is intended to expand to many times its original thickness, as much as one-half inch, to provide an insulating foam-like coating, or char, which protects the structural member from exposure to fire. While the typical intumescent coating installation is on exposed structural members which allows the coating to expand, embedding a coated beam within a wall must also provide space for the char to expand in order to achieve the required results. Because the structural member is bearing on other framing, and because framing is bearing on the structural member, the ability for the coating to expand and perform as intended is restricted or eliminated.

Intumescent coatings are intended to perform as a protective barrier between a fire and the structural member, much the same as encasing a beam in gypsum wallboard. The coating is not intended to meet the requirements of a non-combustible material or be a substitute for pressure-treated material. Because the code only allows the installation of pressure-treated material in lieu of non-combustible material within the 2-hour wall assembly, and

does not provide any allowance for the installation of combustible material if encased in a barrier, the proposed substitution is beyond the intended limitations provided by the CBC.

RECOMMENDATION

The proposed intumescent coating does not comply with both the definition and requirements of noncombustible materials, or both the definition and requirements of fire-retardant treated wood, as defined in the CBC. In staff's interpretation, the proposed alternatives do not meet the intent of the code. Building Division and Fire Department staff recommend the Board not approve the Alternative Materials and Method Request for the use of intumescent paint as an equivalent means of providing fire retardant treatment in lieu of the required pressure process treatment, or manufactured process, that is integral to the wood framing members as stated in the CBC.

EXHIBIT 1: Appeal application

EXHIBIT 2: Applicant's proposal and justification

Exhibit A: Inspection service protocols: Intumescent paint
Product data