15-DAY COMMENT PERIOD

MODIFICATIONS TO EXPRESS TERMS

FOR

PROPOSED BUILDING STANDARDS

OF THE

OFFICE OF THE STATE FIRE MARSHAL

REGARDING THE 2010 CALIFORNIA FIRE CODE

CALIFORNIA CODE OF REGULATIONS TITLE 24, PART 9

2010 ANNUAL RULEMAKING CYCLE

Legend for Express Terms:

1. **Amended, adopted or repealed language for the 15-day public comment:** Amended, adopted, or repealed language will appear in double underline and ~~double strikeout~~.

2. **California amendments that remove IFC language**: Shown as ~~double strikeout~~.

3. **Notation**: Authority and Reference citations are provided at the end of each chapter or Section.

PROPOSED MODIFICATIONS AND RATIONALE:

910.1 General. Where required by this code or otherwise installed, smoke and heat vents or mechanical smoke exhaust systems and draft curtains shall conform to the requirements of this section.

Exceptions:

1. Frozen food warehouses used solely for storage of Class I and II commodities where protected by an approved automatic sprinkler system.
2. *Automatic smoke and heat vents or mechanical smoke exhaust systems are not required within areas of buildings equipped with early suppression fast-response (ESFR) sprinklers unless any of the following conditions exist:*

   2.1. The building is a state institution,
   2.2. The building is a state-owned or state-occupied building,
   2.3. The building is any of the applications listed in Section 1.11 regulated by the Office of the State Fire Marshal, or
   2.4. The area of a Group F-1 or S-1 occupancy protected with the early suppression fast-response (ESFR) sprinklers has an exit access travel distance of more than 250 feet (76 200 mm).

910.2 Where required. Smoke and heat vents *or mechanical smoke exhaust systems* shall be installed in the roofs of one-story buildings or portions thereof occupied for the uses set forth in Sections 910.2.1 and 910.2.2.

910.4 Mechanical smoke exhaust. ~~Where approved by the fire code official, e~~*E*ngineered mechanical smoke exhaust *systems* shall be an acceptable alternative to smoke and heat vents.

910.4.1 Location. Exhaust fans shall be uniformly spaced ~~within each draft curtained area~~ and the maximum distance between fans shall not be greater than 100 feet (30480 mm).

910.4.2 Size. Fans shall have a maximum individual capacity of 30,000 cfm (14.2 m^3/s). The aggregate capacity of smoke exhaust fans shall ~~be determined by the equation:~~

~~$C = A \times 300$ **(Equation 9-4)**~~

~~where:~~

~~C = Capacity of mechanical ventilation required, in cubic feet per minute (ft^3/min).~~

~~A = Area of roof vents provided in square feet (m^2) in accordance with Table 910.3.~~*provide a minimum of two complete air changes per hour based on the volume of the building or portions thereof without deduction for any commodity storage.*

Notation:

Authority: Health and Safety Code Sections 13100.1, 13108, 13143, 13143.9, 13146, 18949.2

References: Health and Safety Code Sections 13143, 18949.2

Rationale for modification:

The SFM is proposing modification as a result of comments made during the 45-day comment period. These modifications provide for an alternative to smoke and heat vents with a mechanical smoke exhaust system. The SFM agrees in part with comments made, and agrees that the inclusion of mechanical smoke exhaust systems provide a viable alternative for the fire service operations of controlling and suppressing a fire event. The ventilation rate for a mechanical smoke exhaust system is revised since the calculation method currently in the code is based on a non-sprinklered building, as confirmed in the following data. Specific rationale for including the proposed mechanical smoke exhaust system alternative and comments are included below.

RJA Group comments:

We have reviewed the proposed amendments to Chapter 9 and Chapter 10 of the 2010 California Fire Code (CFC) intended to address limitations and/or inadequacies of the adopted reference model code and SFM regulations relating to exit access travel distance and fire fighter operations in Group F-1 and S-1 occupancies. We agree that a modification is needed to allow exit access travel distances up to 400 feet in these occupancies. However, we have a number of concerns with the current proposal and wish to offer further modifications. Concerns with the current proposal are summarized as follows:

1. Allowing the increased travel distance should be based on other mitigating factors rather than smoke/heat vents. Experience and full-scale tests show that fusible link-operated vents in a sprinklered building will not likely operate. Furthermore, in the event that the vents operate either automatically or manually, the efficacy of the vents in moving cold smoke out of the building is highly questionable.

The report prepared by Aon Fire Protection Engineering and included in the "Report to the California State Fire marshal on Exit Access Travel Distance of 400 Feet," by Task Group 400, December 20, 2010, shows that a 400-foot exit access travel distance in large Group F-1 and S-1 occupancies provides a reasonable level of safety for the occupants without other special provisions.

2. For firefighting purposes, mechanical smoke exhaust should be recognized as an acceptable, if not superior, method of exhausting smoke in lieu of smoke and heat vents. The referenced standards allow the design of a mechanical system in lieu of providing smoke and heat vents. However, the current language puts this superior method of exhausting smoke at a major disadvantage of being utilized.

Furthermore, the use of smoke and heat vents with sprinkler systems, especially those employing ESFR sprinklers, is questionable and may lead to excessive damage and a risk to life safety. Allowing the use of mechanical systems gives designers an option to meet the goal of the exhausting smoke in these large buildings while not mixing the use of vents and sprinklers.

3. The mechanical smoke exhaust system only needs to replace the smoke/heat vents, therefore, the ventilation rate specified in the code is excessive. The ventilation rate included in the current edition of the CFC, 300 cfm for every square foot of vent area, is based upon calculations derived for uncontrolled fires in unsprinklered buildings. The physics are much different when compared to that associated with fires in sprinklered buildings and are not appropriate to be used.

Attached to this letter are: (1) proposed revisions to Section 910 of the CFC/CBC which address the above concerns, and (2) typical smoke production and exhaust rate calculations approved for use on actual projects in the State of California where mechanical exhaust systems have been used in lieu of smoke and heat vents. The second attachment provides the technical substantiation for the recommended exhaust rate to be used with the mechanical exhaust option.

ATTACHMENT 1 – PROPOSED REVISIONS

1. Amend Section 910.1 of the proposed revision to 2010 CFC/CBC as follows:

910.1 General. Where required by this code or otherwise installed, smoke and heat vents or mechanical smoke exhaust systems and draft curtains shall conform to the requirements of this section.

Exceptions:

1. Frozen food warehouses used solely for storage of Class I and II commodities where protected by an approved automatic sprinkler system.
2. *Automatic smoke and heat vents or mechanical smoke exhaust systems are not required within areas of buildings equipped with early suppression fast-response (ESFR) sprinklers unless any of the following conditions exist:*
   - *2.1. The building is a state institution,*
   - *2.2. The building is a state-owned or state-occupied building,*
   - *2.3. The building is any of the applications listed in Section 1.11 regulated by the Office of the State Fire Marshal, or*
   - *2.4. The area of a Group F-1 or S-1 occupancy protected with the ESFR sprinklers has an exit access travel distance of more than 250 feet (76 200 mm).*

2. Amend Section 910.2 of the 2010 CFC/CBC as follows:

910.2 Where required. Smoke and heat vents or mechanical smoke exhaust systems shall be installed in the roofs of one-story buildings or portions thereof occupied for the uses set forth in Sections 910.2.1 and 910.2.2.

3. Amend Section 910.4 of the 2010 CFC/CBC as follows:

910.4 Mechanical smoke exhaust. ~~Where *approved* by the *fire code official*, e~~Engineered mechanical smoke exhaust systems shall be an acceptable alternative to smoke and heat vents.

4. Amend Section 910.4.1 of the 2010 CFC/CBC as follows:

910.4.1 Location. Exhaust fans shall be uniformly spaced within ~~each draft-curtained area~~ and the maximum distance between fans shall not be greater than 100 feet (30480 mm).

5. Amend Section 910.4.2 of the 2010 CFC/CBC as follows:

910.4.2 Size. Fans shall have a maximum individual capacity of 30,000 cfm (14.2 m3/s). The aggregate capacity of smoke exhaust fans shall provide a minimum of ~~be determined by the equation:~~

~~C = A × 300 **(Equation 9-4)**~~

~~where:~~

~~C = Capacity of mechanical ventilation required, in cubic feet per minute (ft3/min).~~

~~A = Area of roof vents provided in square feet (m2) in accordance with Table 910.3.~~ two complete air changes per hour based on the volume of the building or portions thereof without deduction for any commodity storage.

ATTACHMENT 2 – TYPICAL SMOKE PRODUCTION AND EXHAUST RATE CALCULATION

Introduction

This paper provides an example of the calculation of the capacity of a mechanical smoke exhaust system proposed in lieu of smoke and heat vents for a hypothetical facility. This analysis is based upon an actual project completed by Schirmer (Aon Fire Protection) Engineering. The mechanical exhaust system eliminates the need to have fire fighters going on the roof or entering the building to release smoke and heat vents. In addition, the proposed mechanical smoke removal system provides an effective method of removing products of combustion without compromising the superior performance of the sprinkler system.

Mechanical Smoke Removal System Capacity Requirements

The current design criterion for mechanical smoke removal systems of 300 cfm per square foot of vent area, which first appeared in the 1985 Uniform Fire Code, is believed to have originated from the 1982 edition of NFPA 204M, *Guide for Smoke and Heat Venting*, the current edition at that time. This standard was intended to offer guidance in the design of facilities for the emergency venting of combustion products from *uncontrolled fires* in *non-sprinklered* single story buildings.

Much of the theory for the smoke venting requirements in the 1982 edition of NFPA 204M is based on the work by Dr. Gunnar Heskestad. The recommended mechanical exhaust capacity per square foot of vent area prescribed in NFPA 204M is 354 scfm per square foot for curtained compartments up to 6 feet in depth. The recommended mechanical smoke exhaust rate increases for corresponding increases in curtain depth. It is important to note that the calculations used to derive this relationship were based upon uncontrolled fires in unsprinklered buildings with the resulting temperatures and buoyancy needed to drive smoke and heat out of the vents.

The 2010 California Fire Code (CFC) and California Building Code (CBC) includes the ratio of 300 cfm per square foot of vent area in Section 910.4.2. In addition, the CFC requires that individual fans shall not exceed a capacity of 30,000 cfm and shall be uniformly spaced with not more than 100 feet between fans. For 20 foot high storage of high-hazard commodities (Group A plastics), the required ratio of smoke/heat vents to floor area is 1 square foot of vent area per 50 square feet of floor area (1:50). For the 104,279 square foot floor area of a hypothetical facility, the required smoke/heat vent area is 2,086 square feet. Applying the design of 300 cfm per square foot of venting area results in a total required exhaust capacity of 625,800 cfm, requiring a minimum of 21 exhaust fans. For this 25.5 foot high building, this ventilation rate would exceed an incredible *14 air changes* per hour.

As was previously discussed, the calculation of the mechanical ventilation rate prescribed by the CFC is for the removal of combustion products from uncontrolled fires in large industrial and storage facilities. This design has merit when applied to such cases. However, Section 910 is applicable to storage areas of facilities protected with automatic sprinklers. The proposed smoke removal system will be used for overhaul of the building after the fire has been suppressed, rather than removal of combustion products from an uncontrolled fire. As such, the smoke and heat removal requirements of 300 cfm per square foot of venting area are considered to be inappropriate for the intended application to facilities which are sprinklered.

Design Justification

The conditions that could occur within a building during a fire situation can be simulated by conducting appropriate fire testing. A series of nine large scale fire tests were conducted at the Underwriter's Laboratories Fire Test Center in Northbrook, Illinois, between June and August, 1998. The purpose of these tests was to investigate the performance of the Grinnell Corporation's Model ESFR-25 pendent sprinkler which has a nominal discharge coefficient (K factor) of 25. Test No. 6 consisted of Group A unexpanded plastic stored to a maximum height of 20 feet, protected with ESFR K-25 sprinklers with a design pressure of 15 psi.

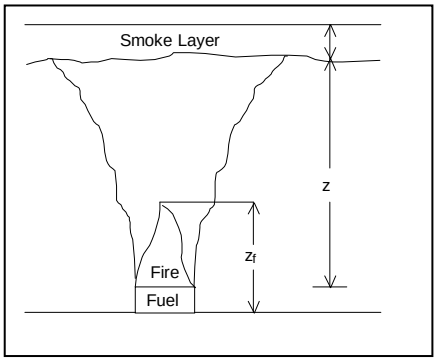
Only one ESFR sprinkler was needed to suppress the fire. The gas temperature above the ignition source peaked at 203ºF and returned to ambient temperature approximately two minutes after operation of the sprinkler. The peak steel temperature was measured at 102ºF. Steel temperatures returned to ambient levels approximately fifteen minutes after operation of the sprinklers. These steel temperatures are well below the critical temperature of 1,000ºF.

Smoke Production Calculations

The mass rate of smoke production can be estimated as the mass rate of air entrained along the height of the smoke plume up to the lower boundary of the smoke layer. Correlations have been developed to calculate the mass rate of smoke production based upon the heat release rate of the fire and height of the fuel surface to the lower boundary of the smoke layer[1]. Utilizing these correlations, the amount of smoke produced by the selected fire scenario will be calculated. An axisymmetric plume was assumed as a worst case situation. The amount of smoke produced will be compared to the capacity of the smoke removal system to determine if the design objective has been met.

Work by Heskestad (1989)[2] has developed the following equation for the calculation of smoke production:

$$\dot{m} = 0.022\,(Ec)^{1/3}\ z^{5/3} + 0.0042\,(Ec)$$



WHERE:

$\dot{m}$ = mass rate of smoke production, lb/sec
Ec = convection heat release rate of the fire, btu/sec
Z = height from top of the fuel surface to the bottom of the smoke layer, feet

The above equation is appropriate for clear heights, *z*, that are greater than the limiting height, *zf*, where $zf = 0.533\ Ec^{2/5}$. A discussion of the input data used in the calculation follows.

Heat Release Rate

The type and form of the commodity are the most influential factors in determining the heat release rate of a storage fire[3]. The heat content of the material, the burning rate, the exposed surface area, and how the commodity reacts to the application of water determine the protection requirements. Rack storage fires are generally more severe than solid-piled storage because of better air access and stability of the burning product. Storage height is a key determinant of heat release rate. As more material is exposed vertically, the burning rate increases with increasing storage height.

For this analysis, assume a storage commodity consisting of a mixture of products, ranging from Class I commodities to Group A plastic. As a conservative approach, Factory Mutual Research Corporation (FMRC) Standard Plastic Commodity (polystyrene cups in compartmented cartons) was selected. This commodity is recognized to represent the most severe fire hazard of the high density plastics tested[4].

Heat release rate data for unsprinklered rack storage fires are almost non-existent due to the obvious hazard of conducting such tests. However, convective heat release data were documented for 20 foot rack storage of FMRC Standard Plastic Commodity by Yu[5]. The storage array used to develop the data consisted of two-pallet loads wide and two-pallet loads deep of FMRC Standard Plastic Commodity in rack storage array. Test Nos. 5 and 6 utilized four tiers of storage stacked in such an array. Total storage height was approximately 20 feet. Heat release data from Test No. 6 was selected as the data is somewhat higher. This testing data is considered a conservative representation of the predicted fire scenario as the amount of product consumed in the ESFR fire testing was much less, the storage array is similar, and the commodity utilized is the same.

The convective heat release rate reaches 5,000 kw (4,742 btu/sec) at approximately one minute, six seconds, which is very conservative since the first ESFR sprinkler activated at 50 seconds. The convective heat release rate will then decrease as fire suppression is achieved. Suppression is achieved not later than two minutes as shown by air temperatures above ignition.

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[1] Design of Smoke Management Systems, John Klote and James A. Milke
[2] Design of Smoke Management Systems, John Klote and James A. Milke.
[3] Factory Mutual Loss Prevention Data Sheet 8-9R *"Storage of Class I, 2, 3, ,4 and Plastic Commodities"*.
[4] An Engineering Approach to Industrial Fire Protection, Robert Zalosh, January 1994.
[5] Yu, H-Z, *The Transient Ceiling Flows of Growing Rack Storage Fires,"* FMRC JION1JO.RA(3).

For calculation purposes, the convective heat release rate is assumed to be a constant 4,742 btu/sec from ignition to two minutes after ignition. This is very conservative as the convective heat release rate increases to a peak of 4,742 btu/sec at one minute, and then rapidly decreases until fire suppression is achieved at two minutes. The convective heat release rate is approximately 70 percent of the total heat release, thus it is noted the total heat release rate is 7,150 kw.

Heat release rate data for the rack storage of aerosols, flammable liquids, and combustible liquids are non-existent. The use of a constant convective heat release rate for Group A plastic is very conservative and the best available data. The axisymmetric plume equation is primarily dependent on the variable clear height. Moderate increases in the convective heat release rate will not significantly affect the smoke production rate or the overall results.

Clear Height

To determine the clear height (z), the height of the top of the fuel surface and the depth of the smoke layer must be determined. The height of the proposed storage array is 20 feet. As shown in the fire test data, the fire actually consumed product to an elevation of 5 feet. As a conservative approach (the greater the clear height the greater the smoke production rate), the top of the fuel surface will be considered at the floor.

The depth of the upper layer is dependent upon the ceiling to fire source height. The upper layer thickness can be estimated as 5 to12 percent of the ceiling to fire source height[6]. An upper layer thickness of 3 feet (25.5 foot ceiling height - 0 foot fire source height x 12 percent) was utilized.

Calculation Results

As shown in the attached calculation (Appendix A), a maximum of 68,960 cfm of smoke will be generated by the design fire. Based upon an empty building volume of 2.659 million cubic feet, the exhaust rate required to achieve two air changes per hour is 88,637 cfm. Because no single fan can exceed 30,000 cfm and fans cannot be spaced more than 100 feet apart, this project required five fans, each exhausting 25,570 cfm for a total of 127,850 cfm. This exceeds the minimum two air changes per hour by more than 40 percent. Even at the minimum required rate of two air changes per hour, the calculation results show that the mechanical smoke removal system proposed will be capable of removing the smoke from the building faster than it will be generated, ultimately removing smoke from the building once the fire is extinguished. A degree of conservatism is added to this by the calculation using an empty building volume.

Discussion

The design goal of the smoke removal system is to remove smoke from the building without compromising the performance of the sprinkler system and to facilitate fire fighting operations. An ESFR sprinkler system will activate very quickly, at approximately one minute, and suppress the fire, thereby minimizing smoke production. The smoke that is produced will be exhausted from the building by fire department activation of the smoke removal system, thus making it unnecessary for fire department personnel to access the roof. At the time the fire department begins manual overhaul, the visibility should be improved, facilitating operations. A superior level of performance is likely when compared to that expected from the performance of the building having heat-activated smoke and heat vents which rely upon the natural buoyancy of cold smoke. The design goal has therefore been achieved.

APPENDIX A – SMOKE PRODUCTION CALCULATIONS

$$\dot{m} = 0.022\,(Ec)^{1/3}\ z^{5/3} + 0.0042\,(Ec)$$ [7]

$$z = (25.5\ ft - 3\ ft) - 0\ ft = 22.5\ ft$$

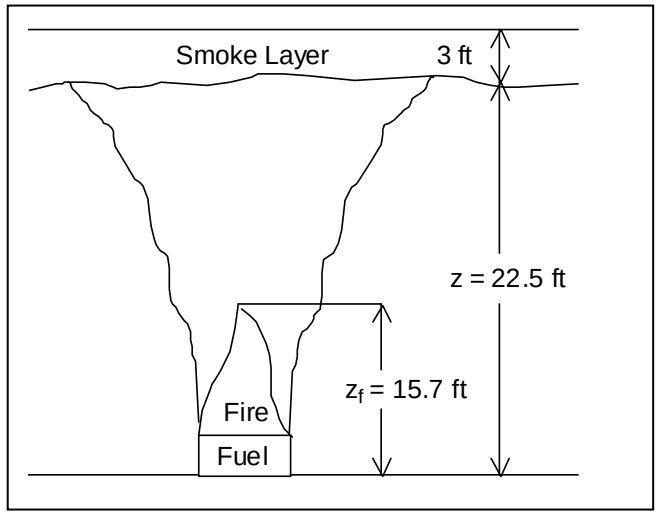
$$Ec = 5000\ \text{KW x}\ \frac{56.90\ \text{BTU/min}}{1\ \text{KW}}\ x\ \frac{1\ \text{min}}{60\ \text{sec}}$$

$$= 4742\ BTU/\text{sec}$$

$$zf = 0.533\,(4742\ BTU/\text{sec})^{2/5} = 15.7\ ft$$

$$z \rangle\ zf, \text{therefore the equation is valid}$$

$$\dot{m} = 0.022\,(4742\ BTU/\text{sec})^{1/3}\ 22.5\ ft^{5/3} + 0.0042\,(4742\ BTU/\text{sec})$$
$$= 86.2\ lb/\text{sec}$$



$$Q = C\,\frac{\dot{m}}{p}$$ [8]

$$Q = volumetric\ smoke\ production\ rate, cfm$$

$$C = 60\ \ (constant)$$

$$p = density\ of\ plume\ gases, lb/ft^3 = 0.075\ lb/ft^3\ (at\ 68^\circ F\ and\ one\ atmosphere)$$

$$Q = 60\ \frac{86.2\ lb/\text{sec}}{0.075\ lb/\ ft^3} = 68{,}960\ cfm$$

Approximate Building Dimensions:
104,279 ft^2 x 25.5 ft high
Building volume = 2.659 million ft^3

[7] Design of Smoke Management Systems, John Klote and James A. Milke, Equation 10.8
[8] Design of Smoke Management Systems, John Klote and James A. Milke, Equation 10.12

1011.3 Tactile exit signage. *Tactile exit signs shall be required at the following locations:*

1. *Each grade-level exterior exit door that is required to comply with Section 1011.1, shall be identified by a tactile exit sign with the word, "EXIT."*
2. *Each exit door that is required to comply with Section 1011.1, and that leads directly to a grade-level exterior exit by means of a stairway or ramp shall be identified by a tactile exit sign with the following words as appropriate:*

    2.1. "EXIT STAIR DOWN"
    2.2. "EXIT RAMP DOWN"
    2.3. "EXIT STAIR UP"
    2.4. "EXIT RAMP UP"

    ~~*Where the exit door leads both to a ramp and a stairway, the tactile sign shall read "EXIT RAMP/STAIR DOWN" or "EXIT RAMP/STAIR UP."*~~

3. *Each exit door that is required to comply with Section 1011.1, and that leads directly to a grade-level exterior exit by means of an exit enclosure or an exit passageway shall be identified by a tactile exit sign with the words, "EXIT ROUTE."*
4. *Each exit access door from an interior room or area to a corridor or hallway that is required to comply with Section 1011.1, shall be identified by a tactile exit sign with the words "EXIT ROUTE."*
5. *Each exit door through a horizontal exit that is required to comply with Section 1011.1, shall be identified by a sign with the words,* ~~*"EXIT ROUTE."*~~*"TO EXIT."*

For the purposes of this Section "tactile exit signs" shall comply with Section 1117B.5.1 Item 1 of the California Building Code.

Notation:
Authority: Health and Safety Code Sections 1250, 1569.72, 1569.78, 1568.02, 1502, 1597.44, 1597.65, 13108, 13143, 13143.9, 13146, 13210, 13211, 17921, 18949.2
References: Health and Safety Code Sections 13143, 13211, 18949.2

Rationale for modification:
The SFM is removing proposed modifications that would have made a significant change to the current 2010 CBC provisions for further study. The additional text to add combined signage of "*EXIT RAMP/STAIR DOWN" or "EXIT RAMP/STAIR UP"* will be readdressed in a future rulemaking cycle. Additionally the SFM is reverting the signage to that of *"TO EXIT"* in item 5 to maintain the current code provisions, this item will also be readdressed in a future rulemaking cycle which is This action is in part as a result of comments made during the March 24, 2011 CBSC Code Advisory Committee which recommended further study. Additionally the SFM received comments during the initial 45-day comment period requesting a similar action and agrees in part with the comments. (See below comments from the CALBO State Code Committee.)

CALBO State Code Committee comments:
As with the Building Standards Commission Code Advisory Committee, we recommend the proposed amendment be studied further. The SFM reason statement suggests that this is simply an editorial modification. While changes to visually sighted signs may be considered editorial, similar changes to tactile signage have potentially substantive impact. We therefore, believe this proposal be both reviewed and if deemed appropriate, brought forward by DSA-AC. If not correlated with DSA-AC, the proposed language may create confusion and potentially, a safety hazard for a non- or partially-sighted person. In order to ensure consistency with state accessibility standards, we therefore, recommend that this and similar accessibility related code amendments be brought forward by DSA.

4603.7.2 Interconnection. Where more than one smoke alarm is required to be installed within an individual *dwelling* or *sleeping unit,* the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.

Exceptions:

1. Interconnection is not required in buildings that are not undergoing *alterations*, repairs or construction of any kind.
2. Smoke alarms in existing areas are not required to be interconnected where *alterations* or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or *basement* available which could provide access for interconnection without the removal of interior finishes.
3. *~~Work involving~~Smoke alarms are not required to be interconnected where repairs or alterations are limited to the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck~~, are exempt from the requirements of this section~~.*
4. *Smoke alarms are not required to be interconnected when work is limited to the ~~.~~installation, alteration or repairs of plumbing or mechanical systems ~~are exempt from the requirements of this section~~or the installation, alteration or repair of electrical systems which do not result in the removal of interior wall or ceiling finishes exposing the structure.*

4603.7.3 Power source. Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exceptions:

1. Smoke alarms are permitted to be solely battery operated in existing buildings where no construction is taking place.
2. Smoke alarms are permitted to be solely battery operated in buildings that are not served from a commercial power source.
3. Smoke alarms are permitted to be solely battery operated in existing areas of buildings undergoing *alterations* or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or *basement* available which could provide access for building wiring without the removal of interior finishes.
4. *~~Work involving~~Smoke alarms are permitted to be solely battery operated where repairs or alterations are limited to the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck~~, are exempt from the requirements of this section~~.*
5. *Smoke alarms are permitted to be solely battery operated when work is limited to the ~~.~~installation, alteration or repairs of plumbing or mechanical systems ~~are exempt from the requirements of this section~~or the installation, alteration or repair of electrical systems which do not result in the removal of interior wall or ceiling finishes exposing the structure.*

Notation:

Authority: Health and Safety Code Sections 1250, 1569.72, 1569.78, 1568.02, 1502, 1597.44, 1597.45, 1597.46, 1597.54, 1597.65, 13108, 13108.5, 13114, 13143, 13143.2, 13143.6, 13146, 17921, 18949.2, Government Code Section 51189

References: Health and Safety Code Sections 13143, 17921, 18949.2, Government Code Sections 51176, 51177, 51178, 51179, Public Resources Code Sections 4201 through 4204

Rationale for modification:
The SFM is providing further modification to the above exceptions based on comments received during the 45-day comment period. The SFM agrees in keeping consistency between similar provisions. However, the SFM is not able to make all necessary revisions in this rulemaking and will work with the Department of Housing and Community in future rulemaking cycles to provide further consistency with the provisions for carbon monoxide alarms contained in the California Building and Residential Codes. (See below comments from the CALBO State Code Committee.)

CALBO State Code Committee comments:
While we believe the intent of these amendments are appropriate, we recommend the wording be consistent with the proposed HCD language in Section 315.1.3 exceptions 3 and 4.

The exceptions for smoke alarms and carbon monoxide alarms are the same and should therefore be written in the same format. We believe the proposed HCD language for section 315.1.3 exceptions 3 and 4 is more clear than that of the proposed SFM language for 314.4 exceptions 4 and 5. Ensuring this consistency is a primary function of the CBSC.

We appreciate and support the hard work of the Commission and the other State Agencies. In particular, we appreciate the ongoing effort to minimize changes to the model code documents. We respectfully request consideration of the modifications noted above.

903.3.1.1.1 Exempt locations. *In other than Group I-2, I-2.1 and I-3 occupancies*, automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an *approved* automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from any room merely because it is damp, of fire-resistance rated construction or contains electrical equipment.

1. Any room where the application of water, or flame and water, constitutes a serious life or fire hazard.
2. Any room or space where sprinklers are considered undesirable because of the nature of the contents, when *approved* by the *fire code official*.
3. ~~Elevator machine rooms and machinery spaces~~*Elevator hoistways, elevator machine rooms, elevator machinery spaces, elevator control spaces, or elevator control rooms in accordance with 3006.4.1 of the California Building Code*.
4. *Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, and associated electrical power distribution equipment, provided those spaces or areas are equipped throughout with an automatic smoke detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with Section 707 of the California Building Code or not less than 2-hour horizontal assemblies constructed in accordance with Section 712 of the California Building Code, or both.*

Chapter 35 Referenced Standards

NFPA National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02269-9101

Standard reference number	Title	Referenced in code section number
13—*10*	Installation of Sprinkler Systems *as amended**	903.3.1.1, 903.3.2, 903.3.5.1.1, 903.3.5.2, 904.11, 905.3.4, 907.7.3, 2301.1, 2304.2, Table 2306.2, 2306.9, 2307.2, 2307.2.1, 2308.2.2, 2308.2.2.1, 2308.4, 2310.1, 2501.1, 2804.1, 2806.5.7, 3404.3.3.9, Table 3404.3.6.3(7), 3404.3.7.5.1, 3404.3.8.4

**NFPA 13, Amended Sections as follows:*

8.15.5.6 Sprinklers shall be installed at the top and bottom of elevators that utilize polyurethane-coated steel belts or other similar combustible belt material.
~~*Exception: Elevator cables and belts, including counterweight cables that are limited combustible (Material).*~~

8.15.5.7 The sprinkler required at the top and bottom of the elevator hoistway by 8.15.5.6 shall not be required where permitted by Chapter 30 of the California Building Code.

72—*10* National Fire Alarm Code*, as amended** ……..…… 508.1.5, Table 901.6.1, 903.4.1, 904.3.5, 907.2, 907.2.6, 907.2.11, 907.2.13.2, 907.3, 907.4.3, 907.4.4, 907.6.2.1.2, 907.6.2.2, 907.7, 907.7.1, 907.7.2, 907.7.5, 907.8, 907.8.1, 907.8.2, 907.9, 907.9.2, 907.9.5, I101.1, J103.1.4

**NFPA 13, Amended Sections as follows:*

21.3.6 Smoke detectors shall not be installed in unsprinklered elevator hoistways unless they are installed to activate the elevator hoistway smoke relief equipment *or where required by Chapter 30 of the California Building Code.*

Notation:
Authority: Health and Safety Code Sections 1250, 1569.72, 1569.78, 1568.02, 1502, 1597.44, 1597.65, 13108, 13143, 13143.9, 13146, 13210, 13211, 17921, 18949.2
References: Health and Safety Code Sections 13143, 13211, 18949.2

Rationale for modification:
903.3.1.1.1, Chapter 47 Referenced Standards NFPA 13 - 8.15.5.6 and NFPA 72 – 21.3.6 (3006.4.1 CBC)
The SFM is proposing these amendments to allow the elimination of fire sprinklers in the elevator hoistway, elevator machine room, elevator machinery space, elevator control space, or elevator control room where all the requirements of the exception are met, including elevator machine room fire-resistive construction and separation, smoke and heat detection and approved signage. By the elimination of sprinklers in elevator hoistways and elevator machine rooms/spaces, “shunt-trip” will also not be required. The SFM and other fire authorities have allowed theses requirements as an acceptable alternate means of protection in lieu of sprinklers in elevator machine rooms on a case-by-case basis. The amendment will codify this proven alternate means of protection

Smoke detection is being required in the elevator hoistways where machinery or combustible belts are located to provide advance initiation and annunciation of fire or smoke within the hoistway. This modification to NFPA 72 Section 21.3.6 is correlated with the modifications to 3006.4.1.

These amendments have the potential to save thousands of dollars in the elevator installation and the required annual shunt-trip inspection and testing cost by eliminating from the elevator machine room; fire sprinklers and associated supply piping, shunt-trip circuit breaker, and associated electrical conduit, wiring, relays and interfaces.

Additional reference to Section 3006.4.1 is proposed for Item 3 of 903.3.1.1.1 relating to fire service access elevators and occupant evacuation elevators. These provisions further clarify current model requirements prohibiting sprinklers in elevator machines of fire service access elevators and occupant evacuation elevators to the appropriate sections to conform to IBC format and for clarification and user-friendliness. These references are necessary as the controlling provisions are located in Chapter 30. These modifications are as a result of comments received by the National Elevator Industry Inc. for which the SFM concurs. (See below comments from the National Elevator Industry Inc. for additional background.)

National Elevator Industry Inc. comments:

The National Elevator Industry Inc. (NEII) is a national trade association representing the interest of firms that install, maintain and/or manufacture elevators, escalators, moving walks and other building transportation products. NEII appreciates the opportunity to comment on the California State Fire Marshal (SFM) Express Terms for proposed Building Standards of the State Fire Marshal Regarding the 2010 California Building Code, California Code of Regulations Title 24, Part 2 2010 Annual Rulemaking cycle, dated April12, 2011.

Our review of those portions of the proposal that affect elevators has revealed a number of areas of major concern. If adopted, the proposed modifications will significantly deharmonize California's regulations with national requirements based on the ICC *International Building Code* and the ASME A17.1/CSA B44 *Safety Code for Elevators and Escalators*. This will likely result in significant delays in elevator availability and will likely not achieve the stated reason *"…to save thousands of dollars in elevator installation…"* On the contrary, the effect will likely be the opposite and will make California less competitive *vis-à-vis* other states in the US and provinces of Canada. Most importantly, the proposed changes will not enhance safety.

NEII's specific concerns and comments are as follows:

1. Proposed Sections 3001.6 and 3001.7 require that elevator cables and belts, as well as equipment within and exposed to elevator hoistways "*shall be noncombustible or limited-combustible (Material) as defined in accordance with NFPA 13*."
    (a) The requirements listed in the note (NFPA 3.3.13) are for typical building materials, not elevator system components.
    (b) There is no requirement in ASME A17.1/CSA B44 requiring equipment in hoistways other than car enclosures to have flame spread ratings.
    (c) Elements of controllers, motors, drives, rollers, isolation pads, buffer strike pads, non-metallic sheave parts, car enclosure, etc. would be affected by this rule. This will result in significant redesign and qualification testing. It will not enhance safety, and would likely cost the state and its stakeholders many thousands of dollars extra per elevator.

NEII recommends the removal of sections 3001.6 and 3001.7 and the note regarding the definition of limited combustible material in NFPA 13, Section 3.3.13.

There is an inconsistency in approach with reference to requirement 3006.4.1 *vis-à-vis* the proposed requirements 3001.6 and 3001.7. Requirement 3006.4.1 exempts machine rooms and machinery spaces from the need for permanently installed automatic sprinkler systems under certain conditions. Such conditions include a requirement for fire-rated enclosures with a rating of no less than that of the hoistway. There is no requirement for a flame spread rating on any of the equipment within the spaces covered by 3006.4.1. Conversely, the proposal would impose flame spread rating requirements for similar equipment in a fire-rated hoistway according to 3001.6 and 3001.7. No rationale has been provided for this inconsistency.

The elevator code and model building codes have traditionally treated the elevator machine, control and hoistway locations the same way. This proposal would de-harmonize those requirements in the state. Presently most new traction elevators are combining these areas within the hoistway.

NEII recommends expanding section 3006.4.1 to include all "machine rooms, machinery spaces, control rooms, control spaces *and hoistways*". This will remove the inconsistency, accomplish the state's goals as stated in the rationale, and increase safety in a cost effective manner.

Finally, an exception to NFPA 13 section 8.15.5.6 is required to not create a conflict with 3006.4.1 of the California Building Code.

As a trade association founded on the principle of providing safe building transportation for elevator riders and the general public, NEII shares the goal of the California State Fire Marshal for building codes and standards that ensure such safety. We thank the State Fire Marshal's Office for its consideration of our comments and concerns in this rulemaking cycle and look forward to future discussion on these points.