



HIGH RISE TASK FORCE

PHASE I & II FINAL REPORT AND PROPOSED CODE CHANGES

**CAL FIRE – Office of the State Fire Marshal
November 2012**



Message from the State Fire Marshal

To the High-rise Task Force Members:

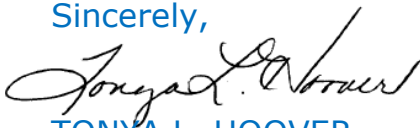
The success of CAL FIRE - Office of the State Fire Marshal (OSFM) is directly related to the dedication and commitment of individuals who are willing to share their time, energy, and talents to provide a fire safe environment to the citizens of California and enhance firefighter safety. The completion of the Phase One and Two High-rise Task Force reports have proved to be instrumental in the Office of the State Fire Marshal's adoption of the California codes. The completion of these reports are examples of such commitment by members of the fire service and private industry.

On behalf of the OSFM, I would like to personally thank each task force member for your dedication towards the development of the final reports that provided needed information to successfully adopt SFM provisions in the California Building Standards. Your assistance and commitment within the task force group is an important part of the code adoption process.

Also, I want to provide special recognition to the Task Force Chairs. Thank you to retired Division Chief Vickie Sakamoto, Rick Thornberry and Supervising Deputy State Fire Marshal John Guhl for your efforts to keep this important effort on track and on schedule.

We at the Office of the State Fire Marshal look forward to working with each of the members on future projects. Thank you for your service and be safe.

Sincerely,



TONYA L. HOOVER
State Fire Marshal

Acknowledgements

This final report was developed through a collaborative effort comprised of many hours of meetings, phone conferences, research, and analysis. Excellent cooperation was demonstrated by individuals representing many disciplines, experts, and stakeholders who participated on the High-Rise Task Force during both Phase I and Phase II. The Office of the State Fire Marshal thanks each member and their organization for their assistance with this important work.

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Preface

The California Department of Forestry and Fire Protection-Office of the California State Fire Marshal (CAL FIRE-OSFM) created a working task force in June, 2010 to evaluate current State regulations and local code amendments and determine the need to propose and/or develop new regulations or reduce existing regulations for high-rise buildings. The task group was titled "Office of the State Fire Marshal's High-Rise Task Force" and was separated into two distinct phases of task groups - Phase I and Phase II.

The High-Rise Phase I Task Force assignment was to assess the professional perspective of fire service operations personnel from Northern and Southern California and make recommendations to the Phase II Task Force for any potential amendments to the 2013 California Building and Fire Codes regarding operational concerns.

The High-Rise Phase II Task Force assignment was to review and develop any potential amendments that were recommended by the High-Rise Phase I Task Force and, as necessary, develop amendments relating to fire and life safety issues in high-rise buildings to be considered as additions to the 2013 California Building (CBC) and Fire Codes (CFC) and NFPA 13. Upon completion, the high-rise regulation package was to be submitted to the State Fire Marshal.

Both the Phase I recommendations and the Phase II potential amendments to the 2013 Building and Fire Code are combined into this one report.

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Executive Summary

CAL FIRE - Office of the State Fire Marshal (OSFM) created a stakeholder group in June, 2010 to evaluate current high-rise building regulations and to make recommendations for eliminating outdated regulations and/or potentially developing new regulations for high-rise buildings. Various jurisdictions across the state have adopted different ordinances based on their operational needs. The primary goals of the Phase I and Phase II Task Force were to examine existing high-rise firefighting strategies, develop potential high-rise regulations to assist in addressing operational needs when applicable to multiple jurisdictions, and eliminate inconsistency between local and state requirements.

The task force was comprised of fire department operations personnel, fire protection engineers, building officials, contractors, & hotel/lodging officials, an apartment association, OSFM staff, and other interested stakeholders.

Members of the OSFM Phase I High-Rise Task Force worked for six months to obtain and assess the professional perspective of fire service operations personnel from across California. These first responders to high-rise building fires were able to assess how the codes affect their operations and thus proposed input into regulatory changes necessary to enhance the effectiveness of their work. The exercise was quite successful and helped provide significant amounts of useful information to the High-Rise Phase I Task Force that resulted in a number of recommendations and potential amendments to the current code requirements. These recommendations and potential amendments are provided in Part 1 of the final report.

The Phase II OSFM High-Rise Task Force commenced where the Phase I group left off. The members worked diligently for the next four months reviewing and developing potential regulation changes pertaining to high-rise buildings, including the justifications and supportive documentation that were recommended by the High-Rise Phase I Task Force. The Phase II Task Force also considered additional proposals and/or modifications as necessary. The Task Force group developed specific code language and statements of reasons for all recommended regulations and modifications and submitted the completed regulation package to the state fire marshal for review and approval. These items are provided in Part 2 of the final report.

High-Rise Phase I Task Force Scope, Goals, Role and Objectives

Scope

The scope of Phase I of the OSFM High-Rise Task Force was to assess the professional perspective of fire service operations personnel from across California. These first responders to high-rise building fires provided insight into how building and fire codes affected their operations and were able to recommend changes that they thought should be made to enhance the effectiveness of fire ground operations for high rise buildings.

Goals

The primary goals of the OSFM High-Rise Phase I Task Force were to promote fire and life safety in high-rise buildings for not only the occupants of the building but for the fire fighting workforce and reduce the need for local ordinances and amendments. An additional goal was to work at reducing inconsistencies between local and state requirements. Lastly, the Phase I Task Force was expected to provide consensus-based recommendations of proposed regulatory changes to the OSFM that included broad stakeholder involvement

Role and Objectives

The role of the High-Rise Phase I Task Force was to analyze and discuss consensus based recommendations in an effort to standardize wherever possible local ordinances, rules and regulations regarding fire and life safety, and firefighting operations in high-rise buildings. The final objective includes proposed building code amendments for the state fire marshal's consideration.

Part 1

High-Rise Phase I Task Force

Recommendations and Potential Amendments

NOTE: Sections referenced in this document are based on the 2010 California Building Code (CBC) and California Fire Code (CFC) unless otherwise noted

After much discussion and consideration, the Phase I Task Force provided the following recommendations and potential code amendment language that would be moved forward to the Phase II Task Force for consideration.

Recommendations:

1. Require both a radio repeater system and a fire department emergency telephone system in all new high-rise buildings
2. Require independent ventilation or air-conditioning system for Fire Command Centers in all new high-rise buildings similar to CBC Section 3006.2 *Venting for Elevator Machine Rooms*.
3. Require graphic annunciators for all fire alarm system components and related equipment including smoke control in all new high-rise buildings
4. Require side-hinged swinging doors into exit enclosures based on a minimum occupant load of 50 people with no exceptions allowed for horizontal or vertical sliding or rolling doors
5. Require every exit stairway serving the upper floors of all new high-rise buildings to be provided with direct access to the roof
6. Require any locked doors leading to the roof from exit stairways to meet the same unlocking requirements as for all of the normal exit stairway access doors
7. Require all new corridors providing access to exits for Group A Assembly occupancies in high-rise buildings to have a one-hour fire-resistance rating.
8. Prohibit emergency generators from being located above the grade level of high-rise buildings.

9. Require two fire pumps for all high-rise buildings regardless of height.
10. Implement the alternate protection methodology to eliminate automatic sprinklers in elevator machine rooms developed by the OSFM dated November 30, 2010. Note: Code change completed July 2012
11. Support a proposed OSFM amendment to add new CBC Sections to 3001.5 and 3001.6 requiring elevator/counterweight cables and belts, as well as equipment within elevator hoist ways, to be noncombustible or limited-combustible with a flame spread of less than 25.
12. Support the current OSFM amendment to CBC Table 1018.1 *Corridor fire resistance rating* that requires corridors in Group R occupancies in buildings protected with automatic sprinkler systems to have a minimum 1 hour fire-resistance rating.
13. Revise the CBC to require the review and approval by the local fire official for the installation of super graphics on the exterior of high-rise buildings.

Potential Amendments:

1. Revise CBC Section 403.3.1 *Number of Sprinkler Risers and System Design* to require two risers to serve every floor in all high-rise buildings with each riser hydraulically designed to supply the entire floor independent of the other riser serving the floor for enhanced redundancy.
2. Require two fire pumps for all high-rise buildings regardless of height. Add a new CBC Section 403.3.2 "two fire pumps required". Current CBC Section 403.3.2 will need to be re-numbered to 403.3.3.
3. Revise the Exception to CBC Section 403.5.2 *Additional Exit Stairway*, so that it starts with "Where approved by the fire chief".
4. Revise CBC Section 403.5.3 *Stairway Door Operation* to require the stairway doors to also be unlocked upon activation of the fire alarm system.

5. Revise Section CBC 403.5.3 *Stairway Door Operation* to require any locked doors leading to the roof from exit stairways to meet the same unlocking requirements as for all of the normal exit stairway access doors.
6. Add a new CBC Section 705.12 *Super Graphics on Exterior Walls of High-Rise Buildings* to require the review and approval by the local fire official for the installation of super graphics on the exterior of high-rise buildings.
7. Revise CBC Section 709.1 *Fire Partitions* Item 6 so that it does not apply to tenant separation walls between adjacent office tenants in high-rise buildings based on the Building Owners and Managers Association of San Francisco (BOMA-SF) letter to the OSFM.
NOTE: See the SFM amendment for the current code cycle.
8. Revise CBC Section 907.2.13.2 *Fire Department Communication System* to require both a radio repeater system and a fire department emergency telephone system in all new high-rise buildings.
9. Revise CBC Section 909.20.2.3 *Standpipes* by adding “Unless otherwise approved by the fire code official” to the beginning of the section.
10. Revise CBC Section 911.1.5 *Required Features* to require graphic annunciators for all fire alarm system components and related equipment including smoke control in all new high-rise buildings.
11. Revise CBC Section 911.1 *General* and add a new CBC Section 911.1.6 *Independent HVAC System* to require an independent ventilation or air-conditioning system for Fire Command Centers in all new high-rise buildings.
Note: this would be similar to CBC Section 3006.2 Venting for Elevator Machine Rooms.
12. Revise CFC Section 1007.8.1 *System Requirements* by changing “or” to “and” in the first sentence and deleting “or 911” in the second sentence for all new high-rise buildings.
13. Revise CFC Section 1007.9 *Signage* to require that signage clearly explain the use of the two-way communication system by persons with disabilities during an emergency and notes the location of the elevator lobby within the building and the address of the building.

14. Revise CFC Section 1008.1.2 *Door Swing* and CFC Section 1008.4.3 *Horizontal Sliding Doors* to make it clear that only side-hinged swinging doors are allowed to be used as exits that lead into exit enclosures based on a minimum occupant load of 50 people, with no Exceptions allowed for horizontal or vertical sliding or rolling doors.
15. Revise CFC Section 1008.1.4.6 *Access-Controlled Elevator Lobby Egress Doors* to clarify that it is not intended to apply to elevator lobbies that serve as part of the means of egress through which occupants must pass to reach an exit on the opposite side of the lobby. Also, the approved smoke detection system need only consist of smoke detectors located in the elevator lobby and one located outside of the elevator lobby directly adjacent to the lobby doors. This section would require a master switch located in the Fire Control Room for the fire department to use to manually unlock all such doors located in the building.
16. Revise CFC Section 1009.13 *Stairway to Roof* to require every exit stairway serving the upper floors of all new high-rise buildings to be provided with direct access to the roof.
17. Revise CFC Table 1018.1 *Corridor Fire Resistance Rating* to require all new corridors providing access to exits for Group A Assembly occupancies in high-rise buildings to have a one hour fire-resistance rating.
18. Revise CFC Table 1018.1 *Corridor Fire Resistance Rating* by adding a new footnote "d" to the "0" in the column titled "with sprinkler system" for the occupancy line designated as "A,B,E,F,M,S,U" to read: "The corridor fire-resistance rating in Group B occupancies in high-rise buildings shall be one hour."
19. Delete reference to "Pressurized Stairways" in CFC Section 1022.9 *Smoke proof Enclosures and Pressurized Stairways* and clarify the matrix adoption table for CBC Chapter 9, Section 909.20.5 *Stair Pressurization Alternative* is not adopted by the Office of State Fire Marshal.
20. Revise Section CBC 2702.1.1 *Stationary Generators* to prohibit emergency generators from being located above the grade level of high-rise buildings.

21. Revise CBC Section 3007.4.4 *Lobby Size* to clarify that each required fire service access elevator is required to have a lobby not less than 150 square feet in area with a minimum dimension not less than eight feet. So if two required fire service access elevators share a common lobby, the lobby would be required to be not less than 300 sq ft in area with a minimum dimension of not less than eight feet.
22. Revise CFC Section 604.2.14.1.1 *Fuel Supply* to increase the fuel supply duration from 6 hours to 8 hours for standby power systems and to require that the minimum required fuel supply be “available at all times”.
23. Revise National Fire Protection Association Standard 13 (2010 edition) Section 8.15.5.6 to exempt combustible elevator belts that qualify as limited-combustible material with a flame spread of less than 25.

High-Rise Phase II Task Force **Scope, Goals, Role and Objectives**

Scope

The scope of the Phase II Task Force was to review potential regulatory changes pertaining to high-rise buildings that included the recommendations supportive documentation developed by the High-Rise Phase I Task Force. Phase II Task Force was also asked to consider additional proposals and/or modifications as necessary to achieve their goals. In addition, this Task Force was responsible for development of specific code language and statements of reasons for all recommended regulations and modifications. Upon completion, their final recommendation package was to be submitted to the State Fire Marshal for review and approval.

Goals

The primary goals of the High-Rise Phase II Task Force were to promote fire and life safety in high-rise buildings, to reduce the need for local ordinances and amendments, and reduce inconsistencies between local and state requirements. Lastly, the Task Force was expected to provide consensus-based recommendations that included broad stakeholder involvement to the State Fire Marshal.

Role and Objectives

The role of the High-Rise Phase II Task Force members included prioritizing the proposed amendments for the 2012 Triennial Code Adoption Cycle while considering further study of lower priority items. The High-Rise Phase II Task Force members reviewed, analyzed, and, where necessary, further developed and documented the rationale for each proposed amendment. The Task Force also ensured that each of the amendments met the California Building Standard's nine-point criteria. They developed specific code language and the initial *Statements of Reason* for each proposed amendment and the chairperson compiled a final report containing the Task Force's recommendations and proposed 2013 code changes for the OSFM review and SFM approval.

Part 2

High-Rise Phase II Task Force

Potential State Fire Marshal Amendments

The High-Rise Phase II Task Force deliberated for many hours in order to determine which potential amendments from the Phase I Task Force would move forward as part of the OSFM code amendments to the 2013 California Building Code (CBC), California Fire Code (CFC), and the National Fire Protection Association (NFPA) Standards amendments. These deliberations provided twelve of the twenty-three potential amendments from Phase I to be considered as part of the OSFM code change proposals. The following are the proposed code changes with the specific rationale and are provided to the state fire marshal for evaluation and consideration.

ITEM # 1

403.3.1 Number of sprinkler system risers and system design. Each sprinkler system zone servicing a floor in buildings that are more than 420 feet in *building height* shall be ~~supplied by no fewer than~~ connected to a minimum of two sprinkler risers or combination standpipe system risers located in separate shafts. Each sprinkler system shall be hydraulically designed so that when one connection is shut-down, the other connection shall be capable of supplying the sprinkler system design demand. ~~Each riser shall supply sprinklers on alternate floors. If more than two risers are provided for a zone, sprinklers on adjacent floors shall not be supplied from the same riser.~~

Phase II Rationale: Section 403.3.1 currently requires the fire sprinkler system risers serving each floor of buildings taller than 420 feet in height to be supplied from one of the standpipe system risers located in each stair shaft. Additionally, it requires that each standpipe system riser to supply sprinkler system on alternate floors. Under the current code, failure of either standpipe riser will impair the operation of the sprinkler systems on half the floors of the building.

The Phase II Task Force is proposing this amendment requiring the connection of the fire sprinkler system to a minimum of two combination standpipe system risers or sprinkler system risers on each floor. This amendment will significantly minimize the risk of sprinkler system failure on every floor in super high-rise structures.

The cost of this additional requirement is considered minimal and will provide a significant increase and enhanced level of reliability of the automatic sprinkler system.

ITEM # 2

403.3.2.1 Fire Pumps: *Redundant fire pump systems shall be required for high-rise buildings having an occupied floor more than 120 feet above the lowest level of fire department vehicle access. Each fire pump system shall be capable of automatically supplying the required demand for the automatic sprinkler and standpipe systems.*

Phase I Recommendation: Require a redundant fire pump for all high-rise buildings. The failure of a fire pump impairs the water supply to fire protection systems in a building. In case of fire pump failure in buildings greater than 120 feet in height, the public water supply may not be adequate to supply the automatic fire sprinkler and standpipe systems. A redundant fire pump increases the reliability of the system that serves fire suppression systems when one of the pumps is out of operation.

Phase II Rationale: Task Force is proposing this amendment to require redundant fire pump systems for high-rise buildings greater than 120 feet in height. This amendment also requires each fire pump system to independently serve the required design demands for both the automatic sprinkler and standpipe systems in the building.

This amendment will help ensure that an adequate water supply is available for the buildings automatic sprinkler system. Also, this item will help ensure an adequate water supply to the standpipe system which is provided for the fire department to fight fires on upper floors of high-rise buildings that are greater than 120 feet tall (about 10 to 12 stories). It should also be noted that this height threshold is the same as used for requiring fire service access elevators.

The failure of a fire pump will significantly impair the water supply to the water-based fire protection systems in a building. In the case of a fire pump failure in buildings greater than 120 feet in height, the public water supply will most likely not be adequate to supply the automatic sprinkler and standpipe systems above that height. A redundant fire pump system greatly increases the reliability of the water based fire protection systems when any one of the fire pumps may be out of operation for repairs or maintenance or is otherwise inoperable or fails. This recommended amendment correlates with the recommended amendment to CBC Section 403.3.2.

Examples are provided in Appendix A of this report.

ITEM # 6

705.12 Graphics on Exterior Walls of High-Rise Buildings. *Where installed on the exterior walls of high-rise buildings, graphics, both permanent and temporary, greater than 100 square feet in area or greater than 10 feet in either dimension shall comply with the following conditions subject to the review and approval of the fire code official and building official:*

- 1. The materials used for graphics installed at a height greater than 40 feet above the grade plane shall be noncombustible materials or shall have a flame spread index not greater than 25 when tested in accordance with ASTM E84 or UL 723.*
- 2. The method of attachment and mounting of the graphics to the exterior wall shall be such that the graphics are securely attached.*
- 3. The graphics shall not interfere with the active or passive ventilation required for the building and the required smoke control systems in the building.*
- 4. The graphics shall not impair the functions of any fire or life safety systems in the building.*

Phase I Recommendation: Add a new Section 705.12 Super Graphics on Exterior Walls of High-Rise Buildings to require the review and approval by the local fire official for the installation of super graphics on the exterior of high-rise buildings.

Local fire departments have concerns regarding the application of graphics and/or wall signs on multi-story buildings when covering large areas of the exterior wall. This applies to temporary mylar-type “advertising” graphics adhesively-applied to the exterior glazing and permanent signage mounted on the exterior wall.

Phase II Rationale: There is currently no language in the code, either the CBC or the IBC, pertaining to large graphic applications on the exterior of high-rise buildings. This pertains both to temporary mylar-type “advertising” graphics adhesively-applied to the exterior glazing and permanent graphics mounted on the exterior wall. This proposed amendment addresses the following concerns raised by the Phase I Task Force:

1. The materials used on graphics signs should not be more combustible than the materials used on the exterior wall. However, Section 1406.2.2 allows combustible materials to be used up to forty (40) feet in height above grade, so the proposed amendment for

noncombustible or reduced flame spread graphics materials applies only to graphics located above forty feet in height.

2. The risk of the graphics falling off the building needs to be minimized. This applies both to the appropriate engineering of mechanical attachments for permanent graphics and adhesive attachments of temporary graphics directly to the surface of the exterior wall.
3. Graphics applied to the exterior walls of buildings should in no way interfere with building ventilation and/or fire and life safety systems in the building. An example of this would be open parking structures that rely on portions of the exterior wall to remain open for natural ventilation and passive smoke evacuation. These openings should not be blocked by added graphic elements. Another example would be glazing on the exterior wall that is designed to be broken out for passive smoke evacuation; the break-away functionality of the glass should not be impeded by adhesively-applied graphic banners on the surface of the exterior wall.

ITEM # 9

909.20.2.3 Standpipes. *Fire department standpipe connections and valves serving the floor shall be within the vestibule ~~and~~ unless otherwise approved by the fire code official. Standpipe connections in vestibules shall be located in such a manner so as not to obstruct egress where hose lines are connected and charged.*

Phase I Recommendation: Revise Section 909.20.2.3 Standpipes by adding “Unless otherwise approved by the fire code official” to the beginning of the section.

Phase II Rationale: The Task Force is proposing this amendment to eliminate the conflict between this section and section CBC/CFC 905.4 Item 1. The Phase II High-rise Task Force determined that the local fire code official should establish the best location based upon their fire department’s operating procedures.

ITEM #10

907.6.3.3 High-Rise Buildings Zoning Annunciator Panel – *In high-rise buildings, a zoning annunciator panel shall be provided in the Fire Command Center. This panel shall not be combined with the Firefighter Smoke Control Panel unless approved. The panel shall be in matrix format or an approved*

equivalent configuration. All indicators shall be based upon positive confirmation. The panel shall include the following features at a minimum:

1. Fire alarm initiating devices with individual annunciation per floor for manual fire alarm boxes, area smoke detectors, elevator lobby smoke detectors, duct smoke detectors, heat detectors, auxiliary alarms, and sprinkler waterflow. (Red LED)
2. Sprinkler and standpipe system control valves per floor - supervisory. (Yellow LED)
3. Common fire alarm system trouble. (Yellow LED)
4. Annunciation Panel Power On. (Green LED)
5. Lamp test. (Push Button)

911.1.5 Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

3. ~~Fire detection and alarm system annunciator~~ Fire alarm system zoning annunciator panel required by Section 907.6.3.3.

13.3. Building construction information that includes: the type of building construction (e.g., floors, walls, columns, and roof assembly);

13.4. Exit stair information that includes: number of exit stairs in building, each exit stair designation and floors served, location where each exit stair discharges, exit stairs that are pressurized, exit stairs provided with emergency lighting, each exit stair that allows reentry, exit stairs providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve, location of elevator machine rooms, location of sky lobby, location of freight elevator banks;

13.5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator, location of natural gas service;

13.6. Fire protection system information that includes: locations of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers, location of different types of sprinkler systems installed (e.g., dry, wet, pre-action, etc.); and

13.7 Hazardous material information that includes: location of hazardous material, quantity of hazardous material.

14. Work table.

15. Generator supervision devices, manual start and transfer features.

16. Public address system, where specifically required by other sections of this code.

17. Elevator fire recall switch in accordance with *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders.*

18. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

19. A master switch for unlocking elevator lobby doors permitted by Section 1008.1.4.6.

907.6.3.3 and 911.1.5 (CFC 508.1.5 and 907.6.3.3)

Phase I Recommendation: Require graphic annunciators for all fire alarm systems and related equipment in new high-rise buildings. This graphic annunciator would usually include the building elevation as background, but could also imply individual floor plans.

Phase II Recommendation & Rationale: This proposed amendment would require a matrix style fire alarm annunciator in new high-rise buildings. A matrix annunciator would facilitate quick evaluation of critical fire alarm conditions by responding emergency personnel. The matrix style annunciator would also indicate multiple alarms on multiple floors and simultaneously show many essential supervisory/trouble conditions.

Upon thorough review and consideration, Phase II High-rise Task Force recommended a matrix style panel utilizing a building elevation pattern instead. This concept simplifies the fire alarm system annunciator, and thus reduces the cost.

ITEM # 11

911.1.6 Ventilation. The Fire Command Center shall be provided with an independent ventilation or air-conditioning system.

911.1.6 (CFC 508.1.6)

Phase I Recommendation: The Fire Command Center should have an independent ventilation or air-conditioning system.

Phase II Rationale: Common heating ventilation and air-conditioning (HVAC) systems may be shut-down under alarm or other emergency conditions. Equipment in this room is computer-based and may malfunction under elevated temperatures. The intent of this code change is to provide an independent HVAC unit within the room. An example to meet this proposed change may be to include a fan coil within the room even though chilled water is provided from a common building source. Emergency power to the HVAC is not required, but would be desirable. CBC Section 911.1.6 is intentionally left performance-based to allow for multiple options based upon building systems. This section is for new buildings and would only apply to an existing building if the Fire Command Center is relocated or completely renovated.

ITEM # 12

1007.8.1 System Requirements. Two-way communication systems shall provide communication between each required location ~~and the fire command center or~~ and a central control point location approved by the fire department. Where the central control point is not constantly attended, a two-way communication system shall have a timed automatic telephone dial-out capability to an approved monitoring location ~~or 911~~. The two-way communication system shall include both audible and visible signals.

Phase II Rationale: Current International Building Code language allows the Communication System Receiving Station to be in the Fire Command Center (FCC). The FCC is normally unoccupied and the voice communication system may be used in other than fire department response emergencies when not used by fire department. This amendment requires the building owner and fire department authority to concur on a specific location for the communication system location based upon building design, building operations, and fire department operations.

The OSFM High-Rise Phase I Task Group recommendation for two on-site locations were re-evaluated by the Phase II Task Group as some equipment can only work correctly with a single call monitoring location. Additional code language would be necessary to assure proper equipment performance. In addition, a call monitoring location may be a security desk in the lobby where fire department operations are often staged. Typically, the FCC is adjacent to the main lobby. The security desk may be the best location under these conditions.

Consideration for removing the direct calling to 911 was based on the idea that an automated system directly calling 911 could tie up a 911 operator who may not be familiar with the building specifics. Off-site monitoring locations are readily available, but may not necessarily be constantly attended. "*An approved*" was added to "monitoring location" to prevent the use of a monitoring location that may not be constantly attended.

ITEM # 13

1007.8.2 Directions – Directions for the use of the two-way communication system, instructions for summoning assistance via the two-way communication system and written identification of the specific story, floor location, and building address or other building identifier shall be posted adjacent to the two-way communication system.

Phase 1 Recommendation: Revise Section 1007.9 Signage to require that signage clearly explain the use of the two-way communication system by persons with disabilities during an emergency, and note the location of the elevator lobby within the building and the address of the building. The majority of information is included in CBC Section 1007.8.2, which is identical to the 2012 IBC Section 1007.8.2. The building address is added along with additional floor location information. Division of the State Architect Access Compliance Division should be provided with language for concurrence and Chapter 11 signage coordination.

Phase II Rationale: The Task Force is proposing this amendment because the word “location” is vague and additional information regarding location should be provided.

When the communication system receiving station is either in an internal building location or an outside monitoring service, the information proposed is specific for determining the location of the individual initiating the call.

ITEM #15

~~1008.1.4.6~~ – 1008.1.9.12 Access-controlled elevator lobby egress doors in high-rise office buildings. *For elevator lobbies in high-rise office buildings where the occupants of the floor are not required to travel through the elevator lobby to reach an exit, when approved by the fire chief, the doors separating the elevator lobby from the adjacent occupied tenant space that also serve as the entrance doors to the tenant space shall be the entrance doors within an elevator lobby in a means of egress of high-rise buildings serving offices that are equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 and an approved automatic smoke detection system installed in accordance with Section 907, are permitted to be equipped with an approved entrance and egress access control system which shall be installed in accordance with provided all of the following requirements are met criteria:*

- 1. The building is provided throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.*
- 2. A smoke detector is installed on the ceiling on the tenant side of the elevator lobby doors along the center line of the door opening, not less than 1 foot and not more than 5 feet from the door opening, and is connected to the fire alarm system.*
- 3. A remote master switch capable of unlocking the elevator lobby doors shall be provided in the fire command center for use by the fire department.*

14. Locks for the elevator lobby shall be U.L. and California State Fire Marshal listed fail-safe type locking mechanisms. The locking device shall automatically release upon activation of any fire alarm device on the floor of alarm (waterflow, smoke detector, manual pull stations, etc.). All locking devices shall unlock, but not unlatch, upon activation.

25. A two-way voice communication system, utilizing dedicated lines, shall be provided from each locked elevator lobby to the 24-hour staffed location on site, annunciated as to location. Operating instructions shall be posted above each two-way communication device.

36. Provide An approved momentary mushroom-shaped palm button connected to the doors and installed adjacent to each locked elevator lobby exit door ~~which will~~ shall be provided to release the door locks when operated by an individual in the elevator lobby. The locks shall be reset manually at the door. Mount palm button so that the center line is 48 inches above the finished floor door.

Provide a sign stating:

**"IN CASE OF EMERGENCY, PUSH PALM BUTTON,
DOOR WILL UNLOCK AND
SECURITY ALARM WILL SOUND."**

The sign lettering shall be 3/4-inch high letters by 1/8-inch width stroke on a contrasting background.

47. Loss of power to that part of the access control system which locks the doors shall automatically unlock the doors.

911.1.5 Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

*ADD New Section # 19

19. A master switch for unlocking elevator lobby doors permitted by Section 1008.1.4.6.

1008.1.9.12

Phase I Recommendation: Revise Section 1008.1.4.6 Access-Controlled Elevator Lobby Egress Doors to clarify that it is not intended to apply to elevator lobbies that serve as part of the means of egress through which occupants must pass to reach an exit on the opposite side of the lobby and that the approved smoke detection system need only consist of smoke detectors located in the elevator lobby and one located outside of the elevator lobby directly adjacent to the lobby doors.

Require a master switch located in the Fire Control Room for the fire department to manually unlock all such doors located in the building.

Phase II Rationale: This proposed amendment is a clarification of the current amendment. The intent is to limit its application to elevator lobbies in office buildings where the required path of egress travel to reach an exit stairway does not pass through the elevator lobby. It also clarifies that the smoke detection system requirement is intended to be a single smoke detector located at each set of the elevator lobby doors on the tenant side ceiling. This proposal requires a remote master switch for unlocking the elevator lobby doors to be provided in the Fire Command Center similar to the requirement for stairway door locks. This proposal also reformats and edits the section to make it more “user friendly” and easier to interpret and enforce.

ITEM # 19

1022.10 Smokeproof enclosures and pressurized stairways and ramps. Where required by Section 403.5.4 or 405.7.2, interior exit stairways and ramps shall be smokeproof enclosures ~~or pressurized stairways or ramps~~ in accordance with Section 909.20.

Phase 1 Recommendation: Delete the reference to “Pressurized Stairways” in CBC / CFC Section 1022.10 Smokeproof Enclosures and Pressurized Stairways and clarify the matrix adoption table for Chapter 9 that Section 909.20.5 Stair Pressurization Alternative is not adopted by the State Fire Marshal.

Phase II Rationale: This amendment is editorial and arose because of fire department operational issues related to pressurized stairs and vestibules. This needs to be correlated with CBC / CFC Section 909.20.5 and the SFM amendment that currently deletes pressurized stairways as an option to smokeproof enclosures.

ITEM # 21

3007.7.4 Lobby size. ~~Each~~ *Regardless of the number of fire service access elevators served by the same elevator lobby, the* enclosed fire service access elevator lobby shall be a minimum of 150 square feet (14 m²) in an area with a minimum dimension of 8 feet (2440 mm).

Phase I Recommendation: Revise CBC 3007.4.4 to clarify that each required fire service access elevator is required to have a lobby not less than 150 square feet in area with a minimum dimension of not less than eight feet. If two required fire service access elevators share a common lobby, the lobby would be required to be not less than 300 square feet in area with a minimum dimension of not less than eight feet.

Phase II Rationale: This proposed amendment is to clarify that it was not the intent to require additional space for each additional fire service access elevator opening into the elevator lobby. The intent of the size requirement was merely to provide sufficient space to conduct firefighting operations. The 2012 IBC has a new requirement for a second fire service access elevator which was not related to the section on lobby size.

The current IBC size requirement is the result of a successful Public Comment to Code Change G197-07/08 submitted to the ICC by the proponent representing the Los Angeles Fire Department. The proponent originally wanted fifty square feet for each additional elevator car served by the lobby but that was disapproved by the ICC General Code Development Committee.

The Public Comment deleted the fifty square feet criterion and added the minimum dimension requirement of eight feet.

A detailed rationale for that approach can be found in the Commenter's Reason submitted with the Public Comment to the ICC <http://www.iccsafe.org/cs/codes/Pages/default.aspx>. This proposed code change implements and clarifies the intent of the Public Comment that was approved by the ICC.

ITEM # 22

913.6 Fire pumps in high-rise buildings. Engine-driven fire pumps and electric drive fire pumps supplied by generators shall both be provided with an on-premises fuel supply, sufficient for not less than an 8-hour full-demand operation at 100% of the rated pump capacity in addition to all other required supply demands in accordance with section 93, NFPA 20 and this section. (Also see 604.2.14.1.1 of the California Fire Code.)

913.6 and 403.3.4 (CFC 604.2.14.1.1 and 913.6)

Phase I Recommendation: Revise Section 604.2.14.1.1 Fuel Supply of the 2010 CFC to increase the fuel supply capacity from six hours to eight hours for standby power systems. Add a statement to require that a minimum fuel supply always be available.

Phase I Statement of Reasons: Potential amendment #25 applies to fuel supplies for all generators serving the standby power of high-rise buildings. The standby power serves the systems that focus more on the continued operation of critical equipment in a building such as elevators and fire pumps. CFC section 604.14.1 requires that the fuel supply shall be sufficient

to serve the systems for a minimum duration of six hours with the exception of fire pumps having a fuel supply capacity of eight hours minimum. There is currently no provision in this code to set a threshold for the minimum fuel level before refueling is required. It is possible that the tank fuel level could drop too low due to the system testing. This code section is modified to require the fuel supply be maintained for six hours at all times.

Phase II Rationale: The Task Force is proposing this amendment based on feedback from the OSFM High-Rise Phase I Task Group. This amendment modifies this Code section to clarify the minimum capacity of the fuel tank. This is to assure that the minimum required fuel supply is available at all times for the operation of the equipment required to be on standby power in high-rise buildings.

This proposed amendment applies to all fuel supplies for generators serving the standby power system in high-rise buildings. The standby power serves the systems that focus more on the continued operation of critical equipment in a building such as elevators and fire pumps. CFC section 604.2.14.1 requires that the fuel supply shall be sufficient to serve the systems for a minimum duration of six hours with the exception of fire pumps having a fuel supply capacity for a minimum of 8 hours. There is currently no provision in the code to set a threshold for the minimum fuel level before refueling is required. During system testing it is probable that the tank fuel level will drop. This code section is being modified to assure that the fuel supply will be maintained for a minimum of six hours for full-demand operation of the system at all times.

To accomplish this, the recommendation is to relocate the current amendment in CFC Section 604.2.14.1.1 to the new CBC Section 913.6 Fire Pumps in High-Rise Buildings, and a new CFC Section 913.6 Fire Pumps in High-Rise Buildings. A new CBC Section 403.3.4 Fire Pumps is also being added as a pointer.

Important Note: The following items are additional potential code amendments recommended to the state fire marshal by the Phase II High-Rise Task Force. These items were not vetted back to the Phase I High-Rise Task Force.

ITEM #1

403.3.2 Water supply to required fire pumps. Required fire pumps shall be supplied by connections to a minimum of two water mains located in different streets. Separate supply piping shall be provided between each connection to the water main and the pumps. Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

Exceptions:

1: Two connections to the same main shall be permitted provided the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through at least one of the connections.

2: *High-rise buildings not having an occupied floor more than 120 feet above the lowest level of fire department vehicle access where a secondary water supply is provided in accordance with Section 903.3.5.2.*

Recommendation: High rise buildings not having an occupied floor of 120 feet above the lowest level of fire department vehicle access shall be provided with a secondary water supply in accordance with existing provisions in the California Fire Code Section 903.3.5.2

Rationale: The Task Force is proposing this amendment because all high-rise buildings in California already require a secondary on-site water supply (CBC 903.3.5.2). The additional reliability of connecting the sprinkler system supply to two separate water mains in different streets does not appear to be necessary for high-rise buildings under 120 feet in height that pose a lesser risk than taller high-rise buildings. The 120 feet threshold for fire service access elevators and redundant fire pump systems was chosen. This amendment will result in significant construction cost-savings for buildings in this category. This amendment correlates to OSFM proposed amendment CBC 403.3.2.1 regarding redundant fire pump systems.

ITEM # 2

403.5.4 - *Every exit enclosure in high-rise buildings shall comply with Sections 909.20 and 1022.9. Every required level exit stairway in Group I-2 occupancies serving floors more than 75 feet (22 860 mm) above the lowest*

level of fire department vehicle access shall comply with Sections 909.20 and 1022.9.

Exception: *In high-rise buildings, exit enclosures serving three or less adjacent floors where one of the three floors is the exit discharge level.*

Recommendation: Clarify where smokeproof enclosures are required. Revise CBC 403 to not include "Every exit enclosure in high-rise".

Rationale: The Task Force is proposing this amendment to allow exit enclosures which serve three or less adjacent floors to be exempt from the smokeproof enclosure requirements where one of the floors is the level of exit discharge, (example: two basements levels and the lobby level or mezzanine and second floor and the lobby). The exit discharge level is required as one of these floors in order to limit this exception to the lower portion of the building.

As currently written, all exit enclosures in a high-rise building are required to be smokeproof enclosures. This includes an enclosed interior ramp on the ground level of the building, or an exit stair from the basement to the exterior with a door at the basement and any other door discharging to the exterior. There is minimal benefit from requiring such enclosures to be smokeproof. This modification to the existing OSFM Amendment will result in significant construction cost savings and will not impact fire and life safety in high-rise buildings.

ITEM #'s 3 & 4

907.6.1.1 High-rise Buildings. *Wiring for fire alarm signaling line circuits, initiating circuits, and notification circuits in high-rise buildings shall be in accordance with the following:*

1. Class A in accordance with NFPA 72.

Exception: *Initiating circuits which serve only a single initiating device.*

2. Enclosed in continuous metallic raceways in accordance with the California Electrical Code.

Exception: *Metallic cable (MC) shall be permitted for fire alarm notification circuits where continuous metallic raceways are not required for survivability.*

Recommendation: In high-rise buildings, the code relies on a high level of performance and reliability by the fire alarm system to maintain life safety. This includes detection of fire incidents, occupant notification, and controlling building systems to minimize the impact of the fire event.

Rationale: Item # 1 requires fire alarm circuits to be Class A in accordance with NFPA 72 to enhance the reliability of these critical life safety circuits. Class A circuits will ensure fire alarm performance even if there's a break in the circuit. The exception would exempt initiating circuits which serve a single initiating device.

Item # 2 requires fire alarm circuits to be protected against fire and physical damage by placing the circuits within metallic raceways (i.e. conduit). CBC Section 909.12.1 already requires that all wiring serving smoke control systems including any fire alarm initiating circuits, monitoring circuits, or control circuits to be in continuous raceways. The exception allows the use of metallic cable for fire alarm notification circuits.

High-Rise Task Force Recommendations NOT Sent for Consideration

The following recommendations have been evaluation by the High-Rise Task Force Phase II. After further review, Task Force Phase II decided NOT to forward them to the state fire marshal for consideration.

ITEM # 3

CBC 403.5.2: Additional Exit Stairway. This potential amendment applied to super high-rise buildings only and stated that where an occupant evacuation elevator system is provided, the installation of an extra stair is not required. The fire department members were concerned about how this exception would impact their typical building operations and whether or not they have the technology and/or ability to deal with it. They indicated that they would rather decide whether or not to apply this exception on a case-by-case basis or develop a policy that addresses this issue rather than apply a blanket exception. The intent of this potential amendment was not to eliminate the exception, but rather to apply it on a case by-case basis, responsive to how the fire departments operate.

Rationale for Denial: This potential amendment lacked consensus regarding the language ("Approved by the Fire Chief") and the members agreed that the issue should be addressed at the local level rather than at the State level.

ITEM #4

CBC 403.5.3: Stairway Door Operation. This potential amendment would have amended the current code which requires that when the stairway doors are locked for security reasons, they can be unlocked manually from a remote switch located in the fire control room. This amendment would have required the stairway doors to be unlocked automatically upon activation of the fire alarm system.

Rationale for Denial: It was agreed that it could result in major security issues.

ITEM # 5

CBC 403.5.3: Stairway Door Operation. This potential amendment would have made it easier for fire department personnel to get to roofs; if

any doors leading to roofs are locked, they would be required to unlock automatically upon activation of the fire alarm system or by a remote switch located in the fire control room.

Rationale for Denial: Task Force members agreed that this is already implied in the CBC and decided that it should be handled as an SFM Code Interpretation rather than as an amendment.

ITEM # 7

CBC 709.1: Fire Partitions/Item 6. This potential amendment would have revised the requirements for tenant separation walls between adjacent office tenants in high-rise buildings based on the BOMA-SF request to SFM.

Rationale for Denial: This is currently an OSFM amendment that was adopted during the last Code cycle.

ITEM #8

CFC 907.2.13.2: F.D. Communication Systems. This potential amendment would have eliminated the option that currently exists to use either a radio repeater system or a fire department emergency telephone system in high-rise buildings and would have required that both communication systems be used to ensure that if and when radio repeater systems aren't working correctly, ~~then~~ tried and true fire department emergency telephone systems will be in place.

Rationale for Denial: Industry is currently pushing for improvements in portable communications and they are more versatile than the hard-wired systems. A person could be located almost anywhere in a building and have access to an emergency communication system.

ITEM #14

CBC 1008.1.2: Door Swing & CBC 1008.4.3: Horizontal Sliding Doors. This potential amendment would have revised the section to make it clear that only single-hinged swinging doors are allowed to be used as exits into exit enclosures based on a minimum occupant load served with no code exceptions allowed for horizontal or vertical sliding or rolling doors.

Rationale for Denial: This potential amendment has already been addressed in the 2012 IBC.

ITEM # 16

CBC 1009.13: Stairway to Roof. This potential amendment would have required every exit stairway serving the upper floors of all new high-rise buildings to be provided with direct access to the roof.

Rationale for Denial: The Task Force disapproved this potential amendment because it was agreed that it would not improve the overall fire and life safety of the occupants enough to justify the high cost of implementing it.

ITEM # 17

CBC 1018.1: Corridor Fire-Resistance Rating. This amendment would have revised Table 1018.1 to require all new corridors providing access to exits for Group A Assembly occupancies in high-rise buildings to have a 1-hour fire-resistance rating.

Rationale for Denial: This potential amendment has already been addressed by the OSFM amendments in Sections 1028.3 and 1028.3.1.

ITEM # 20

CBC 2702.1.1: Stationary Generators. This amendment would have revised the Code to prohibit emergency generators from being located above the grade level of high-rise buildings. It was suggested that the High-Rise Phase I Task Force did not want generators to be located on a roof or intermediate story. These locations are not the designers' primary choices either. Generators are usually located on the roof, intermediate floors or above grade based upon unique site or building conditions.

Rationale for Denial: This potential amendment was not moved forward because the Task Force agreed this can be better addressed at the local level than as a State amendment.

ITEM # 23

NFPA 13 8.15.5.6: Exempt combustible elevator belts. This amendment addressed the issues regarding elevator shunt trip and fire sprinklers in the elevator hoistways.

Rationale for Denial: This potential amendment was addressed in the 2011 Supplement.

ITEM # 29

CBC 403.6 Elevators. This amendment stated that elevator installation and operation in high-rise buildings shall comply with Chapter 30 and Sections 403.6.1 and 403.6.2. (SFM) Enclosed elevator lobbies shall be provided in accordance with Section 713.14.1.Exceptions 3, 5, 6 and 8 shall only be permitted where at least one fire service access elevator is provided in accordance with Section 3007 or where approved by the Fire Chief in accordance with Section 1.11.2.1.1 or in accordance with Section 1.11.2.1.2 for all state-owned buildings, state occupied buildings, and state institutions throughout the state.

Rationale for Denial: Due to a lack of consensus, the task force members suggested waiting until the next Code cycle (after fire service access elevators have been developed, used and are operational, and the resulting data has been analyzed) to introduce this potential amendment.

Appendix A

Fire Pumps: Example

Determine the height threshold to require a secondary fire pump. Illustrate the water pressure distribution for the fire protection systems as the elevation increases, assuming the primary fire pump is out of operation.

Assumptions:

- Pump Bypass is provided
 1. NFPA 20 Section 5.14.4 states: "Where the suction supply is of sufficient pressure to be of material value without the pump, the pump shall be installed with a bypass".

- Automatic Sprinkler System
 1. The typical building occupancies include primarily office space and residential units (low hazard).
 2. The least amount of water demand (Item #3) is assumed to control the fire in the occupancies listed in Item #1.
 3. Water demand is calculated based on flowing four sprinklers with a total discharge of 70 gpm at a minimum pressure of 7 psi at the sprinklers.
 4. The automatic sprinkler system distribution piping is a loop system. The overall friction loss is calculated to be about 10 psi.
 5. A factor of safety of 10 psi is factored in. The demand at the standpipe connection is *27 psi flowing 70 gpm*.
 6. Friction loss in the standpipe is ignored as being insignificant (0.0005 psi/ft).

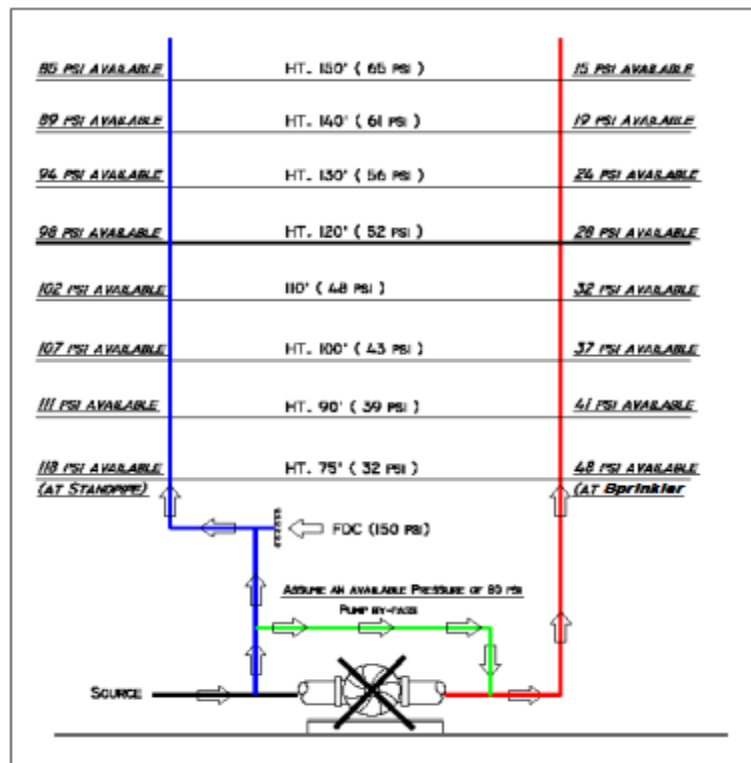
- Manual Fire Department Hose Valves:
 1. Minimum pressure required at the hose valve outlets is 100 psi. NFPA 14 requires a minimum residual pressure of 100 psi at the outlet of the hydraulically most remote 2½ inch hose valve connection. Many fire departments require additional pressure at the hose valve outlet in order to get 100 psi at the hose nozzle due to friction losses in the hose.

- Water supply:
 1. Available residual pressure of 80 psi at the pump bypass.

Appendix A – Fire Pumps (Continued)

Hydraulic Calculations:

- The schematic diagram below depicts the two water based fire protection system scenarios described above and shows the available pressure at each level for each scenario. The standpipe pressures assume the fire department will pump into the standpipe system at the standard operating pressure of 150 psi.
- The break point is about 120 feet in height where the building height elevation exceeds the fire pump bypass capacity to meet automatic sprinkler system demand and the Fire Department pumper's capacity to meet the standpipe hose demands.



403.3.4 Fire Pumps. See Section 913.6.

Appendix B

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Appendix C

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KEY

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