



**National Fire Protection Association**

1 Batterymarch Park, Quincy, MA 02169-7471  
Phone: 617-770-3000 • Fax: 617-770-0700 • www.nfpa.org

**MEETING AGENDA**  
**High Rise Building Safety Advisory Committee**

February 28, 2013  
Teleconference/Web Meeting

1. **Call to Order.** Call the meeting to order by Chair, Jim Quiter, at 3:00 pm EST. on Thursday, February 28, 2013.
2. **Introduction of Attendees.** For a current committee roster. **See pg. 02.**
3. **Review of Agenda.**
4. **Approval of Minutes.** Approve the minutes of the 2012 December 5 meeting. **See pg. 04.**
5. **EAP Guide.** Review and discuss draft for finalization at April 2-3 in-person meeting.
6. **Other Business.**
  - **Status of NFPA 1/101/5000**
  - **Video Monitoring.**
  - **Building Surveys.**
  - **HRB-SAC Site.**
7. **Next Meeting.**
8. **Adjournment.**

# Address List

02/20/2013

Kristin Bigda

HRB-TAC

## High Rise Building Safety Advisory Committee

---

**James R. Quiter** SE 9/30/2004

**Chair** HRB-TAC

Arup  
560 Mission Street, Floor 7  
San Francisco, CA 94105

**Safety to Life Correlating Committee**

**Phone/Cell:** 415-957-9445 415-823-9613

**Fax:** 415-957-9096

**Email :** jim.quiter@arup.com

---

**Jon D. Magnusson** SE 9/30/2004

**Principal** HRB-TAC

Magnusson Klemencic Associates  
1301 Fifth Avenue, Suite 3200  
Seattle, WA 98101-2699

**National Council of Structural Engineers Assns.**

**Phone/Cell:** 206-292-1200

**Fax:** 202-292-1201

**Email :** jmagusson@mka.com

---

**Jack J. Murphy** U 9/30/2004

**Principal** HRB-TAC

Fire Safety Directors Association of Greater New York  
236 Overlook Avenue  
Leonia, NJ 07605-1519

**Fire Safety Directors Association of Greater New York**

**Phone/Cell:** 201-944-2753 201-362-5489

**Fax:** 201-947-4245

**Email :** Ldfmret@nj.rr.com

---

**Jake Pauls** C 9/30/2004

**Principal** HRB-TAC

Jake Pauls Consulting Services in Building Use & Safety  
12507 Winexburg Manor Drive, Suite 201  
Silver Spring, MD 20906

**American Public Health Association**

**Phone/Cell:** 301-933-5275

**Fax:** 301-933-5275

**Email :** bldguse@aol.com

---

**Geoff Craighead** SE 7/19/2005

**Principal** HRB-TAC

Universal Protection Service  
1551 North Tustin Avenue, Suite 650  
Santa Ana, CA 92705

**Phone/Cell:** 213-925-9978

**Fax:**

**Email :** gcraighead@universalpro.com

---

**John P. Miller** L 4/22/2005

**Principal** HRB-TAC

Los Angeles City Fire Department  
Battalion 17 "A" Platoon  
200 North Main Street  
Los Angeles, CA 90012

**Phone/Cell:** 818-756-8617

**Fax:** 818-756-7595

**Email :** jpm9466@hotmail.com

---

**Steven M. Nilles** SE 9/30/2004

**Principal** HRB-TAC

Goettsch Partners  
224 South Michigan, Floor 17  
Chicago, IL 60604

**Council on Tall Buildings & Urban Habitat**

**Phone/Cell:** 312-663-1391

**Fax:** 312-356-0601

**Email :** snilles@gpchicago.com

---

**Sally Regenhard** C 9/30/2004

**Principal** HRB-TAC

The Skyscraper Safety Campaign  
131 East 237 Street  
PO Box 70  
Woodlawn, NY 10470

**Alternate: Charles R. Jennings**

**Phone/Cell:** 718-671-7326 516-287-6203

**Fax:** 718-671-6007

**Email :** sallyregenhard@aol.com

# Address List

02/20/2013

Kristin Bigda

HRB-TAC

## High Rise Building Safety Advisory Committee

---

<b>James P. Shea</b>	<b>U</b> 3/1/2011	<b>William A. Stewart</b>	<b>E</b> 3/19/2007
<b>Principal</b>	<b>HRB-TAC</b>	<b>Principal</b>	<b>HRB-TAC</b>
Tishman Speyer 45 Rockefeller Plaza New York, NY 10111		873 Whitney Drive Mississauga, ON L4Y 1E6 Canada	
<b>Phone/Cell:</b> 212-588-8619		<b>Metropolitan Fire Chiefs-IAFC/NFPA</b>	
<b>Fax:</b> 212-479-8619		<b>Phone/Cell:</b> 905-279-8894 647-382-3097	
<b>Email :</b> jshea@tishmanspeyer.com		<b>Fax:</b>	
		<b>Email :</b> chiefstewart397@rogers.com	
<hr/>			
<b>Charles R. Jennings</b>	<b>C</b> 12/1/2006	<b>Kristin Bigda</b>	6/29/2007
<b>Alternate</b>	<b>HRB-TAC</b>	<b>Staff Liaison</b>	<b>HRB-TAC</b>
John Jay College of Criminal Justice City University of New York 229 Nelson Avenue Peekskill, NY 10566		National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169-7471	
<b>The Skyscraper Safety Campaign</b>		<b>Phone/Cell:</b> 617-984-7791	
<b>Principal: Sally Regenhard</b>		<b>Fax:</b> 617-984-7110	
<b>Phone/Cell:</b> 212-237-8000		<b>Email :</b> kbigda@nfpa.org	
<b>Fax:</b> 914-422-6373			
<b>Email :</b> cjennings@jjay.cuny.edu			



**National Fire Protection Association**

1 Batterymarch Park, Quincy, MA 02169-7471  
 Phone: 617-770-3000 • Fax: 617-770-0700 • www.nfpa.org

**MEETING MINUTES  
 High Rise Building Safety Advisory Committee  
 (HRB-SAC)**

December 5, 2012  
 Teleconference/Web Meeting

1. **Call to Order.** The conference call meeting was called to order by Chair, Jim Quiter, at 1:00 pm EST. on Wednesday, December 5, 2012.
2. **Introduction of Attendees.**

The following committee members were in attendance:

NAME	COMPANY
James Quiter, Chair	Arup Rep. Safety to Life Correlating Committee
Kristin Bigda, Staff Liaison	NFPA
Geoff Craighead, Principal	Universal Protection Service
John Miller, Principal	Los Angeles City Fire Department
Jack Murphy, Principal	Fire Safety Directors Association of Greater New York
Jake Pauls, Principal	Jake Pauls Consulting Service in Building Use and Safety Rep: American Public Health Association
James Shea, Principal	Tishman Speyer
William Stewart, Principal	Rep. Metropolitan Fire Chiefs – IAFC/NFPA
Charles Jennings, Alternate to Sally Regenhard	John Jay College of Criminal Justice Rep. The Skyscraper Safety Campaign

The following guests were in attendance:

NAME	COMPANY
Robert Solomon	NFPA

NAME	COMPANY
Jon Magnusson, Principal	Magnusson Klemencic Associates Rep: National Council of Structural Engineers Assns.

Steven Nilles, Principal	Goettsch Partners Rep: Council on Tall Buildings and Urban Habitat
--------------------------	---

3. **Review of Agenda.** The agenda was reviewed by Chair Jim Quiter.
4. **Approval of Minutes.**
  - a. The minutes of the 2012 March 22 meeting were approved with the following edit: show J. Magnusson as attending the meeting. This edit will be made; an updated copy of the minutes will be re-distributed to the committee and posted to the website.
  - b. Minutes item 8(a) regarding the letter to CTBUH will be completed by Chair Quiter and K. Bigda and will be distributed to the committee for review.
5. **Status of NFPA 1/101/5000.** NFPA 1/101/5000 have completed their first draft meetings. K. Bigda discussed the results of the public inputs submitted by the HRBSAC committee. The first draft report, which will contain all of the official committee actions, will be available online by February 22, 2013. The committee will review any high rise issues and develop public comments as necessary at the next in-person meeting. *See attachment A.*
6. **EAP Guide.** A fully updated draft was transmitted to the committee prior to the meeting and was reviewed during the meeting. Another updated draft will be distributed to the committee immediately following the meeting. At this time, the committee should review the draft and submit any changes or feedback to K. Bigda. J. Murphy will update the items as specified in the draft and during the meeting. The timeline for the draft is as follows:
  - a. Early February (February 8, 2012) – all comments and feedback sent to K. Bigda
  - b. February 15 – updated draft distributed to the committee.
  - c. End of February – teleconference to discuss draft.
  - d. End of March – finalize draft actions items at in-person meeting.
7. **Other Business.**
  - a. **Video Monitoring** – The committee discussed the video monitoring proposal that was submitted to NFPA 101.
    - i. A task group was formed to further refine this language and explore the language that currently exists in other NFPA documents. The task group members include: J. Pauls, C. Jennings, J. Miller, and J. Shea. C. Jennings will lead the task group.
    - ii. K. Bigda will make available to the committee and NFPA 731 and NFPA 72 for review and assistance with the video monitoring discussion.
    - iii. K. Bigda will coordinate in-house discussion at NFPA regarding other NFPA documents efforts in the area of video monitoring and communication/security systems.

- b. Building Surveys** - J. Murphy and C. Jennings briefed the committee on the current surveying of buildings affected by Hurricane Sandy that is ongoing in NYC. The surveys were sent to Fire Safety Directors of the buildings. Results of the survey will be shared with the committee.
  - c. HRB-SAC site** – K. Bigda will look into the possibility to have a HRB-SAC site on the nfpa.org page to post the committee documents in lieu of the current E-Committee page.
8. **Next Meeting.** The next meeting of the committee will be a teleconference scheduled for a time at the end of February. The primary purpose of this meeting will be to further refine the EAP draft. An in-person meeting will be scheduled at the end of March at a location to be determined. K. Bigda will send surveys to the committee to determine the best date for the meetings.
9. **Adjournment.** The conference call meeting was adjourned at 3:00 pm EST on Wednesday, December 5, 2012 by Acting Chair Geoff Craighead.

**Meeting Minutes Prepared by:**

A handwritten signature in cursive script, appearing to read "Kristin Bigda".

Kristin Bigda, Staff Liaison

# ATTACHMENT

## A

**COMMITTEE ACTION: RESOLVE (reject)**

The requirements for the proposed system include nothing relative to installation and maintenance so there is no assurance it will work in an emergency. Nothing clarifies how the system is to operate. Is it constantly on? Is it intended to become activated automatically upon alarm system activation? Reference to "higher story" is not understood. Needs clarification with respect to compatibility with security systems and whether shared features are allowed. Even if emergency personnel learn of a situation, like a bottleneck in a stair enclosure, it is not evident what personnel can do to change the bad situation. In other words, what is the benefit or payback for installing such a system? What situation is remedied? Unclear what "serving an occupant load" means. The word "similar", in the phrase "approved monitoring equipment similar to that" is unclear. The equipment would need to be described. Does the system report only in real time, or must the information gathered be stored. For how long? Minutes? Until long after the event? Need to describe "occupant flow monitoring equipment" that can be used in lieu of video monitoring. How is AHJ to know enough to "approve" equipment that is not well described?

**101 PUBLIC INPUT #1 – Video Monitoring and Situational Awareness**

Add new section to read as follows:

**7.xx.1\*** For new high rise buildings having an Emergency Command Center, in accordance with 11.8.5, and serving an occupant load of 4,000 or more persons, monitoring of exit stair usage shall be provided in accordance with 7.13.2 and 7.13.3

**7.xx.2\*** Approved occupant flow monitoring equipment or video monitoring equipment shall be provided at the exit stair flight immediately adjacent to exit stair discharge doors to enable real-time, remote monitoring, by building management staff and fire service personnel, of all egress and ingress flows on the exit stair flight.

**7.xx.3\*** Approved monitoring equipment similar to that installed in accordance with 7.13.1 shall be provided for higher-story exit stair flights, at building height intervals not exceeding 5 stories, so that descent and ascent flows on the stairs can be remotely monitored by building management staff and fire service personnel.

**SUBSTANTIATION:**

The addition of 7.xx.1 through 7.xx.3 provide additions to the current provision of the code that have the potential to help the fire service, other fire safety personnel and building management to effectively monitor and manage egress during an emergency in a building. The use of equipment that would provide real time data to building command centers could lead to better direction of building evacuations and provide the ability for the command center to see conditions throughout the building. This would allow building officials and the fire service to observe if an egress route has become untenable and where they can most effectively redistribute occupants in the building. The High Rise Building Safety Advisory Committee (HRB-SAC) felt that while this language would provide the ability to better manage and control egress through real-time management, at this time it is only feasible for it to be included in new high rise buildings with occupant loads of over 4000.

One may see it as an invasion of privacy to install video equipment in the stairwells. However, in a report, "Public Perceptions of High-rise Building Safety and Emergency Evacuation Procedures" completed in 2007 for HRB-SAC by the Fire Protection Research Foundation, an independent, non-profit organization, it was found that very few persons have concern over privacy issues if their exit stairwells were equipped with video cameras. A summary of this finding is copied below. When asked about their level of concern over privacy issues if the exit stairwells in their building were equipped with video cameras to permit monitoring of stairwells during evacuations, about nine out of ten respondents (89 percent) reported they would not be concerned at all. Of the remaining, 7 percent reported they would be somewhat concerned and 3 percent would be very concerned.

Clearly, the topic of improving situation awareness of what happens in exit stairs during an evacuation is seen as an important topic and one worthy of new attention in the Code. Also, for the fire protection engineering profession, the need to replace the current technology of people movement in evacuations is getting widespread attention internationally because of the still unknown impact (thus far and forthcoming) of major demographic changes affecting people's body size, body mass and fitness generally—all of which has profound effects on speed, flow and density during evacuations, especially in high-population buildings addressed in this proposal. The profession has to see this proposal plus the comments from NFPA HRB-SAC and me as working to its benefit as well as to the benefit of real-time situation awareness which has been a major factor in many fire incidents as well as other disasters.



The proposed Annex notes, as submitted in Public Input#XX-#XX provide background demonstrating that not only is use of videos very feasible and cost effective; it is very important to achieving life safety in larger buildings—through effective management of egress, especially in a more-complex, post-9/11, safety and security context. Situation awareness is the most important feature of effective responses to emergencies. Situation awareness allows people impacted most directly by an emergency event, or managing the facility, or responding to the event (as with fire services) to make the most appropriate decisions on activities to mitigate the dangers of the event for themselves and others.

During emergencies, exit stairs provide a service that might be overwhelmed by demand. Constraints imposed by their limited capacity must be managed appropriately when many occupants are present, especially when there is a simultaneous egress demand from more than a few stories of a building. For example, in a building with 4,000 occupants and two exit stairs, even with a nominal width of 56 in. (1420 mm) each, a total evacuation could take a half hour or longer and such times would at least increase proportionately with larger occupant loads. Egress for especially endangered occupants, for example those closer to a fire, as well as firefighter access to a fire, would be significantly hampered if usage of the limited stair capacity is not effectively managed. Such management requires accurate, realtime information of exit stair usage. Making such information available at the Emergency Command Center is critical. A secondary use of such information is in post-incident or post-drill evaluation for a particular building/event. A tertiary use of such information is for subsequent research on actual capabilities of building occupants and building means of egress systems generally in all large buildings. All three uses of such information have been badly served by typical capabilities of building monitoring systems that, while monitoring water flows for example, do not convey any information on what is happening in the critical exit stair system.

Increasingly, video camera systems are becoming less costly, smaller, producing better images even in low-light or no-light conditions, using less power, utilizing more-compact and efficient recording/memory systems, and capable of having video—and audio—data transmitted in ways that, until recently, were not even imagined, let alone generally available to typical consumers using a personal computer. Moreover, alternative technologies are being developed that could provide basic people movement data without reliance on video imaging.

It is recognized that both the need for, and capability of, monitoring means of egress usage will grow in the future. Thus an entirely new section is proposed for the means of egress chapter of the Code to provide a home for expanded treatment of the situation awareness issues in egress as well as appropriate Code requirements (perhaps soon referencing appropriate systems standards).

This public input was prepared by the NFPA High Rise Building Safety Advisory Committee. The HRB-SAC members are:

James Quiter (Chair), Arup  
Geoff Craighead, Universal Protection Service  
Jon Magnusson, National Council of Structural Engineers Associations  
John Miller, Los Angeles City Fire Department  
Jack Murphy, Fire Safety Directors Association of Greater New York  
Steven Nilles, Council on Tall Buildings and Urban Habitat  
Jake Pauls, American Public Health Association  
Jim Shea, Tishman Speyer  
William Stewart, Metropolitan Fire Chiefs-IAFC  
Sally Regenhard, The Skyscraper Safety Campaign  
Charles Jennings (Alternate to Regenhard), The Skyscraper Safety Campaign  
Kristin Bigda, NFPA Staff

HRB-SAC is an advisory committee established by the NFPA Standards Council to advise the association, and especially the association's technical committees, on all safety issues related to high rise buildings.

**HRBSAC Ballot Results for This Comment:**

10 Eligible to vote

9 Affirmative Votes (C. Jennings for S. Regenhard)

1 Not Returned (S. Nilles)

Comment on Affirmative:

Shea, J: I agree that video monitoring could be a useful too. However, there ar currently no systems sophisticated enough to allow for real time, building wide monitoring of each stair at each level of a high rise building. As such, I support the public input if proposal can be limited to monitoring stairwells at specific discharge points, namely bottom/lobby discharge or transfer/hold over floors.

## **COMMITTEE ACTION: RESOLVE**

Provisions for a new Section on situation awareness, as recommended by the same submitter, are not being added to the Code. Annex text cannot be added to a nonexistent section.

### **101 PUBLIC INPUT #2 (Link: Public Input #1) Video Monitoring and Situational Awareness**

Add text to read as follows:

**A.7.15.1** Human factors (ergonomics) experts, familiar with building egress issues, utilize the following definition (from Mica Endsley) of situation awareness: “the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future.” The experts note that this definition is especially appropriate for building fire events as it highlights the importance of not just making information available, but also the importance of understanding the significance of that information and predicting how events are likely to evolve. With video systems, real-time images of occupants’ and emergency responders’ presence and movement (or lack thereof) in exits, especially at multiple locations of the same exit stairway, can provide unique information about current and developing conditions to be taken into account in emergency management. NEMA SB 30, “Fire Service Annunciator and Interface,” as reproduced in an annex to NFPA 72, provides general guidelines for effective display of information within an Emergency Command Center. Video displays of images from exit stairways can be small LCD components (a couple of inches in dimension) situated appropriately within a graphic representation of the building (e.g., a vertical section) showing location of other safety systems and their status.

#### **SUBSTANTIATION:**

The addition of 7.xx.1 through 7.xx.3 provide additions to the current provision of the code that have the potential to help the fire service, other fire safety personnel and building management to effectively monitor and manage egress during an emergency in a building. The use of equipment that would provide real time data to building command centers could lead to better direction of building evacuations and provide the ability for the command center to see conditions throughout the building. This would allow building officials and the fire service to observe if an egress route has become untenable and where they can most effectively redistribute occupants in the building. The High Rise Building Safety Advisory Committee (HRB-SAC) felt that while this language would provide the ability to better manage and control egress through real-time management, at this time it is only feasible for it to be included in new high rise buildings with occupant loads of over 4000.

One may see it as an invasion of privacy to install video equipment in the stairwells. However, in a report, “Public Perceptions of High-rise Building Safety and Emergency Evacuation Procedures” completed in 2007 for HRB-SAC by the Fire Protection Research Foundation, an independent, non-profit organization, it was found that very few persons have concern over privacy issues if their exit stairwells were equipped with video cameras. A summary of this finding is copied below. When asked about their level of concern over privacy issues if the exit stairwells in their building were equipped with video cameras to permit monitoring of stairwells during evacuations, about nine out of ten respondents (89 percent) reported they would not be concerned at all. Of the remaining, 7 percent reported they would be somewhat concerned and 3 percent would be very concerned.

Clearly, the topic of improving situation awareness of what happens in exit stairs during an evacuation is seen as an important topic and one worthy of new attention in the Code. Also, for the fire protection engineering profession, the need to replace the current technology of people movement in evacuations is getting widespread attention internationally because of the still unknown impact (thus far and forthcoming) of major demographic changes affecting people’s body size, body mass and fitness generally—all of which has profound effects on speed, flow and density during evacuations, especially in high-population buildings addressed in this proposal. The profession has to see this proposal plus the comments from NFPA HRB-SAC and me as working to its benefit as well as to the benefit of real-time situation awareness which has been a major factor in many fire incidents as well as other disasters.

The proposed Annex notes, as submitted in Public Input#XX-#XX provide background demonstrating that not only is use of videos very feasible and cost effective; it is very important to achieving life safety in larger buildings—through effective management of egress, especially in a more-complex, post-9/11, safety and security context.

Situation awareness is the most important feature of effective responses to emergencies. Situation awareness allows people impacted most directly by an emergency event, or managing the facility, or responding to the event (as with fire services) to make the most appropriate decisions on activities to mitigate the dangers of the event for themselves and others.

During emergencies, exit stairs provide a service that might be overwhelmed by demand. Constraints imposed by their limited capacity must be managed appropriately when many occupants are present, especially when there is a simultaneous egress demand from more than a few stories of a building. For example, in a building with 4,000 occupants and two exit stairs, even with a nominal width of 56 in. (1420 mm) each, a total evacuation could take a half hour or longer and such times would at least increase proportionately with larger occupant loads. Egress for especially endangered occupants, for example those closer to a fire, as well as firefighter access to a fire, would be significantly hampered if usage of the limited stair capacity is not effectively managed. Such management requires accurate, realtime information of exit stair usage. Making such information available at the Emergency Command Center is critical. A secondary use of such information is in post-incident or post-drill evaluation for a particular building/event. A tertiary use of such information is for subsequent research on actual capabilities of building occupants and building means of egress systems generally in all large buildings. All three uses of such information have been badly served by typical capabilities of building monitoring systems that, while monitoring water flows for example, do not convey any information on what is happening in the critical exit stair system.

Increasingly, video camera systems are becoming less costly, smaller, producing better images even in low-light or no-light conditions, using less power, utilizing more-compact and efficient recording/memory systems, and capable of having video—and audio—data transmitted in ways that, until recently, were not even imagined, let alone generally available to typical consumers using a personal computer. Moreover, alternative technologies are being developed that could provide basic people movement data without reliance on video imaging.

It is recognized that both the need for, and capability of, monitoring means of egress usage will grow in the future. Thus an entirely new section is proposed for the means of egress chapter of the Code to provide a home for expanded treatment of the situation awareness issues in egress as well as appropriate Code requirements (perhaps soon referencing appropriate systems standards).

This public input was prepared by the NFPA High Rise Building Safety Advisory Committee. The HRB-SAC members are:

James Quiter (Chair), Arup  
Geoff Craighead, Universal Protection Service  
Jon Magnusson, National Council of Structural Engineers Associations  
John Miller, Los Angeles City Fire Department  
Jack Murphy, Fire Safety Directors Association of Greater New York  
Steven Nilles, Council on Tall Buildings and Urban Habitat  
Jake Pauls, American Public Health Association  
Jim Shea, Tishman Speyer  
William Stewart, Metropolitan Fire Chiefs-IAFC  
Sally Regenhard, The Skyscraper Safety Campaign  
Charles Jennings (Alternate to Regenhard), The Skyscraper Safety Campaign  
Kristin Bigda, NFPA Staff

HRB-SAC is an advisory committee established by the NFPA Standards Council to advise the association, and especially the association's technical committees, on all safety issues related to high rise buildings.

**HRBSAC Ballot Results for This Comment:**

10 Eligible to vote  
9 Affirmative Votes (C. Jennings for S. Regenhard)  
1 Not Returned (S. Nilles)  
Comment on Affirmative:

Shea, J: I agree that video monitoring could be a useful too. However, there ar currently no systems sophisticated enough to allow for real time, building wide monitoring of each stair at each level of a high rise building. As such, I support the public input if proposal can be limited to monitoring stairwells at specific discharge points, namely bottom/lobby discharge or transfer/hold over floors.

**COMMITTEE ACTION: RESOLVE**

Provisions for a new Section on situation awareness, as recommended by the same submitter, are not being added to the Code. Annex text cannot be added to a nonexistent section.

**101 PUBLIC INPUT #3 (Link: Public Input #1) Video Monitoring and Situational Awareness**

Add new text to read as follows:

**A.7.13.2** Having video cameras positioned to capture images of the final flight of an exit stairway, just prior to the discharge doorway from the exit, provides information on the number and flow (in persons per minute for example) of the occupants, among other information, including access by responding firefighters using stairs if elevators are not available. It is not essential that the camera views and image resolution be sufficient to identify specific individuals. Depending on the context (including security applications), such specific-person identification might be essential, desirable, undesirable or forbidden. Digital pixilation of images is one method for resolving personal privacy concerns while still providing information useful for other purposes. Another method could involve having the camera positioned behind evacuating occupants so faces of evacuees are not visible. For postincident evaluation and analysis of egress performance, it is helpful to have image quality and camera angle such that individuals' lateral and front-to-back positions, relative to the stair width, are clear.

**SUNSTANTIATION:**

The addition of 7.xx.1 through 7.xx.3 provide additions to the current provision of the code that have the potential to help the fire service, other fire safety personnel and building management to effectively monitor and manage egress during an emergency in a building. The use of equipment that would provide real time data to building command centers could lead to better direction of building evacuations and provide the ability for the command center to see conditions throughout the building. This would allow building officials and the fire service to observe if an egress route has become untenable and where they can most effectively redistribute occupants in the building. The High Rise Building Safety Advisory Committee (HRB-SAC) felt that while this language would provide the ability to better manage and control egress through real-time management, at this time it is only feasible for it to be included in new high rise buildings with occupant loads of over 4000.

One may see it as an invasion of privacy to install video equipment in the stairwells. However, in a report, "Public Perceptions of High-rise Building Safety and Emergency Evacuation Procedures" completed in 2007 for HRB-SAC by the Fire Protection Research Foundation, an independent, non-profit organization, it was found that very few persons have concern over privacy issues if their exit stairwells were equipped with video cameras. A summary of this finding is copied below. When asked about their level of concern over privacy issues if the exit stairwells in their building were equipped with video cameras to permit monitoring of stairwells during evacuations, about nine out of ten respondents (89 percent) reported they would not be concerned at all. Of the remaining, 7 percent reported they would be somewhat concerned and 3 percent would be very concerned.

Clearly, the topic of improving situation awareness of what happens in exit stairs during an evacuation is seen as an important topic and one worthy of new attention in the Code. Also, for the fire protection engineering profession, the need to replace the current technology of people movement in evacuations is getting widespread attention internationally because of the still unknown impact (thus far and forthcoming) of major demographic changes affecting people's body size, body mass and fitness generally—all of which has profound effects on speed, flow and density during evacuations, especially in high-population buildings addressed in this proposal. The profession has to see this proposal plus the comments from NFPA HRB-SAC and me as working to its benefit as well as to the benefit of real-time situation awareness which has been a major factor in many fire incidents as well as other disasters.

The proposed Annex notes, as submitted in Public Input#XX-#XX provide background demonstrating that not only is use of videos very feasible and cost effective; it is very important to achieving life safety in larger buildings—through effective management of egress, especially in a more-complex, post-9/11, safety and security context. Situation awareness is the most important feature of effective responses to emergencies. Situation awareness allows people impacted most directly by an emergency event, or managing the facility, or responding to the event (as with fire services) to make the most appropriate decisions on activities to mitigate the dangers of the event for themselves and others.

During emergencies, exit stairs provide a service that might be overwhelmed by demand. Constraints imposed by their limited capacity must be managed appropriately when many occupants are present, especially when there is a simultaneous egress demand from more than a few stories of a building. For example, in a building with 4,000 occupants and two exit stairs, even with a nominal width of 56 in. (1420 mm) each, a total evacuation could take a half hour or longer and such times would at least increase proportionately with larger occupant loads. Egress for especially endangered occupants, for example those closer to a fire, as well as firefighter access to a fire, would be significantly hampered if usage of the limited stair capacity is not effectively managed. Such management requires accurate, realtime information of exit stair usage. Making such information available at the Emergency Command Center is critical. A secondary use of such information is in post-incident or post-drill evaluation for a particular building/event. A tertiary use of such information is for subsequent research on actual capabilities of building occupants and building means of egress systems generally in all large buildings. All three uses of such information have been badly served by typical capabilities of building monitoring systems that, while monitoring water flows for example, do not convey any information on what is happening in the critical exit stair system.

Increasingly, video camera systems are becoming less costly, smaller, producing better images even in low-light or no-light conditions, using less power, utilizing more-compact and efficient recording/memory systems, and capable of having video—and audio—data transmitted in ways that, until recently, were not even imagined, let alone generally available to typical consumers using a personal computer. Moreover, alternative technologies are being developed that could provide basic people movement data without reliance on video imaging.

It is recognized that both the need for, and capability of, monitoring means of egress usage will grow in the future. Thus an entirely new section is proposed for the means of egress chapter of the Code to provide a home for expanded treatment of the situation awareness issues in egress as well as appropriate Code requirements (perhaps soon referencing appropriate systems standards).

This public input was prepared by the NFPA High Rise Building Safety Advisory Committee. The HRB-SAC members are:

James Quiter (Chair), Arup  
Geoff Craighead, Universal Protection Service  
Jon Magnusson, National Council of Structural Engineers Associations  
John Miller, Los Angeles City Fire Department  
Jack Murphy, Fire Safety Directors Association of Greater New York  
Steven Nilles, Council on Tall Buildings and Urban Habitat  
Jake Pauls, American Public Health Association  
Jim Shea, Tishman Speyer  
William Stewart, Metropolitan Fire Chiefs-IAFC  
Sally Regenhard, The Skyscraper Safety Campaign  
Charles Jennings (Alternate to Regenhard), The Skyscraper Safety Campaign  
Kristin Bigda, NFPA Staff

HRB-SAC is an advisory committee established by the NFPA Standards Council to advise the association, and especially the association's technical committees, on all safety issues related to high rise buildings.

**HRBSAC Ballot Results for This Comment:**

10 Eligible to vote  
9 Affirmative Votes (C. Jennings for S. Regenhard)  
1 Not Returned (S. Nilles)

**Comment on Affirmative:**

Shea, J: I agree that video monitoring could be a useful too. However, there are currently no systems sophisticated enough to allow for real time, building wide monitoring of each stair at each level of a high rise building. As such, I support the public input if proposal can be limited to monitoring stairwells at specific discharge points, namely bottom/lobby discharge or transfer/hold over floors.

**COMMITTEE ACTION: RESOLVE**

Provisions for a new Section on situation awareness, as recommended by the same submitter, are not being added to the Code. Annex text cannot be added to a nonexistent section.

**101 PUBLIC INPUT #4 (Link: Public Input #1) Video Monitoring and Situational Awareness**

Add new text to read as follows:

**A.7.13.3** For example, a 14 story building would have cameras at the ground level (assuming this is the level of exit discharge), 6th floor, and 11th floor for each of the exit stairs. As well as providing a reasonable sampling of evacuee presence and movement within the exit stair system—*information important for real-time situation awareness*, a comparison of times at which particular individuals pass different cameras provides important data on evacuation movement speed and (indirectly) average occupant density, in addition to flow and number of evacuees overall.

**SUBSTANTIATION:**

The addition of 7.xx.1 through 7.xx.3 provide additions to the current provision of the code that have the potential to help the fire service, other fire safety personnel and building management to effectively monitor and manage egress during an emergency in a building. The use of equipment that would provide real time data to building command centers could lead to better direction of building evacuations and provide the ability for the command center to see conditions throughout the building. This would allow building officials and the fire service to observe if an egress route has become untenable and where they can most effectively redistribute occupants in the building. The High Rise Building Safety Advisory Committee (HRB-SAC) felt that while this language would provide the ability to better manage and control egress through real-time management, at this time it is only feasible for it to be included in new high rise buildings with occupant loads of over 4000.

One may see it as an invasion of privacy to install video equipment in the stairwells. However, in a report, “Public Perceptions of High-rise Building Safety and Emergency Evacuation Procedures” completed in 2007 for HRB-SAC by the Fire Protection Research Foundation, an independent, non-profit organization, it was found that very few persons have concern over privacy issues if their exit stairwells were equipped with video cameras. A summary of this finding is copied below. When asked about their level of concern over privacy issues if the exit stairwells in their building were equipped with video cameras to permit monitoring of stairwells during evacuations, about nine out of ten respondents (89 percent) reported they would not be concerned at all. Of the remaining, 7 percent reported they would be somewhat concerned and 3 percent would be very concerned.

Clearly, the topic of improving situation awareness of what happens in exit stairs during an evacuation is seen as an important topic and one worthy of new attention in the Code. Also, for the fire protection engineering profession, the need to replace the current technology of people movement in evacuations is getting widespread attention internationally because of the still unknown impact (thus far and forthcoming) of major demographic changes affecting people’s body size, body mass and fitness generally—all of which has profound effects on speed, flow and density during evacuations, especially in high-population buildings addressed in this proposal. The profession has to see this proposal plus the comments from NFPA HRB-SAC and me as working to its benefit as well as to the benefit of real-time situation awareness which has been a major factor in many fire incidents as well as other disasters.

The proposed Annex notes, as submitted in Public Input#XX-#XX provide background demonstrating that not only is use of videos very feasible and cost effective; it is very important to achieving life safety in larger buildings—through effective management of egress, especially in a more-complex, post-9/11, safety and security context. Situation awareness is the most important feature of effective responses to emergencies. Situation awareness allows people impacted most directly by an emergency event, or managing the facility, or responding to the event (as with fire services) to make the most appropriate decisions on activities to mitigate the dangers of the event for themselves and others.

During emergencies, exit stairs provide a service that might be overwhelmed by demand. Constraints imposed by their limited capacity must be managed appropriately when many occupants are present, especially when there is a simultaneous egress demand from more than a few stories of a building. For example, in a building with 4,000



occupants and two exit stairs, even with a nominal width of 56 in. (1420 mm) each, a total evacuation could take a half hour or longer and such times would at least increase proportionately with larger occupant loads. Egress for especially endangered occupants, for example those closer to a fire, as well as firefighter access to a fire, would be significantly hampered if usage of the limited stair capacity is not effectively managed. Such management requires accurate, realtime information of exit stair usage. Making such information available at the Emergency Command Center is critical. A secondary use of such information is in post-incident or post-drill evaluation for a particular building/event. A tertiary use of such information is for subsequent research on actual capabilities of building occupants and building means of egress systems generally in all large buildings. All three uses of such information have been badly served by typical capabilities of building monitoring systems that, while monitoring water flows for example, do not convey any information on what is happening in the critical exit stair system.

Increasingly, video camera systems are becoming less costly, smaller, producing better images even in low-light or no-light conditions, using less power, utilizing more-compact and efficient recording/memory systems, and capable of having video—and audio—data transmitted in ways that, until recently, were not even imagined, let alone generally available to typical consumers using a personal computer. Moreover, alternative technologies are being developed that could provide basic people movement data without reliance on video imaging.

It is recognized that both the need for, and capability of, monitoring means of egress usage will grow in the future. Thus an entirely new section is proposed for the means of egress chapter of the Code to provide a home for expanded treatment of the situation awareness issues in egress as well as appropriate Code requirements (perhaps soon referencing appropriate systems standards).

This public input was prepared by the NFPA High Rise Building Safety Advisory Committee. The

HRB-SAC members are:

James Quiter (Chair), Arup

Geoff Craighead, Universal Protection Service

Jon Magnusson, National Council of Structural Engineers Associations

John Miller, Los Angeles City Fire Department

Jack Murphy, Fire Safety Directors Association of Greater New York

Steven Nilles, Council on Tall Buildings and Urban Habitat

Jake Pauls, American Public Health Association

Jim Shea, Tishman Speyer

William Stewart, Metropolitan Fire Chiefs-IAFC

Sally Regenhard, The Skyscraper Safety Campaign

Charles Jennings (Alternate to Regenhard), The Skyscraper Safety Campaign

Kristin Bigda, NFPA Staff

HRB-SAC is an advisory committee established by the NFPA Standards Council to advise the association, and especially the association's technical committees, on all safety issues related to high rise buildings.

**HRBSAC Ballot Results for This Comment:**

10 Eligible to vote

9 Affirmative Votes (C. Jennings for S. Regenhard)

1 Not Returned (S. Nilles)

Comment on Affirmative:

Shea, J: I agree that video monitoring could be a useful too. However, there are currently no systems sophisticated enough to allow for real time, building wide monitoring of each stair at each level of a high rise building. As such, I support the public input if proposal can be limited to monitoring stairwells at specific discharge points, namely bottom/lobby discharge or transfer/hold over floors.

**Committee Action: First revisions created. (Public input was “accepted”)**

The term “emergency action plan” is consistent with that used by the industry as well as the fire service. The term “emergency action plan” is also consistent with the document currently being produced by the NFPA High Rise Building Safety Advisory Committee (HRB-SAC), titled “Guide for the Development of Emergency Action Plans for High Rise Buildings”. Emergency action plans primarily describe the required actions and responsibilities of building occupants, staff and personnel during a fire emergency and other emergencies that may occur in a building. This includes fire drills, evacuation procedures and strategies, and the use and availability of fire protection systems. The technical committee noted a total of 60 occurrences of the term "emergency plan" within 49 provisions of the Code (11 of which have two occurrences each). Each seems appropriate for changing to use the term "emergency action plan."

**101 PUBLIC INPUT #5 - Emergency Action Plan**

Global Change – Change “Emergency Plan” to “Emergency Action Plan” throughout the document.

**SUBSTANTIATION:**

The High Rise Building Safety Advisory Committee (HRB-SAC) recommends revising the term “emergency plan” to “emergency action plan”. The term “emergency action plan” is consistent with that used by the industry as well as the fire service. The term “emergency action plan” is also consistent with the document currently being produced by HRB-SAC, titled “Guide for the Development of Emergency Action Plans for High Rise Buildings”. Emergency action plans primarily describe the required actions and responsibilities of building occupants, staff and personnel during a fire emergency and other emergencies that may occur in a building. This includes fire drills, evacuation procedures and strategies, and the use and availability of fire protection systems.

This public input was prepared by the NFPA High Rise Building Safety Advisory Committee. The

HRB-SAC members are:

James Quiter (Chair), Arup

Geoff Craighead, Universal Protection Service

Jon Magnusson, National Council of Structural Engineers Associations

John Miller, Los Angeles City Fire Department

Jack Murphy, Fire Safety Directors Association of Greater New York

Steven Nilles, Council on Tall Buildings and Urban Habitat

Jake Pauls, American Public Health Association

Jim Shea, Tishman Speyer

William Stewart, Metropolitan Fire Chiefs-IAFC

Sally Regenhard, The Skyscraper Safety Campaign

Charles Jennings (Alternate to Regenhard), The Skyscraper Safety Campaign

Kristin Bigda, NFPA Staff

HRB-SAC is an advisory committee established by the NFPA Standards Council to advise the association, and especially the association’s technical committees, on all safety issues related to high rise buildings.

**HRBSAC Ballot Results for This Comment:**

10 Eligible to vote

9 Affirmative Votes (C. Jennings for S. Regenhard)

1 Not Returned (S. Nilles)

**COMMITTEE ACTION: FIRST REVISION CREATED (ALL TEXT ACCEPTED AS SUBMITTED)**

**101 PUBLIC INPUT #6 – Emergency Action Plans**

Add new annex text to read as follows:

**A.4.8.2.3** Emergency action plans are a critical component of assuring life safety in buildings. Life safety is the result of an interaction of technical and social systems within the building and in the community. Gathering information to evaluate the performance and effectiveness of emergency action plans is important for verifying system performance and as a basis for improvement. Such reports should be retained by the building and used to inform the process for revision of the building emergency action plan.

Following any drill or actual emergency or reported emergency occurring in the building, an after action report should be prepared by building management to document the function of the building's life safety hardware, procedures, and occupant emergency organization.

For ordinary drills and reported emergencies, a short form should be completed. The purpose of this short form is to identify areas of success and areas for improvement.

For actual emergencies in the building, where there is major occupant movement, damage, or casualties, a long form should be used. The long form includes specific questions concerning the event, as well as performance of life safety systems. It also identifies improvements in areas such as training, maintenance, interaction with local emergency response organizations, or occupant management. The reports from these significant events shall be shared with the local emergency response organization.

**SUBSTANTIATION:** Currently, the Code does not contain adequate guidance on after action reporting. As the proposed language states, emergency action plans are a critical component for assuring life safety in buildings. A lot of time, effort, and coordination is required to put together an emergency action plan that is specific to the building. Emergency action plans vary from building to building and address the specific characteristics and hazards of that particular building. Thus, it is important to have means in place to review these plans after emergencies and ensure they are working effectively and are updated where necessary.

This public input was prepared by the NFPA High Rise Building Safety Advisory Committee. The HRB-SAC members are:

James Quiter (Chair), Arup  
Geoff Craighead, Universal Protection Service  
Jon Magnusson, National Council of Structural Engineers Associations  
John Miller, Los Angeles City Fire Department  
Jack Murphy, Fire Safety Directors Association of Greater New York  
Steven Nilles, Council on Tall Buildings and Urban Habitat  
Jake Pauls, American Public Health Association  
Jim Shea, Tishman Speyer  
William Stewart, Metropolitan Fire Chiefs-IAFC  
Sally Regenhard, The Skyscraper Safety Campaign  
Charles Jennings (Alternate to Regenhard), The Skyscraper Safety Campaign  
Kristin Bigda, NFPA Staff

HRB-SAC is an advisory committee established by the NFPA Standards Council to advise the association, and especially the association's technical committees, on all safety issues related to high rise buildings.

**HRBSAC Ballot Results for This Comment:**

10 Eligible to vote  
9 Affirmative Votes (C. Jennings for S. Regenhard)  
1 Not Returned (S. Nilles)

**COMMITTEE ACTION: FIRST REVISION CREATED**

**101 PUBLIC INPUT #8 - Evacuation Strategies**

Revise table A.4.8.2.1(3) to read as follows:

	Managed Sequence	Unmanaged Sequence
Shelter in place <del>(Remain-in-place)</del> No Evacuation	No-movement – <del>Remain in place</del> <u>Shelter-In-Place</u> upon direction	No-movement – <del>Remain in place</del> <u>Shelter-In-Place</u> per prior instruction
<u>Relocation or</u> Partial Evacuation	Managed or controlled partial evacuation <ul style="list-style-type: none"> <li>• In-building relocation on same floor</li> <li>• In-building relocation to different floors</li> <li>• Occupants of some floors leave building</li> </ul>	Unmanaged or <u>movement or</u> uncontrolled partial evacuation
Total Evacuation	Managed or controlled total evacuation	Unmanaged or uncontrolled total evacuation

**SUBSTANTIATION:** The table entry for “No Evacuation” is not accurate and is more appropriately and commonly referred to as “Shelter in Place”. The table should be updated to reflect the commonly used terminology in the field.

This public input was prepared by the NFPA High Rise Building Safety Advisory Committee. The

HRB-SAC members are:

James Quiter (Chair), Arup

Geoff Craighead, Universal Protection Service

Jon Magnusson, National Council of Structural Engineers Associations

John Miller, Los Angeles City Fire Department

Jack Murphy, Fire Safety Directors Association of Greater New York

Steven Nilles, Council on Tall Buildings and Urban Habitat

Jake Pauls, American Public Health Association

Jim Shea, Tishman Speyer

William Stewart, Metropolitan Fire Chiefs-IAFC

Sally Regenhard, The Skyscraper Safety Campaign

Charles Jennings (Alternate to Regenhard), The Skyscraper Safety Campaign

Kristin Bigda, NFPA Staff

HRB-SAC is an advisory committee established by the NFPA Standards Council to advise the association, and especially the association’s technical committees, on all safety issues related to high rise buildings.

**HRBSAC Ballot Results for This Comment:**

10 Eligible to vote

9 Affirmative Votes (C. Jennings for S. Regenhard)

1 Not Returned (S. Nilles)

**TENTATIVE COMMITTEE ACTION (has not been balloted): CHANGES ACCEPTED AS PROPOSED**

The proposed revision is incorporated into all provisions not extracted from other documents via the following FRs: FR-73, FR-74, FR-75, FR-76, FR-77, and FR-78. Revisions to extract text must be submitted to the source document in accordance with NFPA's extract policy.

**1 PUBLIC INPUT #1 - Emergency Action Plan**

Global Change – Change “Emergency Plan” to “Emergency Action Plan” throughout the document.

**SUBSTANTIATION:**

The High Rise Building Safety Advisory Committee (HRB-SAC) recommends revising the term “emergency plan” to “emergency action plan”. The term “emergency action plan” is consistent with that used by the industry as well as the fire service. The term “emergency action plan” is also consistent with the document currently being produced by HRB-SAC, titled “Guide for the Development of Emergency Action Plans for High Rise Buildings”. Emergency action plans primarily describe the required actions and responsibilities of building occupants, staff and personnel during a fire emergency and other emergencies that may occur in a building. This includes fire drills, evacuation procedures and strategies, and the use and availability of fire protection systems.

This public input was prepared by the NFPA High Rise Building Safety Advisory Committee. The HRB-SAC members are:

James Quiter (Chair), Arup  
Geoff Craighead, Universal Protection Service  
Jon Magnusson, National Council of Structural Engineers Associations  
John Miller, Los Angeles City Fire Department  
Jack Murphy, Fire Safety Directors Association of Greater New York  
Steven Nilles, Council on Tall Buildings and Urban Habitat  
Jake Pauls, American Public Health Association  
Jim Shea, Tishman Speyer  
William Stewart, Metropolitan Fire Chiefs-IAFC  
Sally Regenhard, The Skyscraper Safety Campaign  
Charles Jennings (Alternate to Regenhard), The Skyscraper Safety Campaign  
Kristin Bigda, NFPA Staff

HRB-SAC is an advisory committee established by the NFPA Standards Council to advise the association, and especially the association’s technical committees, on all safety issues related to high rise buildings.

**HRBSAC Ballot Results for This Comment:**

10 Eligible to vote  
9 Affirmative Votes (C. Jennings for S. Regenhard)  
1 Not Returned (S. Nilles)