

## ***MEETING MINUTES***

### **NFPA High-Rise Building Safety Advisory Committee (HRB-SAC)**

October 20-21, 2005  
New York LaGuardia Airport Marriott  
East Elmhurst, New York

1. **Call to Order.** Chair Quiter called the meeting to order at 8:30 am.
2. **Introduction of Members and Guests.** Members and guests provided self-introductions.

Committee members in attendance were as follows:

<b>Name</b>	<b>Representing</b>
James Quiter (chair)	Arup (day 1 only)
Richard Bukowski	National Institute of Standards and Technology – Building and Fire Research Laboratory
Geoff Craighead	Securitas Security Services USA, Inc.
Jon Magnusson	Magnusson Klemencic Associates / National Council of Structural Engineers
John Miller	Los Angeles City Fire Department / International Association of Fire Fighters
Jack Murphy	JJM & Associates, LLC / Fire Safety Directors Association of Greater New York (day 1 only)
Steven Nilles	Lohan Caprile Goettsch Architects / Council on Tall Buildings & Urban Habitat
Jake Pauls	Jake Pauls Consulting Services on Building Use and Safety / American Public Health Association
Sally Regenhard	The Skyscraper Safety Campaign
Wes Shoemaker	Winnipeg Fire Paramedic Service / Metropolitan Fire Chiefs
Milosh Puchovsky (non-voting staff liaison)	NFPA

The following guests were also in attendance:

<b>Name</b>	<b>Representing</b>
Anthony Apfelbeck	Altamonte Springs Building/Fire Safety Division / NFPA Technical Committee on Uniform Fire Code

Wayne Holmes	HSB Professional Loss Control / NFPA Technical Committee on Industrial, Storage, and Miscellaneous Occupancies
Gary Keith	NFPA (day 1 only)
James Lathrop	Koffel Associates, Inc. / NFPA Technical Committee on Means of Egress
Nancy McNabb	NFPA
Jarrett Murphy	Village Voice (day 2 only) (Press)
Nadine Post	Engineering News Record (Press)
Ed Schultz	Code Consultants, Inc. / NFPA Technical Committee on Mercantile and Business Occupancies
Robert Solomon	NFPA

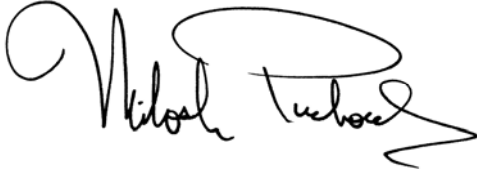
Committee Chair Quiter indicated that due to circumstances not within his control, he would only be available to participate in the meeting on the first day until 4:00 PM. Mr. Quiter appointed committee member Dick Bukowski as interim chair upon his departure.

3. **Approval of July 12-13, 2005 meeting minutes.** The minutes were approved with the following modifications:
  - a. Correct the minutes to correctly indicate that Sally Regenhard was not in attendance at the July meeting
  - b. Correct spelling of Geoff Craighead's name.
4. **Review meeting schedule and key dates.** Mr. Puchovsky reviewed the schedule for future meetings and other key dates as indicated on page 7 of the meeting agenda. The next meeting is scheduled for March 22-23, 2006 in Tampa, Florida. Part of the meeting agenda on March 22 will be to meet with NFPA's Standards Council. A subsequent meeting will be scheduled for August or September 2006.
5. **Review ballot results of HRB-SAC responses to NIST's recommendations on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster.** The ballot results that were distributed to the committee via e-mail on 1 September 2005 were reviewed. NFPA staff indicated that the ballot results were incorporated, in part, into NFPA's response to the NIST Investigation Report. The committee directed staff to distribute a copy of the committee's responses and ballot results to applicable NFPA Technical Committees.
6. **Review subject areas concerning high rise building safety as indicated in the HRB-SAC Charter.** The committee reviewed the subject areas that were established during the December 2004 meeting. The committee incorporated these subject areas into proposed agenda items for the next editions of NFPA 1, 101 and 5000 as indicated in item 7 below.

7. **Set priorities and agenda items for next editions of NFPA 1, 101 and 5000.** The committee established a number of agenda items to be considered by NFPA Technical Committees. The agenda items established at the meeting will be balloted through the committee. See the December 2005 HRB-SAC ballot for a copy of the proposed priorities and agenda items.
8. **Set priorities and agenda items for other applicable NFPA codes and standards.** See item 7 above.
9. **Status Report on incentives to exceed minimum building regulations.** Leadership in Life Safety Design (LLSD) task group chair, Steve Nilles, provided a status report on this activity. Mr. Nilles noted that any values presented in the draft documents are for illustrative purposes and should not be considered as recommendations. The committee expressed their support for the LLSD concept and believes that the concept is an important component of future building safety issues for both high-rise and low-rise buildings. The committee agreed that the concept should be presented to NFPA senior management and the Standards Council for discussion on how best to proceed with its development. Additionally, the committee noted that partnerships with other organizations for implementation, training and certification need to be pursued. In addition to CTBUH, the American Institute of Architects was also mentioned as a potential partner. Task Group member, Wes Shoemaker indicated that he would introduce the concept during the NFPA Board of Directors meeting in November 2005. The committee directed staff to contact the Standards Council in this regard and to place this on the agenda for the meeting with Standards Council in March 2006. See Minutes Attachment A.
10. **Review HRB-SAC Annual Report to the Standards Council.** The committee reviewed the draft report as indicated in Agenda Attachment B. The report to be submitted to the Standards Council is included in Minutes Attachment B.
11. **Other Business.**
  - a. *CTBUH Conference.* NFPA staff member Robert Solomon provided a brief summary of the Conference of the Council on Tall Buildings and Urban Habitat that occurred in New York City on 17-19 October 2005.
  - b. *NIBS project.* Committee member Dick Bukowski provided a brief overview of the National Institute for Building Sciences (NIBS) project to incorporate NIST's recommendation concerning the World Trade Center disaster into building codes. This project is being funded NIST.

12. **Adjournment.** Interim chair Dick Bukowski adjourned the meeting at 1:30 PM, Friday, October 21, 2005

Minutes prepared by

A handwritten signature in black ink, appearing to read "Milosh Puchovsky". The signature is fluid and cursive, with a large loop at the beginning and a long, sweeping tail.

Milosh Puchovsky, P.E.  
Staff Liaison

# Minutes Attachment A



## MEMORANDUM

**DATE:** January 5, 2006

**TO:** Casey Grant, Secretary NFPA Standards Council

**FROM:** Milosh Puchovsky, Staff Liaison – High Rise Building Safety Advisory Committee

**CC:** James Quiter, Chair – High Rise Building Safety Advisory Committee  
Leona Nisbet – NFPA Standards Administration  
Robert Solomon – NFPA Building Fire Protection and Life Safety

**SUBJECT:** **Concept of Leadership in Life Safety Design (LLSD)**

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At its October 20-21, 2005 meeting, the High Rise Building Safety Advisory Committee (HRB-SAC) directed me to write to the Standards Council to introduce the concept of Leadership in Life Safety Design (LLSD), and to initiate discussions on developing a plan on how best to proceed with the development of LLSD. As part of HRB-SAC's meeting with the Standards Council in March 2006, the LLSD concept will be presented.

HRB-SAC believes that the concept of the LLSD is an important component of future building safety issues for both high-rise and low-rise buildings. LLSD is envisioned as being modeled after the Leadership in Energy and Environmental Design (LEED) program sponsored by U.S. Green Building Council. The LLSD approach provides a series of building safety enhancements that could be voluntarily applied in the design or evaluation of buildings. Features identified through the LLSD present voluntary additional "code +" safety provisions beyond those mandated by the applicable building code. The LLSD might also be used to better define and address those hazards and risks of concern to the building owner that are not specifically addressed by the building regulations such as extreme events. Buildings could then be identified as LLSD certified. It is expected that a level of certification would be established similar to that for the LEED program. The attached documents provide further detail about the LLSD concept. Any values presented in the draft documents are for illustrative purposes and should not be considered as recommendations.

HRB-SAC believes that a plan for the formal development of the LLSD concept should be prepared and that it should address the following subjects:

- Identify subject matter to be included in the LLSD concept
- Identify a value system and scoring for various safety features to be considered by LLSD.
- Determine format for maximum usability and applicability for new and existing structures
- Identify how NFPA's technical committee should be involved
- Partnering with other organizations both private and governmental such as CTBUH, NIST, AIA etc.
- Development and implementation of a certification program. (The Green Building Council's program on Leadership in Energy and Environmental Design serves as an example)

Additionally, HRB-SAC committee member Wes Shoemaker introduced the LLSD concept to the NFPA Board of Directors during their November 2005 meeting.

Encl: LLSD Core & Shell Executive Summary  
Draft LLSD Core & Shell Checklist



## LLSD - High-Rise Core & Shell

Leadership in Life Safety Design

NFPA  
CTBUH

### INTRODUCTION

The Leadership in Life Safety Design checklist is being developed through the collaboration of the National Fire Protection Agency (NFPA) and the Council on Tall Buildings and Urban Habitat (CTBUH). The committee is comprised of various professionals from the architecture, construction, engineering, and life safety fields. The mission of the LLSD is to develop and compose a checklist and reference guide for tall buildings that attempt to achieve a greater level of life safety from fire, natural disaster, and man made disasters than the minimums currently set by the existing building codes. With the adoption of these criteria not only will buildings become safer for their occupants in the event of a disaster; but developers, owners, tenants, municipalities, and governing bodies will view a building with these attributes as an asset to the community. Similar in its framework and structure to the Leadership in Energy and Environmental Design (LEED) program developed by the United States Green Building Council, LLSD strives to increase the safety and survivability of disasters that could occur in high rises through voluntary compliance with the proposed program.

Below is a checklist that can be used to audit the safety design of a tall building. Each of these areas consists of at least one pre-requisite and multiple components that a building could achieve if implemented within its design. Items or criteria perceived as “detrimental” to life safety will receive a negative point while criteria seen as “positive” to life safety will be added to the overall score. All of the credits will then be combined and a final number of points determined. The project will then receive one of four classifications: certified, silver, gold, or platinum, with platinum being the highest level of certification. The outcome will be buildings that contain systems, equipment, and design features making them superior to buildings that just simply meet the existing building code criteria.

### CHECKLIST

- 1.0 Building Configuration, General Conditions
- 2.0 Building Enclosure
- 3.0 Fire Resistive Construction
- 4.0 Elevators
- 5.0 Stairs and Enclosure
- 6.0 Area of Refuge, Special Access, Egress
- 7.0 HVAC, Fire Protection, Electrical, Plumbing
- 8.0 Education, Information, Operations
- 9.0 Innovation and Special Design
- 10.0 Structural
- 11.0 Security
- 12.0 Biochemical



Once a final version of the above checklist and criteria has been approved and accepted by the committee, work will begin on the development of a reference guide to support the components of the checklist. The guide is intended to be the user's manual for designers attempting to achieve as many credits as possible listed on the checklist. The guide will assist project teams in their understanding and development of buildings that maximize the principals of the checklist above. It will include examples of design strategies, case studies, and links to other resources concerning Life Safety Design.

#### **WHY MEET THE LLSLSD DESIGN CRITERIA?**

In meeting the criteria to become certified, the developer /owner could receive various financial and development incentives from the municipality in which the building is being constructed. Examples of incentives could be tax credits, "first in line" permit review, lower insurance rates, utility credits, etc. While the upfront costs of some of the criteria may be in excess of the code minimum, these incentives could recoup some of the initial implementation costs. It is also known that in a post 9-11 world people are willing to pay a premium for buildings that are designed with safety that exceeds the minimum code requirements.

Design in which life safety is given a high priority will not only give tenants an advantage if a disaster occurs, but could ultimately result in lower operating costs, smaller clean up costs post disaster, and safer buildings that can offer a higher level of safety for its inhabitants. Through the success of such a program one could predict creating demand in the marketplace for such safe buildings.

Ultimately the LLSLSD framework and program could be expanded to cover all building types not just high-rise core and shell, creating a program that could result in safer communities throughout the world.



**LLSD - High-Rise Core & Shell**  
 Leadership in Life Safety Design

NFPA  
 CTBUH

Points Yes No

**1.0 Building Configuration, General Conditions**

Prerequisite	Points	Yes	No	Description
	1.1			Meet All Local Building Codes And Standards
	1.2			<u>Building/Site Separation</u>
1				≥ 12'-0" Lot Line
1				≥ 24'-0" Lot Line
1				Maximize building protection in adjacent scenarios
1				Maximize building standoff distance from explosive source
	1.3			<u>Building Height</u>
				0 - 8 Floors
(1)				9 - 40 Floors
(2)				40 - 80 Floors
(3)				80 - 120 Floors
(4)				> 120 Floors
	1.4			<u>Building Use / Function</u>
(1)				Iconic Status
(1)				Critical Function
(1)				At Risk User
	1.5			<u>Vehicular Stand-off</u>
1				No Vehicular Access At Building Footprint
1				12'-0" Vehicular Separation
1				24'-0" or Greater Vehicular Separation

**2.0 Building Enclosure**

Prerequisite	Points	Yes	No	Description
	2.1			Non-Combustible, Fire Safing & Smoke Seal
1	2.2			3'-0" 1-Hour Rated Spandrel Separation
1	2.3			Laminated, Tempered, or Wire Safety Glazing
1	2.4			Fire-rated (ceramic) Glazing
1	2.5			Blast Resistant Wall Systems
1	2.6			Stronger anchorages, stiffer support structures, 4 sided glazing systems

Points Yes No

**3.0 Fire Resistive Construction**

Prerequisite				
1			3.1	Superstructure Protection Per Local Code
1			3.2	Columns, Girders, Beams 3-Hour Rated
1			3.3	Increase Slab Construction 1-Hour
1			3.4	Increase at Stair, Elevators, Vertical Shafts, & Corridor 1-Hour
1			3.5	Use of Impact Resistant & Adhesion Enhanced Fireproofing (equal to Cementitious Spray FP)

**4.0 Elevators**

Prerequisite				
1			4.1	Fire Command Elevator Serve All Floors
1			4.2	All Elevators Provided w/1-hour Vestibules
1			4.3	Enhanced Elevator Enclosure: Hoistway equipped sensors, heat and water resistant electrical components. Elevator lobby contains smoke stop doors and enclosure. For fire brigade use and limited evacuation
1			4.4	Protected Elevator Enclosure: All enhanced components plus pressurized elevator cab(s), two hour fire rated lobby with doors, direct access to pressurized egress stair, all contained with a blast resistant core.

**5.0 Stairs & Enclosure**

Prerequisite				
1			5.1	Separation 30'-0" Minimum
1			5.2	Increase Exiting Width 12"
1			5.3	Additional Stair Tower Beyond Exiting Requirements (may be sissor)
1			5.4	Stair Pressurization
1			5.5	Stair Pressurization with Smoke proof Vestibules
1			5.6	Structurally Enhanced Impact Resistant Stair & Vestibule Enclosure
1			5.7	Stair Separation $\geq \frac{1}{2}$ Diagonal Floor Plate Distance
1			5.8	Reduce Max Travel Distance to Stair 50%
1			5.9	Direct Rated Egress to Exterior from Stairs
1			5.10	Photo Luminescent Markings & Pathways

**6.0 Area of Refuge / Special Access / Egress**

Prerequisite				
1			6.1	2'-6" x 4'-0" Clear Space at Each Stair Floor Landing with Communication System
1			6.2	Refuge Area 3-Hour Rated Pressurized with Direct Access to Fire Command Elevator(s) w/Rated Corridor to all Egress Stairs
1			6.3	Refuge Floor 3-Hour Rated. Requirements per 6.2 with Fire Rated Spandrel and Glazing- Number of floors required base on overall building height and occupancy
1			6.4	Roof Top Access (Heliport Requirements Similar to L.A. Municipal Code)

Points Yes No

			<b>6.0</b>	<b>Area of Refuge / Special Access / Egress</b>
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			6.5	Exterior Evacuation System
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			<b>7.0</b>	<b>HVAC / Fire Protection / Electrical</b>
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Prerequisite			7.1	Per Code - Emergency Power Dual Source Fire Command Center Building Management System
1			7.2	Dual Feed Sprinkler with 2-Hour Back-up Water Source (water storage tanks)
1			7.3	Separate electrical feeds (back-up generator) for fire pump(s)
1			7.4	Floor Pressurization / Smoke Evac. System (Purge)
1			7.5	Increase Fire Protection (Sprinkler Design Area) by 100%
1			7.6	Structurally Enhanced Impact Resistant Enclosures for Sprinkler Storage & Emergency Electrical Risers
1			7.7	Reinforce equipment anchorages to prevent failure during event and prevent further destruction of main structure
1			7.8	Fire Brigade Cache Rooms; Direct Access to Egress Stairs or dedicated fire brigade elevator
1			7.9	Redundant water service
1			7.10	Redundant water pumps at remote and protected areas of the building
1			7.11	Connect all HVAC systems to building information system (BIS) and security
1			7.12	Separate public and tenant HVAC Systems
1			7.13	Air intakes not at street or ground level of property
1			7.14	Air filtration systems for all intake air
1			7.15	Air quality detection system connected to BIS

			<b>8.0</b>	<b>Education / Information / Operations</b>
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Prerequisite			8.1	Overall Building Fire Hazard Assessment Emergency Preparedness Plan
1			8.2	LLSD Accredited Design Professional
1			8.3	3 <sup>rd</sup> Party Building Commissioning
1			8.4	Emergency Procedure Training for tenants and building staff
1			8.5	Yearly Full Floor Evacuation Drills
1			8.6	Full As-Built Document Off-Site
1			8.7	Condensed version of as-built document available on site and with fire jurisdiction
1			8.8	Off-Site or Black Box Recording of Communication Building Management System

			<b>9.0</b>	<b>Innovation &amp; Special Design</b>
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1	4		9.1	Special or Innovative Life Safety Features (Max 4 Points)
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**10.0 Structural**

Prerequisite			10.1	Wind Tunnel Analysis
1			10.2	Separate explosive force from critical structural components
1			10.3	Supplementary reinforcement to key structural components
1			10.4	Redundant Structural Design Features to Mitigate Progressive Collapse.
1			10.5	Enhancement of connectivity of structural elements
1			10.6	Blast Resistant Design Features
1			10.7	Passive energy dissipation components (seismic enhancements) What is the model code? What are the minimum requirements?

**11.0 Security**

1			11.1	Security Screening for all Occupants & Visitors
1			11.2	No Public Parking in Structure
1			11.3	Continuous Video Monitoring
1			11.4	Integration of building controls (BIS) with security and fire command center, etc.
1			11.5	Card/ proximity readers at primary entrances or exits

**12.0 Bio-chemical**

1			12.1	See Section 7.0 for HVAC interrelationships
1			12.2	Additional Criteria??
1			12.3	Are there any code minimums??

Points Yes No

**Project Totals**

			Points	LLSD Certified
			+5	LLSD Silver
			+10	LLSD Gold
			+15	LLSD Platinum

**Local Code Equalization**

Base	NFPA 5000 / NFPA XX / NFPA XXX
(+ -)	Municipal Building Codes
(+ -)	Other National Building Codes

DRAFT

# Minutes Attachment B



**TO:** Casey C. Grant  
**FROM:** Milosh Puchovsky  
**SUBJ:** High Rise Building Safety Advisory Committee (HRB-SAC) Annual Report  
**DATE:** 21 October 2005

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As noted in the operating procedures adopted by the HRBSAC, this will serve as the Annual Report to the NFPA Standards Council.

The basic representation, parameters and subjects to be considered by the HRBSAC were approved by the Standards Council at their July, 2004 meeting. Following this meeting, the start up roster of potential participants was identified and the initial roster was approved in October 2004. Additional members were identified, and ultimately appointed in February and June of 2005. The current make up of the HRBSAC includes:

<u>NAME</u>	<u>COMPANY/ORGANIZATION</u>
James R. Quiter - Chair	Arup
Richard W. Bukowski	US National Institute of Standards & Technology
Geoff Craighead	Securitas Security Services USA, Inc.
Jon D. Magnusson	Magnusson Klemencic Associates
John P. Miller	Los Angeles City Fire Department
Jack J. Murphy	Fire Safety Directors of Greater New York
Steven M. Nilles	Lohan Caprile Goettsch Architects (Rep. CTBUH)
Jake Pauls	Jake Pauls Consulting Services in Building Use & Safety (Rep. American Public Health Association)
Sally Regenhard	The Skyscraper Safety Campaign
Wes H. Shoemaker	Winnipeg Fire Paramedic Service (Rep. Metro Chiefs)
Milosh Puchovsky	NFPA – Staff Liaison

Three meetings of the HRBSAC have been held thus far: December 2004, July 2005, and October 2005. The December 2004 meeting (Boston, MA) consisted of an overview of NFPA, discussion of the committee's procedural and operating features, identification of a



comprehensive list of subjects to be considered, and the introduction of the Leadership in Life Safety Design (LLSD) concept that would provide a measured level of safety for building occupants and emergency responders beyond that required by the applicable building code. Members of the Council on Tall Buildings and Urban Habitat (CTBUH) are also in support of this type of concept.

The July 2005 meeting (Gaithersburg, MD) was held at NIST and focused primarily on the development and preparation of responses to the NIST World Trade Center Study. The committee was briefed by Dr. Shyam Sunder from NIST on the main points of the study. Following the briefing, and a discussion period, the HRBSAC members worked to provide initial responses and reactions to most of the 30 recommendations found in the NIST study. A committee ballot was processed to secure the committee's position. Where appropriate, the HRBSAC responses were incorporated into NFPA's formal response to NIST as a part of NFPA's internal review.

The committee also extended discussion on the LLSD concept identified at the December 2004 meeting. LLSD is envisioned as being modeled after the Leadership in Energy and Environmental Design (LEED) program sponsored by U.S. Green Building Council. The LLSD approach provides a series of building safety enhancements that could be voluntarily applied in the design or evaluation of high rise buildings. Features identified through the LLSD present voluntary additional "code +" safety provisions beyond those mandated by the applicable building code. The LLSD might also be used to better define and address those risks of concern to the building owner. Buildings could then be identified as LLSD certified. It is expected that a level of certification would be established similar to that for the LEED program. HRB-SAC hopes to formally present the LLSD concept to the Standards Council in March of 2006.

The October 2005 meeting (New York, NY) consisted of a number of follow up and new initiatives. The committee briefly discussed NFPA's comments on the NIST WTC study and received a briefing on the September 2005 NIST technical conference on the WTC study. In addition, the LLSD task group provided a status report. NIST and CTBUH expressed an interest in collaborating with the HRBSAC on this concept. A major portion of the meeting was held in conjunction with the chairs of certain NFPA Technical Committees. This portion of the meeting served to help identify and prioritize subjects that should be considered in the development of the next editions of key documents such as NFPA 1, NFPA 101 and NFPA 5000. Draft agenda items for the technical committee consideration were drafted and will be balloted through HRB-SAC.

At present, two meetings are scheduled for 2006. The first is scheduled for March of 2006 in Tampa, FL in conjunction with the Standards Council meeting. The second meeting is not yet scheduled but will likely occur in the fourth quarter of 2006.

In summary, HRBSAC continues to pursue an ambitious agenda and is performing as expected. HRB-SAC is providing key input to NFPA staff and technical committees for consideration in the revision of NFPA documents. The diverse views, backgrounds and critical issues discussed by the committee is providing a tremendous advantage as NFPA looks to move forward with changes and safety improvements that encompass the high rise environment. NFPA is fortunate to have a talented and outspoken group of advisory committee members.

C: G. Keith  
R. Solomon