ICC CODE TECHNOLOGY COMMITTEE

BALANCED FIRE PROTECTION – HEIGHT & AREA STUDY GROUP MEETING #2

DRAFT MINUTES

November 16 – 17, 2006
Hilton Garden Inn – O'Hare Airport
2930 South River Road
Des Plaines, IL 60018
(847) 296-8900

November 16: 8:00 am – 5:00 pm
November 17: 8:00 am – 4:00 pm

1.0 Welcome and introductions – Co-chairs Collins & Dargan

1.1 Call to order; introductions; welcoming remarks

The meeting was called to order at 8:10 am on November 16th , welcoming those in attendance. Self introductions were made.

Voting members present: Carl Baldassarra, Laura Blaul, Dave Collins (Co-chair), Kate Dargan (Co-chair), Dave Frable, Sam Francis, Jim Messersmith, Jim Narva, Ron Nickson, Larry Perry, Dennis Richardson, Emory Rodgers (day 2 only), Jerry Sanzone, Rick Thornberry, Robert Wills

Non voting members present: Sean DeCrane, Jon Siu

Members absent: Paul Myers (non voting)

Staff liaison: Mike Pfeiffer

Attendees: A list of attendees is provided at the end of these minutes.

2.0 Approve agenda

Approved

3.0 Approve minutes of Meeting #1 October 21, 2006

Approved as revised. Revisions being:
2.0 first bullet: revise "effected" to "affected"
7.0 eleventh bullet: revise to read: "….Phoenix. Phoenix re-wrote Ch 5……ultimately Phoenix adopted IBC"
Meeting attendees: Add Jeff Shapiro

4.0 Review H & A

Prior to reviewing the case studies done by members of the study group, it was noted that there were a couple of errors in the calculations. In an effort to make sure that all members where in agreement as to how to perform a height and area calculation, especially due to the fact that each of the legacy codes includes different calculations, the group went over the height and area fundamentals for each of the legacy codes. These are summarized on Attachment A (page 6).

4.1 Model codes case studies

4.2 IBC

The authors of the respective studies then presented their findings. It was noted that the findings also included additional information such as fire ratings, corridor considerations and the like and was further questioned as to whether or not this was part of the H&A effort. It was agreed that the focus should be limited to H&A.

In addition to the studies done and posted in advance, the group created additional comparisons. All the comparisons are on Attachment B (page 9).

5.0 Identification of the H & A issues/problem

Identified issues relative to the possible impact of codes on urban design:

- Exceptions in the code, such as for pedestal design, provide flexibility in urban development
- Code revisions represent a piece meal approach
- Urban development is a zoning issue, subject to approval of the elected officials. Dependent on city government structure, land use can impact the codes
- Building codes establish safe limits
- Building codes respond to risks created as a result of policy decisions
- Some issues, such as accessibility, are both policy driven as well as life safety

Identified issues as to how type of construction is impacted by height and area changes:

- Degrees of combustibility, while not part of the IBC, was discussed in the 1990's via BCMC
- Different area limits from the legacy codes create opportunities for different materials
- Smaller projects - Use of construction materials is market driven based on availability of materials in the area
- Large projects - Use of construction materials is driven by availability of materials/cost to construct/time to construct – code issues secondary
- Affordability for developer
- Life safety and property protection are primary objectives, regardless of cost

Input from the committee and those in attendance was solicited in the identification of the H&A problem. These are listed on Attachment C (page 12). After the list was compiled and categorized, each member of the committee was asked to pick the five issues/problems that were most important to them. The following is the tabulated ranking/priorities [Number of votes: Category]:

TOP TIER [5- 8 votes]

- Large non rated bldgs of 4 and 5 stories [8: TOC specific issue]
- Impact of H&A on fire service – delivery of services (ie handle the fire - operations) & FF safety [7: Fire service issue]
- Impact of taller bldgs (stories and feet) – legacy vs IBC [6: Big picture]
- What is the objective of the H&A provisions? What are they trying to accomplish [6: Big picture]
- Water supply issues in high seismic areas – impact on H&A – reliability of water supply. Other natural disasters such as Hurricanes, tornado- Need redundancy? Difference between redundant and layered systems? [5: H&A modifiers]

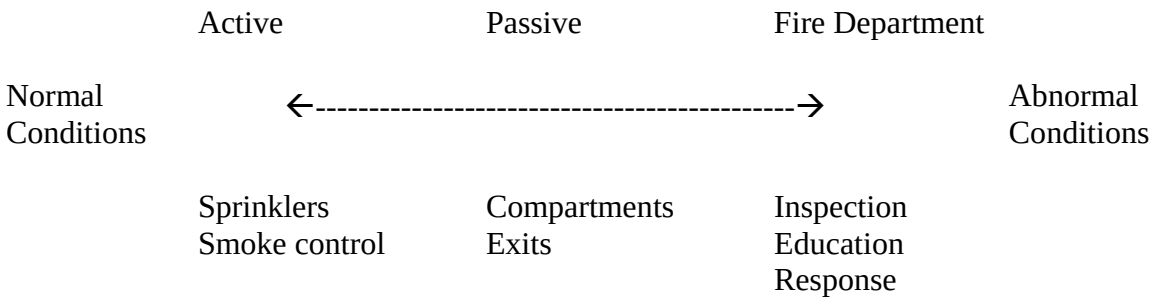
NEXT TIER [3-4 votes]

- ID anomalies that went into table that differed from drafting philosophy…ie, A-2/2B TOC and explanation of why [4: Occupancy specific issue]
- Impact on life safety – area vs height [4: Big picture]
- Identification of the fire problem [4: Big picture]
- Compartmentalization for smoke and fire [3; Compartmentation]
- Very tall bldgs - 150' – impact on fire fighters (FF) and egress – breakpoints [3: Fire service issue]
- Evaluate impact on sprinkler trade-offs to structural fire resistance – ie too much/too little credit? [3: H&A modifiers]

This led to a general discussion on the nature of the height and area code changes since the drafting stage:

- Consensus has been reached via the code change process, not all agree, therefore more code changes
- Some disagree with the general philosophy taken by the drafting committee
- Hearing process not conducive to large/controversial issues such as height and area – leads to more code changes
- IBC has gained attention and as such, more interested parties are participating
- Code change process is dynamic and ever changing, not just for height and area but for many issues
- For the most part, the drafting committees were comprised of code officials. The code development process has significant industry participation
- It's not just H&A, ratings seem to have been reduced due to more emphasis on active fire protection

It was noted that acceptable risk is comprised of a layering of: active fire protection; passive fire protection; and fire department response. It was graphed as follows:



It was further noted that this layering concept was also found in the NFPA 550 "decision matrix"

6.0 Mechanism for problem resolution

Alternative approaches to respond to the problem:

- Public comment(s) on Final Action Agenda for Rochester Final Action Hearing. The specific code changes need to be identified and determined to be within the scope of the proposed public comment. It was noted that individuals are free to submit their own public comment regardless of the action taken by the study group.
- Functional statement of height and area goals, leading to future code changes

As to the mechanism for resolution, there is the negotiation approach and the team approach. Due to the fact that there are only 2 meetings left (December 11-12 and January 3-4), significant decisions will need to be made at the December meeting in order to allow for committee members to report back to their respective representations in order to wrap-up at the January meeting and present to the CTC.

The following task forces/action items were created:

Task group to review IBC height and area for Type 2B and 3B construction:
Chair: Wills
Members: Richardson, Perry, Francis, DeCrane, Messersmith, Thornberry, Rodgers, Nickson

Task group to review the philosophy behind the height and area provisions:
Chair: Baldassarra
Members: Blaul, Frable, Messersmith, Narva, Nickson, Sanzone, Myers, Siu

Action item to review the history of the IBC H&A drafting process: Francis

Action item to develop an IBC maximum allowable height table based on occupancy and TOC: Collins

7.0 Old business

None

8.0 New business

None

9.0 Future Meetings

Meeting #3:	**December 11 - 12, 2006**	**Phoenix, AZ; Hotel - Wyndham Phoenix**
Meeting #4:	**January 3 – 4, 2007**	**Orange County, CA; Location TBD**

10.0 Adjourn

The meeting was adjourned at approximately 3:30 pm on November 17th.

Attachment A
HEIGHT AND AREA FUNDAMENTALS

Notes: SF = street frontage; Sprink = NFPA 13 sprinkler system; Area red = area reduction due to height

IBC

Tabular	**100%**
SF	**75%**
Sprink	**1 st: 300%**
	> 1st: 200%
Max floor area:	
1 st:	**4.75X**
>1 st:	**3.75**
Max total bldg area:	
1 st:	**4.75X**
2 st:	**2st X 3.75 = 7.5 X**
>2 st:	**3st X 3.75 = 11.25X**

UBC

Tabular area	**100%**
SF	**100%**
Sprink	**1 st: 300% of the combined tabular and SF**
	> 1 st: 200% of the combined tabular and SF
Max floor area:	
1 st:	**6 X**
> 1 st:	**4 X**
Max total bldg area:	
1 st:	**6 X**
> 1 st:	**8 X**

BNBC

Tablular	**100%**
SF	**150%**
Sprink	**200% 1 -2 st**
	100% 3 st and greater
Area Red	**Kicks in at 3 stories; max 80%**
Max floor area:	
1 & 2 st:	**4.5X**
3 st:	**3.5X – Area red x Tab area**
Max total bldg area:	
1 st:	**4.5X**
2st:	**9.0X**
>2st:	**area/floor X single floor area**

SBC

Tabular **non sprink value**
sprink value (table builds in increase - 1st: 200%; 2 st: 100%)
1 story value

SF **100% applied to non sprink tabular value**

Max floor area:

1 st w/o sprink: **2X un sprink area**
1 st w/ sprink: **4X un sprink area**
2 st w/o sprink: **2X un sprink area**
2 st w/ sprink: **3X un sprink area**

Max total bldg area:

Max floor area X number of stories

HEIGHT CONSIDERATIONS - SPRINKLERS

IBC – BNBC

UBC – ONE STORY BUT NO HEIGHT OR AREA
AREA BUT NO STORY
ONE HOUR SUBSTITUTION

SBC – GENERALLY HEIGHT INCREASE IN TABLE
FOOTNOTE: INCREASE ONE STORY ABOVE UNSPRINKLERED VALUE

BASEMENTS

IBC – one level max, otherwise count as a story
BNBC- not regulated - multiple level basements permitted, not count as story
UBC – code says "a basement" , however this has led to different interpretations
SBC - ??

FIRE WALLS VS AREA SEPARATION WALLS

Fire wall:

3 hr max
Structural independence
Rating based on occupancy
Fire damper/no smoke damper

Area separation wall:

4 hour max
Rating based on TOC
No structural independence per code – AHJ's may still require; staff interp to define "complete separation"

Fire damper/smoke damper

PODIUM BUILDINGS

Dates back to 1960's in UBC
2 separate bldgs for H&A considerations
No added height in feet – height measured from grade plan around bldg
Allows mixed TOC
3 hour separation between upper and lower
Limitations on occupancy of upper portion
Multiple bldgs separated by fire walls permitted above

Attachment B
LEGACY CODE COMPARISONS – MAX BLDG SIZE

Notes: TOC is the IBC TOC, legacy code TOC is the equivalent IBC TOC.
UBC value below max value is single story value or alternate option value
*Value revised after meeting based on further review by staff/input from committee members

IBC A-1/BOCA A-1/SBC A-1 w/ stage

TOC	IBC	BNBC	SBC
1A	UL	UL	UL
1B	UL	412965	UL
2A	174375*	173320	NP
2B	95625	83160	NP
3A	157500	152460	NP
3B	95625*	83160	NP
4	168750	166320	NP
5A	129375	80325	NP
5B	52250	37800	NP

IBC A-2; UBC A-.2.1 (>300 occ) & A-3 (<300 occ); BNBC A-2/A-3

TOC	IBC	UBC-A 2.1	UBC A-3	BNBC-A-2	BNBC – A-3
1A	UL	UL	UL	UL	UL
1B	UL	239200 119600	239200 119600	78660	395010
2A	174375	108000 54000	108000 54000	39375	173250
2B	106875	NP *	54600*	21600	83160
3A	157500	108000 54000	108000 54000	34650*	152460
3B	106875	NP*	54600*	21600	83160
4	168750	108000 54000	108000 54000	37800	166320
5A	129375	84000 42000	84000 42000	22950	80325
5B	45000	NP*	36000*	10800	37800

IBC B/UBC B/BNBC B/SBC B

TOC	IBC	UBC	BNBC	SBC
1A	UL	UL	UL	UL
1B	UL	319200 159600	875520	UL
2A	421185	144000 72000	418500	382500
2B	258750	96000 72000	190080	255000
3A	320625	144000 72000	316800	315000
3B	213750	96000 72000	190080	210000
4	405000	144000 72000	401760	382500
5A	202500	112000 56000	201960	81000
5B	101250	64000 56000	71280	54000

Notes: For UBC story increase and not area, divide UBC by 2

IBC E/BNBC E/SBC E

TOC	IBC	BNBC	SBC	UBC
1A	UL	UL	UL	UL
1B	UL	677160	UL	361600
2A	298125	297000	108000	161600
2B	163125	142560	48000	81000
3A	264375	261360	108000	161600
3B	163125	142560	48000	81000
4	286875	285120	108000	161600
5A	138750	137700	72000	125600
5B	71250	64800	32000	54600

IBC R-1; R-2/UBC R-1 (hotels) & R-2/BNBC R-1 & R-2

TOC	IBC	UBC	BNBC	SBC All R
1A	UL	UL	UL	UL
1B	UL	239200*	706800	UL*
		119600		
2A	270000	108000	240000	270000*
		54000		
2B	180000	39400	126720	180000
		54600		
3A	270000	108000	211200	270000
		54000		
3B	180000	39400	126720	180000
		54600		
4	230625	108000	230400	162000
		54000		
5A	135000	84000	134640	94500
		42000		
5B	78750	27000	47520	42000
		36000		

Notes:
30000 UBC due to 3000 UBC upper floor limitation

IBC S-2/UBC S-3/SBC –All S

TOC	IBC	UBC	SBC – All S
1A	UL	UL	UL
1B	888750	319200	540000
		159600	
2A	438750	144000	288000
		72000	
2B	292500	96000	192000
		48000	
3A	438750	144000	288000
		72000	
3B	292500	96000	192000
		48000	
4	433125	144000	432000
		72000	
5A	236250	112000	36000
		56000	
5B	151875	64000	24000
		32000	

Notes: UL options available

Attachment C
IDENTIFICATION OF H&A PROBLEM/ISSUE

A list of "problems/issues" was generated, with no intended hierarchy or ranking. They were then categorized. The following is the categorized listing:

BIG PICTURE

- Impact of taller bldgs (stories and feet) - legacy vs IBC
- Impact on life safety: area vs height
- Impact on property protection: area vs height. Corollary: Should code address property protection?
- Identification of the fire problem
- Decision making mechanism..what information to use? Models? Fire data?
- What is the objective of the H &A provisions? What are they trying to accomplish?
- Willingness to go in entirely different direction when compared to current H&A provisions..clean sheet approach
- There is nothing wrong with current H&A, other than possible anomolies raised in #3…raises Q's as to purpose of H&A table
- Are the current H & A provisions too conservative/restrictive? Can we expect even larger heights and areas?
- Base table assumes non sprink? Should we have sprink thresholds in a separate table?
- Are sprinkler trade-offs needed or relevant….A

COMPARTMETATION

- Compartmentalization for smoke and fire
- Reliability/performance of active and passive systems

H & A MODIFIERS

- Revisions in the IBC Work Draft to 2000 IBC to 2006 IBC and the calculation of modifiers
- Why take sprink increase for area and height?
- Appropriate increase for sprinklers
- Reliability/performance of active and passive systems
- Water supply issues in high seismic areas - impact on H & A - reliability of water supply? Other natural disasters such as Hurricanes, tornado - Need redundancy? Difference between redundant and layered systems?
- Assume sprinks functional when doing H&A? Same with passive? Same with street frontage?
- Eval impact of sprink trade-offs to structural fire resistance ie too much/too little credit?
- Value of open space (street frontage) for FF operations. Can the SF increase be quantified?

OCCUPANCY SPECIFIC ISSUE

- Area thresholds for R, I, A, E occupancies
- ID anomolies that went into table that differed from drafting philosophy..ie A-2/2B TOC and explanation of why
- Extreme variances in IBC from any one of the legacy codes …ie UBC…say 3 times…not just total bldg area but also floor area that creates the compartment
- Compared to legacy codes, some are bigger some are smaller…why?.Single story vs multi story
- Unprotected A occupancies
- What are valid "NP" values in the H&A table?
- Sprinkler thresholds adequate? Sprinkler schools? All nursing occs?.
- Are there occupancies that self regulate based on the value of the commodity.ie HPM…E

TOC SPECIFIC ISSUE

- Sprinks in wood frame bldgs >3 st
- Large non rated bldgs of 4 and 5 stories
- Should Type 1 be limited to a specific area and height? Are we good with UL?
- What are valid "NP" values in the H&A table?

FIRE SERVICE ISSUE

- Very large bldgs: unlimited area
- Very tall bldgs: 150' high..impact on FF and egress
- Impact of H&A on fire service - delivery of service - handle the fire/ operations) & FF safety
- Data related to ability of FF to extinguish fire (manual suppression)….max compartment/max fire size

ICC CODE TECHNOLOGY COMMITTEE

BALANCED FIRE PROTECTION – HEIGHT & AREA STUDY GROUP MEETING #2

DRAFT MINUTES

List of Attendees

Thom Zaremba	Firerated Glazing Industry
Tom Mewborne	AFG Industries
William Koffel	Koffel Associates
Mark Kluver	Portland Cement Association
Carl Wren	IAFC/Austin Fire Dept.
Jeff Shapiro	International Code Consultants/NMHC
Gregory Keith	The Boeing Company
Richard Schulte	Schulte & Associates
Kevin Kelly	NFSA
Farid Alfawakhiri	AISI
Jeri Morey	Jeri Morey, Arch.
Ken Kraus	California Fire Chiefs
Pat McLaughlin	Compressed Gas Assoc./CSPA/Semicond Ind. Assoc.
Jason Krohn	PCI
David P. Tyree	AF & PA
Stuart Tom	California Fire Chiefs
David Dratnol	Isolatek International
Bill McHugh	FCIA
Vickie Lovell	Intercode Inc.
Sarah Rice	Schirmer Eng.
Timothy Orris	AMCA International
Marshall Klein	Marshall A. Klein & Assoc./NMHC
Mike Shackleton	Carpenter Shackelton