

ICC Code Technology Committee

**Balanced Fire Protection
Methodology study group**

Staff Notes

**Embassy Suites
Atlanta Airport
March 29, 2007**

Chair Meacham initiated the meeting at approximately 1:00 pm on March 29, 2007.

Members present: Sam Francis, Kevin Kelly, Vickie Lovell, Brian Meacham (Chair), Jim Messersmith, Richard Walke

Interested parties present: Carl Baldassarra, Dick Bukowski, Paul Heilstedt, Gregg Keith, Bill McHugh, Rich Schulte, Carl Wren

Staff present: Pfeiffer

Brian opened the meeting, noting the history of this study group and the March 9, 2006 work plan (Attachment A). The study group was originally formed in December/2005 by the CTC. They held a teleconference in February/2006 and a face-to-face meeting in March/2006 where they developed the work plan. Work assignments – due June/2006 based on the work plan, were made at the March meeting. Unfortunately, they were not completed. For all intents and purposes, the group put their work on hold in light of the establishment of the Height and area study group resulting from the 2006 Orlando Code Development Hearings.

Brian noted the purpose of this meeting, namely:

- Briefly review scope, objectives and task assignments
 - Task 1 – All
 - Task 2 – Schulte, Woods, Kelly
 - Task 3 – Koffel
 - Task 4 – Zaremba, Meacham, McHugh
 - Task 5 – Thornberry, Meacham, Koffel, Lovell
- Short presentation on similar efforts in Australia and New Zealand, with suggested methodology
- Discuss terminology and definitions, as submitted
- Discuss parameters that reflect levels of safety

Brian then presented a Power Point presentation on international activities in Australia and New Zealand.

As far as the methodology options, the following was noted:

- Deterministic (Bill Koffel presented this method at the March/2006 meeting)
- Probabilistic
 - Quantitative risk
 - Quantitative risk to value
- Comparative risk – assess against current IBC
- Risk informed – combination of above

The group discussed the relationship of the Methodology SG to Features. There is sure to be a degree of cross-over, however it was noted that both groups have many of the same participants which will provide for the necessary

monitoring.

Work plan Task # 2 – Definitions:

Three sets of definitions were proposed and discussed, they are shown in Attachment B. After considerable discussion and revisions, the group settled on the following:

BALANCED FIRE PROTECTION

An active, passive or combination of active and passive fire protection for the detection, notification, suppression, limitation, confinement and/or control of fire and smoke appropriate to the level of fire safety desired (required).

PASSIVE FIRE PROTECTION

Construction that confines or limits fire or smoke to specific areas within a building, delays or prevents disproportionate collapse of structural components, and does not require some form of manual or automated intervention of normal building operation.

ACTIVE FIRE PROTECTION

Mechanical or electrical systems that require manual intervention to, or that automatically detect, suppress or control the fire or smoke.

Work plan Task # 4 – Levels of safety

Brian noted the following in his Power Point:

Considerations:

- Deterministic parameters
 - Building structure and general geometry
 - Initial FP systems
 - Initial fuels and configurations
- Stochastic parameters
 - Likely / probable fuel load changes with time
 - Geometry changes with time
 - System reliability and efficacy
 - Occupant characteristics and response
- Occupant Risk Characterization
 - The nature of the hazard
 - The number of persons in the building
 - The length of time occupied and time of day
 - Whether people normally sleep in the building
 - Whether occupants are expected to be familiar with the building layout and means of egress
 - Whether a significant percentage of the building occupants are, or are expected to be, members of vulnerable population groups

Carl Baldassarra passed out a copy (which he purchased) of an NFPA Decision Tree from the Committee on Systems Concepts for Fire Protection in Structures dated November, 1974.

Next action: The definitions noted above will be circulated for review. The task force on Item #4 – level of safety, to identify the parameters which constitute levels of safety. Documents to be sent to staff by May 30th for distribution in advance of the next meeting. The next meeting will be via conference call on June 8th @ 10:00 Central.

The meeting adjourned at approximately 5:00 pm.

Attachment A

Balanced Fire Protection Study Group Work Plan March 9, 2006

Scope: To develop a process to assess what constitutes an appropriate balance of active and passive fire protection requirements with respect to meeting the intent of the IBC relative to safety to life and property from fire and safety to fire fighters and emergency responders.

Goals/Objectives

1. To identify the code requirements applicable to active and passive fire protection
2. Define terms including, but not limited to:
active fire protection
balanced fire protection design
passive fire protection
3. Identify the parameters which constitute levels of fire safety
4. Develop a methodology to assess the parameters for the purpose of determining the levels of fire safety. It is anticipated that the methodology will include the following:
 - 4a. Establish benchmarks against which levels of fire safety will be evaluated
 - 4b. Assess the levels of fire safety achieved using different components and/or systems of active and passive fire protection using the methodology developed per objective #4, against the benchmark established in #4a.
 - 4c. Determine code requirements to achieve intended levels of fire safety

Proposed Tasks

1. Finalize scope and goals/objectives
2. Define terms
3. Id code requirements
4. Identify the parameters which constitute levels of safety
5. Identify/research methodologies that can be used to determine the levels of fire safety. It is anticipated that a suitable methodology will establish benchmarks against which levels of fire safety will be evaluated.

To do when 5 is done

6. Establish the methodology to be used
7. Establish a task group of stakeholders to implement the methodology identified in item #6

To do when 7 is done

8. Develop fire scenarios for the methodology identified in item #6
9. Completion of a comparative matrix by interested parties for the subject matter to be considered.
10. Select scenarios, apply the methodology and evaluate the results.
11. Report findings and make recommendations to the CTC.

Attachment B Proposed definitions

From Kevin Kelly:

“Balanced fire protection”

In recognition of the ability to properly design, install and maintained fire protection systems in buildings the concept of balancing fire protection features in the building/fire code is introduced as an economic incentive to increase overall fire safety of the building. These incentives are to be achieved by a reduction or deletion of other such fire protection measures and devices, provided that:

1. The extent of protection added by a fire protection feature/system should be at least equal to that being waived such that overall level of safety may be enhanced but not lowered.
2. There should be at least a rough equivalency in the nature of protection added by the fire protection system/feature to that reduced or deleted through the economic incentive.
3. Balancing fire protection is not meant to require additional fire protection measures and devices which would increase total building construction costs without generating an appreciable additional increase in overall fire safety.

“Passive Fire Protection”

Passive fire protection means that the building structure is protected against “temperature generated” collapse until the fire department arrives and can suppress the fire. Fire resistance ratings up to 4 hours are required to protect against the extreme temperatures since the fire is able to burn freely without suppression. Passive fire protection will not prevent a fire from occurring, but it is used to limit the overall size of the fire.

“Active Fire Suppression”

Active fire suppression systems react to a fire within minutes of ignition and can begin suppression before the fire department is notified.

From Vickie Lovell

Passive fire protection – Fire or smoke resistant construction intended to confine or limit fire and/or smoke to specific areas within a building, delay collapse of structural components, or control the flammability or fire spread on the surface of building components and do not require some form of manual or automated intervention of normal building operation.

Active fire protection – Fire suppression and detection systems that suppress and control the fire by placing materials or substances directly on the fire (i.e., water), notify occupants, and in some cases the fire department, of a fire in order to respond, escape, and rescue; and requires some form of manual or automated intervention of normal building operation or activity.

Balanced Fire Protection – A fire protection design that incorporates active and passive fire protection systems and features that detect fire or smoke early, slow fire growth and spread, suppress and contain fire and smoke. A balanced fire protection design integrates such features and systems to reinforce one system with another and covers for one another in case of the failure of any one.

Paraphrased from sources:

- 2003 IBC Nonstructural Life and Safety Principles
- 2006 IBC Commentary
- NISTIR 5264 Balanced Fire Protection Workshop

From Rich Schulte:

Passive Fire Protection Definition:

Building systems which are designed to perform any of the following functions:

- Limit the damage to the structural elements of the building caused by heat by encasing or otherwise insulating the structural members (i.e. structural fire protection, membrane ceiling protection)
- Limit the spread of fire and/or smoke by dividing the building into compartments utilizing either horizontal or vertical construction assemblies (i.e. floor construction, floor opening enclosures, fire walls, fire separation assemblies, fire partitions)
- Protect the egress system serving the building from combustion products by separating egress components from adjacent areas utilizing either horizontal or vertical construction assemblies

Active Fire Protection Definition:

Building systems which are designed to perform any of the following functions:

- Limit the damage caused by heat to the structural elements of the building by automatically detecting a fire and automatically discharging an agent which will either control or extinguish the fire (i.e. sprinkler system)
- Limit the spread of fire and/or smoke by automatically detecting a fire and by automatically discharging an agent which will either control or extinguish the fire (i.e. sprinkler system)
- Protect the egress system serving the building from combustion products by automatically detecting a fire and automatically discharging an agent which will either control or extinguish the fire (i.e. sprinkler system)
- Automatically detect the combustion products generated by a fire and sound an alarm within the building and/or transmit an alarm to the fire department (i.e. smoke detection system or heat detection system)

Methodology Study Group 2 March 19, 2007

General Methods of Providing Occupant Fire Safety:

- Means of egress and
- Passive fire protection or
- Active fire protection

Balanced Fire Safety (Building) Design Definition:

- A building design which includes a combination of means of egress and either passive or active fire protection.

General Comments:

- The property protection goal of the IBC is limited to limiting the spread of fire between adjacent buildings. (See the annex of NFPA 5000 for an explanation of the purpose of the building code with respect to property protection.)