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March 21, 2007

New California Fire & Building Codes ...are you ready?

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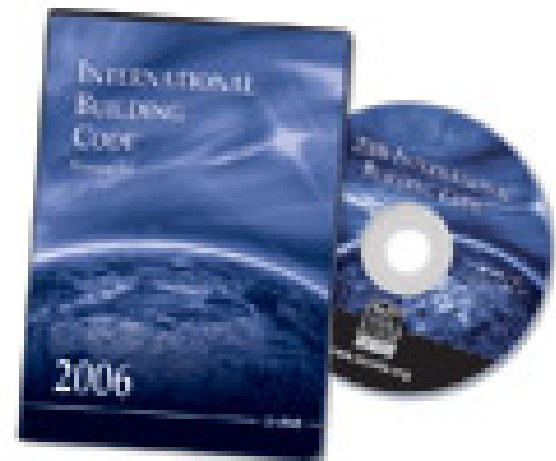
California Insurance License # 0437153

Agenda

- What's a code (and why do we care)?
- How do we use the codes for “fun and profit?”
- Taking California's new codes for a spin



What is a code?
...and why do we care?



Fire & Building Codes tell us how to build and protect our buildings
...they are developed from losses...

- Triangle Shirt Waist Factory NYC 1911 – 146 dead, ?? injured
Kheel Center Web Site (<http://www.ilr.cornell.edu/trianglefire/>)
- High-rise Office Building Atlanta 1989 – 5 dead, 20 injured
- Imperial Foods Processing Plant NC 1991 – 25 dead, 54 injured
- Kader Industrial (Toy Factory) Thailand 1993 – 188 dead, 496 injured (many paralyzed from falls)
- Cook County Administration Building Chicago 2003 – 6 dead, 8 injured

Fire and Building Codes are designed to ensure Life Safety

- Objectives
 - Occupant protection for effective egress
 - Structural integrity
 - Systems effectiveness
- Assumption
 - Single fire source
- Design & Compliance Options
 - Prescriptive-based option
 - Performance-based option



Codes are the Minimum Level of Protection

- Codes are established by committees using a process of consensus
 - Code requirements are the “lowest common denominator,” not the optimum level for most situations
 - Codes require a safe environment only long enough to get occupants out
 - A total property loss where all occupants get out safely is considered a code success
- Companies in a lean economy can rarely afford to lose a building, even if all occupants are safe
 - Guidelines, standards, and “best management practices” supplement the code to address business risk management goals

Using the Codes
...reduce costs and assure business continuity...



Economic trends impact Fire and Life Safety

- Cost reduction pressure on companies is driving ***cuts*** in fire & life safety programs, maintenance, & improvements
- Lean financial conditions and increased competition make the costs of interruptions and losses ***more*** of a threat to business continuity
- Fire & life safety spending should be assigned after an honest analysis of the potential threats to people and business continuity
 - Estimate potential impacts if risks are not controlled
 - Identify & rank criteria for success (e.g., life safety, legal compliance, business continuity, total cost of ownership, etc.)
 - Gather stakeholders to jointly measure projects against criteria, selecting best options for the long term (i.e., total cost of ownership)
 - Prioritize spending to mitigate the most severe threats to people & business continuity

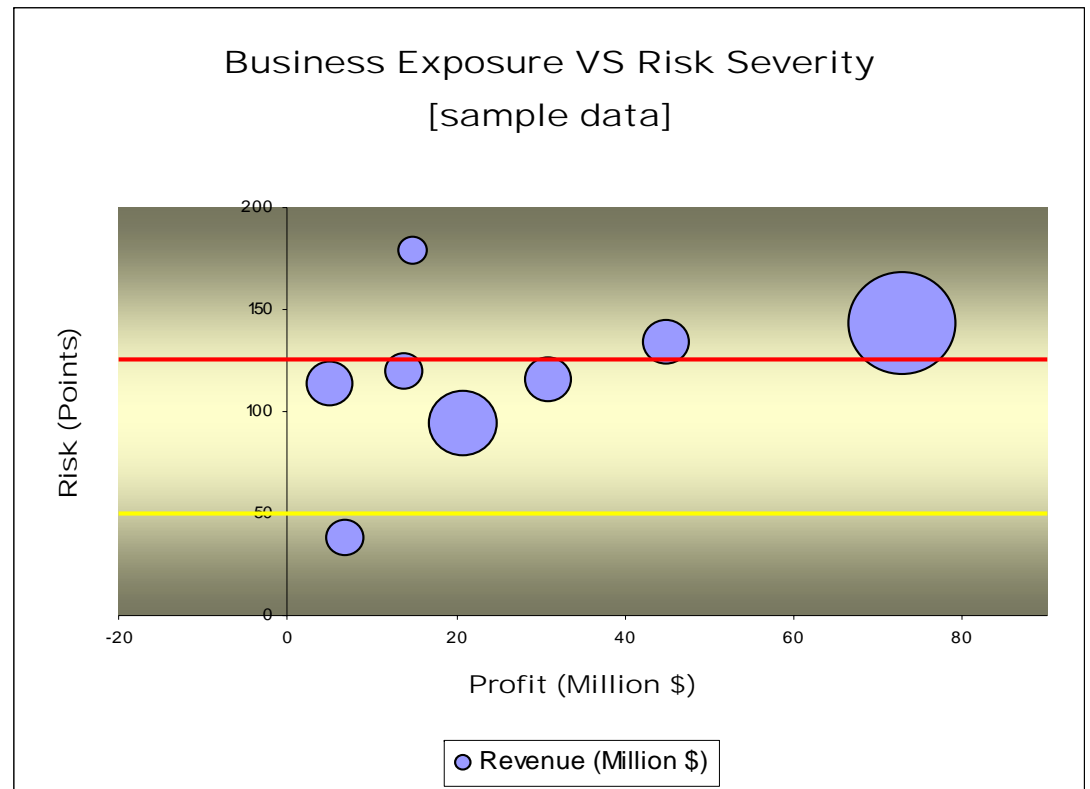
Goals and Objectives for Fire and Life Safety Programs

- Protect the health & safety of people
 - Building occupants
 - Emergency responders
 - Community
- Ensure business continuity
 - Minimize downtime
 - Minimize impact to critical operations & equipment
- Protect Property
 - Buildings
 - Contents
 - Environment

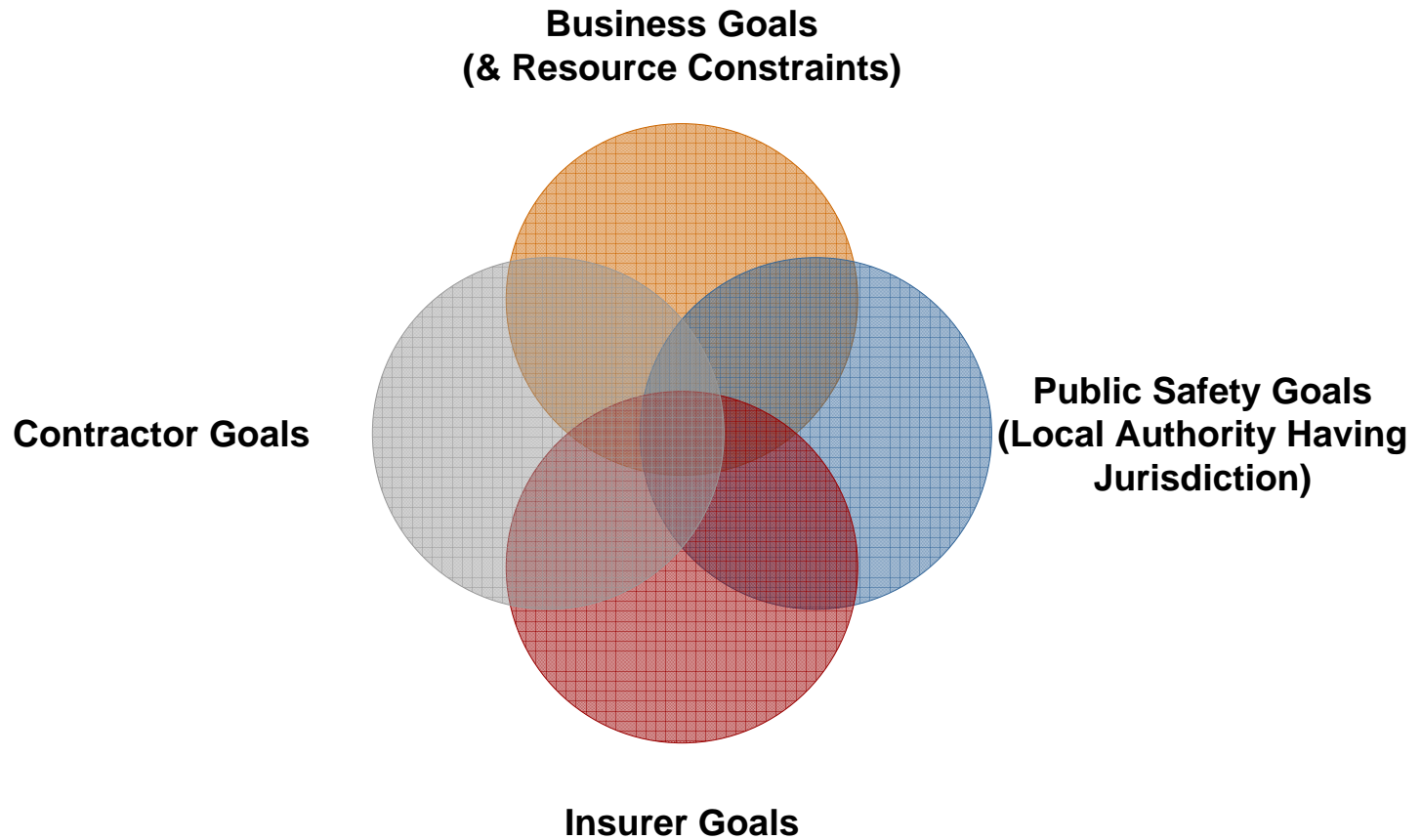
Assess Mission Critical Priorities ...a case study...

Method:

- ✓ Sites complete physical hazard scorecard
- ✓ Operations determines site contributions to Revenue and Profit, including:
 - Capacity upsides
 - Seasonal constraints
 - Site interdependencies
- ✓ Map results in a bubble chart
 - Before budgeting fixes
 - After fixes to reflect risk reduction



Manage stakeholder input ...stay focused on program goals...



California's "new" codes
...same as it ever was...

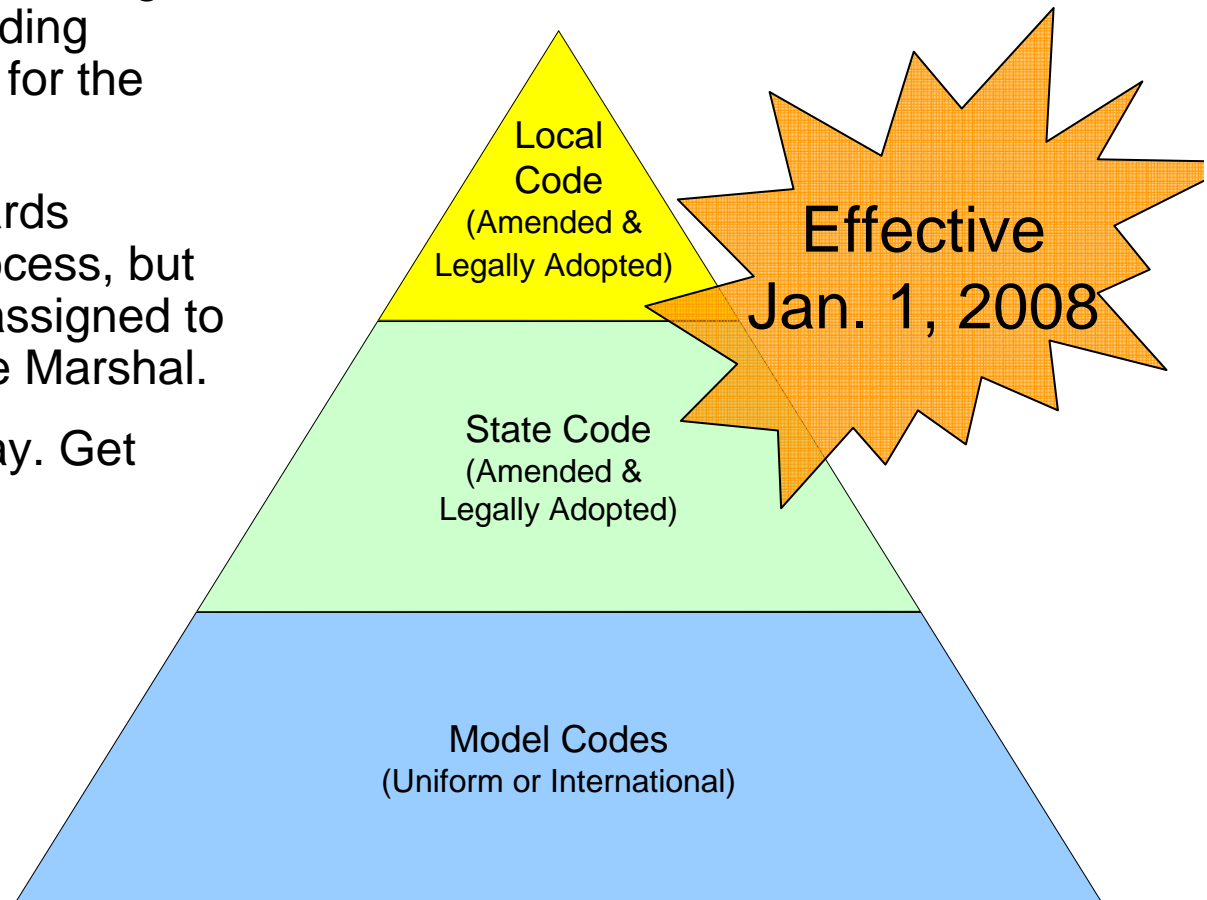


California Legally Adopts Codes by Regulation

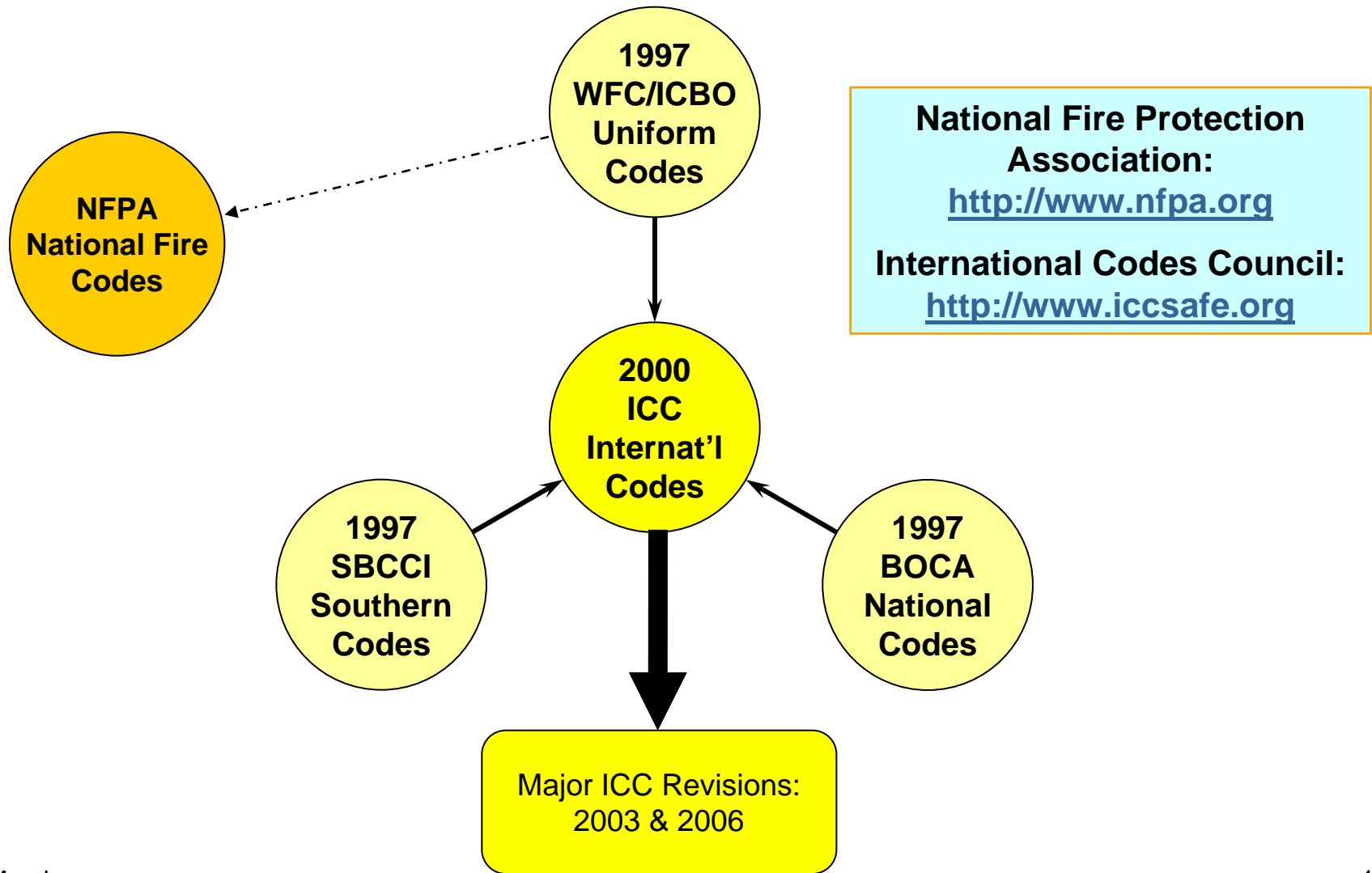
- Cal-OSHA (CCR Title 8)
Primarily states when employers must take actions with minimal requirements for what to do or how to do it
 - § 3220 – Emergency Action Plans
 - § 3221 – Fire Prevention Plans
 - § 6183 – Fire Detection Systems
 - § 6184 – Employee Alarm Systems
- California Fire and Building Codes (CCR Title 24)
Details minimum requirements for employers and residences
 - Specific performance requirements, many based on NFPA 13, 25, 70, and 72
 - CFC Article 90 – Referenced Standards

California's Next Code Set (2007)

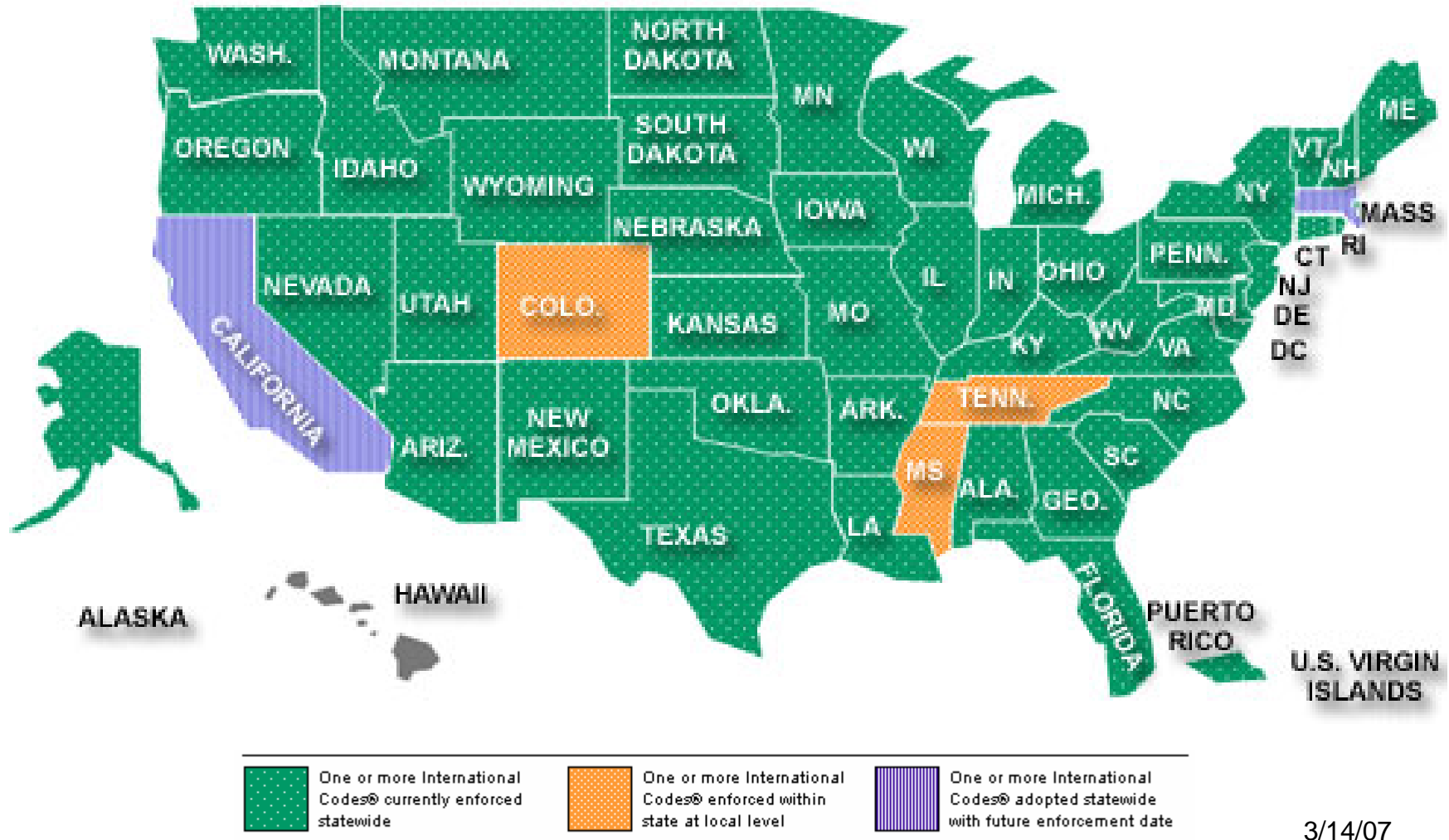
- California has committed to using International Fire and Building Codes as the model code for the 2007 California Code Set.
- California Building Standards Commission owns the process, but the CFC development is assigned to the Office of the State Fire Marshal.
- Code adoption is underway. Get involved!
 - BSC Website:
<http://www.bsc.ca.gov>
 - OSFM Website:
<http://osfm.fire.ca.gov/>



What are the Model Codes? ...and who built them?



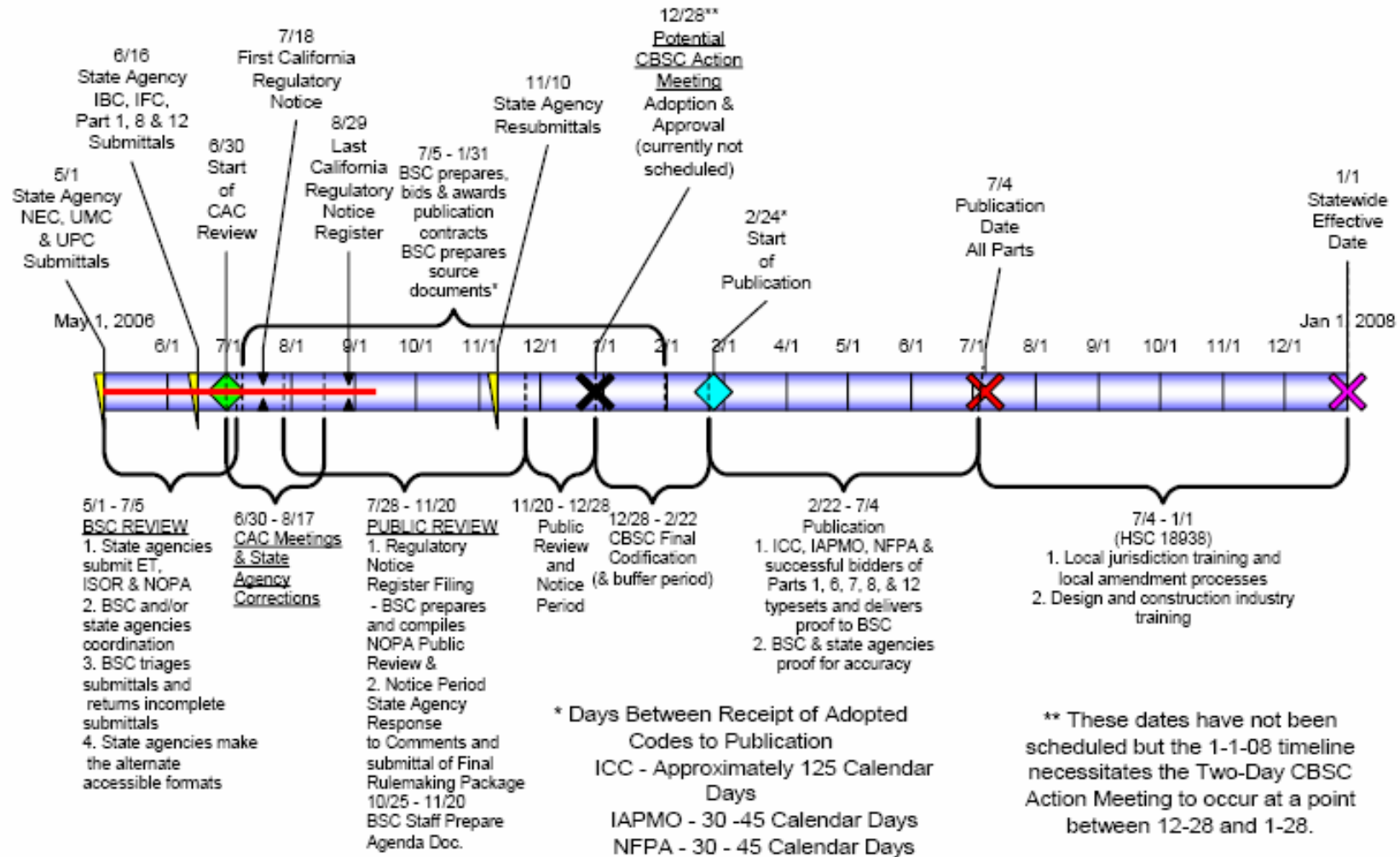
Where are the International Codes used?
...<http://www.iccsafe.org/government/adoption.html>...



3/14/07

2007 California Code Adoption Cycle

...http://www.bsc.ca.gov/prpsd_chngs/pc_06_ann_cycle.html...



The “New” 2007 California Codes ...same as it ever was...

The new California Fire & Building Codes will use the 2006 International Fire & Building Codes as their base, BUT :

- They will still use the Uniform Plumbing and Mechanical Codes (updated for 2007)
- They will still use NFPA standards as the basis for:
 - Electrical Code (NFPA 70)
 - Fire Alarm Design & Installation (NFPA 72)
 - Fire Sprinkler Design & Installation (NFPA 13)
 - Fire Sprinkler Inspection, Testing, and Maintenance (NFPA 25)
 - Flammable/Combustible Liquids (NFPA 30)
- They will still have California-specific amendments (e.g., seismic codes)
- They have similar organizational structure and (mostly) common terminology

The “New” 2007 California Codes ...with some changes...

*All codes evolve, so change is to be expected **at least** every 3 years!*

- Impacts of changes on business depend on:
 - How the changes are interpreted and applied (e.g., retroactive or only for new construction & significant renovation?)
 - Available technology and code options
 - Creative solutions (code options vs. alternative methods)
 - Budgets and cost perspective (short term savings vs. total cost of ownership; static vs. dynamic building use)
- Impacts may be minimized with:
 - Knowledge of the codes, the stakeholders, and the compliance process
 - A good loss prevention plan tied to strategic business objectives (set corporate protection standards to achieve business goals)

Occupancy Classifications

...some new terms for old uses...

IFC Class	UFC Class	Description
A-1	A-1, A-2, A-2.1	Theater/auditorium with fixed seats (>50)
A-2	A-2.1, A-3	Cafeterias, dining rooms (>50)
A-3	A-2.1, A-3	Auditoriums, fitness centers, game rooms (>50)
B	B	Business, offices, labs, data/telecom, assembly (<50)
F-1	F-1	Factory, Moderate Hazard (electronics, liquor, food processing)
F-2	F-2	Factory, Low Hazard (beverages, ceramics, metal fab./assembly)
H-1*	H-1	Explosives, deflagration (explosives, Ox-4, FL-1A, Org. Perox.-UD)
H-2*	H-2	High hazard mat'ls, deflagration (pyrophoric, Ox-3, F-G/L/S, CL, OP-1)
H-3*	H-3	High hazard mat'ls, significant fire (Ox-2, Ox-gas/cryog., CL, CFib., OP-2/3)
H-4	H-7	Health hazard materials (Corr., toxics > IBC Table 307.1(2) in control area)
H-5	H-6	Semiconductor fabrication and research
M	M	Mercantile (retail/wholesale stores, sales rooms, motor fueling facilities)
S-1	S-1, S-2, H-4, H-5	Storage, Moderate Hazard (aerosols-2/3, vehicle repair, combustibles)
S-2	S-2, S-4, S-5	Storage, Low Hazard (parking garages, food, non-combustible liquids)
U	U-1, U-2	Utility building (agricultural, sheds, tanks, towers, livestock shelters)

Occupancy separations ...a mixed bag...

**TABLE 508.3.3
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)**

OCCUPANCY	A ^e , E		I		R ^d		F-2, S-2 ^{c,d} , U ^d		B ^b , F-1, M ^b , S-1		H-1		H-2		H-3, H-4, H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A ^e , E ^e	N	N	1	2	1	2	N	1	1	2	NP	NP	3	4	2	3 ^a
I	—	—	N	N	1	NP	1	2	1	2	NP	NP	3	NP	2	NP
R ^d	—	—	—	—	N	N	1	2	1	2	NP	NP	3	NP	2	NP
F-2, S-2 ^{c,d} , U ^d	—	—	—	—	—	—	N	N	1	2	NP	NP	3	4	2	3 ^a
B ^b , F-1, M ^b , S-1	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2 ^a
H-1	—	—	—	—	—	—	—	—	—	—	N	NP	NP	NP	NP	NP
H-2	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	1	NP
H-3, H-4, H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP

For SI: 1 square foot = 0.0929 m².

- S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
- NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
- N = No separation requirement.
- NP = Not permitted.

a. For Group H-5 occupancies, see Section 903.2.4.2.

- b. Occupancy separation need not be provided for storage areas within Groups B and M if the:
 1. Area is less than 10 percent of the floor area;
 2. Area is equipped with an automatic fire-extinguishing system and is less than 3,000 square feet; or
 3. Area is less than 1,000 square feet.

c. Areas used only for private or pleasure vehicles shall be allowed to reduce separation by 1 hour.

d. See Section 406.1.4.

e. Commercial kitchens need not be separated from the restaurant seating areas that they serve.

Requirements to install sprinklers

...more sprinklers in commercial & industrial buildings...

- 1997 UBC (basis for 2001 CBC)
 - Sprinklers not required in factories (F), warehouses (S), or parking garages (S) based solely on occupancy classification
- 2006 IBC Section 903.2
 - Sprinklers required in F-1 and S-1 if:
 - >12,000 SF
 - >3 stories
 - >24,000 SF aggregate of all stories
 - Sprinklers required in S-2 enclosed parking garage (except where beneath R-3)
 - Sprinklers required in buildings if >5,000 SF used as storage for *commercial* trucks or buses
- 2006 IFC Section 903
 - All H occupancies require sprinklers
 - Many new use/condition triggers requiring installation of sprinklers

Occupant Load determination ...may allow more occupants in same space...

- 2006 IBC Sec. 1002.1, Table 1004.1
 - “Gross” floor area: All FA within exterior walls, except vent shafts & courtyards
 - “Net” floor area: Actual occupied FA, excluding unoccupied accessory uses (e.g., corridors, stairways, closets, built-in cabinets/counters)
 - If AHJ approves, actual number of occupants may be used where < calculated occupant loads
 ** *Be careful if this is accepted into CBC! Uses change over time!!!*

Occupancy	FA per Occupant
Assembly (no fixed seats)	
• Concentrated seating	7 net
• Standing space	5 net
• Unconcentrated (tables)	15 net
Assembly (fixed seats)	Sec. 1004.7
Business areas	100 gross
Day care	35 net
Exercise & Locker rooms	50 gross
H-5 Semiconductor fabs	200 gross
Industrial areas	100 gross
Kitchens, commercial	200 gross
Warehouses	500 gross

Means of Egress Changes

...a few highlights...

- Accessible “Areas of Refuge” above/below accessible level of exit discharge are now required in sprinklered, as well as non-sprinklered buildings (2006 IBC Section 1007)
- Spaces allowed to have single means of egress:
 - Per Table 1015.1
 - If common path of travel < Section 1014.3

**TABLE 1015.1
SPACES WITH ONE MEANS OF EGRESS**

OCCUPANCY	MAXIMUM OCCUPANT LOAD
A, B, E ^a , F, M, U	49
H-1, H-2, H-3	3
H-4, H-5, I-1, I-3, I-4, R	10
S	29

a. Day care maximum occupant load is 10.

- Sec. 1014.3, Common Path of Travel limits:
 - H-1, H-2, H-3: ≤25 feet
 - A w/fixed seating: see Section 1025.8
 - All others: ≤75 feet

Corridor fire resistance requirements

- No specific designation for “hallways” (2001 CBC considers them intervening rooms)
- Fire resistance depends on occupancy and occupant load served

**TABLE 1017.1
CORRIDOR FIRE-RESISTANCE RATING**

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system ^c
H-1, H-2, H-3	All	Not Permitted	1
H-4, H-5	Greater than 30	Not Permitted	1
A, B, E, F, M, S, U	Greater than 30	1	0
R	Greater than 10	Not Permitted	0.5
I-2 ^a , I-4	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1 ^b

a. For requirements for occupancies in Group I-2, see Section 407.3.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.7.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

International Fire Code changes ...more prescriptive emergency preparedness...

- Chapter 4 specifies emergency planning & preparedness requirements
- Sections 404.2 – 405 require written fire safety & evacuation plans, annual fire drills for A; B & M if >500 or >100 +/- level of exit discharge; H; high-rise or underground buildings; buildings with an atrium & an A, E, or M occupancy
- Section 406 – employee training
- Section 407 – hazard communication for HazMat
 - HazMat Inventory (HMIS)
 - HazMat Business Plan (HMMP)

**TABLE 405.2
FIRE AND EVACUATION DRILL
FREQUENCY AND PARTICIPATION**

GROUP OR OCCUPANCY	FREQUENCY	PARTICIPATION
Group A	Quarterly	Employees
Group B ^c	Annually	Employees
Group E	Monthly ^a	All occupants
Group I	Quarterly on each shift	Employees ^b
Group R-1	Quarterly on each shift	Employees
Group R-2 ^d	Four annually	All occupants
Group R-4	Quarterly on each shift	Employees ^b
High-rise buildings	Annually	Employees

- a. The frequency shall be allowed to be modified in accordance with Section 408.3.2.
- b. Fire and evacuation drills in residential care assisted living facilities shall include complete evacuation of the premises in accordance with Section 408.10.5. Where occupants receive habilitation or rehabilitation training, fire prevention and fire safety practices shall be included as part of the training program.
- c. Group B buildings having an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
- d. Applicable to Group R-2 college and university buildings in accordance with Section 408.3.

Hazardous Material Control Areas ...additional options with some restrictions...

- 2001 California Codes
 - Control areas separated by minimum 1-hour occupancy separations
 - Maximum of four control areas in 1 building
 - 100% of exempt HazMat quantities allowed in each control area
- 2006 International Building Code

[F] TABLE 414.2.2
DESIGN AND NUMBER OF CONTROL AREAS

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA ^a	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS ^b
Above grade plane	Higher than 9	5	1	2
	7-9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
	1	100	4	1
Below grade plane	1	75	3	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 307.1(1) and 307.1(2), with all increases allowed in the notes to those tables.

b. Fire barriers shall include walls and floors as necessary to provide separation from other portions of the building.

International Fire Code changes ...cleanroom & high tech issues...

- Chapter 18, Semiconductor Fabrication Facilities (formerly Article 51 in 2001 CFC)
 - **All requirements are retroactive** with a few exceptions in Section 1805.3.2 regarding transportation and handling requirements for Hazardous Production Materials (HPMs)
 - Maximum Quantities of HPM at a Workstation have increased in some cases
 - New requirements for Pyrophoric Liquids and Class 3 water-reactive liquids
- Caution: Cleanrooms used as factories or R&D areas for products not related to semiconductors, are not technically H-5!
 - Evaluate common fire and HazMat hazards and controls
 - Local Authority Having Jurisdiction (AHJ) determination/agreement
- Section 3007.2 requires ventilation for asphyxiant, irritant, or radioactive gases not previously regulated by CFC
- H-occupancies used for oxidizer storage must have sprinkler designs meeting NFPA 430 *Liquid and Solid Oxidizers*

Keys for successfully unlocking the new Codes

- **Don't Panic!**

- Read and understand the new requirements
- Think outside the box – alternative methods!
- When in doubt, **ASK** (e.g., AHJ, insurer, consultant, peers)!!

- **Establish corporate objectives for fire and life safety**

- Evaluate recommendations, projects, and code requirements against objectives
- Prioritize spending using stakeholder input
- Look at total cost of ownership, not just construction costs

- **Get involved!**

- Don't just complain – submit your suggestions for improvement

BSC Website:

<http://www.bsc.ca.gov>

OSFM Website:

<http://osfm.fire.ca.gov/>

Santa Clara County Fire

Paul Inouye (pinouye@ci.milpitas.ca.gov)

Additional Resources for Learning the International Codes

The ICC online store (<http://www.iccsafe.org> & click on “ICC Store” tab) has several guidebooks that may be of use in learning the new International codes. Those listed below are merely a sample:

- *2006 IBC[®] Transition from the 1997 UBC[™] : Nonstructural Provisions*
[ICC Publication # 1029S06]
- *2006 IFC[®] Transition from the 1997 UFC[™]*
[ICC Publication # 1410S06]
- *Quick-Reference Guide to Fire Safety: Occupancy-based Requirements of the 2006 IBC[®]*
[ICC Publication # 4004S06]

ICC also offers training courses under the “Training” tab on the home page.

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