Evacuate or Defend in Place?

Presented by:
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Hughes Associates, Inc.

Webinar sponsored by:
The American Health Care Association (AHCA)
National Center for Assisted Living (NCAL)

Agenda

* Provide background and overview of criteria
* Discuss defend-in-place
* Review fire safety terminology
* Provide code requirement overview
* Discuss upcoming code changes
* Questions
Hughes Associates-Introduction

- Large fire protection/life safety engineering, consulting firm
- Over 150 licensed fire protection and life safety experts
- Works with AHCA and NCAL
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Summary

- Increasing acuity of residents in assisted living facilities
- Decreasing evacuation capability
- Egressing in an emergency to the exterior is not always feasible
- Codes permit a “defend-in-place” methodology
- Require additional fire protection features for occupant protection as a trade-off
Objective

* Review code requirements and discuss code changes relating to fire safety in memory care and assisted living facilities
* Evacuation vs. defend in place (DIP)
* Large vs. small facilities
* Upcoming code changes
* Implementation
* Focus on ALF

Limitations

* Natural disasters
* Security threats
Classification of Units: Life Safety Code

* Depends on abilities
  * Assisted Living/Board and Care
  * Nursing Home/Health Care
* Assisted Living
  * Sleeping
  * Personal care services/not medical care
  * Bathing, dressing...
* Residents can relocate
* Ability to evacuate typically

Self-Preservation

* Rising acuity rate of residents
  * 50 percent have three or more chronic conditions,
  * 42 percent have Alzheimer's disease or other forms of dementia
* Memory care units
* Incapability of self-preservation
* Evacuation may not be appropriate

2010 National Survey of Residential Care Facilities
Impacts of Rising Acuity

- Increased evacuation time
- More rigorous staff training
- Emergency transportation equipment

Evacuation Capability

- Function of two factors:
  - Ability of residents to evacuate
  - Assistance provided by staff
- Must be acceptable to Authority Having Jurisdiction (e.g., regulatory agency)
- Based on results of drills
Definition - Evacuation Capability

* **Prompt** – move reliably to point of safety in a timely manner equivalent to capacity in general population
* **Slow** – move reliably to point of safety in a timely manner not as rapidly as general population
* **Impractical** – inability to reliably move to point of safety in a timely manner

Definition - Evacuation Capability

* **Existing**- Evacuate or relocate from point of occupancy to point of safety
  * Prompt: <3 min
  * Slow: 3-13 min
  * Impractical: >13 min
* **New** assumes **Impractical**
Evacuation Modes

- Evacuate to the outside
- Defend-in-place (Wholesale relocation not desirable)
  - Relocate horizontally to adjacent smoke compartment
  - Remain in current smoke compartment or dwelling unit

Defend-in-Place
Key Features

- Automatic fire sprinkler system (NFPA 13)
  - Controls or suppresses fire
  - Limits fire spread
- Smoke barriers to subdivide building
  - Limits smoke spread
  - Creates area of refuge
- Automatic fire alarm system
  - Alerts occupants/staff
  - Contacts fire service
Defend-in-Place
Benefits

* Minimize or eliminate vertical travel (up or down stairs)
* Minimize or eliminate movement to the outside
  * Lighting
  * Weather
  * Perimeter
  * Elopement
* Increased security and safety
  * Residents safer inside
  * Minimize exposure to outside security concerns

Defend-in-Place
Costs

* Additional fire protection systems
  * Sprinklers
  * Fire alarm
* Additional rated walls (fire or smoke barriers)
* Higher staff to resident ratio
* Fire-resistant construction (new multi-story)
Compliance Hurdles

* What ifs
  * Evacuation required?
  * DIP concept not accepted?
  * Different code editions applicable?
  * Code official requires equivalency for DIP?
  * How do you move forward?

Fire Safety Terminology

Construction

* Credited fire resistance of a feature most often based on standard tests (e.g., UL)
* Fire resistance measured in hours or portions thereof (1-hour, 2-hour)
* Features - walls, floors, roofs, ceilings, structural frame (columns, girders, trusses)
* Requirements based on use/occupancy, sprinklers, height & area, FD access
Fire Safety Terminology
Construction

* Protected – resistive to fire, hourly ratings
* Unprotected – no fire rating
* “Type” specified in codes describes level of fire resistance
  * Type I – highest level (examples high-rises, large health care, large assembly), noncombustible
  * Type II – mostly noncombustible (steel, concrete)
  * Type III – noncombustible exterior walls, combustible interior
  * Type IV – heavy timber
  * Type V – lowest level (houses, small buildings), combustible

Construction-General Concepts

* Higher fire resistive construction types required
  * Taller buildings
  * Large facilities (based on number of residents)
* Lesser construction types permitted
  * Shorter buildings
  * Small facilities (based on number of residents)
  * Sprinkler protection allows reductions
* ALFs-Type II or Type V
Fire Safety Terminology
Fire/Smoke Walls and Partitions

* Additional to construction type features
  * Corridor walls
  * Vertical openings
    * Stairs
    * Shafts
  * Hazardous areas
    * Laundry rooms
    * Storage
    * Boiler rooms
  * Subdivision of building spaces by smoke barriers

Construction and Compartmentation

* Smoke Partition
  * No rating required
  * Doors-no louvers
  * Ducts-no dampers
* Smoke Barrier
  * Ducts-Smoke damper
  * Sealed penetrations
  * Continuity through concealed spaces
* Fire Barrier
  * Based on testing (ASTM E 119)
  * Rated doors and windows
  * Firestopping of penetrations and joints
  * Ducts provided with dampers
Fire Safety Terminology
Automatic Sprinklers

* Delivery of water for suppression/control of fire (NFPA 13)
* Activated by heat from fire
* For most systems, water discharge only from sprinklers in vicinity of fire
* Sprinkler(s) discharge initiates alarm

Automatic Sprinklers

* Three design standards
  * NFPA 13 – covers most systems, most stringent requirements, highest cost per square foot
  * NFPA 13R – limited to residential buildings not more than four stories in height
  * NFPA 13D – limited to one- and two-family dwellings
* Code provisions vary based on design standard
Fire Safety Terminology

Fire Alarm System

- Manual fire alarm system
  - Manual fire alarm “pull” stations required for initiation
  - Bells, horns, speakers for audible notification
  - Strobes for visual notification
- Automatic fire alarm system
  - Does not rely solely on human intervention
  - Smoke detectors, heat detectors, sprinkler waterflow detectors
  - Manual fire alarm “pull” stations allowed for initiation
  - Bells, horns, speakers for audible notification
  - Strobes for visual notification

Smoke Alarms

- Different from smoke detectors
- Detection and audible alarm in one unit
- Battery-operated permitted in some cases
- Limited to within dwelling or sleeping unit
- Does not typically activate building fire alarm system
**Code Requirements**

- Vary by applicable code, and building size, use, and classification
- Based on:
  - New or existing occupancy
  - Number of residents (small vs. large)
  - Applicable code edition
  - Evacuation capability of residents

**What is NFPA 101?**

- Focus on fire and life safety
- Scoping requirements – what is required?
- Technical requirements – how must it be built?
- Addresses New and Existing (unlike building code)
- Technical committees - experts, operators, code enforcers, manufacturers
- Revised every three years
Why NFPA 101?

- Code adopted by many jurisdictions including states
- Technical committees – direct input from ALF experts incl. NCAL, AHCA
  - Last edition based on evacuation capabilities
  - Last edition to reference Ch. 18/19 for Health Care for impractical
  - Applicable to older Iowa ALFs
  - Latest edition in circulation
  - Reflects years of progress in industry

(Applicable Sections)

<table>
<thead>
<tr>
<th>Evacuation Capability</th>
<th>New Small (not more than 16 residents)</th>
<th>New Large (more than 16 residents)</th>
<th>Existing Small (not more than 16 residents)</th>
<th>Existing Large (more than 16 residents)</th>
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<td>32.3</td>
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<td>Ch. 18 (New Health Care)</td>
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<td>Ch. 19 (Existing Health Care)</td>
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### New Small Facilities (2000 LSC)

<table>
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<tr>
<th>Feature</th>
<th>Prompt</th>
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<tbody>
<tr>
<td>Fire Alarm</td>
<td>Required</td>
<td>Required</td>
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<tr>
<td>Automatic Sprinklers</td>
<td>Required</td>
<td>Required</td>
<td>Required (More restrictive criteria)</td>
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<td>Corridor/Demising Walls</td>
<td>Smoke partitions</td>
<td>½-hour fire-resistant Exceptions</td>
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<td>Smoke Barriers (Subdivision of Building Spaces)</td>
<td>No requirements</td>
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<td>Manual fire alarm system</td>
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<tr>
<td>Automatic Sprinklers</td>
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<td>Smoke Barriers</td>
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<td>(Subdivision of Building Spaces)</td>
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<td>Automatic Sprinklers</td>
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<td>Or Smoke partitions</td>
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<td>½-hour smoke barriers</td>
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<td>(other exceptions)</td>
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<td>residents</td>
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**Highlights**

- Why 2012? – Updated to reflect changes in the industry, more flexibility for existing buildings
- New facilities
  - Evacuation capabilities of occupants no longer specified
  - Smoke alarms required even in sprinkler protected buildings


**Highlights (New Large Facilities)**

- Design to defend in place like health care
- 1-hour fire-resistive smoke barriers
- Minimum construction type more stringent
- Smoke alarms also required outside sleeping areas within residential unit
- Corridor smoke detection required even in sprinklered buildings
Highlights (Existing Large Facilities)

- Provisions for evacuation capability retained to ensure existing facilities are not placed out of compliance
- Option to comply with either Chapter 19 for health care or less stringent RB&C Section 33.3

Existing ALF-LSC

- Older editions compliance options as occupants age in place
- Comply with existing health care-Chapter 19
- Transfer incapable patients
Major Change-LSC 2012 edition

- Existing facilities
- Residents become impractical evacuation (3 options):
  - Comply with existing health care-Chapter 19
  - Transfer incapable patients
  - (NEW) Upgrade fire/life safety systems to comply with ALF criteria

Existing Assisted Living Facility Summary

- For facilities with impractical capabilities upgrades may include adding sprinkler system and smoke barriers
- Evacuation may still be necessary under certain emergency conditions
- Trouble with 2000 editions requirements? Work with state to use existing requirements of 2012 edition → NFPA 101A

NEW

* NCAL sponsored
* Smoke barriers not required for slow or prompt evacuation in fully sprinkler-protected buildings
* Non-rated smoke partitions allowed on stories used for sleeping for less than 30 residents
* Sprinklers required for impractical evacuation

NEW

* Smoke detection not required in living areas for slow or prompt evacuation in fully sprinkler-protected buildings
* Limited protection of cooking facilities open to corridors
* Multiple delayed-egress door lock restriction removed
IBC Requirements

* International Building Code
  * Only for new buildings
  * For existing, see International Fire Code

* Occupancy Groups
  * Occupancies used to determine applicable code requirements
  * **Group I-1**, Institutional (more than 16 residents) – more stringent requirements than residential
  * **Group R-4**, Residential (more than 5 and but not more than 16 residents) – less stringent than institutional

Groups I-1 and R-4

* Reside on a 24 hour basis in a supervised environment
* Receive custodial care
* Evacuate at a slower rate and/or who have dementia complications
* Capable of self preservation

- NCAL sponsored wide-ranging changes (G31-12)
- Adds conditions to Group I-1
  - Condition #1 – Keeps original Group I-1
  - Condition #2 – Reflects current resident populations for those incapable of self-preservation
  - Adds requirement for smoke barrier for Condition #2
- Adds conditions to Group R-4 similar to Group I-1 without smoke barrier, options for NFPA 13R sprinklers

Negotiating with State Authorities

- Determine format for obtaining approval
- Prepare letter describing existing conditions and what mitigating features or alternative means of compliance you can provide
  - Example: NFPA 101A (Fire Safety Evaluation System)
- Meet to discuss
- Appeal if necessary
NFPA 101A FSES

* Alternative approach to compliance
* Building not in full compliance with prescriptive requirements
* Equivalent level of life safety to “baseline” building
* Determine facility’s parameter values for several safety parameters
* Compares facility’s parameter values vs. mandatory values
* Requires fire protection engineer, registered architect or third party
* Must evaluate facility as a whole

Summary

* Increasing acuity of residents in assisted living facilities
* Egressing in an emergency to the exterior is not always possible
* Codes permit a “defend-in-place” methodology
* Require additional fire protection features for occupant protection as a trade-off
Summary

• Contact for Further information:
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    Executive Director
    National Center for Assisted Living
    202-898-6312
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    Sr. Director of Regulatory Services
    AHCA
    202-898-6304
  • Eric Rosenbaum, P.E., Vice President
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Questions?

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