Damaged Buildings and Health Facility Evaluations

Hurricanes and Health Care Conference

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Past Catastrophic Hurricanes

- **1992** Hurricane Andrew
- **2004** Hurricanes Charley, Frances, Jeanne, Ivan
  - Of 276 Hospitals…114 sustained damage
  - Of 669 Nursing Homes…over 60 sustained damage
  - Of 2,287 ALF facilities…85 sustained damage
  - Of 476 Adult Family Care Homes…23 sustained damage
  - Of 1,266 Home Health Agencies…29 sustained damage
- **2005** Hurricanes Dennis, Katrina, Rita, Wilma
Agency for Health Care Administration

- **Develops** and writes hurricane construction standards for new and existing health care facilities
- **Supports** Emergency Status System (ESS) website at: [http://ess.myflorida.com](http://ess.myflorida.com)
- **Maintains** Emergency Management Planning Criteria
- **Staffs** ESF-8 at the Emergency Operations Centers (Central and Local)
- **Conducts** damage assessments of all health care facilities
Why AHCA Conducts Damage Assessments

• To provide information to the state and federal response teams
• To monitor and support providers and provider associations in the management of evacuations
• To determine short and long term impact on state wide health care delivery systems
• To learn and apply new knowledge to future hurricane mitigation projects
Typical Health Care Building Construction Types

• **Hospitals**
  – Typically multi-story
  – Type I, II, IV (protected)

• **Nursing Homes**
  – Typically single story
  – Type II, IV, V, (protected/unprotected)
Damage Assessment Categories

- Structural Failures
- Roofing Failures
- Roof Appendage and Site Failures
- Exterior Unit Failures
- Interior Facility Damage
- System Failures
- Surge Damage
Structural Failures
Structural Failures (cont.)
Structural Failures (cont.)
Structural Failures (cont.)
Structural Failures (cont.)
Structural Failures

- Structures such as metal buildings are lightweight and not designed to resist up-lift and should not be used for essential services
- Gable-end trusses not designed and constructed to resist wind pressure will collapse
- Hip roof structures react better to high wind
- Roofs not properly secured to top plates of framing will fail
Roofing Failures
Insufficient Decking Attachment
Roofing Failures (cont.)
Single Ply Roof
Roofing Failures (cont.)

Lose Laid Ballasted Roof
Complete Roofing Failure
Complete Water Intrusion
Recommended Roofing Standards

- No lose laid ballasted roofs
- No mechanically fasted single-ply membrane roofs
- Shingles should be securely fasted with nails, not staples and be of heavy duty material
- Sheathing should be plywood that is securely fastened to the trusses
- Best performing roofs:
  - 5 Ply Modified Bitumen with granular top layer
  - Fully adhered single ply or standing seam fully attached to roof decking
Appendage Failures
Appendage Failure (cont.)
Appendage Failure (cont.)
Appendage Failure (cont.)
Site Failure
Site Failure (cont.)
Recommended Roof Appendage and Site Standards

• All roof appendages should be strapped and attached to the roof structure, not to the curb
• Roof top units should be protected from missile impact by screening
• Signage and large vegetation should be located away from drives and parking areas
• Light standards should be designed and anchored to withstand high wind pressure
Exterior Building Envelope Failure
Exterior Unit Failures
Exterior Unit Failures (cont.)
Exterior Unit Failures (cont.)
Exterior Unit Failures (cont.)
Recommended Exterior Unit Standards

- All exterior windows, door, skylights, louvers, etc. should be protected to resist impact.
- Protective systems should not reduce clear window openings in resident rooms when not being utilized to protect the window.
- Protective systems can be stored on site or be designed to be integral with the window.
Examples of Protective Systems

• Rigid Metal shutters stored on site, applied to building at time of storm event. (Inexpensive but time consuming. For single story facility only.)

• Sliding or hinged hurricane shutters.

• Security Screens. (Reduces clear opening, sightlines skewed, reduces light into room)

• Impact resistant glass. (Best but most expensive.)
Interior Facility Damage
Interior Facility Damage (cont.)
Interior Facility Damage (cont.)
Mold and Mildew Issues
Interior Facility Damage (cont.)
Bent Headwall Bldg. Breach
Interior Facility Damage (cont.)
Building Breach
Recommended Procedures to Correct Interior Water Intrusion and Damage

• Immediately remove all water from facility
• Repair cause of water intrusion
• Retain the services of an Industrial Hygienist.
• See Indoor Air Quality Protocol, May 2006 at:
System Failures
Temporary and unsafe
Back-feeding the Normal Branch
Permanent and Safe
Typical Quick Connections
Temporary generator in use at an ALF
How many unsafe practices can you name??
Recommended Emergency Generator Standards

• The emergency generator system should be fueled by a supply stored on-site sized to fuel the generator for 100% load for 64 hours at full load or 72 hours for actual demand.

• The emergency power system should be in a protected area designed to meet the wind-load and debris-impact requirements.

• Generator should provide electrical service to ice making equipment, refrigeration, and sufficient lighting.
Recommended Temporary Emergency Generator Standards

- Have a contract with supplier throughout the year
- Plan in advance the location the generator will be set
- Protect the generator and its wiring from a damage
- Protect the building interior and occupants from the generator exhaust
- Plan for a safe fuel storage area
- For further information please see Actions To Correct Emergency Generator Problems at:
Surge Damage
Mississippi 2005
Surge Damage (cont.)
Surge Damage (cont.)
Surge Damage (cont.)
General Building Design Strategy

• Analyze Facility Structure to determine wind load capabilities
• Protect the Exterior Building Envelope (roof and walls)
• Protect the Support Services/Utilities
• Improve Site by removing potential obstructions
Develop Enhanced Hurricane Protection Area (EHPA)

- Space requirements: 30 sq. ft. per resident served in occupied resident area(s).
- Space for administrative and support services
- Space for staff and family members in the EHPA
Recommended Standards for Plumbing

• On site storage capability of 3 gals per resident per day for 3 days of potable water
• On site storage capability of 1 gal per staff and others per day for 3 days
• On site storage of water for other needs as determined by the facility. If sewage is inoperable, then use of temporary port o potty
• On site water well, bottled water, storage tank
Protecting the Evacuated Facility

• Harden the exterior openings.
• Power down the building.
• Keep emergency services operational:
  Fire alarm systems, Pumps, Lighting, and Refrigeration
• Let People Know Where You Went
Sign Left At Facility

[Image of a sign with handwritten text:]

We have relocated residents and vacated the premises.

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Typical AHCA Surveyor Concerns

• Have Fire Safety Issues been addressed?
• Is the Environment of Care being maintained?
• Have utilities been restored to the building?
• Is there emergency electrical service for power to the residents for air conditioning, lighting, basic services?
• Are the residents under extreme stress?
• What alternative methods have been taken to off-set non compliance?
• When will facility be able to return to full service?
Reoccupying the Facility

• Notify AHCA before Re-occupancy
• Power must be restored.
• Check all systems for proper operation
• Check all structural elements
• Check for water intrusion and mold growth.
• If there has been water intrusion follow AHCA protocol
Further Hurricane Management Information

• Office of Plans and Construction Web Site at:
  http://www.ahca.myflorida.com/MCHQ/Plans/
  – Recommended Physical Plant Improvements to Existing Nursing Homes for Disaster Preparedness
  – Protocol for Temporary Emergency Generator
  – Comprehensive Emergency Management Plan
  – Emergency Mobilization Plan
  – Emergency Resources and Emergency Management Planning Criteria
  – Emergency Information Links

• Field Office Web Site:
Thank You!

Questions?

This presentation will be posted at:
http://www.ahca.myflorida.com/MCHQ/Plans/