Mass Care Facility Considerations for Selecting Hurricane Shelters
Presenters

Danny J. Kilcollins, FPEM
Florida Division of Emergency Management

Jose Murguido, AIA
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Presenters

- Rose Bernal-Rundle
  Florida Facilities Management Association
  Harborside Event Center, Ft. Myers

- Rick Hamilton
  Florida Facilities Management Association
  Ocean Center, Daytona Beach
Traditional Shelter Buildings

Danny J. Kilcollins, FPEM
Planning Manager
Florida Division of Emergency Management
Traditional Mass Care

Mass Care—Preparedness and Operations (ARC 3041, April 1987)

- Sleeping Space (40-60 sq.ft./person)
- Blankets & Cots (2 & 1/person respectively)
- Food (2,500 Calories/person per day)
- Potable Water (5 gals/person per day)
- Toilets & Showers (1 per 40 persons each)
- Sanitation, Medical, Security & Comfort Considerations, etc.
- Shelter Management & Operations Space Needs
ARC 4496 (2002 Revision)

Standards for Hurricane Evacuation Shelter Selection
Hurricane/High Wind Shelter

Standards for Hurricane Evacuation Shelter Selection (ARC 4496, Rev. 2002)

- Surge Inundation Areas
- Rainfall Flooding
- Wind Hazards / Structural Considerations
- Wind Hazards / Interior Safety Criteria
- Hazardous Materials
- Hurricane Shelter Selection Process
- Least-Risk Decision Making
November 16, 2000

Palm Beach County
Emergency Management Division
20 South Military Trail
West Palm Beach, FL 33415

ATTENTION: Bill O’Brien III

REGARDING: Bear Lakes Middle School
Lake Worth Middle School
Watson B. Duncan Middle School
Omini Middle School
Wellington Middle School

PROJECT NO.: 99-557

Dear Mr. O’Brien:

We have evaluated the roof truss system for the typical classroom pod building and music/choir building. Based on ASCE 7-93 Category III, Exposure C, the truss framing is capable of resisting the proposed design loads.

Our analysis indicated several members were over-stressed but the over-stressed members were not located in critical failure zones. The over-stresses occurred in the uplift analysis in tension members. The design forces did not exceed ultimate strength of the members, therefore failure will not occur but there is a potential for a permanent deformation of the over-stressed member.

If you have any questions or require additional information, please contact this office.

Respectfully,

BRIDGE DESIGN ASSOCIATES, INC.

[Signature]

Brian C. Rheault, P.E. #38797

P.O.Box 210173 • West Palm Beach, Florida 33421-0173 • (561) 753-0816 • Fax (561) 753-0798
Newsome HS
Newsome HS – Design Criteria

DESIGN LOADS

A. LIVE LOADS:
   1. UNIFORMLY DISTRIBUTED LIVE LOADS
      a) CLASSROOMS...........................................40
      b) CORRIDORS ABOVE FIRST FLOOR.....................80
      c) MECHANICAL ROOMS (OR ACTUAL EQUIPMENT LOAD, WHICHEVER IS LARGER)..............150

   2. CONCENTRATED LIVE LOADS
      a) CLASSROOM SPACE, ON AN AREA OF 2.5 SQ FT.................................................2,000
      b) STAIR TREADS (ON CENTER OF TREADS)..........................300

   3. LIVE LOAD REDUCTION:
      FOR LIVE LOADS OF 100 LBS/50 FT OR LESS, THE DESIGN LOADS HAVE BEEN REDUCED AS PER THE STANDARD BUILDING CODE. LIVE LOADS FOR ASSEMBLY BUILDINGS MAY NOT BE REDUCED.

B. OTHER SUPERIMPOSED LOADS:
   1. UNIFORM LOADS
      a) CEILING AND MECHANICAL.............................................10
      b) PARTITIONS.................................................................20

C. WIND LOADS:
   1. ALL WIND LOADS SHALL BE BASED ON THE REQUIREMENTS OF THE STANDARD BUILDING CODE, IN ACCORDANCE WITH ASCE 7-98 AND THE 1999 FLORIDA STATE REQUIREMENTS FOR EDUCATIONAL FACILITIES (SREF).
      a) HURRICANE SHELTERS (BUILDINGS 2, 7, AND 8)
         i) BASIC WIND SPEED = 160 MPH
         ii) USE FACTOR = 1.0
         iii) EXPOSURE CATEGORY = C
      b) REMAINING BUILDINGS
         i) BASIC WIND SPEED = 120 MPH
         ii) USE FACTOR = 1.15
         iii) EXPOSURE CATEGORY = C
Sherwood Elem. Floor Plan
Marianna HS
Example School
Facility: L. Chiles High School, Tallahassee FL
Regional Map – Campus Location
Chiles High School – Building Usage

Courtesy: JRA Architects, Inc.
Checking the Windows
ANSI Z97.1-1984 Certification
Window Protection (example)
Window Protection (example)
Typical Doors
Building 2 – Media / Technology – 1st Floor
Building 3 - Cafeteria
Building 3 – Cafeteria
Bldg #3 - Risk

Mass Care:

- Sleeping Space (20 sq.ft./person)
  - Cafeteria – None
  - Classroom – None
Bldg #3 – Host/Recovery

Mass Care:
- Sleeping Space (40 sq.ft./person)
  - Cafeteria – 200 spaces
  - Classroom – 33 spaces
- Food – adequate 3 day supply
- Toilets - 4 (160 spaces)
- Shelter Management & Operations Space Needs - adequate in kitchen area
Building 7 (&8) – Classrooms – Building Cross Section

YP BLDG SECTION (CLASSROOM)
Building 7 (& 8) – Classrooms – Attic Mezzanine
Building 7 – Classrooms – 1st & 2nd Floors
Building 7 – Classrooms – 1st Floor Corridor
Building 7 – Classrooms – Typical Classroom Type A
Building 7 – Classrooms – Typical Classroom Type B
Mass Care:

- Sleeping Space (20 sq.ft./person)
  - Corridor – 175 spaces @ 1st story
  - Corridor – 175 spaces @ 2nd story
  - Classrooms* – 725 spaces @ 1st story
- Toilets - 4 ea. story (160 spaces ea.)
Building 8 - Science Laboratory
Bldg #8

Mass Care:
- Sleeping Space (20 sq.ft./person)
  - Corridor – 143 spaces @ 1st story
  - Corridor – 143 spaces @ 2nd story
  - Classrooms* – 260 spaces @ 1st story
- Toilets - 4 ea. story (160 spaces ea.)
L. Chiles H.S. Summary

Mass Care:

- Risk Sleeping Space (20 sq.ft./person)
  - "AS IS" space = 788 spaces in 3 bldgs
  - Mitigation space = 1,265 spaces in 3 bldgs
  - Toilet limited space = 480 spaces in 3 bldgs
  - 1,573 spaces lost (approx. $212,355 @ $135/space)
L. Chiles H.S. Summary

Mass Care:

- Host Sleeping Space (40 sq.ft./person)
  - “AS IS” space = 466 spaces in 2 bldgs
  - Mitigation space = N/A
  - Toilet limited space = 443 spaces in 2 bldgs
  - 23 spaces lost
Alternative Mass Care

Mass Care—Preparedness and Operations (FEMA 361, et al)

- Sleeping Space (15 sq.ft./person)
- Blankets & Cots (Not Applicable)
- Food (700 to 1,200 Calories/person)
- Potable Water (1 gal/person per day)
- Toilets & Showers (1 per 75 -100 persons)
- Sanitation, Medical, Security & Comfort Considerations, etc. (reduce)
- Shelter Management & Operations Space (reduce)
Creative Access to Restrooms
1960’s Shelter Supplies
Risk Shelter Issues to be Resolved:

- Limited availability of sanitation/toilets
- Survivability of utilities (water, electric)
- Cooking & Feeding
- Shelter Management & Operations Space Needs
  - Shelter buildings spread out over campus
  - Management of classroom areas
  - Security & Property Protection/Control