3-1-2013

Creating a Multi-Campus Hazard Mitigation Plan for the Mississippi Gulf Coast Community College System

Caroline Cunningham  
*Atkins North America*

Nathan Slaughter  
*Atkins North America*

John Shows  
*Mississippi Gulf Coast Community College*

Follow this and additional works at: [http://scholarworks.uno.edu/dru2013](http://scholarworks.uno.edu/dru2013)

**Recommended Citation**

[http://scholarworks.uno.edu/dru2013/13](http://scholarworks.uno.edu/dru2013/13)

This Presentation is brought to you for free and open access by the Conferences and Workshops at ScholarWorks@UNO. It has been accepted for inclusion in DRU Workshop 2013 Presentations – Disaster Resistant University Workshop: Linking Mitigation and Resilience by an authorized administrator of ScholarWorks@UNO. For more information, please contact scholarworks@uno.edu.
Mississippi Gulf Coast Community College Pre-Disaster Mitigation Plan

A case study for Multi-campus Planning

Disaster Resistant University Workshop 2013
Overview

● Part 1:
  – Atkins
  – MGCCC
  – 6 campus mitigation plan
    ● Planning Process, Planning Team, Campus Visits, Risk Assessment
  – Successes and Challenges
● Multi-disciplinary Engineering Firm
  – Design, Engineering, Project Management Consultancy
  – Emergency Management, Environmental, Transportation, etc
  – www.AtkinsGlobal.com

● Disaster Resistant University (DRU) Planning Experience
  – Mississippi Gulf Coast Community College (MGCCC)
  – Florida International University (sub to URS)
  – University of South Carolina
  – University of Massachusetts Amherst (sub to Jamie Caplan Consulting)
MGCCC

- **Est. 1911**: Harrison County Agricultural High School
- **1925**: junior college courses offered
- **1962**: expanded to serve 4 county area
- **Today**:
  - 3 campuses
  - 1 non-traditional
  - 3 centers
  - 10,000 students
  - 2,000 graduates annually
- www.mgccc.edu
Participating Campuses

- George County Center
- Perkinson Campus
- Adv. Manufacturing & Technology Center
- West Harrison County Center
- Jackson County Campus
- Jefferson Davis Campus
General Overview

- Gather Project Team
- Kick-off Meeting
- Campus Visits
- Reconvene Project Team/Mitigation Strategy
- Draft Plan Review
- State/FEMA approval
- Campus Adoption

Approximately a 12 month process
Internal Kick-off Meeting

- Immediate Planning Team
  - Via webinar
  - Explain:
    - Mitigation
    - Need for HMP
    - Role/Responsibilities
    - Planning Process and Schedule
  - Buy-in
Official Kick-off Meeting

- In-person
- What is Mitigation
- Importance of Hazard Mitigation Plan
- Mitigation Examples
- Upcoming Site Visits
- Project Schedule
- Role/Responsibilities
- Ice Breaker Exercise
Planning Team

- Representatives from each campus
  - Faculty
  - Staff
  - Broad base
- Local community
  - County Emergency Management offices
  - State EMA (MEMA)
  - Utilities
  - American Red Cross
- Possible due to small geographic area
  - Could utilize webinars
Campus Visits

- Visited each participating campus
- Walking tour

Purpose
- Identify Critical Facilities
- Identify Mitigation Actions

Consistency
- Process
  - Step 1: Interview
  - Step 2: Campus tour
- People
- Questions/survey
Attendees

- Atkins
  - Nathan Slaughter, Project Manager
  - Caroline Cunningham, Risk Assessment Specialist

- MGCCC
  - John Shows, Assc. VP
  - Campus Representatives
    - Facilities
    - IT
    - Police
Campus Packets

- Critical Building Scoring Sheets
- List of all buildings/associated information
  - Insurance Dept.
- General questions
  - Previous hazard impacts
  - Known problem areas
  - Campus needs
  - Building questions
### Critical Building Scoring Sheets

- Reviewed with MGCCC officials prior to visits
- Used to determine critical facilities
  - Building Function
  - EOC
  - Housing
  - IT HUB
  - Generator
  - Unique Collections
  - Research

#### MGCCC Critical Building Scoring Worksheet

<table>
<thead>
<tr>
<th>Campus: ____________________________</th>
<th>Facility Name: ____________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the facility serve as the campus Emergency Operations Center (EOC)?</td>
<td>Score</td>
</tr>
<tr>
<td>Yes, Primary EOC = 6 pts</td>
<td>Yes, Secondary EOC = 3 pts</td>
</tr>
<tr>
<td>No = 0 pts</td>
<td></td>
</tr>
<tr>
<td>Does the facility house functions essential to campus operations?</td>
<td></td>
</tr>
<tr>
<td>Main Telecommunication Center = 3 pts</td>
<td>Maintenance = 1 pt</td>
</tr>
<tr>
<td>Computer Network Hub = 3 pts</td>
<td>Public Safety = 1 pt</td>
</tr>
<tr>
<td>Administrative Operations = 1 pts</td>
<td></td>
</tr>
<tr>
<td>Is the facility equipped with a generator or hook-ups?</td>
<td></td>
</tr>
<tr>
<td>Generator = 3 pts</td>
<td>Hook-ups = 1 pt</td>
</tr>
<tr>
<td>Neither = 0 pts</td>
<td></td>
</tr>
<tr>
<td>Does the facility serve as storage for rare or unique collections (art, artifacts, letters, etc.)?</td>
<td></td>
</tr>
<tr>
<td>Yes = 3 pts</td>
<td>No = 0 pts</td>
</tr>
<tr>
<td>Does the facility serve as a pre or post disaster shelter?</td>
<td></td>
</tr>
<tr>
<td>Both pre and post disaster shelter = 6 pts</td>
<td>Either pre or post disaster shelter = 3 pts</td>
</tr>
<tr>
<td>Neither = 0 pts</td>
<td></td>
</tr>
<tr>
<td>Does the facility provide services essential to sheltering?</td>
<td></td>
</tr>
<tr>
<td>Resident Housing = 1 pt</td>
<td>Food Preparation Facility = 1 pt</td>
</tr>
<tr>
<td>Assembly Space = 1 pt</td>
<td>Shower Facilities = 1 pt</td>
</tr>
<tr>
<td>Does the facility provide chilled water distribution?</td>
<td></td>
</tr>
<tr>
<td>Yes = 3 pts</td>
<td>No = 0 pts</td>
</tr>
</tbody>
</table>
## Campus Visit Schedule

<table>
<thead>
<tr>
<th>Campus</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>George County Campus Center</td>
<td>June 14</td>
<td>8:00 AM – 9:30 AM</td>
</tr>
<tr>
<td>Perkinston Campus</td>
<td>June 14</td>
<td>1:00 PM – 4:30 PM</td>
</tr>
<tr>
<td>Jefferson Davis</td>
<td>June 15</td>
<td>8:00 AM – 11:00 AM</td>
</tr>
<tr>
<td>AMT Center</td>
<td>June 15</td>
<td>11:30 AM – 12:30 PM</td>
</tr>
<tr>
<td>West Harrison Campus Center</td>
<td>June 15</td>
<td>1:00 PM – 3:00 PM</td>
</tr>
<tr>
<td>Jackson County Campus</td>
<td>June 16</td>
<td>8:00 AM – 11:30 AM</td>
</tr>
</tbody>
</table>
Perkinston Campus
MGCCC Centers

George County Center

West Harrison County Center
MGCCC Centers

George County Center

West Harrison County Center
Jefferson Davis Campus
AMTC – campus without walls
AMTC – campus without walls
Jackson County Campus
Pictures!
Risk Assessment

- Written portion concurrent with campus visits
- Consulted Local, state, federal sources
- Campus-level assessment
  - Hazards
    - Historical occurrences
    - Hazard location
    - Severity
    - Vulnerability & impact
- Building-specific analysis with Hazus-MH
Hazus-MH

- Utilized to get building specific results for critical facilities
  - Earthquake
  - Flood
  - Hurricane

- Comprehensive Data Management System (CDMS)
  - Input campus buildings (EFS2)
  - Insurance data from campus officials
Flooding
FEMA Digital Flood Insurance Rate Maps

All Campuses
Special Flood Hazard Areas
A
AE
AH
0.2-percent annual chance
VE
Mobile HAZMAT Incident

Mobile HAZMAT Analysis
- MGCCC Campuses
- Interstate/Highways HAZMAT (500 meter buffer)
- Interstate/Highways HAZMAT (2,500 meter buffer)
- Rail HAZMAT (500 meter buffer)
- Rail HAZMAT (2,500 meter buffer)

Railroads
- Interstates
- Railroads
- Interstate
- US Highways
- State Highways

Map showing the locations of MGCCC Campuses and the buffers for HAZMAT incidents.
Reconvene Planning Team

- Mitigation Strategy Meeting
  - Held at MGCCC Jefferson Davis Campus

- Present Risk Assessment Results
  - By campus
  - Consider audience

- Transition to Mitigation Strategy
  - Discussed problems identified
  - Recommended additional mitigation actions
Mitigation Strategy

- Broke into groups by campus
- Brainstormed Mitigation Actions
- Shared with entire group
- Result was a campus-specific mitigation action plan
Draft Plan to Adoption

● DRAFT
  – Submitted to planning team for review
  – Publicized on campus website
  – Atkins incorporated comments before submission to state

● SUBMISSION to State/FEMA

● ADOPTION by MGCCC following approval
  – Single adoption for all campuses
Next steps

- Working on projects
- Pursue grants
- Monitor
- Evaluate
Successes/Challenges

● Successes
  – Defined planning process
  – Campus visits
  – Planning Team
  – Involvement from each campus & community
    ● Small geographic area
  – Consistent Team
  – Recent Disasters

● Challenges
  – Limited time on the ground
  – Use of engineer on visits
Questions?

Contact:
Caroline Cunningham
Caroline.Cunningham@AtkinsGlobal.com
General Overview of Hazus and CDMS for Universities

Getting Beyond the Box
What is Hazus?

- A free software put out by FEMA to estimate losses for Flood, Hurricane Wind, Earthquake, and Storm Surge
- An **ESTIMATION** Tool
- A **PLANNING** Tool
- A Population **ASSESSMENT** Tool
- Run on ArcGIS platform
  - Spatial analyst extension needed for flood modeling
Hazus History

- Program initiated in 1992
- Earthquake in 1997
- Hurricane Wind and Flood in 1998
- Hurricane Storm Surge in 2011
- Tsunami coming soon…
Who Uses Hazus? Where?

- Lots of People!
  - Governments
  - Consultants
  - Federal Agencies
  - Education Entities
  - International Arena

- Where
  - Universities
  - Locally (state, county, region)
    - Hazard Dependent
  - Internationally
How Does Hazus Work?

Loss Estimation Process

1. Describe the hazard
2. Determine what is at risk
3. Describe the environment
4. Understand the environment
5. Describe the impact
6. Analyze the impact
7. Earthquake
8. Flood
9. Hurricane
Inventory

- Hazus-provides ("out of the box") inventory

- Two Types of Data:
  - Aggregate Data
    - General Building Types/Number
    - Demographics
  - Site Specific
    - Essential Facilities (universities)

- Powerful capability to ADD and ENHANCE data via CDMS
What is CDMS?

- Comprehensive Data Management Systems
- “The CDMS is a complimentary tool to Hazus-MH that provides users with the capability to update and manage statewide datasets, which are currently used to support analysis in Hazus-MH.” –source: FEMA
- A tool used to integrate data into Hazus for enhanced inventory and results
CDMS Overview

What is CDMS?

External Data Sources
- Excel 2003
- Access 2003
- Shapefile
- Personal GDB

CDMS Repository

Hazus-MH Statewide Databases
- Bndrygbs.mdb
- EF.mdb
- Trn.mdb
- Util.mdb
- Hplf.mdb
- fLAG.mdb
- flVeh.mdb
- Msh.mdb

Field Mapping and Validation

Source: FEMA
Why Do We Use CDMS?

- To Get Beyond the Box of Default Data!
- Update data:
  - Residential Building Counts: Census 2000
  - Non-Residential Counts and Data: Dun & Bradstreet, 2006
  - Demographics: Census 2000
  - Essential Facilities
    - Schools (including universities)
- Better input = Better results
- Better identify risk and prepare
Determining What’s in Hazus

- Many avenues
  - Investigate the state dataset on CD/local drive
  - Create a study region and view inventory
  - Query state dataset in CDMS

- Result
  - Colleges are a Single Point in Hazus (EFS2)

- In actuality, an entire campus of many buildings
Add Existing Data for Visual Reference

Hazus Study Region
University of South Carolina, Beaufort Campus
Export EF School Data

- Use CDMS to Query Dataset for schools
- Export Data
- CDMS-ready template
Template

- Updates down outside of CDMS
- Import New data into CDMS
- Cannot make changes in CDMS
What are the required inputs?

- Hazus ID
- Essential Facility Type
- Spatial Location
- First Floor Occupied Height (flood)
- Foundation Type (flood)
- Damage Function ID (flood)
- Contents Function ID (flood)
- Building Type (flood, earthquake)
- Design Level (flood, earthquake)
- Landslide Susceptibility (earthquake)
- Liquefaction Susceptibility (earthquake)
- Soil Type (earthquake)
What are the *additional* inputs?

- Back-up Power
- Contact Information
- Kitchen
- Shelter Capacity
- Comments
- Number of Stories
- Number of Students
- Replacement Cost
- Content Costs
- School District
- Year Built
- EQ soil Type
- EQ Water Depth
CDMS Data Dictionary

- Data Dictionary
  - [http://www.fema.gov/library/viewRecord.do?id=5120](http://www.fema.gov/library/viewRecord.do?id=5120)
  - In Hazus>CDMS Program Files after installation
- Explains all data requirements
- Indicates requirements for each field
  - Text (40), double, currency, etc
### Schools Facilities

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Required</th>
<th>Type</th>
<th>Units</th>
<th>Domain</th>
<th>Default</th>
<th>Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Address</td>
<td>FALSE</td>
<td>Text(40)</td>
<td></td>
<td>All</td>
<td></td>
<td>All</td>
</tr>
<tr>
<td>Area</td>
<td>Area</td>
<td>FALSE</td>
<td>Single</td>
<td></td>
<td>All</td>
<td></td>
<td>All</td>
</tr>
<tr>
<td>BackupPower</td>
<td>Back-up Power Yes(1) or No(0)</td>
<td>FALSE</td>
<td>Yes/No</td>
<td></td>
<td>All</td>
<td></td>
<td>All</td>
</tr>
<tr>
<td>BldgDamageFnId</td>
<td>Structure Damage Function Id</td>
<td>TRUE</td>
<td>Text(10)</td>
<td>643</td>
<td>FL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BldgType</td>
<td>Flood Building Type</td>
<td>TRUE</td>
<td>Text(15)</td>
<td>Table C.1</td>
<td>Masonry</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>City</td>
<td>FALSE</td>
<td>Text(40)</td>
<td></td>
<td>All</td>
<td></td>
<td>All</td>
</tr>
<tr>
<td>Comment</td>
<td>Misc. Comments</td>
<td>FALSE</td>
<td>Text(40)</td>
<td></td>
<td>All</td>
<td></td>
<td>All</td>
</tr>
<tr>
<td>Contact</td>
<td>Contact Person</td>
<td>FALSE</td>
<td>Text(40)</td>
<td></td>
<td>All</td>
<td></td>
<td>All</td>
</tr>
<tr>
<td>ContDamageFnId</td>
<td>Contents Damage Function</td>
<td>TRUE</td>
<td>Text(20)</td>
<td>480</td>
<td>FL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>Replacement Cost (thous. $)</td>
<td>FALSE</td>
<td>Currency</td>
<td>Thous. $</td>
<td>All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DesignLevel</td>
<td>Flood Pre/Post FIRM Design Level</td>
<td>TRUE</td>
<td>Text(1)</td>
<td>Table C.2</td>
<td>0</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>DesignLevel</td>
<td>Design Level</td>
<td>TRUE</td>
<td>Text(2)</td>
<td>Table B.6</td>
<td>LC</td>
<td>EQ</td>
<td></td>
</tr>
<tr>
<td>District</td>
<td>School District</td>
<td>FALSE</td>
<td>Text(30)</td>
<td></td>
<td>All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EfClass</td>
<td>Facility Class</td>
<td>TRUE</td>
<td>Text(5)</td>
<td>Table A.2</td>
<td>SDFLT</td>
<td>All</td>
<td></td>
</tr>
</tbody>
</table>
Understand Inputs and Outputs

- Use the CDMS Data Dictionary
  - Replacement Cost: not a required input
    - Losses not shown for all models
  - Perhaps better to use defaults after verification
    - Soil maps, Landslide maps, professors

- Understand What Drives Losses (technical manuals)
  - Location: verify!
  - Flood: location, foundation, elevation
  - Hurricane: location, EF Class
  - Earthquake: location, building type, soils, etc

- Site Visits are Helpful for Data Collection
  - Google Maps, Bing, etc also utilized
  - Number of buildings
Data Collection Site Visits: Foundation Type
-School Default: Slab on Grade

<table>
<thead>
<tr>
<th>Hazus Foundation Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile</td>
</tr>
<tr>
<td>Pier</td>
</tr>
<tr>
<td>Solid Wall</td>
</tr>
<tr>
<td>Basement/Yard</td>
</tr>
<tr>
<td>Crawl Space</td>
</tr>
<tr>
<td>Fill</td>
</tr>
<tr>
<td>Slab on Grade</td>
</tr>
</tbody>
</table>

- Can tell most from a picture or site visit, but not all.
- If an expert isn’t collecting it, put together a guide.
## Data Collection Site Visits: Building Type

-School Default: Masonry

<table>
<thead>
<tr>
<th>General Building Types</th>
<th>Model SPECIFIC Building Types – Earthquake and Flood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>Wood frame construction</td>
</tr>
<tr>
<td>Masonry</td>
<td>Reinforced or unreinforced masonry</td>
</tr>
<tr>
<td>Steel</td>
<td>Steel frame construction</td>
</tr>
<tr>
<td>Concrete</td>
<td>Cast-in-place or pre-cast reinforced concrete</td>
</tr>
<tr>
<td>Manufactured homes</td>
<td>Factory-built residential constructions</td>
</tr>
<tr>
<td></td>
<td>RM</td>
</tr>
<tr>
<td></td>
<td>Reinforced masonry</td>
</tr>
<tr>
<td></td>
<td>URM</td>
</tr>
<tr>
<td></td>
<td>Unreinforced masonry</td>
</tr>
</tbody>
</table>
Hurricane Essential Facility Class

- Hurricane Model Now using EF Building Class
  - Greater Focus on Building envelope
  - Considers construction of building/openings/etc
    - Formerly the construction material

- Cannot Update in CDMS
  - Small School: 45,000 square feet
  - Medium School: 90,000 square feet
  - Large School: 135,000 square feet
Add New Data into CDMS

- Import into CDMS
- Updates Study Region and state database
  - Any new study regions will have the updates
What is getting updated?

- State database
  - Any newly created study region will reflect data updates
- Study Region
  - Can add updates to existing study region
- ON LOCAL MACHINE

What is CDMS?
Ensure New Dataset is Updated

Run in Hazus!
Results for Essential Facilities (universities)

- **Flood Model**
  - Probability of Damage (by damage state)
  - Functionality
  - Dollar losses
    - Contents
    - Inventory

- **Hurricane Model**
  - Probability of Damage (by damage state)
  - Functionality

- **Earthquake Model**
  - Probability of Damage
  - Functionality
Essential Facilities Update Lessons Learned

- Must update inventory for university buildings
- Building Site Visits are Helpful
  - Data Collection
- Know your inputs and outputs
  - Saves Resources:
    - Make assumptions if necessary (use defaults)
    - Understand models and requirements
- Number of Buildings may dictate process
CDMS Limitations

- Cannot Update Hurricane-related data
  - Must update in study region (building class: small, medium, large) for each building

- Data cannot be “fixed” in CDMS
  - No way to change field classification (making field text to numeric, for example)
  - Use Excel set to general as a work-around

- When entering data, must know spatial location
  - By Lat/long
    - Decimal Degrees

- Limited to type of files to be updated
  - Excel, access, shapefile, person geodatabase
CDMS FYI’s

- Export Data for Template
- Can be temperamental
- Use excel
  - Work around for many of the requirements
- Office 2003
- No commas
- Delete empty rows and columns
- Projection for shapefile: GCS NAD 83
- First Floor Height (Elevation) – Feet above the ground
- Consult resources!
Hazus Resources

- Hazus HUGS
  - Likely one in your area
  - Attend others!
- Official FEMA Hazus site
- Data Dictionary
  - http://www.fema.gov/library/viewRecord.do?id=5120
  - In Hazus>CDMS Program Files after installation
- UseHazus.com
- Technical Manuals/User Manuals
- Emergency Management Institute

Source: FEMA.gov
Questions?

Contact:
Caroline Cunningham
Caroline.Cunningham@AtkinsGlobal.com