Advancing Disaster Resistant University Planning Beyond the Basic Requirements

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ADVANCING DISASTER RESISTANT UNIVERSITY PLANNING BEYOND THE BASIC REQUIREMENTS

Melanie Gall
DRU Workshop
University of New Orleans
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LSU System DRU Plan

- 4 campuses:
  - Alexandria (2,700 students)
  - Baton Rouge (28,000 students)
    - LSU AgCenter
    - Pennington Biomedical Research Ctr.
    - Paul M. Hebert Law Center
  - Eunice (3,000 students)
  - Shreveport (4,600 students)

- Organizational setup
  - Technical working group
  - Advisory group
  - Planning group
  - GOHSEP support

http://dsm.lsu.edu/pr_hazmit.htm
Steps beyond the Cross-Walk

1. Campus Participation and Communication
2. Student Involvement
3. Data Collection
   - Non-natural Hazards
   - Building Inventory
4. Predictive Modeling
1. Campus Participation

- Outreach Strategy:
  - Online Survey
    - LSUA: 73 responses
    - LSUE: 306 responses
    - LSUS: not administered
    - LSU: 1,036 responses
  - Administration Survey
  - Research Survey
  - Labs Survey
Example: LSU Online Survey

Question 1: What hazards do you think the university needs to prepare for?

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood</td>
<td>66%</td>
</tr>
<tr>
<td>Hurricanes</td>
<td>95%</td>
</tr>
<tr>
<td>Hail</td>
<td>25%</td>
</tr>
<tr>
<td>Tornado</td>
<td>61%</td>
</tr>
<tr>
<td>Severe thunderstorm</td>
<td>68%</td>
</tr>
<tr>
<td>Extreme heat wave</td>
<td>41%</td>
</tr>
<tr>
<td>Earthquake</td>
<td>10%</td>
</tr>
<tr>
<td>Lightning strikes</td>
<td>2%</td>
</tr>
<tr>
<td>Wildfire</td>
<td>5%</td>
</tr>
<tr>
<td>Severe winter weather</td>
<td>28%</td>
</tr>
<tr>
<td>Chemical spills</td>
<td>58%</td>
</tr>
<tr>
<td>Nuclear accident</td>
<td>30%</td>
</tr>
<tr>
<td>Campus shooting</td>
<td>91%</td>
</tr>
<tr>
<td>Terrorist attack</td>
<td>49%</td>
</tr>
<tr>
<td>Epidemics</td>
<td>69%</td>
</tr>
<tr>
<td>Other</td>
<td>44%</td>
</tr>
</tbody>
</table>
Example: Were you required to complete a safety training course prior to working in the lab?

- Yes: 48%
- No: 52%

Safety Training Description (n=53)

- Online/Computer: 10
- Basic Lab Safety/Lab Tour: 10
- Written: 1
- Personal Instruction: 5
- Hazardous Materials Training: 3
- Videos/Guidebooks: 2
- None (Trial by Fire): 1

Type of Training
1. Campus’ Input and Participation (cont.)

- Communication Strategy
  - Basecamp
  - Project website
    - Meeting minutes
    - Plan draft
    - Feedback
  - Twitter
- Visualization Strategy
  - Flex Viewer
2. Student Involvement

• Planning team
  - Data collection
  - Data analysis
  - Plan writing

• Service-Learning course
  - Grant application
  - Survey development and deployment
Environmental Hazards Analysis (ENVS 4262)

- Community partner: LSU Public Safety
- Syllabus covered all elements of mitigation planning
- Assignments supported pre-plan and plan data collection (capacity assessment)
- Training in areas outside of course material
- Lots of team work
- Interaction with non-students
  - Community partner, assignments, ...
- Guest presentations by State’s Hazard Mitigation Officer
Assignments - Pre-Plan

- DRU Vulnerability questionnaire (individual)
- Identify the hazards (data collection, team work)
- Impact assessment (surveys, team work)
- Identify mitigation actions (research, individual)
- DRU Vulnerability questionnaire “plus” (individual)
- Reflection paper
- Midterm and final exams
Assignments in support of plan

- Human subjects training (NIH certificate, individual)
- Draft surveys (online, face-to-face, 5 teams)
  - General, H1N1, admin/staff, labs, researchers
- IS-22 Citizen Preparedness certificate (individual)
- Deliver completed surveys (20 per person)
- Present survey findings
- Reflection paper
- Midterm and final exams
3. Data Collection

- **Surveys**
  - Perception
  - Capabilities
  - Vulnerabilities (business continuity, buildings, etc.)

- **Archival Research (campus newspapers)**

- **Inventories**
  - Buildings
  - Populations
  - Chemicals
Non-natural Hazards

- LSU Environmental Health and Occupational Safety
- LSU EOC

Figure IV-15: Type on lab incidents on the main campus based on interviews.  
Source: ENVS 4262 (Spring 2010)

Past Occurrences:

11/15/2001: Lab in Life Science Annex had an explosion in the hood. Personnel were scaling up a reaction when the reaction vessel exploded due to formation of organic peroxides. The lab worker suffered cuts, lacerations, burns, and eye injury.
Building Inventory (Dept. of Constr. Mgmt)

Science Building
Building ID: 1

Building Information
- Building Condition: Good
- Building Type: Steel
- Substructure: Basement
- Cladding: Brick Veneer
- Number of Stories: 2
- Basement Levels: 1
- Lowest Floor Elevation (ft): 3
- Mechanical Equip. Height (ft): Shutters: No
- Building Openings: 41 to 50%
- Door Protection: None
- Garage Doors: None
- Window Area: Medium
- Glass Type: Unknown
- Glass Construction: Unknown

Building Comments:
1) Shielding Height: Taller Trees, Shorter Trees
2) Wind-Borne Debris Source: Arch. Features, Sheds
3) Cladding: Brick Veneer, Glass, Granite

Site Information
- Topography: Flat
- Wind Exposure: Open Land
- Wind Shielding: One Side
- Wind-Borne Debris Source: Unknown

Roof Information
- Roof Covering Condition: Good
- Roof Covering Type: Asphalt Section, Membrane without Ballast
- Roof Deck Type: Steel
- Roof Geometry: Flat
- Roof Slope: 0
- Roof Height: 0 Feet
- Roof Span: > 40 Feet
- Overhang Length: >2
- Approximate Roof Area (SF): Atrium Glass: No
- Aggregate Roof Ballast Size: None
- Eleved Penthouse: No
- Parapet: Surrounded
- Parapet Height (ft): 0.5
- Roof Skylights: Yes

Roof Comments
- Number of Roof Drains: 18
- Evidence of Water Damage: No
- Average Drain Diameter(in): 2
- Evidence of Water Pounding: Yes
- Roof Scupper: No
- Roof Drain Blocked/Clogged: Yes
- Roof Gutter: Yes

Anchorage
- Exhaust Fan Anchored: Yes
- Exhaust Stack Anchored: Yes
- HVAC on Roof Anchored: NA
- Satellite Dish Anchored: NA
- Communication Antenna Anchored: NA
- Lightning Protection System Anchored: NA
- Other Rooftop Equipment Anchored: NA

Current Problems & Vulnerabilities
- Drainage Issue: Evidence of water ponding on rooftop
- Drainage Issue: Roof drain is clogged, preventing adequate drainage
- Overhanging Trees: Tree located near or above structures should be trimmed periodically to prevent damage to the structure and reduce the amount of organic debris on rooftops which pose drainage issues and potential fire hazards.
- Securing Small Rooftop Equipment to Curbs: Attach stacks, exhaust fans and air intakes to the curb with corrosion resistant fasteners not exceeding 6in. on centers between the equipment, transition pieces, and the roof curb. (Ref. 1)
- Attached Structures: Periodically check connections of carports, canopies and porches to prevent wind related damages: 1) Connections between tops of columns and roof. 2) Connections between bottom of columns and foundation. (Ref. 6)
4. Predictive Modeling

- Utilization of HAZUS-MH
  - Replaced building inventory
  - Replaced census data
  - Analysis at building level - not block level

- Climate change
  - Likelihood of future occurrences
Levee Failure
Planning for a University

- Data not readily available
  - NCDC and SHELDUS inadequate for campus scale
  - HAZUS-MH default database inadequate

- Opportunity for beneficial spin offs
  - Real-time connection between chemical db and building footprints

- Highlight response and other state support activities

- Bases mitigation actions in facts, i.e. risk assessment
Thank you for your attention!

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