EPA United States Environmental Protection Agency New England

Preparedness & Security

Conducting a Vulnerability Assessment

Updated January 2007

Summary: In 2000, the University of Washington (UW) was invited by FEMA to participate in the Disaster Resistant University Project (DRU) along with the University of California, Berkeley, Tulane University, Miami University, University of North Carolina-Wilmington, and the University of Alaska-Fairbanks. These Universities had several things in common. They are leaders in campus emergency preparedness, have an extensive amount of federally-funded research with large amounts of hazardous materials, and have a concerned local community. They are committed to the protection of students, staff, faculty, intellectual property, the Universities infrastructure, the community, and the environment. Lastly, each of the Universities participating had significant exposure to natural hazards. UW faces earthquakes, fallout from volcanic eruptions, and severe storms.

UNIVERSITY OF WASHINGTON

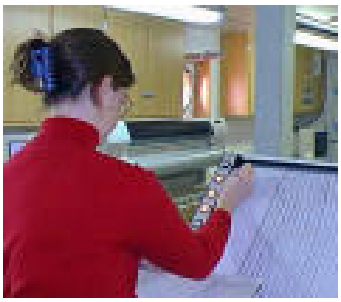
Campus Profile
University of Washington
Seattle, Washington
UG Students: 31,400
Grad Students: 9,760
Professional: 1,720
Resident Students: 28,500
Faculty and Staff: 23,300
Campus Area: 643 acres
No. of Buildings: 297 on the Seattle campus
Operating Budget: $2.4 billion
Research Budget: $1+ billion

FEMA grant money provided each University with $150,000 to participate in the pilot activities. The first step was ensuring the support of senior management. The University then began activities to identify campus and community wide hazards and risks and the assets vulnerable to those hazards and risks. With the compiled information, a vulnerability assessment was conducted and documented. The overall goal, after identifying risks and assessing vulnerabilities to natural and man-made hazards, is to begin development of hazard mitigation plans and putting these plans into action.

UW has a history of partnering with local response agencies. They are a member of the Local Emergency Planning Committee (LEPC), which was involved in the vulnerability assessment, and several emergency planning committees within the City of Seattle's Office of Emergency Management. The Office of Emergency Management includes the Business Emergency Network, the City of Seattle's Project Impact Disaster Resistant Business Program, and the Urban Area Security Initiative. By working with the City and County in establishing emergency management plans which include mitigation activities, they are now eligible for grants from the Hazard Mitigation Grant Program.

Created by Campus Consortium for Environmental Excellence through EPA funding

Project Goals



- Identify hazards and assess campus vulnerabilities.
- Begin the campus mitigation planning process.
- Survey non-structural conditions, time critical business functions, and incorporate recommendations from surveys into prioritization of seismic retrofits of critical, older facilities.
- Increase the level of awareness within the UW community and improve information-gathering and dissemination.
- Establish an Office of Emergency Management with on-going responsibility after the DRU vulnerability assessment.
- Establish unit/departmental/school emergency response plans.
- Develop a model for business continuity and resumption.

Description of Issue/Problem

In 1991, the University studied the conditions of 166 major capital facilities and derived an orderly and uniform method of establishing priorities for structural retrofit. It identified 14 buildings that had a high potential for life safety issues and severe damage in the event of an earthquake. While the report dealt with structural mitigation, it did not address non-structural mitigation. During the DRU project, the report became the foundation upon which to conduct the UW's first Hazard Identification and Vulnerability Assessment (HIVA).

Pre-Project Considerations

- Determine how to obtain a high level of interest and a sense of ownership within the campus community.
- Set aside a sufficient amount of time as it can take several months to complete.
- Investigate if your city/county/state adheres to FEMA Section 322.
- Collecting data is time-consuming and costly. There is a lot of available information so check with local and state authorities. Tap into resources (e.g., plans, data) already in existence.
- Understand your specific geography and the hazards associated with that geography.

Steps Taken

1. The University President approved the project.
2. The President appointed a committee made up of leading members of the campus community.
3. Established a UW DRU team that included a DRU Coordinator and a graduate research assistant to conduct research and coordinate committee meetings.
4. The UW DRU Coordinator acted as liaison to the DRU Program Administrator at FEMA Region X.
5. Reviewed and evaluated current emergency preparedness plans in line with DRU requirements.
6. Research was conducted to define hazards:
   - Collected historical data relating to the University's experience with the impacts of identified hazards; and
   - assessed how they could impact the University's people, property, and systems by looking at location of damage, severity, and frequency of an event.

Vulnerabilities

Campuses may be vulnerable to some of the following hazards:
Natural Hazards – earthquakes, wildfires, volcanic eruption, severe storms blizzards, & floods.
Technological Hazards – utility failures, loss of communications.
Human-caused hazards – terrorism, hazmat release, health epidemics or mass causalities.

7. The HIVA and other related documents were produced and distributed to the committee for comment.
8. The final HIVA was shared with the other DRU campuses.
9. Developed an on-going information sharing process through development of web-based information and revised emergency reference materials.
10. The vulnerability assessment was conducted in the Spring of 2001 and was completed in the Spring of 2002.

System Description, Tools Used & Resources

System Description and Tools

- Utilizing market available software, a campus map was created to analyze high population areas; concentration of research and equipment dollars; vulnerable critical, older facilities; and soil types.
- Created a hazard worksheet using operational variables to assess the hazards: primary hazards, secondary hazards, frequency of events, possible effects, location, ability to predict event, and major predicated impacts on the University.
- Summarized the data by using a Hazard Impact Matrix. It showed the probability (high, moderate, low) of each hazard impacting the University's physical environment, people, systems, and property.

Resources

- University of Washington Earthquake Readiness Advisory Committee Report
- University Campus Master Plan and Environmental Impact Statement
- Interviews conducted with University officials, staff, and technical experts
- City of Seattle, Hazard Identification and Vulnerability Assessment
- Pacific Northwest Seismograph Network information
- Strategic Plan for Loss Reduction and Risk Management: University of California, Berkeley

The HIVA Report had the following sections:

- Executive Summary
- Description of UW characteristics
- Assessment of all natural hazards that may affect the University
- Assessment of all human-caused hazards that may affect the University
- Recommended mitigation steps for each hazard deemed significant to campus
- Future Directions
- Hazard Worksheets that listed in tabular format: primary hazard, secondary hazard, frequency of events, effects, location, ability to predict, major predicted impacts
- Hazard Impact Matrix that outlined the expected hazards and the impacts to campus (e.g., number of areas impacted, casualties, utilities, disruption to research)
- Bibliography
- References
- List of Recommendations for Minor Improvements (suggestions of items that can be taken care of quickly with little expense).
- Campus maps with facility and infrastructure information

The report was reviewed by the Disaster Resistant University Steering Committee prior to its release and distribution.

Participants

- Associate Vice Presidents - Business Services, Facilities Services, and Capital Projects
- Director and Associate Director - University Computing Services
- Director, Communication Technology
- Senior Planner and Analyst – Capital and Space Planning
- Chief and Lieutenant - UW Police Department
- Director and Administrator, Environmental, Health & Safety
- Director, News & Information
- Assistant to the VP & Director of Student Activities and Union Facilities, Office of the Vice President for Student Affairs
- Senior Operations Officer, UW Medical Center
- Executive Director, Health Sciences Administration
- Director, Real Estate
- Safety Administrator and DRU Coordinator, Facility Services
- Director of Academic Services & Facilities, Health Sciences
- Director, Risk Management
- Director, Purchasing and Stores
- Director, Institute for Hazard Mitigation, Planning and Research, Department of Urban Design and Planning
- Associate Vice Provost, Office of Research
- Director, Student Health Center
- Faculty and Student Representative
- Director of Information Services, Pacific Northwest Seismograph Network
- King County LEPC
    - Program Manager for Emergency Services, King County Public Health
    - Division Manger, King County Emergency Management Division
    - Director, Emergency Management Office, City of Seattle

Performance and Benefits

- High quality document that provided key information on vulnerabilities.
- Set priorities on mitigating hazards.
- Provided the impetus for the establishment of a campus Office of Emergency Management and a full time staff person.
- Shared information and experiences with other universities around the country and received feedback from the other DRU participants.
- Increased level of awareness and participation from all areas of campus.
- Continued positive relationship with City of Seattle in other emergency management projects.
- Capital and Space Planning Office was committed to upgrade old buildings to address life safety and other identified hazards.
- Began process to develop long term strategic risk reduction and management plan.
- When the Business Services Office obtained a federal grant from FEMA, it provided "prestige and credibility" to the staff conducting the HIVA.
- In working with the State, a mitigation plan was developed (as a result of the HIVA), so application for pre-disaster grants is now possible.
- Installed 1,500 emergency evacuation posters around campus.
- Conducted active drills on campus.

"Five Things to Do"

The DRU Steering Committee published a protocol on what to do during/after an earthquake. It was distributed via email, posted on the DRU website, and was included in orientation packages. Posters were also created providing suggestions on what to do in the event of a fire, Hazmat Release, power outage, and suspicious person or object.

Lessons Learned

1. Conduct the HIVA in-house with committed and knowledgeable staff familiar with campus activities, operations, and the physical layout.
2. The individual(s) conducting the HIVA should have established and positive relationships with faculty, staff and students as well as local emergency response agencies.
3. UW had no formal archives of information related to specific hazard events. This slowed down the process of gathering information.
4. Need to address the lack of communication between the academic side of the University and the operational side who is implementing the hazard mitigation strategies.
5. Facility information not available on Geographic Information Systems (GIS) limited the ability to analyze infrastructures.

Costs

$50K - overhead
$100K - salaries for time spent conducting the HIVA;
- Costs for 1,500 posters on building evacuations;
-Travel to meet with other DRU universities during the program.

Next Steps

- Participate in the continuing FEMA Disaster Resistant University Program to enhance the initial efforts that began in 2000-2001.
- Continue the seismic retrofit for existing buildings and implement a campus-wide nonstructural mitigation program aimed at loss reduction in laboratories, libraries, classrooms, and offices.
- Assess hazards and vulnerabilities when making space allocation decisions for University activities.
- Construct a Loss Estimation model to assess financial risks associated with business interruption.
- Supplement the strategic campus plan encompassing academic and facility planning, to include business continuity and resumption planning to incorporate the recommendations from the HIVA and ERAC reports.
- Improve record keeping on the damage, costs and effects of hazard events to aid future planning and mitigation efforts.
- Shift UW maps/records to similar systems used by the City of Seattle to manage data and to conduct analysis on Geographic Information Systems.

For Further Information

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UW Office of Emergency Management
http://www.washington.edu/admin/business/oem/

FEMA Disaster Resistant University Project
www.fema.gov/library/file?type=originalAccessibleFormatFile&file=dru_report.txt&fileid=e161cf50-79a5-11db-9b42-000bdba87d5b

The Disaster Mitigation Act of 2000 (DMA 2000) amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding a new section, **322-Mitigation Planning**. Mitigation is defined as "sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects." Mitigation Planning is a collaborative process whereby hazards affecting the community are identified, vulnerability to hazards assessed, and consensus reached on how to minimize or eliminate the effects of these hazards. Effective November 1, 2004, a mitigation plan approved by FEMA and the State is required from any community that wishes to obtain funding from the Hazard Mitigation Grant Program (HMGP) or the Pre-Disaster Mitigation (PDM) Program to reduce potential damages.