TsuInfo Alert

prepared by the Washington State Department of Natural Resources on behalf of the

National Tsunami Hazard Mitigation Program

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Contents

WORKSHOP ON CONSTRUCTION GUIDANCE FOR AREAS OF HIGH SEISMIC AND TSUNAMI LOADING

Convened by Timothy J. Walsh, George Crawford, Richard Eisner, and Jane V. Preuss
for the National Tsunami Hazard Mitigation Program,
November 21, 2002

EXECUTIVE SUMMARY

A workshop attended by structural, marine, and civil engineers, geologists, seismologists, and emergency managers convened on November 21, 2002. Its goal was to investigate the possibility of developing design guidance for shelter in place for communities subject to tsunami wave attack within minutes of a great earthquake. Presentations were made detailing the seismic and tsunami hazards of isolated coastal communities. Data needs were discussed for estimating the critical loads and mapping needs for siting of appropriate structures. A two phase program was recommended. The purpose of Phase I is to extract data from un-published tsunami surveys relevant to estimating forces from tsunami waves and to prepare an RFP for Phase II, which will result in the development and assembly of design and siting specifications, a manual for field data collections, and an outreach program consisting of the creation of data-bases and a series of workshops to disseminate and train design professionals in the application of the guidelines.

INTRODUCTION

The National Tsunami Hazard Mitigation Program (NTHMP) was created by Congress in October, 1996 and is a partnership of the five Pacific Coast states, the National Oceanic and Atmospheric Administration (NOAA), the Federal Emergency Management Agency (FEMA), and the U.S. Geological Survey (USGS). The NTHMP is designed to reduce the impact of tsunamis through warning guidance, hazard assessment, and mitigation. Its strategic implementation plan for tsunami mitigation projects (Dengler, 1998) identified construction guidelines and coastal land use guidance in areas of both strong ground shaking and tsunami hazard as a primary need throughout the region. In November, 2002, we convened a workshop in Seattle, Washington, with attendees having expertise in structural, marine, and civil engineering, seismology, geology, and emergency management to assess the feasibility of such guidance and to formulate a plan for its development.

MEETING OBJECTIVE

This workshop was intended to develop a program that will overcome deficiencies in availability of standards and guidelines for building safely in highly seismic/tsunamigenically vulnerable locations.

Currently available building codes and building guidelines separately identify ways to design for seismic loading and for tsunami loading. There are, however, significant regions in all of the Pacific states where these two loads can occur concurrently. The purpose of this meeting was to determine whether tsunami vulnerability in such areas is an intractable problem, and, if not, to identify steering directions and a strategy. Although much research remains to adequately constrain tsunami forces, it is appropriate to identify criteria and develop overall siting and design guidelines for communities at risk. The following summarizes the discussion at the workshop and presents the outline of a plan to create appropriate design guidance for communities with difficult emergency evacuation routes and areas.

(continued on page 3)

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(continued from page 1)

BACKGROUND AND STATEMENT OF PROBLEM: EXAMPLE FROM OCEAN SHORES, WASHINGTON

All states bordering the Pacific Ocean, as well as Puerto Rico and the Caribbean, have low lying coastal communities with limited road access that are subject to both tsunami inundation and to strong ground-shaking. Examples of such locations include Ocean Shores, Washington (Fig. 1), Seaside, Oregon (Fig. 2), the Samoa peninsula in California (Fig. 3), Homer spit in Alaska, and the Kalapana coast in Hawaii (where two people were killed by a tsunami in 1975). These highly vulnerable, populous sites are near source areas that can generate great earthquakes: the Cascadia subduction zone off California, Oregon, and Washington; the Aleutian subduction zone off Alaska; and the East and Southwest rift zones along the southern coast of Hawaii. Very high ground shaking is anticipated for all of these areas. The USGS national seismic hazard maps (Frankel and others, 2002), which are the basis for the seismic provisions of the International Building Code, show peak acceleration (%g) with 2% probability of exceedance in 50 years greater than 50%g for the Cascadia subduction zone (CSZ), 80%g for the Aleutian subduction zone, and 175%g for the southern coast of Hawaii (Fig. 4-6). These areas are also at risk of tsunamis, which would follow devastating ground shaking within just a few tens of minutes.

Ocean Shores is a good example of a place where evacuation would be difficult. It is located on a peninsula that is about 7 miles long. The highest point on the peninsula is 26 feet, but most of it is under 20 feet and at risk of tsunami inundation (Fig. 1). Geologic evidence from the last Cascadia subduction zone earthquake and tsunami in AD1700 (Curt D. Peterson, Portland State University, oral commun., 1999) suggests that at least part of the peninsula may have been overtopped by a tsunami wave. In a recurrence of that earthquake the first wave crest would arrive within about 30 minutes. With so little time available for evacuation to high ground, and the likelihood that rubble and ground failures from the earthquake would make the road ways unusable, evacuations will have to be spontaneous and on foot. However, there are no reasonable congregation areas on the peninsula that are out of the inundation zone. This suggests that vertical evacuation would be the way for most residents to get out of harms way. However, Ocean Shores has few appropriate buildings for vertical evacuation. Most of the commercial buildings are in one-story strip malls. At the north, or mainland, end of the peninsula, there a few hotels and motels, which are generally low- to mid- rise and a two-story convention center; farther south, most of the buildings are condominiums and single family residences. The Ocean Shores Convention Center was built before the current under-standing of the hazard from the Cascadia subduction zone and may be unsound in an earthquake or consequent tsunami. The same may be true of hotels as well, which were also built to a previous code standard. In addition, as privately owned buildings, they may not be available to the general public for shelter. In either case, emergency managers do not want to direct people to run upstairs if the structure is seriously damaged, particularly since subduction zone earthquakes commonly are followed by large after-shocks; however, there may be no better option.

The goal of this project is to develop tools that communities can apply to this dilemma, i.e. construction guidance for facilities that large numbers of people can use for shelter to survive such an event. But because the cost of designing buildings exclusively as shelters for rare events would be prohibitive, this project seeks to leverage limited public funds by adapting existing or planned buildings. Possibilities for Ocean Shores might be to retrofit the convention center or one of the hotels so that the second story or above could be used to shelter-in-place. Another approach might be to site and design the next replacement for their high school to be both earthquake- and tsunami-resistant and with ample space for shelter-in-place. Other creative solutions are likely to be avail-able as well.

In summation: in the communities we have identified virtually the entire community is in a hazardous location. It is not feasible to deny owners the opportunity to build—or remodel. It is critical that standards be developed.

CURRENT STATUS OF DESIGN GUIDANCE FOR TSUNAMI HAZARD AREAS

The Coastal Construction Manual (CCM) (Federal Emergency Management Agency, 2000) presents FEMA 's perspective on building design along the coast. The CCM provides "Best Practices" guidelines for design in areas subject to coastal flooding, including tsunamigenic areas (although not necessarily in conjunction with seismic loading). The manual is meant for an engineering audience, and provides guidance for design and load determination meeting (ASCE 7-98, ASCE 24, FEMA Technical Bulletins) and code requirements (International Building Code (IBC) and International Residential Code (IRC)). It includes case studies featuring design calculations. The current edition is available for free from FEMA in paper or CD (FEMA-55).

The primary emphasis in the CCM is on identification, planning, and siting considerations, since failure to site buildings properly can negate other positive design features. It highlights those siting, design and construction techniques that have proven to be disaster-resistant. Building success within the CCM is achieved when damage is minor and easily repairable, when the foundation remains intact and functional, and when the envelope remains structurally sound and minimizes penetration of wind, rain and debris. The overall design emphasis in the CCM is on continuous load paths, foundation design, enclosures below base flood elevations, environmental effects (corrosion, water intrusion, etc), building envelope protection, and utilities and accessory structures.

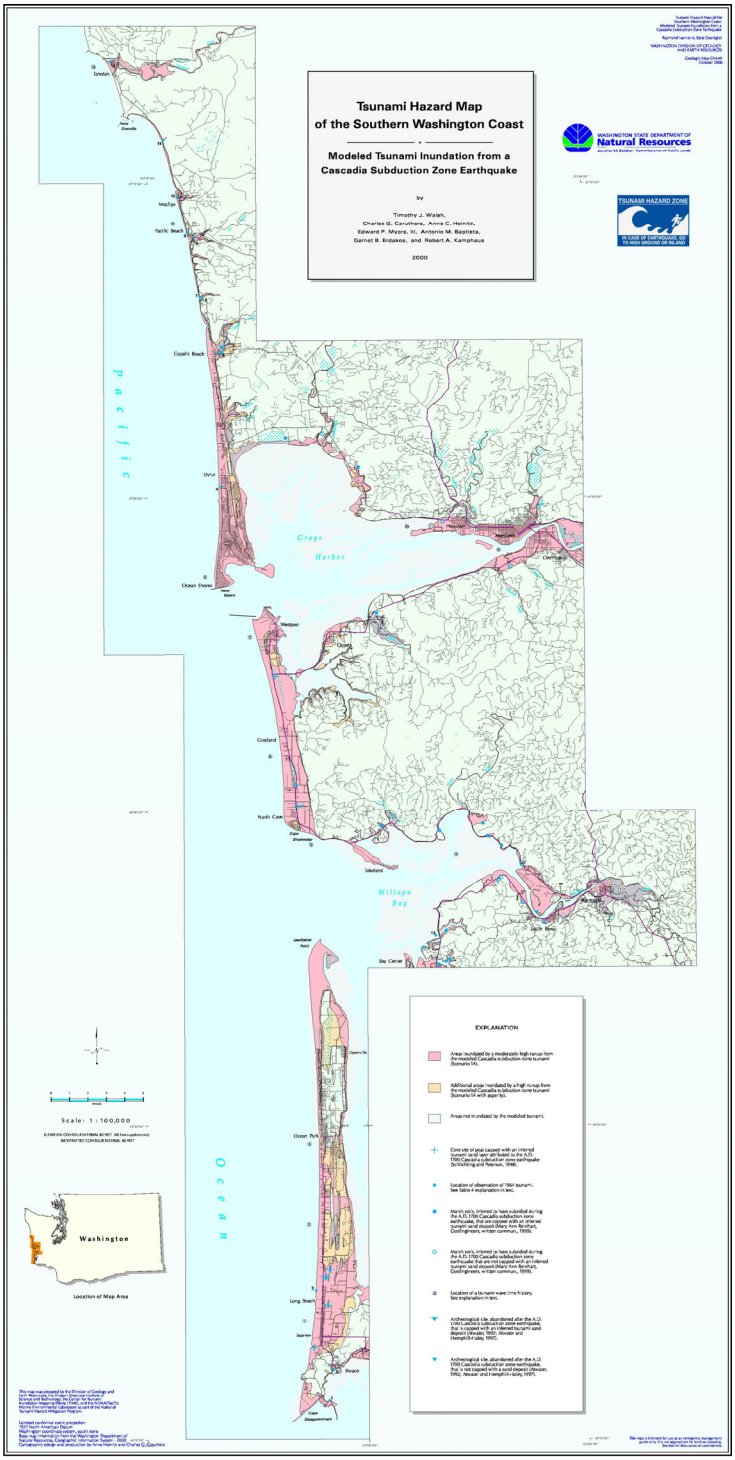

Figure 1. Tsunami inundation map of the southern Washington coast (Walsh and others, 2000).
Figure 2 http://sarvis.dogami.state.or.us/earthquakes/Coastal/tsubrochures/SeasideEvac.pdf
Figure 3 Tsunami inundation map for the Eureka California area (Toppozada & others, 1995)
Figure 4 http://geohazards.cr.usgs.gov/eq/html/wus2002.html
Figure 5 http://geohazards.cr.usgs.gov/eq/html/aks.html
Figure 6 http://geohazards.cr.usgs.gov/eq/index.html

Foundation design (pile embedment, pile size and spacing, connections, cross-bracing, and grade beams) is critical for flood disaster -resistance. Determining flood loads for foundation design requires estimating water depth and velocity, wave characteristics, scour and impact forces, and hydrostatic and hydrodynamic loads.

The CCM provides a methodology to evaluate tsunami loads, which are similar to flood loads except that wavelengths and run up elevations are much greater. Loads are defined in the CCM assuming that a tsunami is a wave-like surge of water, albeit with higher velocities than for flood loads. Parameters used in the manual assume that tsunami velocities are very large and water depths greater than for coastal flooding. Due to higher velocities, as depth increases, tsunami forces will quickly become too large for most normal construction to withstand. Therefore, at some depth (small, because of high velocities), it will become impossible to withstand tsunamis with normal coastal construction standards.

Seismic loads are determined according to the 2000 IBC based on 1997 NEHRP recommended provisions and are not an element of the CCM. There are many issues related to seismic/tsunami design that are not generally relevant to the CCM, thus, FEMA would like a separate document rather than updating the CCM with respect to criteria for the tsunami zone.

CONSIDERATIONS FOR TSUNAMI/EARTHQUAKE DESIGN

Mapping criteria: Probabilistic vs. Deterministic

The current NTHMP program maps tsunami inundation in a single zone without regard to inundation depth, although this practice is evolving. Each of five states tailors its tsunami programs to its own needs and circumstances. The availability and resolution of topographic and bathymetric data, for instance, constrains the resolution of modeling, so, although all states use modeling techniques that have undergone extensive peer review, the resolution of their inundation models varies. One of the most significant issues of tsunami inundation modeling is the uncertainty in the selection of the source: an earthquake, a landslide, or a design wave. Washington and Oregon model a Cascadia subduction zone (CSZ) earthquake, which has a recurrence interval between 500 and 600 years (Atwater and Hemphill-Haley, 1997), and is similar in probability to the 500-year flood event that is used in building codes for critical facilities. The CSZ event is the design earthquake in the IBC for coastal Washington, Oregon, and northern California. The fault parameters used for so this earthquake are similar to those in the probabilistic hazards maps that are the basis for the IBC, so the CSZ earthquake plus tsunami is on the same probabilistic basis as the building code. The recurrence of most other tsunami sources is not as well constrained. Other states use historic events, such as the 1964 Alaskan earthquake, or hypothetical earthquakes or landslides to model tsunamis. California has local earthquake sources, which are used as triggers in deterministic models of large slumps on the continental shelf. Although tsunamigenic slumps occur very infrequently, submarine-landslide-triggered tsunamis can locally have very large runups. However, the recurrence, location, and physical characteristics of potential slumps are poorly constrained. At any location, the hazard from a slump-induced tsunami is probably less than provided for in building codes, which generally consider hazards exceeding some threshold of probability. Therefore, there is considerable uncertainty over whether to design for these rare or poorly understood events. It was agreed that it is important to be able to make maps within the same probability ranges as other hazards, such as earthquakes or floods. The tsunami hazard, however, occurs on two different time scales—distant tsunamis, with 6-10 hours of warning, and local tsunamis, with only a few tens of minutes of warning. The local tsunami hazard is the focus of this workshop, because only local, vertical evacuation is available for these events.

The FEMA flood hazard maps prepared in the 1970s were probabilistic with respect to tsunamis, but our understanding of potential tsunami sources has increased greatly since then. They were done at a time before it was known that the Cascadia subduction zone is seismogenic, for instance, and so they fail to account for a substantial amount of the tsunami hazard not only for the west coast of North America but potentially for Alaska, Hawaii, and Japan as well.

Mapping Inundation Zones: Subzonation

Most of the inundation maps prepared to-date are simple binary-- areas inundated or not inundated. These are useful for emergency management purposes such as designating areas to evacuate and areas to congregate but not for construction guidance, in which loads need to be estimated and designed for. We need to define those places that are appropriate for this type of construction guidance, that is, areas of the inundation zone with relatively low forces. If we can decide between the merely wet and truly dangerous zones, then we can suggest sub-zoning for critical facilities in the tsunami inundation zone as tsunami “high”, “medium”, and “low” impact zones or perhaps wet (high impact), wet (low impact), and dry. Preferably, evacuation should be into low or no impact zones if these are available, but there may not be enough evacuation time if these are a significant distance.

There are significant uncertainties in inundation modeling, however, particularly at large scales because of minor changes in local topography. It was suggested that the uncertainty of modeling water surface elevations would in all likelihood be on the same order of magnitude of uncertainties with earthquake ground motions, but uncertainties are probably less than order of magnitude.

Current models calculate water depth and velocities for each point in topographic and bathymetric grids that are constructed from Digital Elevation Models (DEMs) that are available from the USGS. The DEM typically has a hori-

zontal resolution of 10 m, that is, elevations are interpolated from the topographic contours of a 7.5' quadrangle map at a spacing of 10 m on the ground. The national map standards for topographic maps lists an elevation uncertainty of 7' that is propagated through the DEM and the grid of the inundation model. Nearshore bathymetry typically has similar resolution and accuracy. In Alaska, the available bathymetric and topographic data are of even lower resolution. Because water depth in the inundation model is determined by subtracting the topographic elevation from the water surface elevation, this can result in large uncertainties in determining water depth. Numerical models are generally sufficient to model waves up to about 10 m water depth, but more accurate bathymetry and topography are needed to model run up near the shore and on land. Where higher resolution local topography is available, significantly more precise maps can be produced than when standard USGS DEMs are used.

Correlating velocity and depth would help to define the sub-zones. It is not clear how accurately velocity and depth must be known but it was suggested that modeling should be within 10-20% on both depth and velocity. It is not necessarily the depth of flooding that creates the greatest hazard but rather the velocity, although high velocity at 1-inch depth is less severe than high velocity at 1-foot depth.

From theoretical modeling we know where maximum force should occur - a little bit offshore and decreasing onshore, for uniform slope. For site-specific location it becomes much more difficult; --for instance, these models are for shallow water waves, not bores running inland. The possibility of an approach used by wind was discussed. For wind loads, the IBC zones are coarse segregations, and this is for structural loads that we think we understand pretty well.

Past Damage from Tsunamis

Post tsunami damage inspections such as in Nicaragua and Okushiri and Crescent City indicate certain patterns of damage. Blow out of back walls of houses is fairly common as water pushed through. It is also fairly common to have buildings moved off their foundations; our discussions should discuss how to minimize this, perhaps with better anchoring to foundations. For homes built to relatively good standards, i.e., modern building codes in places like Japan, windows were broken out and the houses flooded inside, but the houses withstood. Behind the waterfront first row, however, houses in the second row were totally destroyed. On the water side buildings are newer, better built and stronger. The inland buildings in the second and third rows were weaker, older, and did not perform as well.

With respect to causes of damage, post tsunami damage inspections indicate that water depth varied by several meters over short spatial distance; damage was a result not only of the wave height but also the flow through. Where pressure of water was equalized inside and out of the structure, there may be minimal damage if water velocities are low. It was emphasized, however, that much more information about forces on buildings could be gotten from tsunami surveys that have not yet been analyzed, particularly for the Okushiri Island survey.

Vertical Evacuation and Performance Based Design

In developing a policy, differences between earthquakes and tsunamis must be addressed. Tsunamis occur very infrequently, and unlike earthquakes, there is some lead-time. Designers are moving forward so that buildings can be built to sustain little damage from an earthquake, i.e., performance standards. The tsunami field should also use this concept of design utility. The big issue is that people need to be able to get out of the structure in order to evacuate to safety before the tsunami comes.

Regarding an evacuation plan, for long lead times, ordinary evacuation methods can be used to get people out. With a short time between earthquake and the tsunami it is important to figure out a way to enhance (not guarantee) the possibility that people will survive a near-field event. Communities need guidance for where we go to run to safety after an earthquake.

What criteria do a community use to design a facility to withstand both earthquake and tsunami? The communities in question do not have enough resources to build a single use evacuation structure. The possibility of encouraging private property owners to open up to people in an evacuation, for example, the Shilo Inn in Oregon was suggested. With respect to the issue of liability it was pointed out that in SE Texas, hotels were designated where people could go. FEMA has an arrangement with property owners in case there is a hurricane.

The entire Cascadia region vulnerable to earthquake and immediate tsunami inundation is now UBC seismic zone 3 or 4 or the equivalent in the IBC. It was suggested that structures designed to withstand zones 3 to 4 for earthquake resistance will likely be designed to resist tsunamis, although that assumption needs to be investigated. It is older wood frame single and multi family residential structures that will almost certainly not survive. An added problem with existing structures, such as virtually all the ocean front hotels in Seaside is that they were built when Oregon was in seismic zone 2b, which is not up to modern standards.

Buildings designated for vertical evacuation need to be able to withstand earthquake loads and then tsunami loads. We need to focus on engineered structures that are designed to provide evacuation space. Buildings need to be designed to basic life safety for earthquake and tsunami loads. We would like to take into account what are other acceptable uses for these evacuation structures. We are heading toward performance-based earthquake building codes. All shelters, hospitals, police stations, and fire stations will need to be designed to be immediately usable after a subduction zone earthquake, and so they will probably survive a tsunami.

The NTHMP should not be construed as recommending building code changes. All we can provide is

guidance to building standards. Performance-based standards will be the outcome of a multi-disciplinary effort including structural engineers, geologists, geotechnical engineers, and planners with respect to siting criteria. These criteria must balance the potentially conflicting requirements of earthquake and tsunami forces. For example, for higher seismic loads, you build more ductility... but for tsunami, you create a soft first story for flow through—and a weaker building. It is important that you design for both. Depending on the site characteristics a tsunami can easily reach height and velocity conditions that can overcome earthquake design structure. [It was noted that no engineered structures have come down in a tornado although this issue of resistance to earthquake and tsunami is not yet settled by IBC.]

The bottom line is that if it is a well-enough-designed structure to survive an earthquake it should be appropriate to use as vertical evacuation. Unfortunately most of the small communities in the types of areas we have identified for this project do not have these structures. Furthermore, most commercial structures are not built to recent codes.

In establishing performance guidelines we need to think of the location of structures in relation to the initial shoreline. For a uniform slope beach with in-coming waves, maximum force occurs offshore of the initial shoreline. In this case the maximum force occurs where the wave breaks, and decreases quickly inland.

The IBC will force performance-based design for buildings to be used as an evacuation center by insisting it address earthquake and tsunami. These requirements are not expected to raise the cost too much beyond already designing the building to IBC standards. The issue is floodwater is coming in. Thus for example a hospital, can lose 3 stories to flood-waters. There was consensus that individual wood-frame structures are going to be gone. These people need a place to go after earthquake has damaged their houses and before the tsunami arrives. The "place" must have at least three stories.

The building envelope is the key point: to let water in / go through. Use moment frames or seismic walls for earthquake design structure. Moment frame is almost an ideal solution because they are open frames. Shear walls may not be the way to go.

The statement that we can make now is that designs should provide the smallest profile to in-coming wave.

THE PROPOSED RESEARCH PROGRAM

Key Issues

*FEMA has required states to develop solutions to problems like tsunamis based on available information. From the discussion at this meeting it is clear that available information is not adequate.

*Current numerical models can be calibrated better to refine inundation boundaries, but there is very little empirical data for velocity models. We need a system to get velocity and depth data for tsunamis. Empirical data from real tsunamis are needed to calibrate models such as is available from other hazards. For example, we know how wind impacts structures.... but if we do not know the amount of energy impacting structure from tsunami, than we have to go ahead with intelligent guesses.

This program will have to have some data collection component. We need to take advantage of field studies and lab studies for this project.

Action Plan Outline

Design Philosophy

The project needs to determine how to enhance the possibility of people surviving who are in an area where it is not possible to evacuate e.g. Ocean Shores, Samoa Peninsula. The philosophy of the project is that residential and other structures should be designed to not collapse during an earthquake but that tsunami survivability is an objective only for a few structures.

Develop a Three-Part Document

Part I: Siting

Assumptions:

We want a structure for vertical evacuation on the spit. We want to choose a place that will not liquefy, is as high as possible, and is as far from the coast as feasible

Site Selection

Site evaluation criteria

Status: Knowledge is in hand

Part II: Design Criteria

Assumptions:

Designing and rehabilitating engineered structures in the tsunami inundation area by translating performance guidelines into new design and (if possible) retrofit standards.

Underlying objectives: We need to come up with an answer to help establish design constraints for both new and existing buildings to help people survive in an evacuation center.

*new buildings, what design codes should we have for evacuation centers

*how can we strengthen existing new buildings

Performance Based Design criteria must be proposed for critical facilities and possibly other designated structures.

Guidelines for Three Types of Criteria Need to be Developed:

1) Guidelines for site-specific analysis for design

2)Design load specification ATC or FEMA document spelling these out very helpful

3)Guidelines for combined seismic/tsunami structural system

Part III. Outreach Program

1. Protocols for ongoing data collection including collecting structural data after coastal earthquakes (EERI). Structural engineers interested in tsunami-structural problems should be part of reconnaissance teams.
Schedule: FY 03
2. The public

Action Items: Work Program

This should be considered a two phase project over several years.
Phase I (FY 2003): Search for investigators looking at tsunami forces; Data mining; Develop research needs for follow-up with NSF funding
Phase II (FY 2004-05): Develop design load specifications; develop tsunami/seismic guidelines provisional to completion of load studies

Phase I (FY 2003)

Task 1. Data mining to understand available research pertaining to wave forces and loads

Who is doing what research on tsunami forces?
Find out who is doing what in relation to research
Currently using C_d but need large scale experiments
Zoning: people are doing runup for rivers and need to do (possibly use h X (v^2)
Product is an annotated bibliography.
Differing practices and design assumptions currently used by structural engineers

Task 1: Literature and mining of data pertaining to buil-dings that were impacted by tsunamis.

Past tsunami damage might be a way of getting at flow forces. Documentation from past tsunami damage (e.g. video of 1983 Chuba tsunami, recent events such as Okushiri, Nicaragua) should be evaluated.

The data "mining" of past events should be done in next year or so, and should not to wait for development of databases. This could be done concurrently with other tasks.

Action Item/ Assignment:

a) Yeh and Robertson will develop a proposal for mining data and investigate back calculations from case histories. They will submit proposals to Walsh and Crawford for graduate students to review gray literature pertaining to the load specification and engineering practices
b) After completion of Phase I work, a workshop will be held during which Yeh and Robertson will explain their fundamental findings, and then participants will identify what is needed for follow-up work. This would be the starting point for NSF proposals. Yeh will try to get funding for workshop through a small NSF grant.

Task 2. Develop a detailed RFP

The purpose of the RFP is so that this project can solicit a proposal that will result in a project that meets their demands for the FY 04-05 phase to develop the guidelines pertaining to structural loading. The RFP should also request preparation of an implementation plan. The RFP to be prepared by April or May, 2004.

Prepare a list of names for future meeting for determining research goals.

Task 3 Data Collection Protocols

A manual for future tsunami data collection for structural engineers should be done in Phase I, or at least be an early (first year) effort. There is likely something out there (EERI earthquake reconnaissance manual) that could be easily modified to include data collection procedures. Phase I would also require "mining" what design practices that structural engineers are currently using (e.g., Japanese approach?).

Phase II (FY 04-05)

Task 1. Develop the design specifications

--Design assumptions: We need to differentiate between depth and velocity (one suggestion: high impact (deep and fast areas (destroys everything) vs. low impact areas).
--Research on building's capability to resist those forces--need to know wave height and velocity constraints at that structure.
--Field research investigation to verify wave forces and the loads they are capable of producing so that we can give credibility to design recommendations. We could specify types of conditions such as uniform sloping beach. This type of characterization could be useful for developing criteria for force with 3 expo-sure contours (comparable to the wind approach):

--sufficient to damage buildings and people (death zone)
--medium impact buildings could survive
--areas that would be able to survive—useful for vertical evacuation (low impact)

Task 2. Develop the Siting Specifications

If we go to a zonation concept the local community must decide what to do with the designation i.e. how to use them. Caution: the exist-ing maps are not appropriate for regulation.

Site selection for new facilities is crucial. There is no use putting a new structure where it is just going to be wiped out by earthquake, liquefaction, etc. The same considerations for retrofit if the building is in really poor location it may not be worth retrofitting.

Guidelines from new facilities that require survivable vertical evacuation.

The document should be clear that the guidelines are for impacts for water only, not for debris in water. Nonetheless is important to consider that high structures are designed to withstand wind and seismic loads; the lower floor is the best to hit with high loads, not the upper floors

Task 3. Develop manual and protocols for field data collection
Task 4. Outreach
1. Create long-term databases of past data.
2. Dissemination and training in use of the guidelines (series of workshops) can associate with NEES and EMI.

Administration and Funding Possibilities

Funding for Phase I of this project is available within the NTHMP in the FY 2003 budget-- approximately $100,000 is allotted to support this project.

Phase II funding is not assured but we should consider partnerships. FEMA has sponsored similar efforts in the past and their participation would be sought. FEMA's participation would require a 50-50 match. In the past FEMA has funded engineering guidance documents through contracts to firms such as the Applied Technology Council. Previous ATC guidelines with a similar scope cost on the order of $500,000. This wouldn't include data mining, which can be funded out of the current budget. It was suggested that it would take about 2 years to develop a full guideline document. Other possibilities might be an NSF proposal.

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Appendix 1

ATTENDEES

John Aho, CH2M-Hill, Anchorage, Alaska
Arun Chawla, Oregon Graduate Institute, Beaverton, Oregon
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HarryYeh, Oregon State University, Corvallis, Oregon

Appendix 2 on next page

Appendix 2

Seismic/Tsunami Construction,
Phase-1: A Pilot Study

By Harry Yeh: Oregon State University
Ian Robertson: University of Hawaii
Jane Preuss: GeoEngineers Inc.

A workshop was held in Seattle on November 21, 2002, to develop a program to overcome deficiencies in availability of standards and guidelines for building safely against combined seismic/tsunami loads. Proposed herein is a systematic pilot program for development of such guidelines in conjunction with the Coastal Construction Manual that was released by FEMA in 2001. Unlike seismic ground shaking, tsunami effects are strongly related to a short-distant locality: the closer to the shore the more severe the destruction. The present binary (wet-or-dry) presentation of the tsunami hazard maps must be improved so as to identify the multiple influence zones: e.g. high, medium, and low tsunami force zones, in terms of both human survival and structural safety. Another issue associated with buildings within the tsunami inundation zone is to evaluate the design requirements for a structure to survive strong seismic ground shaking as well as subsequent tsunami forces. The design requirements for seismic response generally depend on structural flexibility, ductility and redundancy, while design for tsunami effects requires considerable strength and rigidity, particularly at the lower levels. These requirements need not be contradictory, but both must be considered while developing the structural system for a building exposed to potential seismic and tsunami effects. In addition, poor performance during the seismic event may jeopardize the structural response to subsequent tsunami loads.

These issues are particularly critical for structures that are designated as vertical evacuation sites. Note that, by contrast to seismic ground shaking, there is usually a short lead-time for tsunami attack, which makes effective evacuation possible. The lead-time can range from a few minutes for a local source to ten or more hours for a distant source. Tsunami warning lead-times are however much shorter than those of many other natural hazards, e.g. volcanic eruptions, hurricanes, and floods. Hence, in some situations, vertical evacuation to upper floors or evacuation to tsunami resistant buildings within tsunami inundation zones, i.e. tsunami shelters, is the only choice to minimize human casualty.

It has been observed in past field observations, as well as by the numerical simulations, that there is much variability over short along-shore distances in tsunami energy and resulting damage to coastal structures. Local amplification of tsunami energy along the shore results from the influence of three-dimensional bathymetry and coastal topography. The bathymetry leads to wave refraction, diffraction, reflection, and resul-ting interference phenomena that cause both focusing and de-focusing of tsunami energy thereby accounting for the observed, alongshore variability of wave energy. Furthermore, building destruction is often enhanced by the impacts of water-born missiles (floating automobiles, lumber and other debris). Hence final and detailed evaluation of tsunami effects on an individual structure should ultimately be made using case-by-case analysis. We envision the guidelines and standards – that we will develop -- be used for the initial and preliminary evaluation, but not for its final and detailed design. We must also emphasize that even the most advanced simulation models available are still far from perfect, so even their results must be analyzed and interpreted together with the standards and guidelines developed in the proposed program.

Proposed herein is a pilot study for a forthcoming systematic full-scale development of standards and guidelines for building safety in high seismic and tsunami hazard zones. There are primarily three major tasks:

(1) Compilation of previous works. There is some published literature that is relevant to the present study, most written in Japanese, e.g. Shuto (1994). In addition, current design guidelines in the FEMA Coastal Construction Manual and other code sources will be evaluated in light of recent research and tsunami events.

(2) Compilation of unpublished field data (grey literature) in structural damage by tsunamis, especially for recent tsunami events.

(3) Estimation of tsunami forces on structures based on the simplified models, e.g. Carrier et al. (2003), as well as unpublished experimental work at the University of Washington.

For Task 1, Yeh will summarize the existing research literature relevant to our work including those written in Japanese. Robertson will provide comments from the structural engineers' view-point. Robertson will also compile all current design guidelines related to tsunami loading. Preuss will provide input to Yeh and Robertson, identifying any oversight in the literature.

For Task 2, Yeh will analyze his own unpublished field data (mainly photographs) obtained from 1992 Nicaragua, 1992 Flores, 1993 Okushiri, 1994 East Java, 1994 South Kuril, and 1996 Peru field surveys. Preuss will provide her input to Yeh for the Nicaragua and Okushiri events. It is anticipated that the Nicaragua, Flores, and Okushiri data should be the most relevant to the types of buildings in the US. Yeh will digitize the selected photographs, attach his annotations (runup heights etc.), and forward them to Robertson for his review and analysis. Where possible, the observed structural consequences of a particular tsunami will be compared with the design forces suggested by current guidelines. For this process, a high-resolution photo scanner is needed and will be purchased by Oregon State University. Tasks 1 & 2 will identify what further work will be required to develop a rational building standard for combined seismic-tsunami loads.

Recently, Carrier and Yeh developed a new solution technique to describe tsunami runup/ run-down motions caused by very general initial conditions (Carrier, et al. 2003). The technique is an analytical-numerical hybrid model based on the fully nonlinear shallow-water-wave theory. While this model is for one-spatial-dimension and arbitrary-but-uniform beach geometry, the method provides a convenient means to evaluate the critical flow-velocity, as well as the fluid force associated with tsunami run-up and draw-down processes. We found that the maximum fluid force occurs in the vicinity of the extreme drawdown location. The direction of the maximum force depends on the initial wave form: it occurs in the inshore direction when the initial wave form is predominantly depression, while the maximum force occurs in the offshore direction when the initial wave has a dominant elevation characteristic.

For Task 3, Yeh will run this analytical-numerical hybrid model with approximately 25 realistic initial conditions. The purpose of this exercise is to develop a parametric presentation(s) for tsunami force attenuation as a function of the distance from the initial shoreline. The resulting chart(s) for the tsunami forces vs. shoreline distance can then be developed for the practical applications. It is noted that the resulting force is the fluid force per unit breadth and the actual force exerted on a structure must be evaluated further with the following method.

A recent laboratory investigation at the University of Washington (yet to be published) indicates that tsunami forces on a structure can be well estimated by the traditional drag force concept, i.e.

$$Force = \tfrac{1}{2} C_d \, A \, \rho V^2$$

where A is the projected wetted area of the structure, ρ is the water density, V is the flow velocity, and C_d is the drag coefficient. For high Reynolds number, the value of C_d is order unity for 2-D flows. For tsunami cases, the value of C_d is approximately 4, much higher than the 2-D equivalent flow. This higher value appears due to the free-surface effect. The shallow impinging flow causes significant difference in water surface between its front and back. This additional hydrostatic force is responsible for the higher value of C_d. As soon as this critical information becomes available in peer reviewed literature, Yeh will revise his semi-analytical results (as described earlier) for forces on buildings. All of the predicted force information will be analyzed in terms of structure resistance by Robertson.

In Task 3, Robertson will also create sample structural building designs that satisfy both seis-mic and subsequent tsunami loading. The seismic design will be based on the latest International Building Code (IBC 2003) seismic provisions while the tsunami loading will be generated using the force expressions derived in the proposed study.

At the conclusion of the proposed pilot study (in the spring of 2004?), Yeh will organize a workshop to prepare the RFP for development of comprehensive design guidelines for combined seismic and tsunami effects. If possible, this will be piggybacked to his NSF-funded workshop for "tsunami scenario simulation." (Note that the concept of tsunami scenario simulations was discussed at the workshop in 2002, see:http://faculty.washington.edu/cpetroff/TsuSim/tsusimall.htm

References:

Carrier, G.F., Wu, T.T. and Yeh, H. 2003. Tsunami Runup and Drawdown on a Plane Beach, Journal of Fluid Mechanics, 475, 79-99.

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Tsunami-resistant construction

A selected bibliography
Compiled by Lee Walkling

Even less is known about the interaction of tsunami waves and structures and, in contrast to seismic design and engineering, no standards have been developed in the United States for the design of tsunami-resistant structures

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Werner, S. D., 1985, Structural failure and design for new and retrofitted seaport facilities. IN Siegel, Gilbert B.; Bjur, Dorothy M., 1985, Earthquake mitigation management for harbors and seaports: University of Southern California School of Public Administration, p. 89-110. (good reference list)
Yabe, G., 1994, Tsunami resistant construction and design. IN Savidis, S. A., editor, Earthquake resistant construction and design--Proceedings of the second international conference: A. A. Balkema, v. 2, p. 1107-1112.

* http://www.wsspc.org/pubs/news/eq9808.htm

♦♦♦♦

WEBSITES

http://dels.nas.edu/dr/

The Disasters Roundtable (formerly called the Natural Disasters Roundtable) has unveiled an updated web site. The Roundtable's mission is to facilitate and enhance communication and the exchange of ideas among scientists, practitioners, and policymakers in order to identify urgent and important issues related to the understanding and mitigation of natural, technological, and other disasters.

From: Disaster Research 395, 9-29-03

http://training.fema.gov/emiweb/EENET/

A reminder that the most current listing of programs and satellite information about the Emergency Education Network (EENET)'s current schedule is available on this web site.

From: Disaster Research 395, 9-29-03

http://www.trauma-pages.com/

This web site focuses primarily on emotional trauma and traumatic stress, including post-traumatic stress disorder (PTSD), whether following individual traumatic experiences or a large-scale disaster, with the goal of providing information for clinicians and researchers in the traumatic-stress field. The site includes extensive information that is tailored to disaster response, including a variety of handouts for adults, children, and families who undergo disaster-related traumatic experiences. There are also a number of general disaster resource links.

From: Natural Hazards Observer, v. 28, no. 1, p. 11

http://www.csc.noaa.gov/text/grant.html

This web site provides coastal managers with information on grant opportunities, including those of interest to hazards and emergency managers, offered by the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center and other relevant organizations. The site also provides links to grant-writing resources, including articles, tutorials, and tips to help navigate the grant-writing process.

From: Natural Hazards Observer, v. 28, no. 1

http://www.osha-slc.gov/SLTC/ emergencypreparedness/ index.html

The U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), has an emergency preparedness web site that focuses on emergency preparedness and response materials, resources, and links for workplace safety.

From: Disaster Research 393, August 18, 2003

http://www.crisismanageruniversity.com/

Crisis Manager, a free, printed newsletter, announces a complementary web site and listserv on the topic of crisis management. To subscribe, go to the URL above and then click on "register" in the upper right corner. Registration for the on-line listserv is free.

From: Natural Hazards Observer, v. 28, no. 1, p. 12

http://www.all-hands.net/pn/

The "All Hands Community," a virtual, growing, and user-supported community of emergency and continuity professionals, has launched an electronic newsletter that will con-ain links to web resources, relevant articles, and news. To sign up to receive the newsletter, register (free) as a member of the community.

From: Natural Hazards Observer, v. 28, no. 1, p. 12

http://atlas.pdc.org

The Pacific Disaster Center (PDC) has released an "Asia-Pacific Natural Hazards and Vulnerabilities Atlas" to provide a dynamic geospatial framework through which information may be accessed and viewed by the disaster management and humanitarian assistance communities. An objective of the atlas is to provide emergency managers and decision makers with greater awareness of the risks of natural hazards in their area of concern.

From: Disaster Research 394, Sept. 12, 2003

Modifications to Products and Procedures of the Pacific Tsunami Warning Center

Effective June 21, 2003, the Richard H. Hagemeyer Pacific Tsunami Warning Center (PTWC) made the following changes to its international tsunami warning and information products, and the procedures used for issuing those products:

1. The earthquake magnitude reported in the bulletins and used in criteria for determining the type of bulletin to issue is now the moment magnitude, Mw, instead of the Richter surface wave magnitude, Ms. Mw values are similar to Ms values for most shallow earthquakes. However, Mw is a more accurate scale for very large earth-quakes and for slowly rupturing earthquakes that have an enhanced tsunamigenic potential. Mw is also the standard magnitude now used by most seismic observatories.
2. Tsunami Information Bulletins (TIB) continue to be issued for shallow Pacific earthquakes with magnitudes between 6.5 and 7.5, inclusive. However, a TIB supplement will now be issued if data from nearby sea level gauges indicate a local tsunami was generated. A TIB will now also be issued for certain large Pacific region earthquakes that do not pose a tsunami threat to the Pacific Basin because they are inland or deep or located in a marginal sea.
3. A Spanish-language version of the Tsunami Information Bulletin, formerly sent to a few locations in South America, will be replaced by the English-language version. This change is being made to eliminate the potential for confusion when PTWC staff make changes to prescripted language of the English version to accommodate a particular situation, but are unable to compose similar changes in the Spanish version.
4. A non-expanding regional warning, limited in areal extent to 1000 km from the earthquake epicenter, will be issued for shallow Pacific earth-quakes with magnitudes between 7.6 and 7.8, inclusive.
5. An expanding regional tsunami warning and watch, formerly issued for shallow Pacific earthquakes with magnitudes of 7.6 or greater, will now only be issued for magnitudes of 7.9 or greater.
6. A number of additional warning points have been added. Warning points are locations used to determine if an area should be in a warning or watch based either on that point's distance from the epicenter or on the time remaining until the estimated arrival of the first tsunami wave at that point. The additional warning points are needed to improve the coverage and accuracy of warning and watch areas. Estimated arrival times will continue to be provided in bulletins for all warning points within warning and watch areas.
7. A few format changes have been made to the bulletins. Notable is that the earthquake parameters are now in a tabular rather than narrative form. In addition, the geographic coordinates of warning points are now provided whenever estimated arrival times for those points are listed in the bulletins.

The purpose of these changes is to help reduce the problem of over-warning, to provide more comprehensive and accurate warning and watch areas, and to otherwise make the bulletins more informative and effective. These changes are largely the result of recommendations made and approved at the Eighteenth Session of the International Coordination Group for the Tsunami Warning System in the Pacific (ITSU-XVIII). Questions or comments regarding these changes should be directed to:

Dr. Charles McCreery, PTWC Geophysicist-In-Charge,
91-270 Fort Weaver Rd., Ewa Beach, HI 96706 USA.
Tel: 1-808-689-8207 x301
Fax: 1-808-689-4543
Email: charles.mccreery@noaa.gov

Introducing SHELDUS - County-Level Data on Natural Hazards

Looking for the most comprehensive database of natural hazards events and losses available? SHELDUS is a geo-referenced data set providing county-level data on natural hazard events and losses from 1960 to 2000. The geographic entities are U.S. counties. Eighteen different hazards types are covered in the data base: avalanches, coastal hazards, drought, earthquakes, flooding, fog, hail, heat, hurricane/ tropical storms, landslides, lightning, severe storms/thunderstorms, tornadoes, tsunamis/ seiches, volcanoes, wildfires, wind hazards, and winter weather. Data were culled from repositories such as the National Climatic Data Center's Storm Data and the Council of National Seismic Systems. Variables include county name, state, Federal Information Processing Standrd (FIPS) code, date, event type, property losses (in unadjusted dollars), crop losses (in un-adjusted dollars), injuries, and deaths.

Only those events that generated more than $50,000 in losses were included in the database. For events that covered multiple counties, the dollar losses, deaths, and injuries were equally divided among the counties. Where dollar loss estimates were provided in a range (e.g., $50,000 to $100,000), the lowest value in the range of the category was used. This results in the most conservative estimate of losses during the time period.

SHELDUS is web accessible and contains more than 300,000 entries. Users can query by date, location, event type, and loss. Results are available as downloadable text files that can be viewed in most spreadsheet-type software packages. To access the database, go to http://www.sheldus.org. For more information about this project, contact Susan L. Cutter, Hazards Research Laboratory, Department of Geography, University of South Carolina, Columbia, SC 29208; (803) 777-1699; e-mail: scutter@sc.edu; http://www.ca.sc.edu/geog/hrl/home.html.

From: Natural Hazards Observer, v. 28, no. 1, p. 6

An Old Review

"*TsuInfo Alert* is produced by the Geology and Earth Resources Library of Washington State's Department of Natural Resources [Division of Geology and Earth Reources]. It's a monthly 12 to 20 page newsletter listing devel-opments in tsunami planning on the west coast of the US. The first issue was January 1999. It lists publications, reviews disaster and hazards books, an updates planning efforts. It appears to be a useful tool for anyone tracking or collecting tsunami information." From the February 2000 International Association of Aquatic and Marine Science Libraries and Information Centers (no. 74), p. 20. Thanks for the good word!

Educational Opportunities Grant

The Society for Risk Analysis (SRA) has received funding to provide educational opportunities for African, Latino, or Native American college students who are interested in pursuing a career in disciplines involved with risk analysis and management. Students should be enrolled in a college or university program in one of the following disciplines: biology, chemistry, economics, psychology, environmental management, or a variety of other subjects. The grant will support laboratory projects, field studies, sociological and policy research, issues of environmental justice, law, and more.

For more information, contact Michael Greenberg, SRA, 1313 Dolley Madison Boulevard, Suite 402, McLean, VA 22101; (732) 932-0387 x673; e-mail: mrg@rci.rutgers.edu.

From: Disaster Research 393, August 18, 2003

Comments Wanted

The Partnership for Public Warning (PPW) has issued a draft report on the Emergency Alert System (EAS). The purpose of the assessment report is to review the history of EAS, assess the current state of the national warning system, and provide recommendations regarding its future.

PPW sought public comment on this report. In adition providing comments, reviewers were invited to sugest recommendations about EAS that should be conidered for inclusion in the final report. Comments were due by September 5, 2003. Please see http://www.partnershipforpublicwarning.org/ppw/eas.html for complete details. PPW may be contacted at 7515 Colshire Drive, Mail Stop N655, McLean, VA 22102; (703) 883-2745; e-mail: information@ppw.us.

From: Disaster Research 393, August 18, 2003

Proposed Historical Tsunami Database

The U.S. National Geophysical Data Center/ World Data Center for Solid Earth Geophysics (NGDC/SEG)and the Novosibirsk Tsunami Laboratory/Institute of Computational Mathematics and Mathematical Geophysics (NTL) have developed a plan with the International Tsunami Information Centre (ITIC) to compile a unified and comprehensive Global Historical Tsunami Database (GHTD) that will be built by merging the two existing tsunami databases (Worldwide Tsunami Database of the NGDC and the Historical Tsunami Database (HTDB) of the NTL) with the further input from the HTDB Regional Coordinators for the Pacific on the historical data locally and regionally available. This proposal was developed extensively during June, 2003, by Paula Dunbar (NGDC Natural Hazards Program Manager), Laura Kong (ITIC Director), Viacheslav Gusiakov (HTDB Project Coordinator), and Eddie Bernard (NOAA

Pacific Marine Environmental Laboratory Director). The first NGDC/ HTDB working meeting was held on July 8, 2003 in Sapporo, Japan, before the IUGG Tsunami Symposium.

The second NGDC/HTDB meeting is scheduled for September 24, 2003, just before the beginning of the International Tsunami Workshop and the XIX ICG/ITSU Session, where most of the participants will again be gathered. At this time, a HTDB Regional Coordinator's meeting is planned to provide the coordinators with new guidelines. Additionally, a presentation of the plan will be made at the ICG/ITSU Session to inform the Member States of the GHTD development effort.

Abridged from the Tsunami Newsletter, v. 35, no. 4, p. 10. Available online at http://www.prh.noaa.gov/itic/library/pubs/newsletters/nl_pdf/2003_Aug.pdf

Lifeline Project Suggestions Wanted!

The American Lifelines Alliance (ALA) invites topics for potential projects to improve current hazard management practices for both natural and human-made hazards in the lifelines industry. ALA is in the process of identifying projects that can be funded in FY 2004 (October 1, 2003, to September 30, 2004).

Potential projects should be related to one of the following topics: improvement of existing guidelines and standards for lifeline systems and components, new guidelines based on past successful industry practices, focused studies that provide information necessary to assess lifeline systems to various hazards, integrated approaches for assessing lifeline system performance to multiple hazards, and assisting decision makers in the public and private sectors to assess the performance of lifeline systems and identify appropriate ways to improve performance.

ALA requests a brief (not more than two pages) description of the project that identifies the need for the project, its key aspects, and the approximate level of effort envisioned to carry it out (in terms of duration, total staff-hours, or ap-proximate cost). Those responding are reminded that ALA contracting requirements generally require competitive bids for new projects funded entirely through ALA.

Send comments or suggestions to Joe Steller, ALA, c/o National Institute of Building Sciences, 1090 Vermont Avenue, NW, Suite 700, Washington, D.C. 20005; (202) 289-7800 e-mail: jsteller@nibs.org; http://www.americanlifelinesalliance.org/.

From: Disaster Research 394, Sept. 12, 2003

Sept. 25th 8.0 Hokkaido earthquake & tsunamis

To all tsunami warning system participants
Subject: tsunami warning bulletin - final
Bulletin number 3
From: West Coast and Alaska Tsunami Warning Center/ NOAA/NWS
Issued 09/25/2003 at 2217 UTC

The tsunami warning and watch status is cancelled for Alaska...

Earthquake data:
preliminary magnitude: 8.0
location: 42.1n 143.6e - Hokkaido, japan
time: 1150 adt 09/25/2003
1250 pdt 09/25/2003
1950 utc 09/25/2003

A regional tsunami was observed at the following sites:

Hanasaki Japan 213cm/7.0ft
Urakawa Japan 150cm/4.9ft
Ofunato Japan 50cm/1.64ft
Kamaishi Japan 100cm/3.3ft

Evaluation: No tsunami danger exists for Alaska, British Columbia, Washington, Oregon, or California. However, some areas may experience small sea level changes. As local conditions can cause a wide variation in tsunami wave action, the all clear determinations must be made by local authorities. The tsunami warning and watch status is cancelled for Alaska...

From: http://wcatwc.gov/message.txt

New Hazards Center Created

Millersville University in Pennsylvania announces the creation of the Center for Disaster Research and Education (CDRE). The center's mission includes conducting research into the behavioral and organizational response to disasters and terrorism as well as risk and hazards assessment; disseminating research findings to the public, mass media, and emergency management personnel; contributing to the education of disaster researchers, public policy makers, emergency managers, and other concerned community members; and contributing to public policy development and the creation of disaster-resilient communities.

CDRE anticipates undertaking several grant-supported projects, including developing training and educational materials and a variety of collaborative research. Partnerships are being created with the Disaster Research Center of the University of Delaware, the Pennsylvania Emergency Management Agency, the Pennsylvania Office of Homeland Security, and the Lancaster County, Pennsylvania, Emergency Management Agency.

In addition, CDRE publishes the newsletter "*UnScheduled Events*" and the on-line journal "*Contemporary Disaster Review*," both of which are official publiccations of the International Research Committee on Disasters of the International Sociological Association.

For more information, visit CDRE's web site at http://www.millersville.edu/~CDRE, or contact Henry W. Fischer, Department of Sociology, Millersville University

of Pennsylvania, PO Box 1002, Millersville, PA 17551-0302;(717) 872-3568; e-mail: hfischer@millersville.edu.
From: Disaster Research 395, Sept. 29, 2003

FEMA Provides State Grants for Community Emergency Response Teams

On August 15, the Federal Emergency Management Agency (FEMA) issued a notice in the Federal Register regarding the availability of $18.8 million in grants for fiscal year 2003 for the development or improvement of Community Emergency Response Teams (CERTs). The FY 2003 grant funding is in addition to $17 million distributed under the FY2002 emergency supplemental appropriation. In the FY2003 program, FEMA intends to continue, maintain, and expand existing state and local CERT programs while supporting new CERT Train-The-Trainer courses and extending the CERT program into new jurisdictions nationwide.

FEMA Regional Offices have finished processing these CERT grants from the 2003 budget to the states and territories. Local government jurisdictions that are interested in receiving sub-grants for starting or maintaining CERTs should contact the person in their state/territory who is responsible for the CERT/Citizen Corps pro-grams.

For further information about this program at the federal level, contact Sam Isenberger, National Emergency Training Center, Training Division, 16825 South Seton Avenue, Emmitsburg, MD 21727; (301) 447-1071;
e-mail: sam.isenberger@dhs.gov.
From: Disaster Research 395, Sept. 29, 2003

STATE EMERGENCY MANAGEMENT OFFICES

Alaska Division of Emergency Services
Dept. of Military & Veterans Affairs
PO Box 5750
Fort Richardson, AK 99505-5750
(907) 428-7000; toll-free 800-478-2337
Fax (907) 428-7009
http://www.ak-prepared.com/

California Office of Emergency Services
PO Box 419047
Rancho Cordova, CA 95741-9047
(916) 845-8911; Fax (916) 845-8910
http://www.oes.ca.gov/

Hawaii State Civil Defense
Dept. of Defense; 3949 Diamond Head Road
Honolulu, HI 96816-4495
(808) 734-2161; Fax (808) 733-4287
rprice@pdc.org; http://iao.pdc.org

Oregon Division of Emergency Management
595 Cottage Street NE
Salem, OR 97310
(503) 378-2911, ext. 225; Fax (503) 588-1378
http://www.osp.state.or.us/oem/oem.htm

Washington State Military Dept.
Emergency Management Division
Camp Murray, WA 98430-5122
(253) 512-7067; Fax (253) 512-7207
http://www.wa.gov/mil/wsem/

Provincial Emergency Program
455 Boleskin Road
Victoria, BC V8Z 1E7 Canada
(250) 952-4913; Fax (250) 952-4888
http://www.pep.bc.ca

PUBLICATIONS

New Electronic Newsletter

The International Red Cross/Red Crescent Center on Climate Change and Disaster Preparedness, the United Nations Development Program, and the Interagency Secretariat of the Strategy for Disaster Reduction announce the inaugural edition of "*DR+CC infolink*," an initiative to stimulate linkages and information exchange between the disaster reduction and climate change communities.

The main focus of the *DR+CC infolink* is the intersection of disaster risk reduction and climate change adaptation, to promote disaster risk reduction as an adaptation strategy, and to clarify the role of climate change in disaster risk management. *DR+CC infolink* will provide information on key issues, upcoming events, publications and linkages with other like-minded organizations and individuals.

The newsletter will be published every three to four months. The editors would greatly appreciate contributions and comments about content or outreach. To contact the editorial staff, or to subscribe to the newsletter e-mail: DRCCinfolink@un.org.

From: Disaster Research 394, Sept. 12, 2003

Social Vulnerability, Sustainable Livelihoods, and Disasters

A new and timely report has just been released by the Benfield Hazard Research Center. Titled "Social Vulnerability, Sustainable Livelihoods and Disasters" the report explores the links between standard methods of social vulnerability analysis used by disaster managers and the sustainable livelihoods approach being promoted in development practice. It includes a general discussion, case studies of four vulnerability analysis methods, and a resource list.

The report is available from the Benfield Hazard Research Center, Department of Earth Sciences, University College London, Gower Street, London WC1E 6BT UK; tel: +44 (0)20 7679 3637; http://www.benfieldhrc.org/ DMU/OtherPublications/ DFIDVulandLiveRepFin0 303.pdf (please cut and paste complete link).

From: Disaster Research 394, Sept. 12, 2003

Act Now for a Free *Disaster Resource Guide*

The publishers of the "*8th Annual Disaster Resource Guide*" will supply free copies of this business continuity and disaster response publiccation for those working in the crisis, risk management, or business continuity fields who have mailing addresses in the U.S.

The guide has six categories: planning, human concerns, information technology, telecommunications, facility issues, and crisis communications and response. There are also listings of companies and non-profit organizations.

For additional details, contact Kathy Rainey, Disaster Resource Guide, P.O. Box 15243, Santa Ana, CA 92735; (714) 558-8940; e-mail: webmaster@disaster-resource.com.

From: Disaster Research 394, Sept. 12, 2003

Disaster and Emergency Preparedness in Foodservice Operations.

This volume (by Ruby P. Puckett and L. Charnette Norton. 2003. 100 pp.) explores the role of foodservice professionals in both the creation and execution of emergency preparedness plans. It includes a step-by-step overview of food-related emergency procedures that focuses on employee, institution, and food safety practices and plans, including spoilage, contamination, and food transportation issues. Planning suggestions are broken down by type and extent of hazard or disaster. Nonmember price $33.00; member price $25.00. Available from the American Diabetic Association, 120 South Riverside Plaza, Chicago, IL 60606-6995; (312) 899-0040; http://www.eatright.org/Public/ProductCatalog/SearchableProducts/104_8862.cfm.

From: Natural Hazards Observer, v. 28, no. 1, p. 19

Understanding Wireless Communications in Public Safety.

This guidebook (by Kathy J. Imel and James W. Hart. 2003. 174 pp. Free) to technology, communication issues, planning, and management was conceived to help public safety personnel understand and use new wireless technology. Its goal is to demystify the complexities of planning for new systems, raising funds to purchase equipment, and sifting through purchasing options in the realm of wireless communications, with a special focus on commercially available systems. Chapters cover federal and local regulations, wireless communication technologies, radio frequencies, and other useful topics.

Available from Justice Technology Information Network, 2277 Research Blvd., M/S 8J, Rockville, MD 20850; (800) 248-2742; http://www.justnet.org/pdffiles/wireless2003.pdf.

From: Natural Hazards Observer, v. 28, no. 1, p. 20

Characteristics of Effective Emergency Management Organizational Structures

This online publication was written as a self-assessment tool for local government officials. A number of interviews undertaken in the late 1970s revealed common organizational characteristics of successful emergency management programs and this updated guide revisits the data and provides 20 characteristics of "good" government and strong emergency management organizations. Checklists help define effective planning, response, alerts, operations, and recovery activities, with the goal of helping to foster an ongoing, all-hazards approach toward

integrating mitigation and preparedness more directly into local government structures and practice.

Public Entity Risk Institute (PERI). 2003. 143 pp. Free. Available from PERI, 11350 Random Hills Road, #210, Fairfax, VA 22030; (703) 352-1846; http://www.riskinstitute.org/ptrdocs/CharacteristicsofEffectiveEmergency.pdf.

From: Natural Hazards Observer, v. 28, no. 1, p. 20

Principles of Emergency Planning and Management

This book (by David Alexander, 2002, 340 pp. $30) provides a general introduction to the methods, procedures, protocols, and strategies of emergency planning, with emphasis on situations in industrialized countries. Local levels of organization (i.e. cities, municipalities, metropolitan areas, and small regions) are examined, with ample reference to national and inter-national levels. Rather than concentrating on the practices of any one country or state, the author focuses on the general principles of emergency management and planning, with the intent of creating a reference source and manual from which emergency managers can extract ideas, suggestions, and methods to help them design and implement emergency plans. The book adopts a comprehensive all-hazards approach, and 12 examples of emergency planning and management problems are analyzed in detail.

Available from Oxford University Press, 198 Madison Avenue, New York, NY 10016; (212) 726-6000; http://www.oup-usa.org.\

From: Natural Hazards Observer, v. 28, no. 1, p. 20

Introduction to Emergency Management

*Introduction to Emergency Managemen*t (by George D. Haddow and Jane A. Bullock. 2003. 272 pp. $49.95) is a practical reference for professionals and students who need to understand the process of disaster response planning and mitigation. The book describes the world's leading emergency management agency, the Federal Emergency Management Agency (FEMA), covering its history, organization, programs, and operations as well as the Federal Response Plan (FRP). The authors examine the roles, responsibilities, and interrelationship among FEMA, state and local emergency management systems, and other critical partners. They also explain the government emergency resources available before, during, and after crises. The volume includes information on the Department of Home-land Security and several detailed appendices that provide a list of organizations involved in disaster management, a directory of disaster management and terrorism web sites, a glossary of disaster management terms and acronyms, and a compendium of domestic and international disaster statistics.

To purchase a copy, contact Butterworth-Heinemann/Elsevier Science, Order Fulfillment, 11830 Westline Industrial Drive, St. Louis, MO 63146; (800) 545-2522; fax: (800) 568-5136; e-mail: custserv.bh@elsevier.com;

http://www.bhusa.com.

From: Natural Hazards Observer, v. 28, no. 1, p. 19.

Biblio-des

Learn more about how communities are organizing to manage risk in a special edition of *Biblio-des*, a series of selected bibliographies produced by CRID, the Regional Disaster In-formation Center. This special English/ Spanish issue covers three related topics: community participation and organization, risk mapping and local emergency plans.

It contains essays and descriptions of reference documents, audiovisual materials and books on the subject, including the URL where you can download the full text.

View a pdf version on the web at www.crid.desastres.net/crid/eng/tools/tools.htm (scroll down to the section on *Biblio-des*).

CRID: Regional Information Center, APDO. 3745-1000, San Jose, Costa Rica; fax (506) 231-5973; e-mail: crid@crid.or.cr; website: www.crid.or.cr.

From: Disasters-Preparedness and Mitigation in the America, Issue no. 92, July 2003, p. 1

Health Library for Disasters, 2003 Edition

The 2003 Edition of the *Health Library for Disasters*—the most complete electronic collection of information resources on public health in disasters and complex emergencies—has just been published.

The selection of material in this third edition is the result of a long process of consultation and exchange between WHO and PAHO, with participation from other UN agencies such as UNHCR, UNICEF, and the ISDR; the Red Cross movement; the SPHERE project; non-governmental organizations and national organizations. Thanks to this joint effort, more than 500 technical and scientific documents on disaster reduction and public health related to emergencies and humanitarian assistance form the basis for this electronic collection.

For more information, contact WHO at eha@who.int or PAHO at disaster-publications @paho.org. Visit this collection on the Internet: www.helid.desastres.net.

From: Disasters-Preparedness and Mitigation in the America, Issue no. 92, July 2003, p. 6

Business Survival Kit for Earthquakes & Other Disasters (What Every Business Should Know Before Disaster Strikes)

Produced by Global Net Productions, Inc. and sponsored by the Cascadia Regional Earth-quake Workgroup (CREW). Video (2003, 27 minutes) with accompanying CD: (1) Open for Business: A Disaster Planning Toolkit (IBHS) (2) Getting Back to Business (IBHS) (3) Nisqually Earthquake (Washington Military Department) (4) Business Survival Kit Video

The Disaster Planning Toolkit includes worksheets and emergency checklists by the Institute for Business and Home Safety. The kit includes information about tsunamis, earthquakes, terrorism, fires, floods, winter storms, hurricanes, biological disasters, chemical disasters, explosions, nuclear disasters, radiation, and volcanoes.

This video/CD has been added to our video-loaning library. See the list on page 22

Let's Learn to Prevent Disasters! Fun Ways for Kids to Join in Risk Reduction

This colorful, 24-page booklet is filled with games, hazard information, puzzles, and activities for kids, ages 8-12, including a board game RISKLAND.

Produced by UNICEF and ISDR (International Strategy for Disaster Reduction), the book deals with risk management, preparedness, natural hazards, and environmental hazards.

Contact: www.eird.org or www.unisdr.org. E-mail: eird@eird.org.

ITIC *Tsunami Newsletter*

The August 2003 issue of the *Tsunami Newsletter* is available online at http://www.prh.noaa.gov/itic.

CONFERENCES/SYMPOSIA/MEETINGS

October 8-9, 2003

Emergency Management Accreditation Program (EMAP) Training. Sponsor: Council of State Governments. Cincinnati, Ohio. Completion of this training prepares experienced emergency managers to serve as on-site assessors as part of EMAP's processes. Training will cover EMAP standards, assessment procedures, assessor responsibilities, and will conclude with an assessor examination. Contact: Nicole Morgan, EMAP, Council of State Governments, P.O. Box 11910, Lexington, KY 40578; (859) 244-8242; e-mail: nmorgan@csg.org; http://www.emaponline.org.

From: Disaster Research 393, August 18, 2003

October 22, 2003

"Reducing Disaster Losses through Improved Earth Observations" is the topic of an upcoming workshop being held by the National Academies' Disaster Roundtable. The daylong event begins at 8:30 AM EDT Wednesday, in Room 100 of the National Academies' Keck Center, 500 Fifth St. NW, Washington, DC. The work-shop is free and open to the public, but advance registration is required. http://dels.nas.edu/dr/f9.html

October 27-29, 2003

Emergency Preparedness: Improving the Odds. Sponsor: Pacific Northwest Preparedness Society. Vancouver, British Columbia.

Conference goals are to raise the global level of emergency preparedness through promoting awareness, providing information and solutions to problems, sharing experiences, showcasing technologies, and creating networking opportunities. Contact: the Center for Policy Research on Science and Technol-ogy, Simon Fraser University, Burnaby, BC, Canada, V5A 1S6; (604) 665-6097; e-mail: info@epconference.ca; http://www.epconference.ca/.

From: Natural Hazards Observer, v. 28, no. 1, p. 15

October 27-28, 2003

How to Measure and Benchmark Business Continuity and Disaster Recovery Programs and Processes. Sponsor: Shared Services and Outsourcing Network. Chicago, Illinois. This conference will focus on evaluating business continuity programs and ways to implement performance measures to determine the effectiveness of protection archives. Contact: Inter-national Quality and Productivity Center, 150 Clove Road, Little Falls, NJ 07424; (973) 256-0211; http://www.sharedservicesnetwork.com.

from: Disaster Research 393, August 18, 2003

November 14-20, 2003

51st Annual Conference and EMIX 2003 Exhibit. Sponsors: International Association of Emergency Managers (IAEM) and National Association of Manufacturers. Orlando, Florida:. The theme of this meeting is "communities and connecting: comprehensive emergency management." Featured sessions include the use of robots in disaster response, perspectives on management of information during emergencies, continuity operations, public health and emergency management, and much more. The EMIX exhibit will bring together homeland security and disaster preparedness suppliers. There are a number of pre-conference training opportunities. Contact: IAEM, 201 Park Washington Court, Falls Church, VA 22046; (703) 538-1795; http://www.iaem.com.

from: Disaster Research 393, August 18, 2003

November 16-19, 2003

Emergency Preparedness and Prevention Conference: Stay the Course. Sponsor: U.S. EPA Region III. Norfolk, Virginia. This conference will focus on training, networking, and continuing education for a variety of emergency management issues. Conference information is available from Katrina Harris, 2003 Conference, c/o General Physics Corporation, 500 Edgewood Road, Suite 110, Edgewood MD 21040;(800) 364-7974; http://www.2003conference.org/.

From: Disaster Research 394, Sept. 12, 2003

A comprehensive list of upcoming hazards-related meetings and training is available from the Natural Hazards Center web site: http://www.colorado.edu/hazards/conf.html.

INFREQUENTLY ASKED QUESTIONS

Compiled by Lee Walkling

When and where was the biggest *recorded* tsunami?

The Guinness Book of Records credits an obscure Alaskan inlet with the world's biggest recorded tsunami (seismic wave). This monster, caused by a massive landslip into the fjord-like Lituya Bay at 10:17pm on July 9 1958 washed 1720 feet high (524m) along the inlet at a speed of 100mph.
from:
http://www.magicsurfbus.com/surftrivia2.htm

Name the four ways volcanic eruptions near a marine environment can generate tsunamis.

Pyroclastic flows, submarine explosions, landslides, or caldera collapse.
from: Gray, J. P.; Monaghan, J. J., 2003, Caldera collapse and the generation of waves: Geochemistry, geophysics, geosystems, v. 4, no.2, p. 1

Can you name the two types of shock waves produced by Krakatau?

"One was a wave that passed invisibly through the air, a sudden burst of pressure that bounced around the world, and was recorded doing so, moreover, a remark-able seven times. These air waves – which recorded as pressure spikes at the Batavia [Jakarta] gasworks, ninety miles to the east – radiated outward from Krakatoa very fast, at what was an easily calculated velocity of about 675 mph." The other shock waves were carried in the water: tsunamis.
from: Winchester, Simon, 2003, Krakatoa, the day the earth exploded: HarperCollins, p. 247.

You all know that "tsu" means harbor or port in Japanese. Can you give the dictionary (English) meaning of TSU?

According to Websters Third New International Dictionary (1993) it means 'this side up.'

DISASTER TIME LINE

The latest version (ver.2.0) of **Disaster Time Line** provides a unique, graphic depiction of major disasters both natural and technological, that have affected emergency management policies in the US. Using colorful computer graphics, the **Disaster Time Line** chart (roughly 11" x 32") shows not only major milestone events, and the year each occurred, but also the influences each event had on major after-action reports and analyses; federals statutes, regulations and executive orders. etc.

Please note that this time line is copyrighted. Clair Rubin is allowing users to download a copy for personal use or for training and education purposes. Please respect their effort and the copyright for this intellectual property.

Available at: http://www.disaster-timeline.com/dtl.html

Evacuating Special Needs Individuals: Multi-Hazard Benefits

Ned Wright, Linn County Emergency Management Agency
Lisa Gibney, Emergency Planning Department, Duane Arnold Energy Center
From: Natural Hazards Observer, v. XXVII, no. 6, July 2003, p. 8-9; online at http://www.colorado.edu/hazards/o/julyo03/ julyo03d.htm

In partnership with Iowa's only nuclear power plant—the Duane Arnold Energy Center (DAEC)—the Linn County Emergency Management Agency in Cedar Rapids, Iowa, has developed a voluntary program to register those in the community who are not living in group facilities and may need special assistance during emergency situations. The program began in 1993, with the goal of reaching out to a segment of the community that could easily become lost in the shuffle during an emergency. Originally designed to assist with special needs evacuation transportation requirements in the unlikely event of an accident at DAEC, the program has proved useful to people who are able to manage day-to-day activities but may need assistance during a dangerous or stressful situation like an evacuation. Program participants may not have regular contact with anyone outside their home, may have family or friends in the area who are unable to respond quickly enough to be of assistance, or who may not have personal access to emergency assistance through social service agencies or other avenues.

Although started in response to a specific preparedness need, the information gathered for this program is useful in almost every emergency situation. Linn County emergency managers realized the importance of using this information as part of its overall emergency response, regardless of the type of event. The county has prepared pre-plans for a variety of industrial, agricultural, or natural risks that could require the evacuation of a large portion of the county's more than 195,000 residents.

This special needs registration system addresses several problems, but perhaps the most significant is that this program reaches out to a special population whose voice is often absent from emergency planning.

Community Outreach and Program Registration

Currently, there are nearly 1,600 participants in the program, and registration is expected to double in the next few years as the program is increasingly publicized. Participation is free and confidential, and the application process is straightforward and user-friendly. Applicants are asked to fill out and return a postage-paid card with basic information such as name, address, phone number, and a brief description of their circumstance. Knowing the kind of assistance required by each resident (transportation help, lift assistance, oxygen requirements, visual or hearing guidance, etc.) allows emergency management staff to determine the best use of available resources.

Registration cards are mailed directly to county residents living closest to DAEC, and cards are also distributed in telephone books to residents within the 10 miles that surround the DAEC (the area that comprises the emergency planning zone). In Linn County, Alliant Energy Customer Service operators, along with the emergency management agency, accepted and logged phone-in registration information. Staff from the county maintain the database.

Community service groups, such as the Visiting Nurses Association, Meals on Wheels, and Hospice, which work with the elderly and special needs clients, also help to publicize the program. They identify potential registrants, present the program, and distribute cards. All residents who believe they or a family member or friend may need assistance during an evacuation are encouraged to register. Unlike a handicapped parking sticker, no doctor's statement is needed to qualify.

Data Management

Once the registration cards are returned, the information is entered into a system that is compatible with the county's geographic information system (GIS) database. This aspect of the program started in 1998, and enabled the county to link program registrants with its county-wide evacuation pre-planning system as well as the ability to locate each participant's house on a computer-generated map. During an emergency situation, mapping participant locations gives emergency responders a quick snapshot of the situation that helps evaluate the need for additional resources or increased staff. Since GIS maps are used county-wide, if there is an event requiring an evacuation, maps easily locate special needs registrants in the affected area. At the same time that the general population is being alerted, the Human Resources Department contacts the special needs registrants individually to alert them and determine their specific needs prior to dispatching the necessary emergency response.

Effective Use of Response Resources

Having information about residents' location, type of needs, and potential evacuation challenges helps the Linn County emergency management staff ensure that available resources remain at adequate levels of readiness. Evacuations are time consuming under the best conditions, and having critical information in advance saves valuable time and permits more efficient use of limited resources. Pre-planning and community outreach means that the county can be proactive in its emergency response by both identifying those with special needs and providing responders with specific requests for resources that will need to be dispatched. Due to the program database and mapping capability, effective and targeted response can be activated before a 911 call is made by a citizen.

The program also ensures a situationally appropriate response as well—responders know if the person is confined to bed, needs a wheelchair lift device, or requires other assistance.

Although the program has never been fully implemented, recent flooding events have put the plan to the test on a limited basis. During the flooding, the special needs list successfully identified registrants living in low lying areas that had been targeted for potential evacuation. Program participants received as much notice as possible about the situation, and the Department of Human Resource Management used the list to coordinate their safety and welfare checks, ensuring that these community members were properly notified.

To Get Started . . .

This type of program is easy to replicate. Some issues that need to be resolved include:
(1) Designating emergency management staff to coordinate the distribution and receipt of Registration cards;
(2) Agreeing on the type of information to ask for and an appropriate form design;
(3) Working with appropriate community organizations and in-home service providers to assist with identifying potential participants and distribute blank cards and program information;
(4) Determining a location that can accept phone-in registrations;
(5) Ensuring adequate computer systems and software to support the database;
(6) Determining whether to only notify individuals or to notify and transport those with special needs.
(7) Allocating sufficient volunteer or paid staff time to keep the information updated.

There are a few obstacles with the potential to impact the program's effectiveness:
(1) This is a voluntary registration program & there needs to be a dedicated outreach and publicity campaign to make citizens aware it;
(2) Participants may have concerns that their registration information may be sold, when in truth the information is confidential;
(3) Privacy laws prevent social service agencies from sharing their client lists, and clients of a given social service agency may automatically assume that they are enrolled in the emergency notification program;
(4) Interagency coordination may be difficult. It is important to work with representatives from all agencies (public and private) that will be involved with the program;
(5) There is an ongoing challenge to keep the list up-to-date; consider asking participants to re-register each year, tell the emergency management agency about changes to their situation, or allocate staff to contact participants individually;
(6) To decrease misuse of first responder resources, it is important to track when a participant leaves for an extended period of time, moves to a care facility, or passes away.

Program Beneficiaries

The special needs population is constantly growing, and therefore, the need for this program will increase. Linn County officials encourage program registration for persons with any kind of special need because timely notification for those who require special evacuation assistance benefits both citizens and local government.

The beneficiaries of this program are the nearly 1,600 registrants who have chosen to participate. Families gain peace of mind from knowing that, if their loved one is part of this registration process, emergency management officials will be checking on the health and welfare of their family member.

The emergency management agency benefits as well because of the relative ease of efficiently allocating scarce resources in disaster situations and the ability to provide targeted assistance where it is most needed. First responders also reap the program's benefits, as it provides them with detailed information to quickly assist people with special needs.

Further information about this program is available from Lisa Gibney, DAEC Emergency Planning Department, (319) 851-7010; e-mail: lisa.gibney@nmcco.com. Ned Wright may be reached at (319) 363-2671; e-mail: Ned.Wright@linnema.com.

WSSPC 2003 Awards in Excellence
Presented at the WSSPC Annual Conference
September 20-24, 2003, Portland, Oregon

Award Category: Overall Excellence in Mitigation

Recipient for Overall Excellence and Educational Outreach to General Public
Program Name: Earthquake/Public Education Programs
Administering Agency: Washington State Emergency Management Division

Award Category: Mitigation Efforts (3 Winners)

(1) Program Name: Improving Natural Gas Safety in Earthquakes
Administering Agency: California Seismic Safety Commission
(2) Program Name: Clackamas County Natural Hazards Mitigation Plan
Administering Agency: Clackamas County Emergency Management
(3) Program Name: Seismic Design Criteria of Non-Structural Systems for New and Existing School Facilities
Administering Agency: Salt Lake City School District

Award Category: Educational Outreach to General Public (3 Winners)

(1) Program Name: Quake Cottage Outreach Program
Administering Agency: Alaska Division of Emergency Services
(2) Program Name: Tsunami Safety Video: "Tsunami: Waves of Destruction"
Administering Agency: Hawaii State Civil Defense
(3) Program Name: Earthquake/Public Education Programs
Administering Agency: Washington State Emergency Management Division

Award Category: Response Plans/Materials (2 Winners)

(1) Program Name: Tsunami Warning and Evacuation Program
Administering Agency: Cannon Beach Rural Fire Protection District
(2) Program Name: Oregon Tsunami Evacuation Map Program
Administering Agency: Oregon Department of Geology & Mineral Industries and Oregon Emergency Management

Award Category: Use of New Technology

Program Name: Colorado Late Cenozoic Fault and Fold Database and Internet Map Server
Administering Agency: Colorado Geological Survey

Award Category: Innovations

Program Name: Mt. Rainier Lahar Warning System and Lahar Travel Time Mapping Project
Administering Agency: Pierce County Department of Emergency Management

Award Category: Non-Profit Agency Efforts

Program Name: Daycare Retrofit and Preschool Earthquake Safety Program
Administering Agency: Partners for Loss Prevention

The Western States Seismic Policy Council *Awards in Excellence* recognizes achievement in different areas of earthquake mitigation, preparedness and response. This program is both an effective method to share model programs, as well as to recognize the hard-working, creative and innovative efforts within the earthquake hazards reduction community.

It is the intent of WSSPC's *Awards in Excellence* to bring greater visibility to exemplary state, county and local programs and policies and to facilitate the transfer of those successful experiences to other states.

http://wsspc.org/award/

Material added to the National Tsunami Hazard Mitigation Program Library
September-October 2003

Note: These, and all our tsunami materials, are included in our online catalog at
http://www.dnr.wa.gov/geology/washbib.htm
The September-December 2003 citations will not show up in the online bibliography until January 2004

Asphaug, Erik; Korycansky, Donald; Ward, Steven, 2003, Exploring ocean waves from asteroid impacts: Eos (American Geophysical Union Transactions), v. 84, no. 35, p. 339.

Bondevik, Stein; Mangerud, Jan; Dawson, Sue; Dawson, Alastair; Lohne, Oystein, 2003, Record-breaking height for 8000-year-old tsu-nami in the North Atlantic: Eos (American Geo-physical Union Transactions), v. 84, no. 31, p. 289, 293.

Buika, Jim; Goosby, Stanley; Isawa, Raymond; Kong, Laura; Lo, Juliana; Yanagi, Brian, 2003, Automated tsunami alert system for Hawaii with applications for other tsunami-prone nations: Tsunami Newsletter, v. 35, no. 3, p. 13-15

Federal Emergency Management Agency, 1998, FEMA disaster preparedness and mitigation library: Federal Emergency Management Agency, 1 CD-ROM

Fryer, Gerard, 2003, Tsunami modeling of landslide sources workshop: Tsunami Newsletter, v. 35, no. 3, p. 12

Gusiakov, Viacheslav K., 2003, IUGG tsunami commission business meeting: Tsunami News-letter, v. 35, no. 4, p. 9-10

Gusiakov, Viacheslav K., 2003, NGDC/HTDB meeting on the historical tsunami database proposal: Tsunami Newsletter, v. 35, no. 4, p. 10

International Tsunami Information Center, 2003, Algerian earthquake: Tsunami Newsletter, v. 35, no. 3, p. 2

International Tsunami Information Center, 2003, Hemispheric consultation on earth warning systems: Tsunami Newsletter, v. 35, no. 3, p. 4-5

International Tsunami Information Center, 2003, NESDIS data users workshop and unified global tsunami historical database initiative: Tsunami Newsletter, v. 35, no. 3, p. 5

International Tsunami Information Center, 2003, PTWC News – Modifications to products and procedures of the Pacific Tsunami Warning Center: Tsunami Newsletter, v. 35, no. 3, p. 3-4

Miller, Jacquelin, 2003, In Memoriam - Doak Carey Cox, January 16, 1917 – April 21, 2003: Tsunami Newsletter, v. 35, no. 3, p. 6-7, 12

Nishide, Noritake, 2003, Japan's EPOS earth-quake and tsunami warning system: Tsunami Newsletter, v. 35, no. 4, p. 2-5

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Satake, Kenji, 2003, Current research in Japan; Paleo-tsunami studies renewed our knowledge on earthquake recurrences: Tsunami Newsletter, v. 35, no. 4, p. 9

Satake, Kenji, 2003, Twenty-first international tsunami symposium: Tsunami Newsletter, v. 35, no. 4, p. 6

Setterlund, S. K., 2003, Coastal hazards-A guide to print, electronic and web resources: Journal of Coastal Research, v. 19, no. 1, p. 134-156.

Walker, Daniel A.; Hulbirt, Nancy, 2003, Run-ups in the Hawaiian Islands: Tsunami News-letter, v. 35, no. 3, p. 7-11

Walsh, Timothy J.; Titov, Vasily V.; Venturato, Angie J.; Mofjeld, Harold O.; Gonzalez, Frank I.,, 2003, Tsunami hazard map of the Elliott Bay area, Seattle, Washington-Modeled tsunami inundation from a Seattle fault earthquake: Washington Division of Geology and Earth Resources Open File Report 2003-14, 1 sheet, scale 1:50,000.
http://www.dnr.wa.gov/geology/pdf/ofr03-14.pdf

World Health Organization and Pan American Health Organization, 2001, Health Library for Disasters: World Health Organization and Pan American Health Organization, 1 CD-ROM

Note: The articles from the International Tsunami Information Center *Tsunami Newsletter* are available at
http://www.prh.noaa.gov/itic/library/pubs/newsletters/nl_home.htm

VIDEO RESERVATIONS

Place a check mark (T) beside the video(s) you want to reserve; write the date of the program behind the title. Mail to TsuInfo Alert Video Reservations, Lee Walkling, Division of Geology and Earth Resources Library, PO Box 47007, Olympia, WA 98504-7007; or email lee.walkling@wadnr.gov

NEW!! ____Business Survival Kit for Earth-Quakes & Other Disasters; What every business Should know before disaster strikes. Global Net Productions for the Cascadia Regional Earthquake Workgroup, 2003. 27 min. With CD disaster planning tool-kit and other information.

___ Tsunami Chasers. Beyond Productions for the Discovery Channel. 52 minutes.

___Earthquake…Drop, Cover & Hold; Washington Emergency Management Division. 1998. 5 min.

___Tsunami Evacuation PSA; DIS Interactive Technologies for WA Emergency Management Division. 2000. 30 seconds.

___Cascadia: The Hidden Fire–An Earthquake Survival Guide; Global Net Productions, 2001. 9.5 minutes. A promo for a documentary about the Cascadia subduction zone and the preparedness its existence demands of Alaska, Oregon and Washington states. Includes mention of tsunamis. (The full documentary was broadcast on a PBS station in April 2002.)

___Not Business as Usual: Emergency Planning for Small Businesses, sponsored by CREW (Cascadia Regional Earthquake Workgroup), 2001. 10 min. Discusses disaster preparedness and business continuity. Although it was made for Utah, the multi- hazard is-sues remain valid for everyone. Websites are included at the end of the video for further information and for the source of a manual for emergency preparedness for businesses.

___Adventures of Disaster Dudes (14 min.) Preparedness for preteens

___The Alaska Earthquake, 1964 (20 min.) Includes data on the tsunamis generated by that event

___Cannon Beach Fire District Community Warning System (COWS) (21 min.) Explains why Cannon Beach chose their particular system

___Disasters are Preventable (22 min.) Ways to reduce losses from various kinds of disasters through preparedness and prevention.

___Disaster Mitigation Campaign (15 min.) American Red Cross; 2000 TV spots. Hurricanes, high winds, floods, earthquakes

___Forum: Earthquakes & Tsunamis (2 hrs.) CVTV-23, Vancouver, WA (January 24, 2000). 2 lectures: Brian Atwater describes the detective work and sources of information about the Jan. 1700 Cascadia earthquake and tsunami; Walter C. Dudley talks about Hawaiian tsunamis and warning systems.

___Killer Wave: Power of the Tsunami (60 min.) National Geographic video.

___Mitigation: Making Families and Communities Safer (13 min.) American Red Cross

___Numerical Model Aonae Tsunami–7-12-93 (animation by Dr. Vasily Titov) and Tsunami Early Warning by Glenn Farley, KING 5 News (The Glenn Farley portion cannot be rebroadcast.)

___The Prediction Problem (58 min.) Episode 3 of the PBS series "Fire on the Rim." Explores earthquakes and tsunamis around the Pacific Rim

___Protecting Our Kids from Disasters (15 min.) Gives good instructions to help parents and volunteers make effective but low-cost, non-structural changes to child care facilities, in preparation for natural disasters. There is an accompanying booklet. Does NOT address problems specifically caused by tsunamis.

___The Quake Hunters (45 min.) A good mystery story, explaining how a 300-year old Cascadia earthquake was finally dated by finding records in Japan about a rogue tsunami in January 1700

___Raging Planet; Tidal Wave (50 min.) Produced for the Discovery Channel in 1997, this video shows a Japanese city that builds walls against tsunamis, talks with scientists about tsunami prediction, and has incredible survival stories.

___Raging Sea: KGMB-TV Tsunami Special. (23.5 min.) Aired 4-17-99, tsunami preparedness in Hawaii.

___The Restless Planet (60 min.) An episode of "Savage Earth" series. About earthquakes, with examples from Japan, Mexico, and the 1989 Loma Prieta earthquake in California.

___Tsunami and Earthquake Video (60 min.) Includes "Tsunami: How Occur, How Protect," "Learning from Earthquakes," and "Computer modeling of alternative source scenarios."

___ Tsunami: Killer Wave, Born of Fire (10 min.) NOAA/PMEL. Features tsunami destruction and fires on Okushiri Island, Japan; good graphics, explanations, and safety information. Narrated by Dr. Eddie Bernard, (with Japanese subtitles).

___Tsunami: Surviving the Killer Waves (13 min.) Two versions, one with breaks inserted for discussion time.

___Understanding Volcanic Hazards (25 min.) Includes information about volcano-induced tsunamis and landslides.

___The Wave: a Japanese Folktale (9 min.) Animated film to start discussions of tsunami preparedness for children.

___Waves of Destruction (60 min.) An episode of the "Savage Earth" series. Tsunamis around the Pacific Rim.

___Who Wants to be Disaster Smart? (9 min.)Washington Military Department/Emergency Management Division. 2000. A game show format, along the lines of *Who Wants to be a Millionaire*?, for teens. Questions cover a range of different hazards.

___The Wild Sea: Enjoy It...Safely (7 min.)Produced by the Ocean Shores (Wash. Interpretive Center, this video deals with beach safety, including tsunamis.

NATIONAL TSUNAMI HAZARD MITIGATION PROGRAM STEERING GROUP

FEDERAL

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Seattle Initiates Business Emergency Network System
designed to assist with response and economic recovery

NEWS RELEASE
May 1, 2003
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The City of Seattle today unveiled a communication system that will assist businesses in their response to and recovery from an emergency. Known as the Business Emergency Network (BEN), it enables businesses to receive information directly from the City's Emergency Operations Center and provide feedback about what they need.

BEN is designed to reach businesses throughout the Central Puget Sound and become a regional network for sharing information and resources among public and private sector organizations.

"We are committed to making Seattle the most prepared city in the nation," said Mayor Greg Nickels. "BEN will help us prepare businesses to address the safety and economic recovery issues that they face in the wake of a natural disaster or other emergency."

For the last year, the city has worked with the Greater Seattle Chamber of Commerce, the Building Owners and Managers Association of Seattle and King County (BOMA), and other business organizations to create a meaningful partnership between government and the corporate community. BEN is designed to create a one-stop shop for businesses to share information and resources during an emergency, as well as a way to create partnerships among businesses that would assist economic recovery.

"An effective communication channel from the City to the business community will ensure that businesses, both small and large, receive timely information and have the ability to report about necessary resources after a disaster," said Steve Leahy, President & CEO of the Greater Seattle Chamber. "Involving the business community in disaster preparedness is a critical component. Enabling businesses to recover quickly post-disaster helps ensure that our economy will avoid a major disruption."

BOMA, whose members own or manage 35 million square feet of office and commercial real estate in Seattle and King County, is participating in BEN to assist in the emergency preparedness of the organizations located in their buildings, representing more than 175,000 employees.

"BOMA looks forward to this important partnership with the City of Seattle, local governments and other business groups. Working together, we can be a powerful force to minimize the impact of an emergency situation and more effectively return the region's economy back to normal." said BOMA President, Don Wise, a real estate executive with Unico Properties.

The system will be initiated in early May to inform the business community about TOPOFF2, the most comprehensive terrorism response exercise ever undertaken in the United States. TOPOFF2 will take place the week of May 12 and include 36 hours of continuous, live, full-scale exercise play, in the field and at the City's emergency operations centers. Hundreds of police, fire, health, and other emergency responders are expected to participate.

Not only is this a great opportunity to test BEN, the test will help to let businesses know what to expect during the exercise.

"This is just the beginning of our partnership," said Nickels. "BEN will go far beyond the scope of this exercise, and it will continue to grow to benefit the whole region."

For more information about BEN, contact Ines Pearce, Seattle Emergency Management, (206) 615-0288 or via e-mail at ines.pearce@seattle.gov

From: http://www.epicc.org/

”Ciao!" from co-editor Connie J. Manson

TsuInfo Alert thanks Connie for her 5 years' editing labors and wishes her success in whatever adventure she chooses next.