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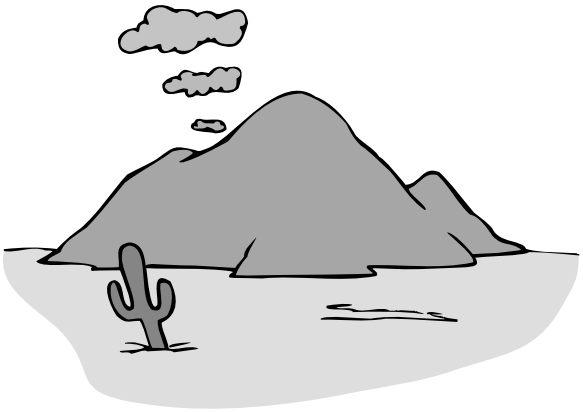
COMMUNICATIONS - IS IT OUR WEAKEST LINK?



In most situations where interaction is required in order to achieve some goal or level of cooperation that would result in a better, if not stronger partnership approach, communications seem to be the weak link. The inability or resistance to exchange information can significantly reduce the effectiveness of individuals, groups, and organizations in addressing issues of common interest.

Barriers created by leadership and goal differences between departments, differences in funding streams, and in many cases, differences in personalities, can result in a "stove piping" effect that makes for less effective communications.

Communication is a relatively simple concept which involves the exchange of thoughts, messages, or information by speech, signals, writing, or behavior. Although simple in definition, the reality is that communication is a complex process which, if not acknowledged for its role, can slow, if not halt, what could otherwise be a productive interaction.

The earthquake program is not immune to the problems associated with communication breakdowns. The CUSEC Board of Directors recognized that all four program areas CUSEC works within (mitigation, multi-state planning, application of research, and public outreach and education) were dependent on a strong and effective ability to communicate. Recognizing this common element helped to show where improvements could be made. A reprioritization of CUSEC programs placed Public Outreach and Education at the top. A conscious effort was made to improve the way information about the earthquake hazard and the various programs that are in place to address it were presented. This also included an effort to improve organizational interaction. CUSEC, like the state emergency management agencies it represents, serves in a coordination role. The success of this role is dependent on the ability to overcome the various barriers previously mentioned, as well as others.

For the past twenty years, CUSEC has worked hard to improve the level of interaction between the various players with one goal in mind **"... the reduction of deaths, injuries, property damage and economic losses resulting from earthquakes in the Central United States."**

This issue of the CUSEC Journal is dedicated to trying to highlight the issue of communications and the importance of improving it. The issue of communications is much too broad to be

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covered in this publication. The intent is simply to bring attention to the issue and try to highlight certain points with the hope that we can begin to overcome some of the barriers through a conscious acknowledgment of the problem.

Looking Outside the Box

Like most organizations, CUSEC worked within the box it had created for itself in addressing the seismic hazard of this region. Even with what was thought to be a conscious effort to include all the appropriate partners, it wasn't until after the priority shift to making public outreach and education a major emphasis, that it became clear that at least one essential group had been left out.

A look outside the box showed that there was an untapped resource that had the skills and enthusiasm needed to greatly expand, and hopefully improve, the way in which CUSEC and its partners communicated their message. In the Fall of 2001, the Earthquake Program Managers and CUSEC staff began a dialog with the Public Information Officers (PIO) from the seven CUSEC States. Almost immediately it was clear that the inclusion of the PIO's had great potential.

In the spring of 2002 the CUSEC PIO's and PIO's from the four FEMA regions within the CUSEC region came together to begin outlining ways they could help the earthquake program (see Public Information Officers Unite… page 4). The inclusion of the PIO's resulted in a fresh perspective to the hazard. The possibilities of where this could lead have just begun to be explored.

Recent meetings of the PIO's have resulted in the inclusion of other groups such as the Mid America Earthquake Center, which was looking to expand their outreach efforts, donations planners in the CUSEC states looking for ways to improve the donations message before disasters strike, and the Association of CUSEC State Geologists. The PIO's have also opened up additional lines of communication through their counterparts within USGS and FEMA, which show great potential in improving

the overall message about the earthquake program in the central U.S. In one respect, this relationship has helped to strengthen the earthquake program simply by providing a broader understanding of the earthquake program's need and the outreach issues with which those of us within the box have struggled to overcome.

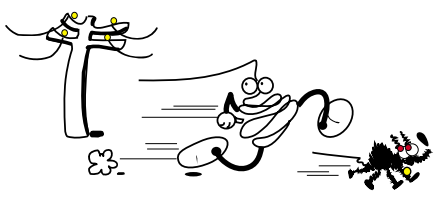
The new relationships this created came at a time when major changes were taking place across the country in emergency management. CUSEC has continued to promote the earthquake program as a viable part of an all hazard approach, and it didn't take long for the PIO's to see the benefits to be gained in addressing other hazards as well.

The PIOs helped to bring some diversity to the earthquake program which is important because it helps prevent the "box" syndrome by capitalizing on unique talents and perspectives. Diversity not only helps create good ideas, but it can help prevent overlooking opportunities which present themselves.

Communication Advances

Technological advances have improved the means of communication by providing the tools to link groups together but, as with personal communications, there are barriers which prevent the tools from being used or used in an appropriate way. Across the U.S. there is example after example of inconsistencies in communication protocols, hardware differences, frequency differences and the absence of communication interoperability.

The stovepipe concept can be applied to almost every level of government and jurisdiction just as easily as it can to programs within them. Disasters do not recognize jurisdictional boundaries, but a quick look at communication capabilities between different departments, agencies, and levels of government, clearly shows a unconscious stovepipe approach. Each operate within its own structure, and its own funding, its own communications hardware and software. Each has its



own process of moving information. Only recently have many of these agencies begun to recognize the need to communicate with each other, and it often takes a disaster of some magnitude to force the awareness.

The events of 9/11 magnified the inconsistencies & the lack of interaction and sharing of information between key agencies. These shortcomings became the underlying basis for President Bush's formation of the Department of Homeland Security.

Communication, for the most part, has not taken a national approach in a unified framework. It is true that a disaster is always a local event and this is where the inoperability can also be most apparent. The problem is shared at the state and national levels as well. As growth occurs often the approach taken in the development of a communication capability is single minded. Public works, law enforcement agencies, emergency medical, and fire just to name a few, often reflect an undirected growth in emergency communications.

The absence of a single framework can contribute to the tendency to grab the latest and greatest widget which presents itself. This may satisfy the immediate need but in the long, run may not fit a larger communications strategy. With technological advances have come a proliferation of individual systems without concern for inoperability. It is doubtful that such progressions are done with any intent to purposefully exclude but the net result is the same. There are reasons for having differing systems to meet the unique needs of the situation or agency but this should not contribute to the inconsistencies which burden the current system. Advances in communications hardware and software bring hope that these differences can be overcome.

GIS as a Communication Tool

The tools used to communicate are sometimes less obvious than one would expect. For instance, most people do not think of maps as a form of communication, but, in reality, they are a very powerful form of communication. The art of map design has improved with advances in technology. Maps which were once very focused and often limited by the availability of data have exploded with possibilities. With the advent of GIS and GPS the speed and depth in which maps can be generated has changed for ever the cartographic process. Vanessa Bauman, University of Colorado at Bolder, discusses in her article Managing Seismic Hazards: The Value of Maps (page 11) the value that GIS has brought to mapping.

FEMA's loss estimation software program HAZUS (Hazard US) builds on this concept by providing a program that enables the user to develop scenario maps depicting damages from earthquakes in a given area. Originally limited to the seismic hazard, HAZUS is close to becoming a multi-hazard application. The program will greatly expand the application by allowing users to model wind and flood hazards as well as seismic (see HAZUS MH page 22).

The trend in communicating through the use of maps has been one of shifting from mapping obvious features to discovering relationships between different levels and layers of geographic information. Mapping has become more conceptual and imaginative. More people find maps relevant to their life and work than ever before and maps are being produced on demand to an ever-expanding market.

Clearly, there is much to be gained from improved communications across the board. We have the tools and the means to improve our lines of communication. The challenge that lies before us is to maximize the use of these new technologies to overcome communications barriers.

Patrick R. Ralston, Chair

Statement from the Chairman of the Board

It is a pleasure and an honor to be named Chair of the Central United States Earthquake Consortium during its 20th anniversary year. Since its inception, CUSEC has been dedicated to "the reduction of deaths, injuries, property damage and economic losses resulting from earthquakes in the central United States."

I want to thank the Director of the Arkansas Department of Emergency Management, W.R. "Bud" Harper, for his leadership as Chair over the last two years. During his tenure great strides were made to develop a strategic plan to carry out CUSEC's mission.

Our goals could not be accomplished without the cooperation and support of the seven member states, numerous federal agencies, non-profit and volunteer organizations, the academic community and corporate sponsors.

With so many groups and individuals involved, effective communications are vital. Our priority this year will be to ensure that information is shared between the various entities in a timely manner. It is easy for one group to become focused on its specialty and forget that others could use its information. When everyone works together, the entire puzzle becomes visible, not just its parts.

We live in a time when threats to Homeland Security are very real. As a member of the U.S. Department of Defense Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, more commonly referred to as the Gilmore Commission. While the Commission focuses on threats to Homeland Security from individuals, nature also poses a threat to Homeland Security. A major earthquake along the New Madrid Seismic Zone has the potential of causing more disruption to this country than any terrorist could imagine. Mitigation and preparedness are our only defenses.

CUSEC is a vital organization with its eyes on the future. We will work together to further improve mitigation, planning, public information, research and resource development to prepare for the inevitable. The last 20 years have been good. The next 20 years will be better.

Public Information Officers Unite to Strengthen Earthquake Program

Jennifer Gordon - PIO, Past Chair
Arkansas Department of Emergency Preparedness
Association of CUSEC Public Information Officers

Earthquake Public Information is at times like the analogy of the blind men touching an elephant. Each state Public Information Officer (PIO) is working to share information with our public, but without sharing information with each other, we can't possibly understand the whole picture.

In March of 2002, the Central United States Earthquake Consortium (CUSEC) addressed this problem by inviting the state emergency management PIOs to the CUSEC Annual Meeting. During the meeting we recognized the need to coordinate information and resources in order to reach a larger population. We proposed holdings meetings to develop a variety of tools to increase public awareness of the earthquake hazard in the central US and improve the lines of communications among the state and federal emergency management PIO's for addressing this hazard.

> *"Having a strong, timely, coordinated response is dependent on having plans and information in place ahead of time"*

Because most people living in the central U.S. today have not experienced a damaging earthquake, they have little to no knowledge of the earthquake threat or of the potential devastation of a large earthquake on their communities and their lifelines. Public awareness campaigns have been held in some states, but there has been little to no coordination of this effort throughout the central United States. This has resulted in inconsistencies in the message delivered to various groups, and in some instances misinformation brought on by the use of outdated research information.

Another element of concern is the post earthquake response and information flow. Having a strong, timely, coordinated response is dependent on having plans and information in place ahead of time. Several projects completed ahead of time could get important and potentially life-saving information to the public and assist in gathering critical and, in some cases, perishable, information from the public back to the geoscience, geotechnical, and structural community.

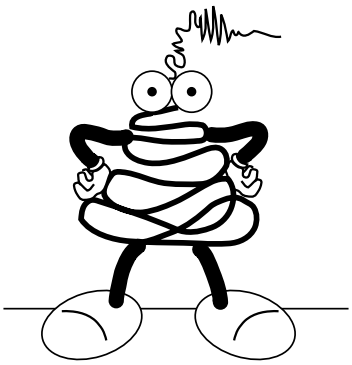
The media will be an invaluable source for getting this information out to the public.

Projects suggested include:

- ❏ A "smart book" with pre-approved information that can help PIOs answer questions regarding the earthquake threat.
- ❏ A media kit addressing the earthquake threat and the work being done to mitigate damage from earthquakes
- ❏ Expanding the CUSEC web site to deliver information and other resources to the public and media outside the Central U.S.
- ❏ An inventory of existing video material on the earthquake hazard/risk in the Central U.S. The resulting database will be used to determine future video needs.
- ❏ Collaboration with Public Broadcasting stations within the CUSEC States through development of a pilot earthquake video designed for public television.
- ❏ Development of pre-prepared news releases that can be adapted immediately following a large earthquake.
- ❏ Discussion on how to coordinate public information among the states during response and recovery considering the possibility of heavy damage to the communications and transportation infrastructure. PIOs need to be aware not only of the resources of each state, but also of Federal Emergency Management Agency (FEMA), United States Geological Survey (USGS) and other federal agencies.
- ❏ A questionnaire for the non-web connected public, to be disseminated through the media immediately following an earthquake of magnitude 3.5 or greater, to capture the level of damage and intensity of an earthquake based on direct observation. The questionnaire would target populations who have limited or no access to the Internet and who would not be able to access the USGS questionnaire.

An organizational meeting was held in Memphis in August of 2002 and another meeting was held at the University of Memphis, Center for Earthquake Research and Information in conjunction with the Mid America Earthquake Center in October. A grant proposal has been sent to NEHRP with hopes that it would defray some of the costs associated with this endeavor.

For more information on the CUSEC Public Information Officers activities, contact Jennifer Gordon at jennifer.gordon@adem.state.ar.us or 501-730-9818



Communicating the right message about donations – Will it ever be heard?

Elaine Clyburn
American Red Cross Liaison to CUSEC

A damaging earthquake in the Central or Eastern U. S. will elicit worldwide attention for many reasons. Due to the sudden onset, the initial communication to the public about the event and its consequences must be almost instantaneous. The population directly affected by the event will be primarily concerned about safety and security issues. Much of the rest of the world will want to know how they can help.

For years, a coalition of voluntary agencies in partnership with government at various levels has refined strategies for dealing with donations management. The following are some of their suggestions in no particular order of importance.

Good working relationships with the media and other agency partners in the community are the foundation of successful coordinated action. These relationships are forged and nurtured in the pre-incident phase to establish credibility and to practice those actions which mitigate against confusion. Invariably some on-scene responder may comment on the absence of some item or actually request items of assistance. While this cannot be prevented it may be tempered by requesting that any such offers be verified by designated spokespersons.

Decide in advance what you will accept or solicit so that conditions surrounding acceptance of a donation are explicit. For example, some offers come with additional costs to the user such as transportation to the site or housing and other support for unaffiliated volunteers.

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Consider purchasing advertising time or space to publish the donations message to augment public service announcements.

Mass media operates on a 24 hour cycle and the public information strategy has to be in place as soon as coverage of the disaster begins

Establish a clearinghouse for donations and volunteers. These can be handled by one organization with a system of referrals to constituent agencies or several agencies working in concert. Communicate among agencies to keep information current.

Seek opportunities to explain how donations are making a difference in the relief effort or how they are causing problems.

Records of transactions must clearly identify the offer and the disposition of the offer in order to maintain credibility. Develop a procedure for acknowledging receipt of accepted donations to include recognition of volunteers.

Remember that people generally want to help. Messages on how, when and where to help should make it easier for the right stuff to be sent to the right place at the right time.

For further information on donations management see www.nvoad.org.

CBE IMPLEMENTATION OPPORTUNITIES AND CHALLENGES MAE CENTER PROJECT FD-3

Robert A. Olson, Consultant

The following information was summarized at the Mid-America Earthquake Center's Research Associates Symposium and Annual Meeting in Memphis, Tennessee on November 24, 2002.

Project Objective: To prepare a "guideline" or similar document that identifies typical, real, or perceived barriers to implementing Consequence Based Engineering (CBE) and strategies and methods to help overcome such barriers. The document will be "user oriented" and will address CBE's applicability to new or replacement construction and the retrofitting or rehabilitation of existing structures or systems.

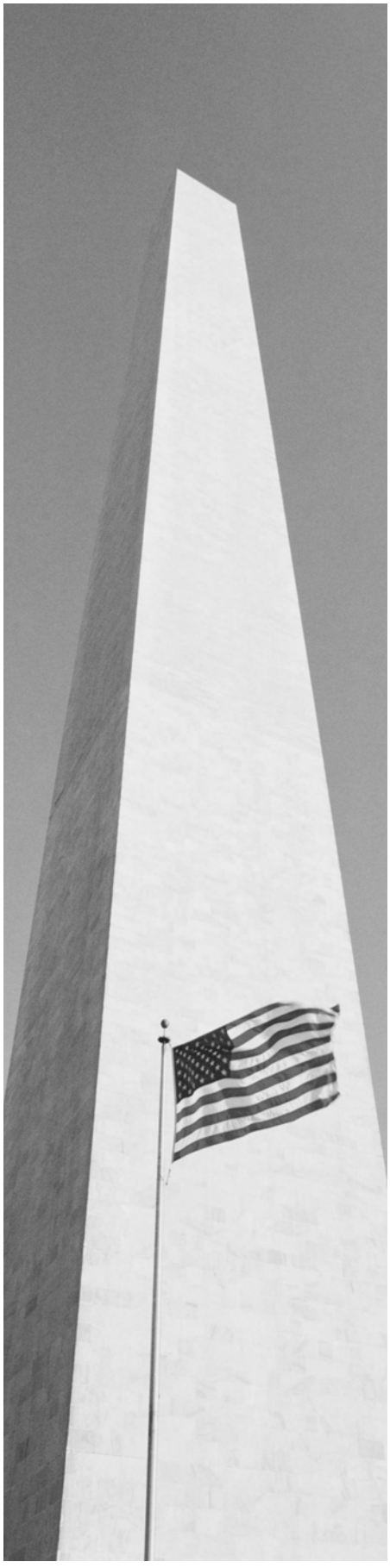
Working Papers: Three working papers will be prepared to support this project, with the intent of integrating them and other materials into the final document. A Working Bibliography has been completed, all of the materials have been assembled, and they will provide a basis for each of the working papers.

WP 1: Knowledge and Technology Transfer Models and Commentaries: This working paper will synthesize several models for transferring knowledge and technology from research into practice. I will briefly describe each model and include comments on its attributes and strengths and limitations. Examples include the professional association model, project sponsor-driven model, legislative and regulatory model, internal consultant model, and researchers' outreach or consultants' model. Draft prepared by April 1, 2003.

WP 2: Variables Affecting Acceptance and Use: This working paper will describe variables that affect the acceptance and use of research by various stakeholder groups. Depending on the context or situation, many could be opportunities or barriers. Where possible, I anticipate suggesting some strategies about exploiting the opportunities and overcoming the barriers. Draft prepared by July 15, 2003.

WP 3: Strategies for the MAE Center: This working paper will contain recommended strategies available to the MAE Center that could support its knowledge transfer roles, and to an equal extent, assist the center in becoming a source of expert earthquake engineering advice, testing, and other services to meet regional needs. Draft prepared by October 1, 2003.

Contact: Robert A. Olson, Robert Olson Associates, roa1@attbi.com, 916-989-6201.



Department of Homeland Security CIO Supports NIUSR Concept of "Interstate Communications Expressway"

A Step Forward in Solving the Interlinking Puzzle

By Lori Bush

In what could be one of the most promising developments in the battle to provide a multipurpose infrastructure for emergency communications, Steve Cooper, Chief Information Officer for the Department of Homeland Security says it supports in concept an "Interstate Communications Expressway"(ICE).

In a nutshell, the Interstate Communications Expressway uses the model of the successful and popular US interstate highway system to show how a federally funded communications "backbone" could solve many of the problems plaguing antiquated and incompatible emergency communication systems.

Representatives from the National Institute for Urban Search and Rescue (NIUSR) visited Cooper in October to press their case and to present the analogy in graphic detail, from roads representing network infrastructure, to on-ramps as access points, to vehicles representing IP packets, and guard rails representing firewalls.

"No one doubts the absolute need for a national information infrastructure linking all stakeholders in the event of a another major incident," said Lois Clark McCoy, President of NIUSR. "The Interstate Highway System provides a successful—and politically practical—model for federal, state and local cooperation."

Just weeks after meeting with NIUSR, Cooper spoke at the National Association of State CIOs annual conference in St. Louis. He shared the Interstate Communications Expressway concept and said that he would press forward to explore how it could be funded and implemented. He said the federal government could create, leverage, and expand existing networks to build an infrastructure for national communications, greatly improving the speed and quality of information sharing between federal, state and local governments. This, of course, would represent significant progress for Homeland Defense.

In his speech, Cooper said Washington would pay for on-ramps for states to gain access to this new information super-highway. He went on to say that standards for these on-ramps would be derived jointly with the states and other users.

Authorized by an act of congress in 1944 (but funded in the 1950s), the Dwight D. Eisenhower System of Interstate and Defense Highways was designed to provide efficient national transportation in case of war or other emergencies, and also for people, goods, and services in ordinary times as well. In the same way, it's anticipated that an Interstate Communications Expressway could provide significant commercial benefit as well. Now, to make this Expressway a reality, emergency responders need to make sure their local and state leaders know the importance of adopting such a system.

Editor's note: The next edition of Homeland First Response will focus on emergency communications and will feature an interview with Steve Cooper. For a downloadable rendition of the Interstate Communications Expressway graphic and legends, go to www.homelandfirstresponse.com.

Lori Bush is a member of NIUSR's National Consortium for Readiness in Emergencies (N-CORE) and is a senior advisor in Cisco's Homeland Security Support team out of Research Triangle Park, NC, assisting State and Local governments and non-profits with technology solutions for Homeland Security.

Article reprinted courtesy of NI/SAR President Lois Clark McCoy. - For addional information on NI/SAR please visit their web site at: http://www.niusr.org

Risk Communication

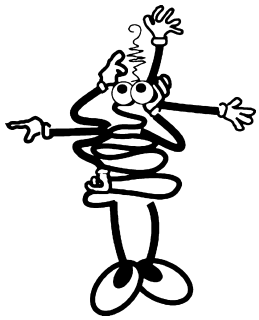
By Dr. Peter M. Sandman

Published in *Encyclopedia of the Environment,* ed. by Ruth A. Eblen and William R. Eblen (Boston, MA: Houghton Mifflin, 1994), pp. 620-623.

In the history of language, "Watch out!" was almost certainly an early development. "Stop worrying" probably came on the scene a little later, as it reflects a less urgent need, but both poles of risk communication — alerting and reassuring — undoubtedly predate written language.

So does the discovery of how difficult risk communication is. If there is a central truth of risk communication, this is it: "Watch out!" and "Stop worrying" are both messages that fail more often than they succeed. The natural state of humankind *vis-à-vis* risk is apathy; most people are apathetic about most risks, and it is extremely difficult to get them concern-ed. But when people are con-cerned about a risk, it is alsoextremely difficult to calm them down again.

Taking "Watch out!" and "Stop worrying" as the defining goals of risk communication embeds an important and very debatable assumption: that risk communication is essentially a one-way enterprise, with an identifiable audience to be warned or reassured and a source to do the warning or reassuring. For this to be an acceptable assumption, at least three other interconnected assumptions must be accepted as well: that the source knows more about the risk than the audience; that the source has the audience's interests at heart; and that the source's recommendations are grounded in real information, not just in values or preferences. In many risk communication interactions these specifications are not satisfied. A parent warning her children about the risks of marijuana may know less than they do about the drug; a chemical company reassuring neighbors about its effluent may be protecting its own investment more than its neighbors' health; an activist urging shut-down of all nuclear power plants may be motivated more by a preference for a decentralized energy industry than by data on the hazard. To the extent that these things are so, risk communication ought to be multi-directional rather than one-directional, a debate instead of a lecture. And the criteria for "effective risk communication" ought to be things like the openness of the process to all viewpoints and the extent to which values are distinguished from scientific claims, rather than whether the audience's opinions, feelings, and actions come to reflect the source's assessment of the risk.



The judgment that risk communication should be multi-directional is well established in the literature about risk communication, but not yet in its practice. Except in the growing area of environmental dispute resolution, which is grounded in the negotiation of competing risk claims, it is considered almost heretical to assert that industry, government, activist groups, and the media (the principal risk communicators) should perhaps talk less and listen more. There is, however, progress on the more modest claim that even one-directional goals are best served by multi-directional means — that is, that it is easier to design effective messages if the sources pays attention to what the prospective audience thinks and feels.

Many risk communicators, especially in government, try to avoid the problem by defining their goal in strictly cognitive terms: to explain the risk so that people can make up their own minds how to respond. Though still not multi-directional, this approach is at least respectful of the audience's autonomy. It measures success not by what the audience decides, but by what the audience knows, and whether it believes it knows enough to make a decision. A source that takes knowledge gain as equivalent to making the "right" decision is likely to be misled about the effort's success; knowledge about radon, for example, is virtually uncorrelated with actually doing a home radon test. But often enough knowledge is the real goal. A 1991 California law requires factories to send out a notification letter if they pose a lifetime mortality risk to neighbors of more than ten in a million. Merely letting people know puts pressure on management to get the risk down below the trigger point; the notification letter itself need not aim at provoking or deterring neighborhood activism. Informed consent warnings, similarly, can be considered successful whatever the forewarned audience decides.

> *"The natural state of humankind* vis-à-vis *risk is apathy"*

Whether the process is one-directional or multi-directional, and whether the goal is persuasion or knowledge, risk communicators typically start out with a gap they hope to bridge between their assessment of a particular risk and their audience's assessment. In other words, "Watch out!" and "Stop worrying" are still the archetypes.

Risk-aversion, risk-tolerance, and risk-seeking are often assumed to be enduring traits of character (in individuals and in cultures), but the variations are more impressive than the consistencies. There is no great surprise in encountering a sky-diver who is terrified of spiders. Concern about personal risks (like cholesterol) shows only modest correlations with concern about societal risks (like

industrial effluent). When the domain of "risk" is extended even further, the correlations may disappear or even reverse. Quite different groups lead the way in concern about environmental risks (global warming, toxic waste dumps), economic risks (recession, unemployment), and social risks (family values, violent crime). Cultural theories of risk try to make sense of these patterns; one such theory attributes them to distinctions among hierarchical, entrepreneurial, and egalitarian cultural values. Depending on the hazard under discussion, in short, we are all both over- and under-responders to risk.

"Watch Out!"

The most serious health hazards in our lives (smoking, excessive fat in the diet, insufficient exercise, driving without a seatbelt, etc.) are typically characterized by under-response — that is, by apathy rather than panic. This is apparently true even where the list of serious hazards is dominated by war, famine, and infectious diseases instead. Considering how many lives are at stake, the enormous difficulty of warning people gets surprisingly little comment. The new risk communication industry that has emerged since the mid-1980s is preoccupied far more with reassuring people; those who seek to warn operate under less trendy labels like "health education." Apart from the fact that industry has more money for reassurance than government and activists have for sounding the alarm, there is a more fundamental reason for the distortion: Apathy makes intuitive sense to most people. We are not especially surprised, bewildered, or offended when others fail to take a risk seriously enough.

The dominant models of self-protective behavior assume a rational under-response to the risk and aim at correcting the misunderstandings that undergird that response. That is, they try to convince the audience that the magnitude of the risk is high ("X is a killer"); that the probability of the risk's occurrence and the susceptibility of the audience are high ("X strikes thousands of people each year and is likely to strike you as well"); and that the proposed solution is acceptably effective, easy, and inexpensive ("Here's what you can do about X"). All these propositions are difficult to convey effectively. People tend to be particularly resistant to the idea that they are at risk. For virtually every hazard, most people judge themselves to be less at risk than the average person: less likely to have a heart attack, less likely to get fired, less likely to become addicted to a drug. This unrealistic optimism permeates our response to risk, and we support it by concocting from the available information a rationale for the conviction that the hazard will pass us by, even if it strikes our neighbors and friends. "This means you" is thus a more difficult message to communicate than "many will die."

"For virtually every hazard, most people judge themselves to be less at risk than the average person"

Several newer models of self-protective behavior postulate that different messages are important at different stages of the process. Information about risk magnitude may be most important in making people aware of risks they have never heard of, while information about personal susceptibility may matter more in the transition from awareness to the decision to act. And deciding to act is by no means the same as acting. As advertisers have long known, what makes the difference between procrastination and action isn't information, but frequent reminders and easy implementation.

In alerting people to risk, social comparison information is often as important as information about the risk itself. Since most people prefer to worry about the same risks as their friends, they are alert and responsive to evidence that a particular hazard is or is not a source of widespread local concern. (The first person in the neighborhood to worry is a coward if the risk turns out to be trivial and a jinx if it turns out to be serious; read Ibsen's *An Enemy of the People.*) Messages aimed at building the audience's sense of efficacy may also be effective in motivating action about a risk. Fatalism makes apathy rational; if you are convinced that nothing you can do will help, why bother?

Emotions are also important. Concern, worry, fear, and the like can be products of the cognitive dimensions of risk, but they also exert an independent influence. Even so, many risk communicators forgo appeals to emotion, sometimes out of principled respect for the audience, sometimes out of squeamishness, and sometimes out of a mistaken belief that emotional appeals inevitably backfire. Any appeal can backfire, but the data do not support the widely shared concern that too powerful an emotional appeal, especially a fear appeal, triggers denial and paralysis. Even if the fear-action relationship turns out to be a ∩- shaped curve (that is, even if excessive fear is immobilizing), virtually all efforts to arouse the apathetic are safely on the left-hand side of the curve, where action is directly proportional to the amount of fear the communicator manages to inspire.

"Stop Worrying!"

In essence, people usually underestimate risks because they would rather believe they are safe, free to live their lives without the twin burdens of feeling vulnerable and feeling obliged to do something about it. Why, then, do people sometimes overestimate risks?

A key can be found in the sorts of hazards whose risk we are most inclined to overestimate. What do nuclear power plants, toxic waste dumps, and pesticide residues — to choose three such hazards at random — have in common? In all three cases, the risk is:

- Coerced rather than voluntary. (In home gardens, where the risk is voluntary, pesticides are typically overused.)
- Industrial rather than natural. (Natural deposits of heavy metals generate far less concern than the same materials in a Superfund site.)
- Dreaded rather than not dreaded. (Cancer, radiation, and waste are all powerful stigmata of dread.)

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- Unknowable rather than knowable. (The experts endlessly debate the risk, and only the experts can detect where it is.)
- Controlled by others rather than controlled by those at risk. (Think about the difference between driving a car and riding in an airplane.)
- In the hands of untrustworthy rather than trustworthy sources. (Who believes what they are told by the nuclear, waste, and pesticide industries?)
- Managed in ways that are unresponsive rather than responsive. (Think about secrecy vs. openness, courtesy vs. discourtesy, compassion vs. contempt.)

Any risk controversy can be divided into a technical dimension and a non-technical dimension. The key technical factors are how much damage is being done to health and environment, and how much mitigation can be achieved at how much cost. The key non-technical factors are the ones listed above, and others like them. Consider a proposed incinerator.

"...people usually underestimate risks because they would rather believe they are safe, free to live their lives without the twin burdens of feeling vulnerable and feeling obliged to do something about it."

Assume that the incinerator can be operated at minimal risk to health. Assume also that its developers tried to cram the facility down neighborhood throats with minimal dialogue; they are not asking the neighbors' permission, not offering to grant them oversight responsibilities, not proposing to share the benefits. While the experts focus on the technical factors and insist that the risk is small, neighbors focus on the non-technical factors, find the risk huge, and organize to stop the facility. Is this an over-response? It is if we accept only technical criteria as valid measures of risk. But it may be a proportionate response, even a forbearing response, to the non-technical side of the risk.

The two dimensions have been given various sets of labels: "hazard" versus "outrage," "technical rationality" versus "cultural rationality," etc. But it is a mistake to see the two as "objective risk" versus "perceived risk" or as "rational risk response" versus "emotional risk response." For many disputed hazards, in fact, the data on voluntariness, dread, control, trust and the like are more solid, more "objective," than the data on technical risk. These non-technical factors have been studied by social scientists for decades, and their relationship to risk response is well-established. When a risk manager continues to ignore the non-technical components of the situation, and continues to be surprised by the public's "overreaction," it is worth asking just whose behavior is irrational.

Since people's response to controversial risks doesn't arise from technical judgments in the first place, explaining technical information doesn't help much. When people feel they have been badly treated, they do not want to learn that their technical risk is small; instead, they scour the available documentation for ammunition and ignore the rest. It is still necessary to provide the technical information, of course, but the outcome depends far more on the resolution of non-technical issues. Communication in a risk controversy thus has two core tasks, not one. The task everyone acknowledges is the need to explain that the technical risk is low. The task that tends to be ignored is the need to acknowledge that the non-technical risk is high and take action to reduce it. When agencies and companies pursue the first task to the exclusion of the second, they don't just fail to make the conflict smaller; they make it bigger.

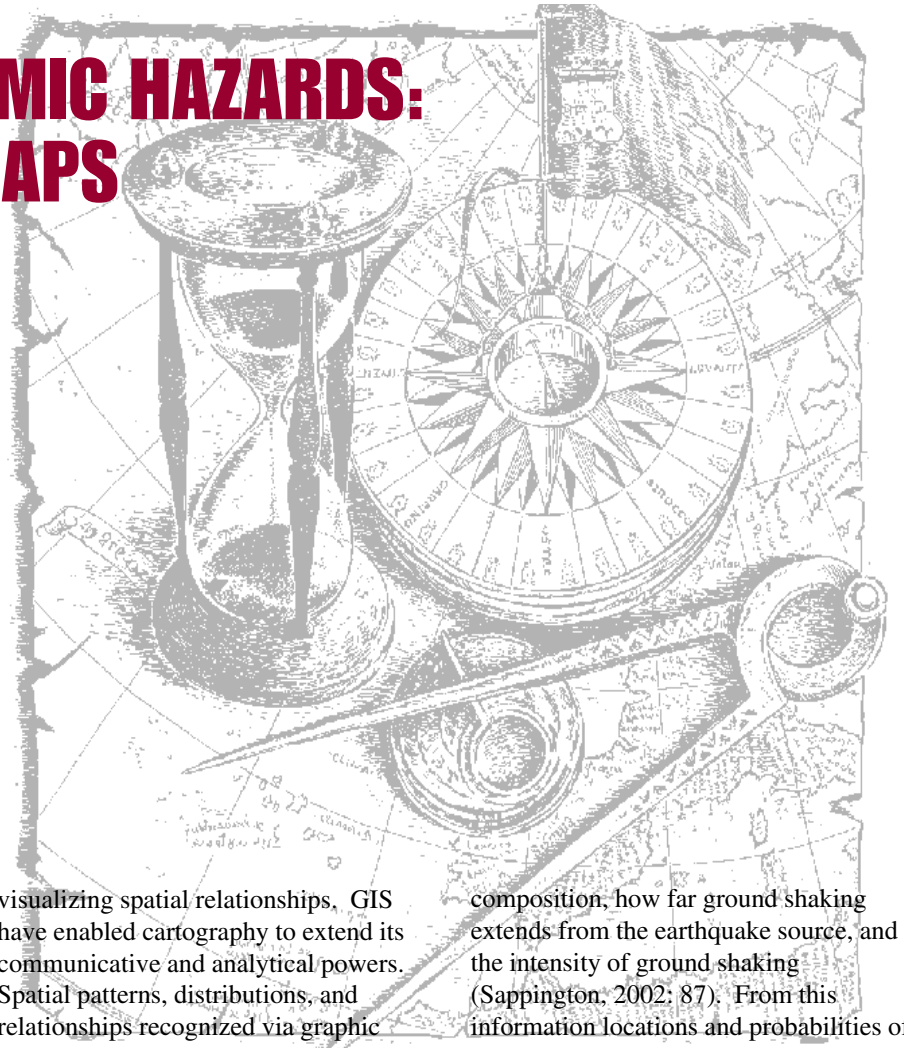
Of course, not all non-technical issues can be resolved. Part of the public's response to controversial risks is grounded in characteristics of the hazard itself that are difficult to change — undetectability, say, or dread. Part of the response is grounded in the activities of the mass media and the activist movement, both of which amplify public outrage even though they do not create it. But the part that most deserves attention is the part that results from the behavior of the hazard's proponents. Risk communication guidelines for the proponents of controversial technologies are embarrassingly commonsensical:

- Don't keep secrets. Be honest, forthright, and prompt in providing risk information to affected publics.
- Listen to people's concerns. Don't assume you know what they are, and don't assume it doesn't matter what they are.
- Share power. Set up community advisory boards and other vehicles for giving affected communities increased control over the risk.
- Don't expect to be trusted. Instead of trust, aim at accountability; prepare to be challenged, and be able to prove your claims.
- Acknowledge errors, whether technical or non-technical. Apologize. Promise to do better. Keep the promise.
- Treat adversaries with respect (even when they are disrespectful). If they force an improvement, give them the credit rather than claiming it yourself.

Advice like this is not difficult to accept in principle. It is, however, difficult to follow in practice. It runs afoul of organizational norms; sources that do not tolerate much internal debate are unlikely to nurture a more open dialogue with the community. It raises "yes, but" objections, from the fear of liability suits to the contention that it is better to let sleeping dogs lie. Perhaps most important, it provokes the unacknowledged bitterness in the hearts of many proponents, who may ultimately prefer losing the controversy to dealing respectfully with a citizenry they consider irrational, irresponsible, and discourteous.

MANAGING SEISMIC HAZARDS: THE VALUE OF MAPS

Vanessa M. Bauman, University of Colorado at Boulder



Cartography, an ancient science, remains one of the most important means of human communication. Improved cartographic techniques and precision have opened new possibilities of gathering and applying spatial information to issues of science, government, education, and business. Today maps are essential to the analysis, modeling, and decision-making processes. This article looks specifically at three keys ways that modern cartography contributes to the study of seismic hazards as well as some future directions and limitations.

Cartography Today: The Digital Revolution

Cartographic techniques have changed dramatically in recent years as a result of the digital revolution. The transformation of map making from paper to digital formats, and the rise of Geographic Information Systems (GIS) have greatly shaped approaches to modern cartography. A GIS is a computer-based system, designed for storing, retrieving, combining, analyzing, and displaying geographic data (Olshansky, 1992). Maps are fundamental to GIS as an input, a means of analysis, and as a principal means of visualizing spatial relationships. GIS have enabled cartography to extend its communicative and analytical powers. Spatial patterns, distributions, and relationships recognized via graphic methods now have new interpretive significance. Not only are cartographers able to map where things are, but also what's inside, what's nearby, the density of phenomena , and the occurrence of change (Mitchell, 1999). The goal of developing these new technologies is to bring the use of maps to their full potential. Natural hazards mapping, specifically as applied to seismic hazards, is one avenue to which this new technology is making a positive contribution.

"Cartography, an ancient science, remains one of the most important means of human communication."

Seismic Hazard Mapping

Most of today's earthquake hazard zone maps use GIS technology in their preparation. Seismic source zones and disaster impact areas are identified and delineated using a GIS. The data for this type of map analysis is compiled from past earthquake histories and current information. This includes the rate at which earthquakes occur in different areas, variations in geologic composition, how far ground shaking extends from the earthquake source, and the intensity of ground shaking (Sappington, 2002: 87). From this information locations and probabilities of ground shaking and ground failure are calculated and mapped. Planners can create earthquake hazard maps by using the GIS to overlay hazards data with information about buildings, infrastructure, and demographics. The system can also be queried for relevant information. For example, by displaying buildings constructed prior to 1925 that are also located in a floodplain or built on unsafe soils, high-risk structures can be selected for study (Lang, 1998: 91-98). Areas at risk for natural hazard damage are thereby identified using these GIS mapping techniques.

Disaster Risk and Management through Spatial Analysis

Current spatial analysis techniques make it possible to predict where the most destruction will occur when disaster events strike. As a result, these target areas receive the necessary

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attention from scientists, engineers, city planners, and emergency response teams. This added knowledge enables people to raise hazard awareness where appropriate. Monitoring and warning systems can be implemented. Building construction codes and safety standards can be established accordingly (Carrara and Guzzetti, 1995). Color ranking areas of priority help relief organizations deploy personnel and resources more effectively (Amdahl, 2002: 99-108). The maps communicate where action is necessary. The goal of this geographic focus provides the means to prevent costly damage, and most importantly, save lives.

Maps to Aid Decision-Making and Planning

City policy makers use earthquake hazard maps when making decisions concerning land use, transportation and utility networks, regions of development, and emergency services planning. Decision makers guided by these maps are able to, for example, avoid constructing critical facilities such as hospitals, schools, and fire stations at locations showing high damage potential. Maintenance of existing structures such as dams, bridges, and buildings of older design can also be properly managed (Olshansky, 1992). Reflecting on the social value of maps in this case, it is clear that forecasting and communicating *where* hazards will be a threat to lives and property is essential to disaster prevention and management. As a positive result, infrastructures are currently being designed and implemented using these spatial analysis principles.

Future Directions and Limitations

With the help of user-friendly, desktop map making and GIS software packages, creating maps has become more practical and easier than ever. The Internet is also increasing the availability of digital map resources and basic map making software to the general public. Novice map makers now have the cartographic and analytical capabilities to take full advantage of spatial information. However, these important new developments also have their limitations. One must consider, for example, that maps can only be as accurate as their source data. Limitations involving data accuracy and uncertainty must be considered in the analysis. In the case of natural hazards mapping, it must be remembered that maps show only zones of relative hazard (Olshansky, 1992). They are not precise, but the sharp lines of digital maps often mislead inexperienced users into a false sense of accuracy and precision. Additionally, careful map making does require specialized skills and knowledge. Inexperienced users can sometimes make significant errors unless provided with proper guidance on cartographic principles . Yet there is every indication that spatial analysis will continue to make major contributions to the research and management of disaster reduction programs. As mapping technology advances, so will our ability to more effectively manage natural hazards.

"One must consider, for example, that maps can only be as accurate as their source data."

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Odden's Bookmarks, The Fascinating World of Maps and Mapping, URL: http://oddens.geog.uu.nl/index.html

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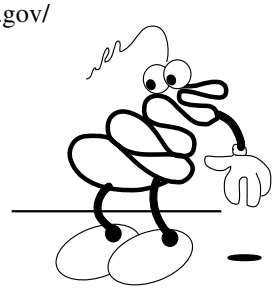
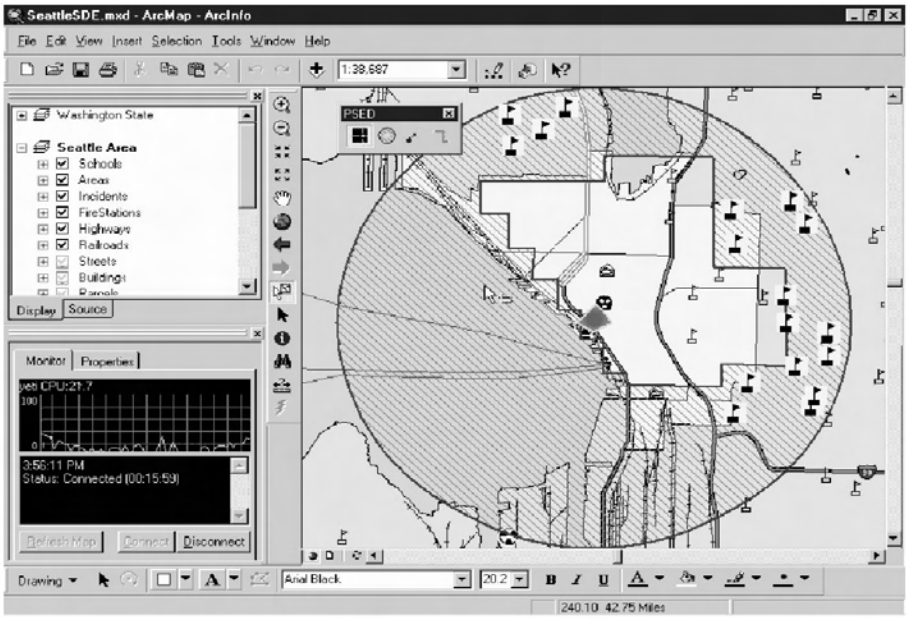


Enhancing Earthquake Response Capability with GIS

How Computer Mapping Software Can Make Emergency Management A Faster, More Accurate Process

Geographic Information Systems for Emergency Response



One of the most difficult challenges in responding to large scale emergencies, such as earthquakes, is understanding quickly where damage and rescue requirements are most critical and then updating that information with newly captured field data.

Assessing damage often takes several hours and deploying public safety assets to the highest priorities is dependant upon these assessments. Large volumes of raw data and firsthand field knowledge must all be taken in from many different sources and somehow combed over and understood no matter how large or complex the data sets.

"GIS works effectively in all four phases of disaster management: preparation, mitigation, response, and recovery."

How can GIS technology help streamline and optimize these response and information processes? GIS has been in use emergency response for decades and the value and appreciation for mapping, or the visualization of information, predates computer methods and has been in use for centuries.

Today's automated, computerized geographic information system (GIS) software is used by virtually thousands of fire fighters, law enforcement, medical, and other emergency response professionals. With GIS, users can integrate, organize, analyze, and visually display information in the field as well as in the Emergency Operations Center (EOC).

Indeed, one of the most powerful aspects of GIS is its ability to integrate information using the locational aspect of data. Virtually all information can be integrated in a computer map by location. Whether its structure or building information, critical assets, street networks, power grids, hospitals, utility networks, or incident locations, emergency response information can be integrated and visualized to allow the most intuitive means possible for quickly assessing various operations.

GIS works effectively in all four phases of disaster management: preparation, mitigation, response, and recovery. Whether its collecting data, deploying emergency personnel and equipment, routing vehicles, or assessing overall damage, GIS is the tool that allows fast, efficient use of information when a disaster occurs. This is especially true in the event of an earthquake, GIS can be used throughout an emergency management digital nervous system.

Lastly, today's GIS technologies work throughout an information enterprise and on any hardware and software platform, including large-scale relational databases, desktop PCs, wireless handheld and in-vehicle devices, and via the Internet and intranet. Whether it's a large, back-office EOC database with thousands of records or an in-vehicle computer on a fire-truck, GIS can make a difference in both the field or in the office.

Responding to an Earthquake

Imagine a local EOC has GIS and uses it to assist in the management of emergencies throughout the community.

An earthquake strikes. Initially, in such an emergency, there is no substitute for first hand field information since the size of the earthquake, its epicenter, and it's impact on the surrounding area are unknown. With GIS, the EOC can coordinate information in near real-time from multiple personnel. Calls made from fire fighters, police officers, emergency service technicians and citizens help provide an approximate magnitude and extent. Using GIS, the earthquake and possible damage can be modeled and potential damage rings can be displayed on the map. This information, along with calls concerning actual damage and emergency response needs begin to

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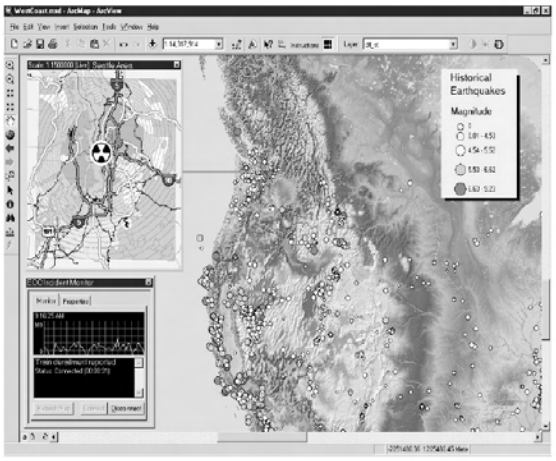


Historical Earthquakes Northwest

develop the actual impact of the earthquake event. Public Safety responders can begin to focus on critical facilities and infrastructure (roads, bridges, schools, public assemblies, etc) that maybe damaged based on their proximity to the event.earthquake and possible damage can be modeled and potential damage rings can be displayed on the map. This information, along with calls concerning actual damage and emergency response needs begin to develop the actual impact of the earthquake event. Public Safety responders can begin to focus on critical facilities and infrastructure (roads, bridges, schools, public assemblies, etc) that maybe damaged based on their proximity to the event.

As the event unfolds, a more accurate assessment map can be made using the epicenter location, underlying soils, and other factors. There are powerful desktop applications available that provide modeling capabilities for several different kinds of natural and man-made disasters and work not only with GIS but also with a wide range of geo-referenced data, including population distribution and infrastructure databases.

The earthquake model provides a triage view of possible damage on the map as either severe, light, or moderate.

With these damage codes visible a user can begin to correlate critical facilities and where they reside within the damage bands. Multi-story buildings, hospitals, schools, nursing homes, industries with potential hazardous materials, electrical power-plants and more are brought into the view to determine the likelihood of severe damage.

A fire department captain uses a laptop computer with a wireless Internet connection to communicate with EOC; this requires only standard Web-browser software. This means emergency workers can do their job leveraging computing and communications technologies without learning complex software programs.

A GIS routing application provides directions to the location of an emergency incident. While in route, GIS compiled information are sent to the fire-truck where the fireman can take a closer look at the location of the event and related tabular information.

A fireman is responding to a report of smoke from a building. Upon arrival, the fire fighter does not see smoke, but does smell what is recognizable as some sort of toxic chemical. The fire fighter quickly changes the status and nature of the incident and add additional information; this information in close-to-near time is sent back to the EOC centralized database and the incident data is updated and sent back to every computer and wireless device out in the field and in the EOC.

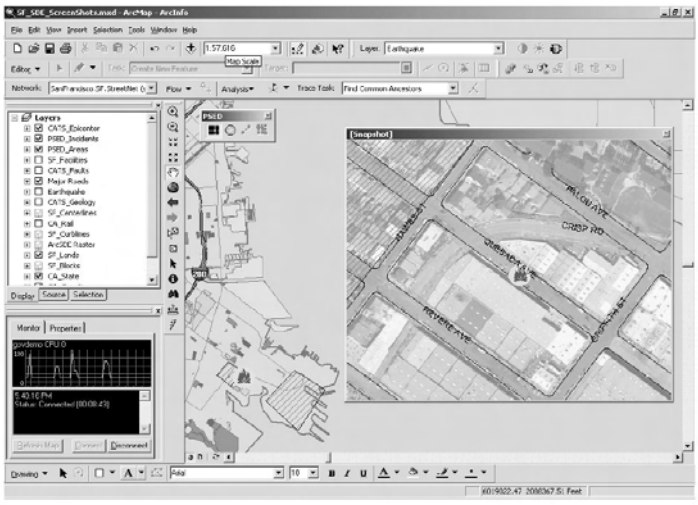
In another incident, a law enforcement official is deployed to a public disturbance call. En route, several damaged buildings are noticed; the officer quickly inputs location and additional information and sends it to the to the EOC. When the police officer arrives onsite, the person quickly notices the disturbance has turned to a looting.

The police officer alerts the EOC by changing the incident icon from disturbance to looting from his location and adds additional information. The updates from the field, including the sited damaged buildings and the looting incident, are immediately posted to the EOC database. The new information is now available to all emergency personnel. The GIS automatically time-stamps all the data as it is received in the database.

Using Information in the Most Effective Manner Possible

As emergency situations develop, timely, accurate information is crucial. GIS can help manage incidents remotely, in near-real-time, and integrate reams of disparate data that can be visualized and used in the most effective manner possible.

The real key for the successful use of GIS in the management for emergency management is how it can help with one of the most difficult challenges in the event of an earthquake: understanding exactly where damage is, it's extent, and where to deploy resources. When an incident occurs, personnel deployed to a scene can verify, discount, or capture all sorts of data by what they see while in the field. How that information is centralized, analyzed, and re-deployed in the most effective manner possible can make a difference in saving lives and protecting valuable assets and infrastructure.



EOC - Fire Inspection

Non-Traditional Funding Sources – and the Communications Skills We Need to Find Them

Phyllis J. Steckel, RG

It's 11:00 o'clock, and do you know where next year's funding is coming from?

Many people involved in the earthquake risk reduction issue in the central US ultimately depend on a few, "traditional" funding sources. These include the National Earthquake Hazard Reduction Program (NEHRP), the Federal Emergency Management Agency (FEMA), the National Science Foundation (NSF), and state and local governments. But if your work depends, either directly or indirectly, on any one of these, I don't have to tell you that you're feeling the pinch already.

We're learning the hard way just how vulnerable these familiar sources are. The economy is slow. Tax revenues are down. Federal and state budgets are being cut, trimmed, whittled, and re-cut. Throw in the very real, new need for homeland security, and the effective pinch is even greater.

As a result, it may be time to look at some non-traditional funding sources. Some federal and state sources could be considered non-traditional, such as the Department of Defense, the Department of Commerce, and others. However, they may be a "new frying pan, same fire" situation. I'm talking *really* non-traditional funding sources.

Non-traditional funding sources include private foundations, community funds, corporate grants programs, and even individual philanthropists. One of the biggest challenges for the central US earthquake risk community – us! – is communicating effectively with this resource.

There's probably more than one way to do this. But by adopting a methodical, checklist-type approach, you will save time and trouble, and increase your chance of success.

Think first. This may sound oversimplified, but it's worth it in the long run. Brainstorm some ideas that can be packaged into distinct scopes of work. List on-going efforts as well as new ones. The ideas can be quite specific or generalized, which can be fine-tuned once you identify a potential funding source. Examples of these packaged ideas include a facility-specific, hazard-mitigation project; an upgrade to a local emergency communications system; a specific engineering applications test; or, a program to coordinate volunteers. Package the idea in a way that it's integrated into your overall program, but not integral for it. Have a list of general ideas ready so when you find a potential funding source, you'll recognize it. Know what you're looking for.

Next, do your research. The internet can be a gold mine or a worthless pit, depending on how you manage your efforts. Take careful notes, bookmark the websites of possibilities, and summarize what you find in a spreadsheet. This can be intense, so document everything you do, and don't assume you will remember anything after a few hours of nitty-gritty digging.

There are several clearinghouse websites, some of which offer access – for a fee, of course – to their database of foundations and grants programs. Some of these can be well worth their modest cost, while others are an outright scam, so *caveat emptor*. The Foundation Center [fdncenter.org] requires a fee for access to their database, although guest browsers can poke around the outskirts of the site for free. The CSC Non-Profit Resource [http://home.attbi.com/~cscunningham/Foundation.htm] offers free access to a list of more than 1000 funding sources. But, even without using the clearing-house websites, you will find literally thousands of legitimate, well capitalized, philanthropic organizations looking to fund projects that support *their mission*.

This is a make-or-break concept. Non-traditional funding sources exist to support *their mission,* not yours. Be sure all contact you make with grantors shows them that you understand, embrace, and will act exclusively toward fulfilling their mission. Grantors can see right through self-serving applicants, so don't even try to tiptoe around this one.

Do the homework – and there's good news and bad news here. There are many, many billions of dollars available through non-traditional funding sources. Unfortunately, relatively little of it is earmarked either geographically for the central US, or for the missions of risk-reduction, earthquake research, or public safety. Understand that you will probably not find any funding source that will plug into and pay for the "perfect" scope of work as you envision it now. More probably, you will have to find something close, and then hone your scope of work to fit.

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Who We Are

In the central US, the earthquake risk community is a small group, perhaps less than a thousand people involved in all aspects of the issue here. This includes emergency managers, planners, practicing engineers and geoscientists, researchers, insurers and risk managers, and outreach specialists. Most of the faces are familiar and most, if not all of us, wear two or more hats.

Everywhere, funding is down and budgets are cut. Yet the needs continue to grow. As a community, we must learn how to recognize and tap non-traditional funding sources.

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Get creative. Incorporate the hot buttons of the grantor throughout your proposal. Use educational or charitable venues. Include diverse, intergenerational, impoverished, or under-served populations. Show a grassroots flavor and you definitely increase the curb appeal of a proposal. Some proposals may even work best as a joint venture (JV) with a recognized educational or charitable organization – preferably one with a recognized, good track record among these non-traditional funding sources.

Once you've found a potential funding source, read, understand, and follow the submission requirements. All of them, period. Is there a geographic limitation? Must awardees be an educational institution? Or a local government? Or a 501c3 organization (charitable, according to the IRS)? Are funding requests welcome anytime or only once a year? Most importantly, just what is that mission of theirs and can you live with it?

Fine-tune the concept. Those general ideas you made at first must be reviewed and tweaked now to make sure that the grantor's mission will be clearly supported. This could be anything from a minor course correction to a U-turn. This is also one of the most difficult steps, because, in order to be successful, you must critique your package from the grantor's perspective. Find the weak spots and strengthen them. Look for gaps, and fill them in. Eliminate the overlaps and streamline the overhead. Recheck your proposal to make sure that it supports *their mission as they see it,* not your mission as you hope they will pay for it. If you don't do this step effectively, the grantor will do it for you by eliminating your request in the first round of review.

Initiate the inquiry. Most grantors ask for a summary of your proposal first, often in letter format. General project information may be requested, such as scope, project leader, expected results, audience served, approximate budget, and schedule. This gives them the opportunity to make sure the concept supports their mission. It also minimizes the burden on both applicants and their board, by weeding out projects early that just don't fit. After a review by their board, and if a proposal concept is perceived as supporting their mission, the grantor may ask for details. Being invited to take this second step is no guarantee of funding. It just means you haven't been eliminated. Yet.

Compel the grantor to action. Write the funding request, using terminology and project plans familiar to the grantor. Provide compelling proof of how and why your approach is the most effective and best value. The burden of proof is on you. Avoid jargon and minimize the use of acronyms unfamiliar to the grantor. Write clear, short sentences. Ask the pickiest person you know to critique it and role-play as grantor. Review it again, send it off, and keep your fingers crossed.

Ask for feedback from the reviewers at every step – both what you did right and what you did wrong – for every proposal you submit, winners or not.

Do it all, over and over again. One proposal submitted to one potential grantor won't change the course of the earthquake risk community in the central US. Chances are that your first request will not be funded, but don't lose the momentum you've just created. If you've done it right so far, you now have a spreadsheet and database, some priorities, and constructive feedback to avoid remaking the mistakes of your first attempts. It's a learning curve, so *learn* it.

Nationally, there are billions of private dollars earmarked for philanthropy and charity. The budget pressures of public funding have also increased the competition within this private sector. However, none of it will come your way without some extremely effective communication on your part. Plan ahead. Do your homework. Write it right.

And a little good luck never hurt, especially at 11:00 o'clock.

Examples

Monsanto Fund
[www.monsanto.com] – Provides funding for science education.

Public Entity Risk Institute
[www.riskinstitute.org] – Serves public, private and non-profit organizations as a "resource for practical enhancement of risk management."

Sarah Scaife Foundation
[www.scaife.com/sarah.html] – Public policy programs that address major domestic issues.

The G. Unger Vetlesen Foundation
[www.monellvetlesen.org] – Provides grants "in fields of oceanography, climate studies, and other earth sciences."

Citigroup Foundation
[www.citigroup.com/citigroup/corporate/foundation/index.htm] – Focuses on community infrastructure improvements.

Get Creative

There are some common themes within the deepest pockets of philanthropy, such as social issues, economic development, education, and the environment. Most of these common themes, at first, don't seem relevant to the earthquake-risk issue in the central US. But a creative connection to one or more of them improves the prospects for non-traditional funding.

For example, tweak the scope of your proposal from "a new way to retrofit non-structural seismic design" to "a new way to retrofit non-structural seismic design *at a public library or museum, where it will be incorporated into an exhibit.*"

A proposal for funding "to improve the local emergency communications systems" may be more effectively packaged as a proposal "to improve the local emergency communications systems *among a traditionally underserved population and to increase the prospects for local economic development.*"

A proposal to "develop an earthquake-risk outreach program" may be better received as a proposal to "*organize able-bodied volunteer senior citizens* for an earthquake-risk outreach program *for elementary schools.*"

New Midwestern Seismic Network Combines Research and Education

Michael W. Hamburger, Gary Pavlis
Indiana University
Bloomington, Indiana

Indiana University, in collaboration with Purdue University and a network of seismology research centers across the country, have developed a new, state-of-the-art digital seismic network for the state of Indiana. The Indiana PEPP Seismic network is an outgrowth of a major national science education initiative, The Princeton Earth Physics Program. The PEPP program, developed by geophysicists Guust Nolet and Robert Phinney of Princeton University in 1994, represents an unusual combination of an educational goal—to introduce seismology into America's high school earth science and physics curriculum—with a research goal—of providing dense seismic coverage of the United States, using research-quality, broadband digital seismic sensors. To date, there have been over 80 PEPP seismograph stations installed around the country (Figure 1), and through the efforts of geophysics groups from Purdue and Indiana Universities, Indiana can now boast one of the most successful educational seismic networks in the country. There are now over 20 PEPP seismic stations operating in and around the state (Figure 2). The infrastructure of this network was capitalized through a combination of funding from the National Science Foundation (for the seismic equipment) and school support (for computing and network infrastructure).

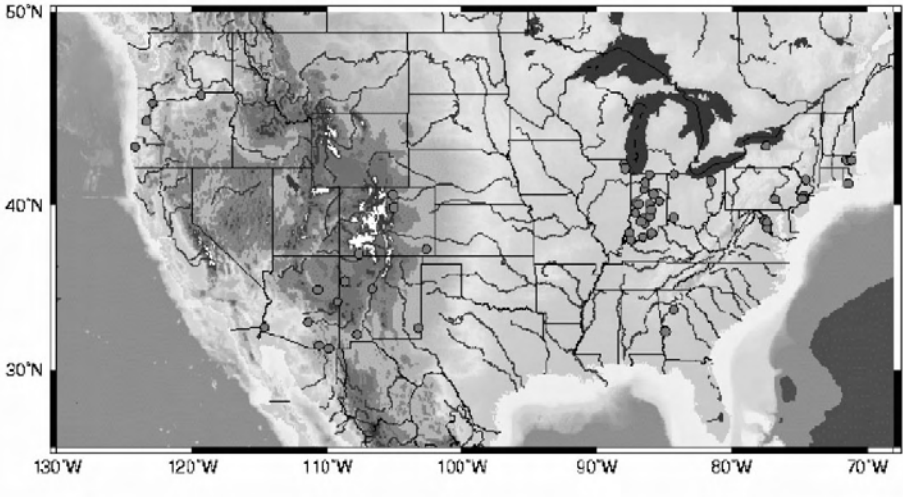

Figure 1. Map of national PEPP seismic network (exclusive of Alaska).

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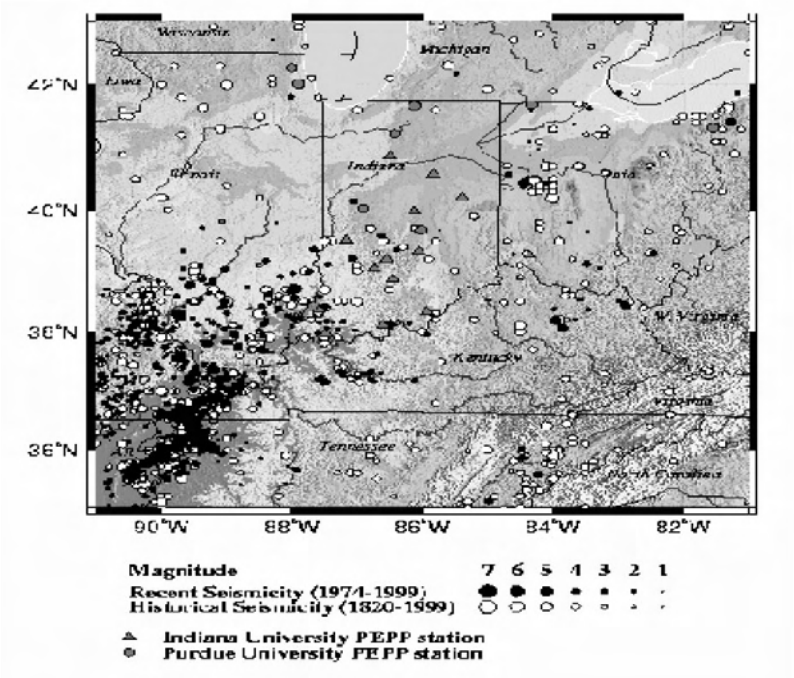
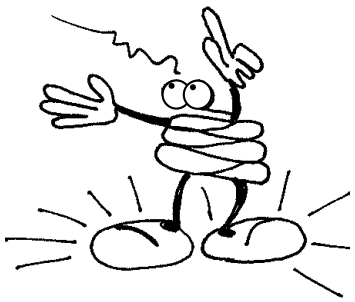


Figure 2. Map of Indiana PEPP seismic network (red symbols) and historical seismic activity in and around the state of Indiana.



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Indiana University has taken on a major role in the national PEPP project, both in operating the Indiana PEPP network, and as a provider of technical support as the national "PEPP Instrument Center". As part of that program, we have developed a number of important new technical initiatives that have enhanced the operation of the Indiana PEPP network. These include:

- introduction of a new, real-time digital recording system for PEPP systems;
- development of real-time, internet-based recording of the Indiana PEPP network; and
- introduction of data analysis tools for near-real time earthquake detection and location.

An example of the real-time recording of the recent Putnam County, Indiana earthquake is shown in Figure 3; the earthquake location is shown in Figure 4.

We believe that these developments hold real promise for the natural hazard mitigation in the midwest. First, the Indiana PEPP seismic network can offer access to the real-time seismic monitoring system to earthquake hazard professionals, for rapid earthquake information and response. Second, the network provides an opportunity, for the first time, to have relatively complete seismic coverage of earthquakes throughout the state for all events with magnitudes greater than about 2.5. Third, it provides a high-visibility earthquake education tool, both within the schools and for the public at large. And finally, the seismic network can provide critical information for more accurate assessment of earthquake hazards affecting residents of the state.

"...these developments hold real promise for the natural hazard mitigation in the midwest."

The next stage of the PEPP initiative is to link our efforts with those of over a number of other major seismology education and outreach programs across the country. These school-based seismograph stations, now numbering in the hundreds, are demonstrating a growing potential to contribute both to science education and to scientific research. A new national initiative is developing that strives to bring together these diverse programs of educational seismology under a single umbrella, the *U.S. Educational Seismology Network,* or USESN [Hamburger et al., 2001].

In addition to the PEPP seismograph network in Indiana and environs, the *Michseis* and *Ohioseis* programs have built a network of 18 school and college-based stations in Michigan, Indiana, and Ohio; the *South Carolina Earth Physics Project* (SCEPP), is in the process of developing a 50-station educational seismic network in South Carolina; the *Public Seismic Network* (PSN) is an informal coalition of amateur seismologists, which includes stations at a number of schools in the midwest. A similar effort has been mounted by the IRIS 'Seismographs in Schools' program,

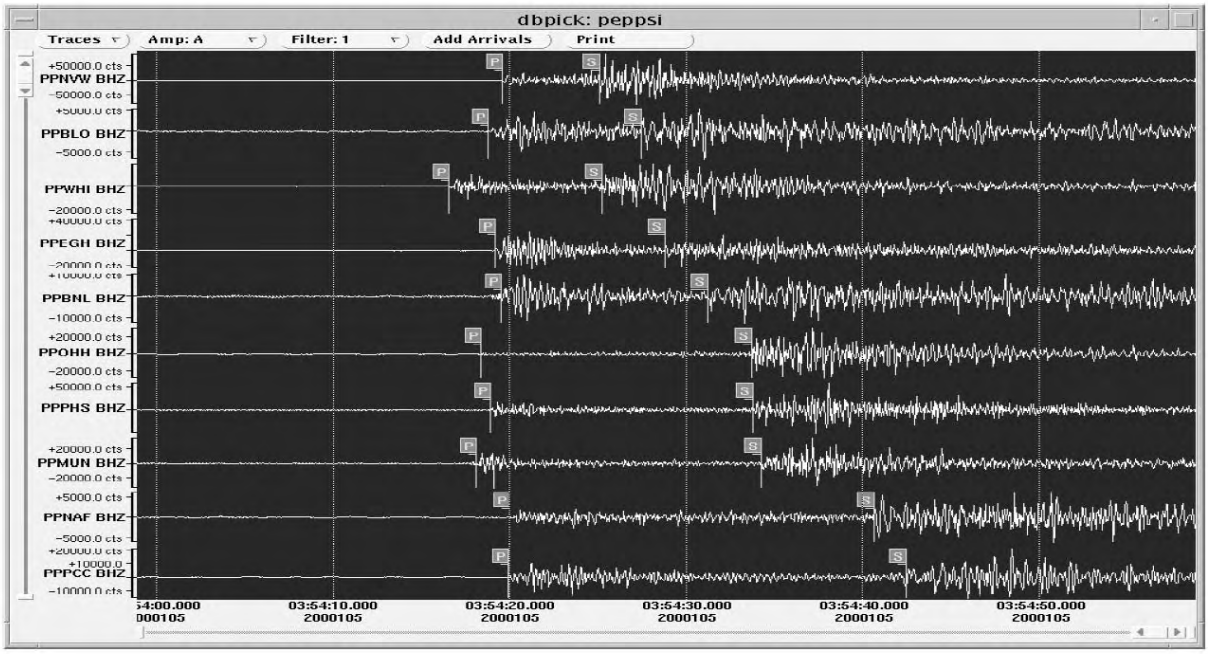


Figure 3. Network recording of the April 14 Putnam County, Indiana earthquake. Each trace represents one of the Indiana PEPP seismic stations, with station code noted at left. Flags note arrival times of P and S waves.

which also brings seismic instruments into schools. The goal of USESN is to provide a mechanism for coordination of individual efforts, to provide common technical and educational resources that will enhance all of the educational seismology programs, and to be an advocate for educational seismology.

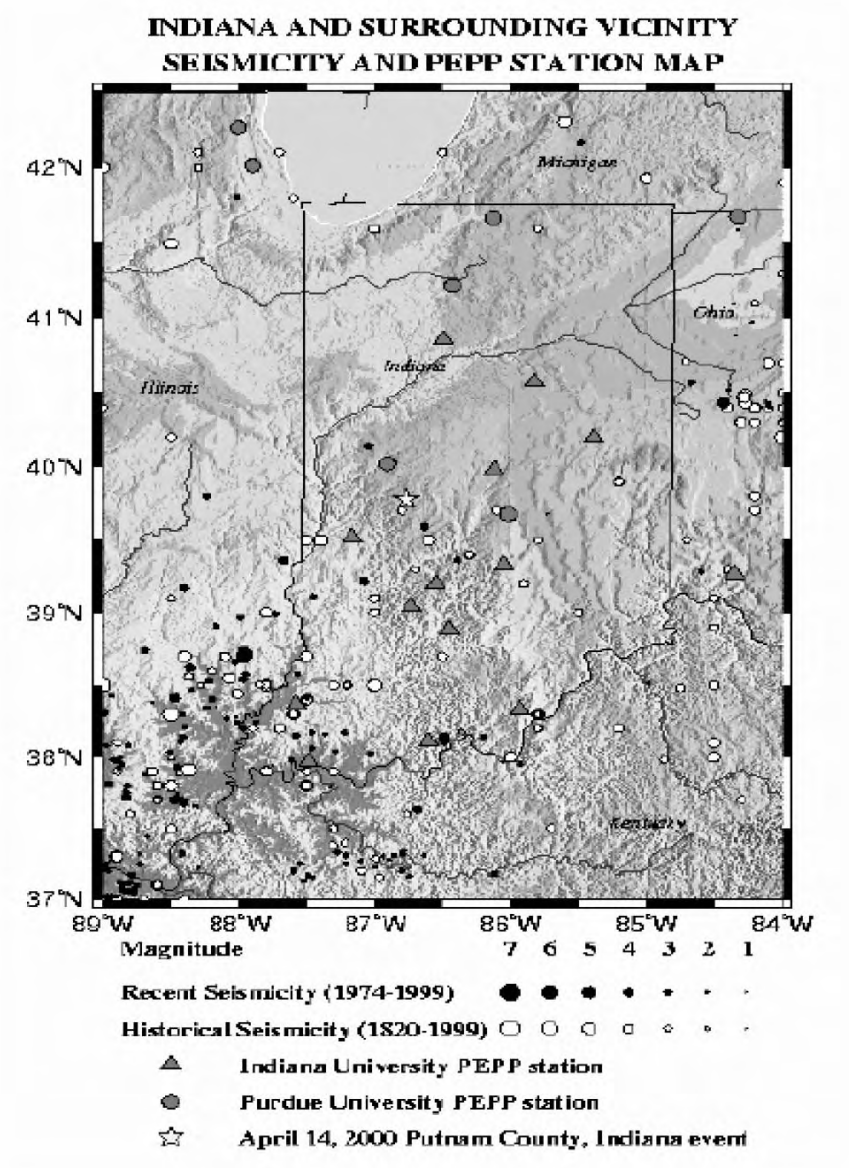
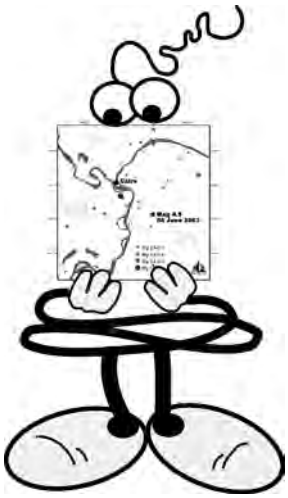


Figure 4. Map showing the location of the April 14 Putnam Country, Indiana earthquake. Indiana PEPP seismic network is shown by red symbols and historical seismic activity in and around the state of Indiana is shown by black and white symbols.



CUSEC Receives New Board Member for Illinois

Gov. Rod R. Biagojevich appointed William C. Burke as the new Director of Illinois Emergency Management Agency according to the news release dated March 19, 2003.

Burke, 61, served as regional administrator for the U.S. General Services Administration. He directed logistics in a six-state region with over 1,000 employees. He managed annual budgets of $300 to $400 million, and served as the agency's liaison to other federal agencies as well as congressional, state and local judicial officials.

Burke is also a decorated Army veteran who served in Vietnam and the National Reserves. During his military service, he received several commendations, including the Bronze Star and Army Commendation Medal.

Burke also served as Inspector General for the Illinois Department of Military Affairs, 33rd Infantry Brigade, where he developed and implemented the yearly training program for the 600-person battalion. He currently works as marketing director for Teng & Associates, a Chicago architectural engineering firm. Burke is a native of Hyde Park, Illinois, where he now resides.

"Bill Burke has an outstanding record of managing people and complex functions," the governor said. "He is eminently qualified to fill the shoes left by Mike Chamness as he leaves to focus on the work of the Illinois Terrorism Task Force. The two of them together will provide outstanding leadership and coordination with law enforcement at all levels to deliver on homeland security."

Mike Chamness, 49, has served as the Director of IEMA for the last four years, leading the efforts of the Illinois' Terrorism Task Force to develop and implement a statewide strategy for domestic preparedness to terrorist attacks.

In the past, the director of IEMA served as the task force chair, but due to the ongoing need for increased coordination with law enforcement, emergency personnel and the U.S. Department of Homeland Security, both the task force and IEMA require full-time leadership.

CUSEC's Mitigation Program Coordinator accepts job with FEMA

Rae Varian will serve as a course manager and exercise specialist in the Integrated Emergency Management Course(IEMC) program as well as other EMI and Headquarters programs requiring the development and evaluation of exercise based training. She will serve as the course manager and/or chief exercise control officer for both community specific and generic IEMC programs with an emphasis on health and bio-terrorism issues.

Ms. Varian's replacement was Mr. Brian Blake. Mr. Blake brings a new level of expertise to CUSEC which will augment CUSEC efforts to promote the use of GIS and HAZUS among the CUSEC states and throughout the central U.S.

Mr. Blake will serve a key role by working with the earthquake program managers, and various CUSEC associations from the CUSEC region as they continue to address the seismic hazard.

Kentucky Earthquake Program Manager, Dave Boyer announces retirement plans

After serving in state government for 22 years, 3 of which was spent as the Earthquake Program Manager, Dave Boyer has made plans to retire. Mr. Boyer's contributions to the earthquake program and to CUSEC have been many and his leadership in the area of donations management served as a cornerstone for addressing the unique regional donations issues which would follow a damaging earthquake. With no definite plans other than leaving Kentucky to take up residency in Georgia, Mr. Boyer is looking forward to some down time before pursuing other interests.

We wish him well.

CUSEC Region Receives First HUG

This year saw the formation of the Southeastern HAZUS User Group in Johnson City, Tennessee. SEHUG is comprised of the eight states in FEMA Region IV: Tennessee, Florida, Mississippi, Alabama, North Carolina, South Carolina, Georgia, and Kentucky.

Organized by Joe Rachel, Earthquake Program Coordinator, FEMA Region IV, SEHUG will provide a strong partnership between the public and private sectors to utilize HAZUS, FEMA's loss estimation tool for natural hazards, to its fullest potential. SEHUG combines the powerful capabilities of HAZUS with the knowledge and judgement of emergency management professionals, GIS technicians, and natural hazards experts in both the public and private sectors.

The formation of the SEHUG will allow all states in FEMA Region IV to implement FEMA's HAZUS-MH loss estimation software and develop partnerships with various entities

throughout the region. SEHUG will also be able to apply results from HAZUS-MH pilot projects for mitigation planning to meet the requirements of the Disaster Mitigation Act (DMA) 2000. With the pilot projects SEHUG will also be able to share results and successes nationwide.

Plans are in the works to create similar HUG's in the other three regions which fall within the CUSEC area.

For more information on SEHUG contact Joe Rachel at joseph.rachel@fema.gov.

CUSEC Promotes Collaborative Approach with recent ATC-20 Classes

Two ATC-20 (Post Earthquake Safety Evaluation of Buildings) classes were offered during the past year, both of which used a collaborative approach to fulfill. In order to continue to offer such classes, a cost saving approach needed to be used.

CUSEC worked with a host of partners which included the Arkansas Structural Engineers Association; the Arkansas Electric Cooperative Corporation; Arkansas State Earthquake Program Manager, Dan Cicirello; Missouri Earthquake Program Manager, Randy Scrivner; FEMA Region VII Earthquake Program Manager, Sue Lubbering Evers; and the Missouri Department of Conservation Discovery Center Urban Conservation Campus.

Each contributed to the class's success. Classroom space was donated by the Arkansas Electric Cooperative and Missouri Department of Conservation which contributed significantly to reducing cost. Instructors John David McFarland, Steve Sharp, Jacques Pierini, Frank Allison, John Finke, Richard Freh, and Joseph Randazzo all donated their time.

This type of collaborative effort is typical of the types of approaches CUSEC takes in building a strong partnership approach to addressing the seismic hazard in the central U.S.

NIUSR President Lois McCoy Honored as a "Leader Who Made a Difference."

Lois Clark McCoy, President of NIUSR was one of the winners of the

2003 "Federal 100" awards presented to 100 leaders who made a difference in federal information technology during the 2002 calendar year. This Gala banquet was held on March 25th at the Ritz-Carlton Hotel in Tyson's Corner outside Washington, DC. Over a 1000 attended the dinner to honor the 100 leaders who made a difference in IT during the 2002 calendar year. These winners at the 14th Annual event were nominated by Federal

Computer Week readers and selected by an independent panel of judges.. In this first week of the War in Iraq, the audience broke into the spontaneous singing of "God Bless America" during the presentation of the Stars and Stripes by the honor guard.

President Bush sent a special message of congratulations to the honorees. In part he said, "During this time of great consequence,

Americans continue to rely on a government that is efficient, dependable, and responsive. The proper handling and use of information by public institutions remains critical to securing our homeland and to ensuring that all our citizens have access to our vital programs and services."

In addition to the "Federal 100" special recognition was paid to Patrick Schanbach, Associate Undersecretary for Information, Security Technology, and CIO for the Transportation and Security Administration, for his guidance in setting up the IT systems for this new agency. A second "Eagle Award", this time for industry, was presented to Renato DePentima, President of Consulting and Systems Integration with SRA International Inc.

Among our friends of NIUSR also receiving the Federal 100 award this year were Steve Cooper, John Stenbit, and Tom Ridge. Several sitting members of the NIUSR have received this Federal 100 Award in past years. McCoy considers the honor of this award as a recognition of the great work of the NIUSR team. Accompanying her at the presentation were two NIUSR Joint Board members, Pete Buckley of Titan Corporation and Tom Staadt of the Association of Health Insurance.

On a personal level she says. "I have never attended such a wonderful event, with the possible exception of lunch at the White House with Barbara Bush during the series she hosted in honoring the women among "The Thousand Points of Light". I accept this Federal 100 award in the name of the National Institute for Urban Search & Rescue."

USGS Looks at Next Phase of Urban Hazard Mapping for the Central US.

The strong ground shaking and resulting catastrophic losses in the 1994 Northridge and the 1995 Kobe, Japan, earthquakes reinforced the need for the USGS Earthquake Hazards Program (EHP) to concentrate its efforts where the risks are highest, in the Nation's urban areas. Planning officials require seismic hazard maps for metropolitan areas at a scale of 1:24,000 or other appropriate large scales if risks to building sites and structures are to be mitigated. Emergency response officials also use these maps to plan preparedness and recovery efforts. Such maps have the added benefit of drawing the attention of policy makers and the public to the hazards they face. Maps must integrate available earth science information relevant to risk identification and to mitigation strategy design and implementation.

The National Seismic Hazard Maps consider the potential for damaging earthquakes and the strength of ground shaking on rock site conditions. The maps do not take into account local and regional geological structures and soil conditions, which may have strong effects on ground shaking. For this reason, the Program conducts more detailed studies in urban areas to produce hazard assessments that reflect local variations in geology and seismic wave propagation. These regional studies also address ground failure hazards such as liquefaction and earthquake-triggered landslides, and include hazard assessments of scenario earthquakes and long-term forecasts of earthquake probabilities.

Beginning in 1998, the EHP launched cooperative efforts with local interest groups in the eastern San Francisco Bay region, Seattle, and Memphis to provide detailed urban hazard maps and derivative products. The efforts in the Memphis-Shelby Country, TN, region are in the final stages of completion. This project has demonstrated that hazard mapping can be the impetus for focused scientific research. The benefits from the research, the expertise gained, and the collaborations developed extend far beyond the local maps themselves. In addition to large-scale seismic hazard maps, the project has assembled publicly available, digital geologic and geotechnical databases for the region. This work cannot be done without strong partnerships, such as those between the USGS and CUSEC, and the Central U.S. Earthquake Consortium (CUSEC) State Geologists.

In then next five years, the EHP will bring the Memphis-Shelby County mapping effort to an organized conclusion by effectively communicating the results and lessons learned and applying these results to new and ongoing efforts in other urban areas. One new priority focus for urban hazard studies of the Central U.S. will be a phased, targeted mapping effort in the densely populated, high-risk, St. Louis urban area. The EHP also will assist the Tri-State Evansville community with some phases of their ongoing hazard-mapping program. The EHP will work cooperatively with the State Geological Surveys and other local groups to assess earthquake size and recurrence, to map variations in soil conditions, to assess variations in site response, and to quantify liquefaction potential. This work commenced with two 'scoping' meetings between the USGS and key players from the St. Louis area on June 9th and from the Evansville area on June 11th. These meetings sandwiched a workshop on June 10th to present preliminary drafts of the Memphis maps and derivative products and to solicit input from potential users. In addition to the EHP, these new efforts bring in participation by the USGS National Cooperative Mapping program.

HAZUS-MH, to be released in 2003, is a nationally applicable standardized methodology and software program that will contain models for estimating potential losses from earthquakes, floods, and hurricanes. HAZUS-MH is developed by the Federal Emergency Management Agency (FEMA) under contract with the National Institute of Building Sciences (NIBS). NIBS maintains committees of wind, flood, earthquake and software experts to provide technical oversight and guidance to HAZUS-MH development. Loss estimates produced by HAZUS-MH will be based on current scientific and engineering knowledge of the effects of hurricanes, floods and earthquakes. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing mitigation plans and policies, emergency preparedness, and response and recovery planning.

HAZUS-MH will use state-of-the-art geographic information system (GIS) software to map and display hazard data, and the results of damage and economic loss estimates for buildings and infrastructure. It will also allow users to estimate the impacts of hurricanes, floods and earthquakes to populations. HAZUS-MH will be fast running to facilitate use in real time to support response and recovery following a natural disaster.

For more information about HAZUS-MH visit the web site at: www.hazus.org.









2003 CUSEC Annual Meeting
Communicating the Earthquake Risk:
Two Decades of Collaboration
"The Ongoing Challenge"
Nashville, Tennessee – June 30- July 1, 2003

Please mark your calendar and plan to attend the 2003 CUSEC Annual meeting in Nashville Tennessee on June 30 to July 1, 2003.

A portion of this years meeting is being dedicated to looking back on some of the events which helped shape the last two decades for CUSEC and its members. For more information visit the CUSEC Web site at www.cusec.org or call 1-800-824-5817

Sunday, June 29

1:00 – 5:00	Earthquake Program Managers Meeting
3:00 – 5:00	Conference Registration

Monday, June 30

8:00 – 1:00	Conference Registration
8:30 – 12:00	CUSEC Board of Directors Meeting
8:00 – 12:00	CUSEC State Transportation Task Force Meeting
8:00 – 12:00	CUSEC Geologists Meeting

Annual Meeting

1:00 – 1:30	Welcome and Introductions
1:30 – 2:00	Keynote Speaker – Anthony Lowe, Director, Federal Insurance & Mitigation Administration (Invited)
	General Session
2:00 – 3:00	CUSEC – The Early Years – Thoughts behind the formation of CUSEC
3:00 – 3:30	Break – Exhibitors Hall
3:30 – 4:30	Looking back on the Iben Browning Years
4:30 – 5:00	CUSEC – The Real Story
5:30 – 8:00	Reception – Exhibitors Hall

Tuesday, July 1

	General Session
8:30 – 8:45	Welcome
8:45 – 9:30	Building stronger lines of communications within NEHRP – Chip Groat, Director, United States Geological Survey (Invited)
9:30 – 10:00	Break – Exhibitors Hall
10:00 – 11:00	Meeting local needs – Are we really listening?
11:00 – 12:00	Showcasing University Efforts
12:00 – 1:30	Awards Luncheon
1:45 – 3:00	**Breakout sessions** 1. Clearinghouse planning effort for the central U.S. 2. Advanced National Seismic System – Building an effective network 3. What's the right message in communicating the risk from a low probability high impact event? – Developing effective awareness tools and strategies.
3:00 – 3:30	Break – Exhibitors Hall
	General Session
3:30 – 4:00	Follow-up to 2002 Breakout Sessions
4:00 – 4:45	Getting Disciplines to Work Together
4:45 – 5:00	Closing remarks – Vice Chair, Robert Latham – Mississippi Emergency Management Agency
5:00	**Conference Ends**
6:00 – 8:00	Banquet

Wednesday, July 2

8:00 – 12:00	Central U.S. Seismic Advisory Council Meeting









DATES TO MARK

CUSEC Annual Meeting -Nashville, Tennessee, June 30 July 1, 2003. The 2003 conference marks the 20th anniversary for CUSEC. For information, contact CUSEC at 1-800-824-5817. Watch the CUSEC web site for further announcements.

NIUSR announces
Homeland First Response Conference
June 4-7, 2003 in Los Angeles

Solving the Challenges of Readiness: Rethinking the Front Line...As We Change. This is the only conference that brings together all members of the response community — law enforcement, fire, rescue, EMS, military, industry, and local, state and federal government – for a meaningful, facilitated open forum designed to affect future policy decisions.

For **registration information,** please contact: Michelle Gherardi 760/632-8280, extension 200 mgherardi@kgbmedia.net

Disaster Management Workshops – Managing Mass Population Displacement Emergencies. Course # E874

Univ. Wisconsin-Madison, Dept. of Engineering Professional Development will offer a course, Disaster Management Workshops September 22-26, 2003 For further information contact Nora Kaufman 1-800-462-0876

WSSPC Annual Meeting - Portland, Oregon: Sept. 20-24. Toward Earthquake Reduction: Developing Effective Communications, Realistic Strategies and Successful Mitigation Actions for Your Community. For registration information contact: WSSPC at 650-330-1101 or wsspc@wsspc.org

The Central United States Earthquake Consortium is a not-for-profit corporation established as a partnership with the Federal government and the seven member states: Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri, and Tennessee; and ten associate member states: Alabama, Georgia, Iowa, Louisiana, South Carolina, North Carolina, Ohio, Oklahoma, Nebraska and Virginia. The Federal Emergency Management Agency provides the basic funding for the organization.

CUSEC's purpose is to help reduce deaths, injuries, damage to property and economic losses resulting from earthquakes occurring in the central United States. Basic program goals include: improving public awareness and education, mitigating the effects of earthquakes, coordinating multi-state planning for preparedness, response and recovery; and encouraging research in all aspects of earthquake hazard reduction.

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Peggy Young ..... **Associate Director**
Brian Blake ... **Earthquake Program Coordinator**
Gwen Nixon ..... **Accounting**
Kerri Hall ..... **Administrative Assist.**
Elaine Clyburn ..... **ARC Liaison**
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Federal Highway Administration
Federal Emergency Management Agency
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U.S. Department of Transportation
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