

The Final Connection in the Warning Chain

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Much of the recent discussion around early warning systems has gotten swept up in the newest high-tech gadgets that can push messages out to emergency first responders and those within the public safety community via online web portals, cell phones, two-way pagers, and many other sophisticated pieces of technology. While these are important new technologies that can play important roles in a quick, targeted, and coordinated response, they may not be the most efficient and effective methods for notifying large numbers within the general public. Mass notification still relies heavily on more common tools of television, radio, and even the outdoor warning sirens.

New Threats that Require New Forms of Warning

Many who grew up in the United States during the nuclear age are familiar with the Civil Defense sirens that were installed throughout our communities to warn of a nuclear weapon strike. As the nuclear threat decreased, communities that did not view these civil defense warning systems as having a significant dual-use capability for warning of other emergency situations – created by natural hazards such as tornados, hurricanes, or flash floods – stopped maintaining their sirens or removed them entirely. While sirens have continued to be a significant part of the early warning landscape for much of the country, until recently they had all but disappeared from several major metropolitan areas along the East Coast from Washington DC to Maine and in California. However, the new threats of international terrorism and devastating tsunamis have meant that the sirens are back.

This is not Your Father's Civil Defense Siren

It is important to realize that outdoor warning and mass notification technology has evolved significantly during the last 25 years. Now that cities have realized that that a dirty bomb has replaced the nuclear bomb as a threat and other communities have renewed concern about tsunamis, those responsible for warning the public are taking a serious look at the new breed of sirens known as the talking siren.

While it may sound a little like George Orwell, having a top shelf voice system to communicate information at great distances is being found to be an effective tool for both emergency response and recovery operations. In fact, Congress acknowledged advances in siren technology by directing the Federal Emergency Management Agency (FEMA), now a part of the Department of Homeland Security, to update its guidance for state and

local governments on outdoor warning. Congress instructed FEMA to revise its guidelines for outdoor warning so that it might reflect advances in technology, such as voice sirens, but this new guidance has yet to be published and is currently two years overdue. State and local governments are hungry for this revised document and have been looking to FEMA for these new standards so that they can better warn their communities of all hazards. Being able to communicate specific evacuation or sheltering plans with large numbers of people can save lives. While coastal communities in the US are significantly more prepared than South Asia to communicate warnings to their residents and visitors, it is a sad irony that a nation as advanced as ours is struggling to produce the necessary guidance to emergency managers regarding state of the art technology for outdoor warning and mass notification.

It is vitally important to build and maintain the infrastructure that detects tsunamis, but as we learned with South Asia, this is not enough. Even though there was not a dedicated system of buoys in place throughout the Indian Ocean, many monitoring agencies were able to determine the massive earthquake off the coast of Sumatra would likely result in a tsunami. The real tragedy is that there was no system in place to quickly get this information to those that were in harms way. A Tsunami Warning System that does not “make the final connection” by alerting human beings to the on-coming wave of destruction, thereby giving them the ability to take the appropriate protective actions, is ultimately ineffective for its intended purpose.

The chief Australian scientist involved in researching a tsunami detection system for the Indian Ocean, Phil McFadden of Geoscience Australia, says an alert system consisting of sensitive buoys placed in the ocean to monitor for earthquakes and other events likely to set off tsunami waves, would be useless unless there was a better way for scientists to warn coastal residents of an impending threat. Many of the coastal villages that were wiped out by the killer waves last month did not even have telephone service, let alone a reliable emergency broadcasting system. In many parts of South Asia, voice sirens may be the most practicable and effective means of warning for areas that do not possess the technological infrastructure to pass along these warnings. Even for those areas that have phone service, coverage is not always dependable nor is it effective if those on vacation purposely leave a device behind so that their vacation is not interrupted.

Even for the technologically more advanced areas of the United States, it can not be assured that emergency messages are received by phones, text pagers, or radios. Alert notifications through such modes, assumes that the recipient possesses the necessary equipment and that the batteries are fresh. *Special Paper 35: Tsunami Warning Systems and Procedures: Guidance for Local Officials*, published by the State of Oregon, begins with a quote attributed to Pierre Martineau “The greatest enemy of communication is the illusion that it has taken place.”

The most effective means of warning masses of people is to ALERT with a tone and then INFORM with voice directions. In other words, people must be told what action to take in emergencies and the new breed of talking sirens does this very effectively.

The Case for Talking Sirens as an Important Mass Notification Tool

Outdoor warning sirens, with voice capability, are not the only answer for communicating with those in harms way. Effective warning relies on various and redundant modes of communication. Voice sirens should be given attention equal to the other communications technologies highlighted in the recent discussions on early warning

The following points demonstrate instances where voice sirens are uniquely effective for communicating warnings to large numbers of people.

- Voice sirens do not discriminate against those without telephones, televisions, pagers, cell phones or other communications devices.
- Voice sirens warn all people outside (many of whom may have left a pager or cell phone behind).
- Voice sirens work even when the electricity or phone lines are out (unlike telephone ring-down systems, scrolling messages on television sets, or radio announcements).
- Voice sirens, with live public address or pre-recorded messages, are used BEFORE and AFTER the incident. Voice sirens are frequently used in the post-disaster environment, before electrical power has been restored, to notify survivors regarding assistance centers or aid stations.
- Voice siren system batteries can be charged by solar panels thereby allowing the system to be placed virtually anywhere.
- Voice sirens have been specifically designed and engineered to provide warning for the past twenty-five years with non-corrosive materials and electronics that function in various extreme climates, from the deserts of Kuwait to the frozen tundra of Greenland and Alaska.

The Policy Implications for Various Approaches to Warning

There are several policy implications to consider with the various technologies that communities select as their method for making the “final connection” to living human beings in emergency situations which include:

- Individual citizens are responsible for keeping the batteries in their NOAA radio charged in order to receive warnings. Individuals and families do not have any additional responsibility, other than to be attentive, with a voice siren system. Therefore, once must ask, do NOAA weather radios provide an effective “safety net” and level of redundancy to guard against human error related to maintenance of personal communication devices?
- Emergency broadcasts over the television are often used to warn the public of an emergency situation. In considering the relative strengths and weaknesses of using television broadcasts to make public warnings, one must consider how we warn those who are outdoors or who are not near a television set that is on?

- Great advances have been made in the area of personal telecommunication equipment and the ability to transmit voice as well as data has come a long way in recent years, but what happens when the cell phone system crashes as has been the case during many recent catastrophic disasters? What are the liabilities for a mobile phone provider that fails to provide adequate coverage during a major disaster and what are the liabilities for the local units of government that have retained these wireless providers?
- Regarding the government’s responsibility to warn the public, how do we account for people who do not own cell phones, pagers, or televisions? Are governments guilty of economic discrimination if they opt for methods of warning that require individuals to purchase a particular technological device so that they might be warned of an impending emergency?
- Telephone “ring down” systems (reverse 911) are used in many areas to warn residents. These systems are rendered useless for homes that have cordless phones when the power goes out. What are the liabilities for a community that has chosen a reverse 911 as their primary mechanism for warning their residents?

While there are limitations to each method for communicating warnings, it is evident that no one method will insure 100 percent coverage. Each community needs to consider their unique circumstances so that they may determine the combination of warning technologies that will allow them the greatest efficacy for making the “final connection” to those who will need to evacuate, shelter-in place, or stay tuned for additional updates and information.

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About the Symposium

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