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Public safety in the aftermath of earthquakes

The ability to communicate directly with large and geographically dispersed populations is a key factor for emergency services and relief agencies alike.

The recent tragedies in Haiti and Chile have once again highlighted the extent of the devastation that can be caused by earthquakes. Earthquakes present governments and relief organisations with a wide variety of challenges when it comes to ensuring public safety. One key challenge lies in how to establish an effective communications channel to the public affected by an earthquake. Both in the run-up to a seismic event, and afterwards, the ability to communicate directly with large and geographically dispersed populations remains at the top of the agenda for emergency services and relief agencies alike.

The first communications challenge lies in being able to warn populations that an earthquake may be imminent so that they can take appropriate action. While seismologists have not yet developed techniques for accurately predicting in the long/midterm when an earthquake will strike, early warning devices can give a few seconds' advance warning.

The issue is how to transmit that warning to all citizens in the disaster zone so that they can find shelter before the tremors start. Television, radio and sirens have all been used in the past, but they have their limitations. TV and radio will only alert people who are actively listening to a broadcast – during working hours that is a small proportion of the total public. A siren alert, on the other hand, is something of a 'dumb' system:

it tells people that something is happening, but not what – and crucially not what the appropriate action should be. What is needed is a system that can immediately tell all people within a given geography that an earthquake is imminent and that they should take shelter either outdoors or under a table or doorframe, immediately.

The most obvious channel for relaying this information is the mobile phone. Even in developing countries mobile phones are the most ubiquitous communications channel. As mobile phones can support text messages, they can convey the level of detail needed during earthquake alerts. Getting the necessary information to mobile phones, however, is not as simple an issue as it first seems.

SMS text messaging is the most widely used messaging system at present, but it is hugely flawed as a medium for public warning. SMS is a point-to-point technology, meaning that an individual message needs to be sent to each device. This slows down the process of sending messages – in the case of an earthquake early warning system this time delay would render the system useless. SMS is also limited as a solution to public warning as it relies on users registering their phone numbers with the authorities. There are privacy concerns here as the only way a government would be able to send text messages to users within a specific location would be to track

their movements. This is obviously too 'big brother' to work in practice.

There is, however, a service which is far more practical for public warning. To end users, Cell Broadcast resembles SMS closely, but in terms of implementation it is more practical. The technology works on a one-to-many basis, meaning that one message can be sent to many hundreds of thousands of devices, instantly. These messages are sent to all phones within reach of specific mobile telephone masts, making it a truly location-specific solution and one without the need to register or track devices. As an early warning alert comes in for an earthquake in a specific geographic location therefore, operatives can send a message to everyone within that area instantly, whether locals or visitors, giving them the appropriate level of information to take action.

In the aftermath of an earthquake, Cell Broadcast can continue to offer governments and public safety agencies a useful communications channel. As the Haiti earthquake showed, telephone networks often survive earthquakes, but due to the huge amounts of traffic going over the voice and data channels they often fall over and cannot support voice and text messages. Cell Broadcast however has its own dedicated broadcast channel and would continue to function.

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