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May 02, 2003

40-second alerts that could save thousands

BY MARK HENDERSON, SCIENCE CORRESPONDENT

EARTHQUAKE warning systems could save thousands of lives in heavily populated seismic hotspots such as Turkey and California, scientists say.

Details of a proposed warning system for California, which has several active faults, are published today in the journal *Science*.

Similar networks would work well in any seismically active region, and a variation was already used in Japan to stop bullet trains in the event of a quake, experts noted.

Networks of detectors, which pick up low-energy waves that precede a major earthquake, could sound the alarm up to 40 seconds before its full and devastating effects are felt.

Experts say that while less than a minute's warning does not sound like much it could be crucial to reducing the death toll from major quakes. Just 15 to 20 seconds warning would allow air-traffic controllers to stop aircraft from landing, factories to stop production lines, gas companies to shut pipelines, bridges to be closed and trains to be stopped.

Small buildings could be evacuated, and people without time to get outside could take other steps to protect themselves, such as sheltering under a desk or table. The result could be thousands of lives saved.

The system would use 155 seismic monitoring stations already in place across California to pick up P-waves — low-amplitude waves of energy that are the first to be generated at the epicentre of an earthquake.

These low power waves generally cause little

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damage, but they spread out quickly and are easy to detect. They are followed by slower-moving S-waves — high-amplitude, high-energy waves that shake the ground and pose the greatest threat to life and property.

The length of time between the arrival of a P-wave and an S-wave depends on distance from the epicentre, but can be as long as 40 seconds, according to researchers at the University of Wisconsin-Madison.

Cities closer to the epicentre, which are likely to be hardest hit, would have less time to react, perhaps just a few seconds, but if the system was automated for key sections of infrastructure, many lives might still be saved.

“People who need warning the most will have less time, but at least the system can give people a chance to react,” said Richard Allen, Professor of Geology and Geophysics at the University of Wisconsin-Madison. “In an earthquake, every second counts.

“There is a capability now of detecting earthquakes within a matter of seconds and transmitting that information in a way that could provide some early warning to earthquake-prone regions.”



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