New System to Prevent Construction Site Trench & Soil Collapses

On behalf of Johnston, Moore & Thompson

- October 22, 2010

Geotechnical engineers at Loughborough University in England are working on a new way to prevent catastrophic soil collapses on construction sites as well as landslides that occur naturally but without warning. The sound sensor system measure's the soil's acoustical behavior to predict when a landslide or trench collapse is imminent so that preventative steps can be taken before people are hurt.

The new system works "just the same way as bending a stick creates cracking noises that build up until it snaps. So the movement of soil before a landslide creates increasing rates of noise," says principal project investigator Neil Dixon.

"This has been known since the 1960s, but what we have been able to do that is new is capture and process this information so as to quantify the link between noise and soil displacement rates as it happens, in real time - and hence provide an early warning."

The system has the potential to prevent untold numbers of construction accidents, worker injuries and fatalities from naturally occurring landslides worldwide.

Sensors Could Be Used on Infrastructure Embankments and Construction Trenches

The system is being developed with a dual purpose. First, because the system does not require a nearby central computer, it could be deployed in developing countries or wherever there is a known potential for landslides. Second, the system could be deployed to monitor the condition of construction sites with trenches, mines, and potentially unstable slopes built to support road or rail embankments, levies or other infrastructure.

A network of low-cost sensors would have visual and/or audible alarms. They could even be set up to send text messages to workplace safety or disaster response officials, giving them an early warning that could allow them to evacuate the area, stop workers or residents from crossing the unstable area, or take steps to stabilize the slope or trench.

The sensors act like microphones, recording noises in the subsoil and sending them to a central computer for analysis. Increased soil noises are known to predict imminent soil collapses, but that knowledge hasn't had a practical application until now.

"The development of low cost independent acoustic slope sensors has only become possible in very recent times due to the availability of microprocessors that are fast, small and cheap enough for this task," said Dixon.

A commercially available sensor system could be available to begin preventing landslides and construction accidents as early as in the next two years.

Source: Occupational Health & Safety magazine, "System Warns of Imminent Landslides," October 22, 2010