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and ground vibrations from explosions on the Earth's surface

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Most equations used to predict the ground motion produced by explosions were developed using confined blasts that were detonated with the intention of breaking rock for mining or tunnelling. Ground motion is usually recorded by geophones or seismometers. The air blast produced by open-pit blasts and explosions on the surface can pose a significant risk, thus microphones and pressure gauges are often also used to monitor the effects of the explosion. The aim is to determine whether or not the predictive equations developed for confined explosions can be used to predict the effects from explosions placed on the surface, with appropriate adjustments to the various coefficients.

Three predictive equations developed for buried explosions were tested and it was shown that the United States Bureau of Mines peak particle velocity (PPV) predictive equation is the most reliable. In addition, a predictive equation using the secondary atmospheric shock wave phenomenon also produced good results and is easier to measure. These equations may be utilised both for demolition sites, where old and potentially unstable explosives and obsolete equipment are destroyed on the surface of the ground, and for assisting in forensic seismology to determine the details of an unexpected and unknown explosion.

Promotional text

The study focused on seismoacoustic signals produced by surface explosions at distances further than what is normally monitored. Although the explosions were not on the same scale as those monitored by the IMS, the study provides interesting insight into forensic seismology.

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