

EFFECTS OF MILLISECOND-DELAY INTERVALS ON VIBRATION AND AIRBLAST FROM SURFACE COAL MINE BLASTING

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ABSTRACT

A mayor concern with blasting at surface mines is generation of ground vibrations and airblast and their effects on nearby residences. This Bureau of Mines report looks at the use of millisecond delays in blast design and their effect on the resulting ground vibrations and airblast. A total of 52 production blasts were instrumented and monitored at a surface coal mine in southern Indiana. Arrays of seismographs were used to gather time histories of vibrations and airblast. The data were analyzed for peak values of vibration and airblast and for frequency content. Various delay intervals were used within and between rows of blastholes. Delay intervals within rows were 17 and 42 ms, and those between rows ranged from 30 to 100 ms; these intervals are equivalent to 0.5 and 1.3 ms/ft within rows and 1.2 to 4.3 ms/ft between rows. Subsonic delay intervals within rows reduced airblast by 6 dB. Large delay intervals between rows reduced the amplitude of ground vibrations; their frequency depended primarily upon the geology of the mine site.