

"FREQUENCY ADJUSTMENT" WITH HIGH ACCURACY DETONATORS

Ken C. Pruss
The Ensign-Bickford Company

ABSTRACT

Seismic studies have proven that the frequency with which shock or vibration waves are reacting on a structure, in correlation with the amplitude of those waves, has a definite affect of structural damage. Different structures will react to different frequencies. In the past few years, some major coal producers in the midwest United States have shown that with the use of highly accurate detonators and exotic timing patterns they have effectively been able to adjust frequencies and this has enabled the operators to continue their excavation of overburden in environmentally sensitive areas.

Natural geological response is determined by generating a shock wave through that geology. This is accomplished by detonating a single hole or series of single hole blasts with sufficient enough explosives to produce a "signature" on strategically located seismographs. Once this information has been recorded and analyzed, delay patterns that are most desirable to produce higher frequencies which are less noticeable and less destructive than low frequencies are determined.

Because delay patterns can be extremely complex, and the accuracy with which individual charges are detonated are critical to the success of the program, a highly accurate, adjustable initiation system is required.

This presentation will include overheads of the location of "signature" holes in relation to uncontrolled structures and seismographs. There will also be some sample delay patterns showing the timing patterns and how vibration results may be improved upon by increasing your maximum pounds per delay period. High speed photography confirming the accuracy of these LVST(R) line Primadet(R) non-electric detonators is also part of the presentation.

Of interest to the end users, here are the resultant increase in fragmentation and the reduction or elimination of blasting complaints and violations that we have seen with these frequency adjustment programs.