

Comparative Study of Structure Response to Coal Mine Blasting – Non-Traditional Residential Structures

Project: Office of Surface Mining
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In progress

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The objective of this study is to measure the response of non-typical structures to blast-induced ground motions and airblast. The study focuses on residential structures that were not studied in earlier research and include dwellings such as manufactured homes (trailers), log and rock homes, adobe, and traditional coal mine “camp” homes.

Blasting seismographs record exterior ground and air vibrations and are used to trigger the interior structure systems, recording a common time base for all vibration data. Interior seismographs are connected to light-weight, single component velocity geophones, as shown in Fig.1. Structure instrumentation has been designed to measure whole structure response and mid-wall response for a total of 22 structures at 11 sites.

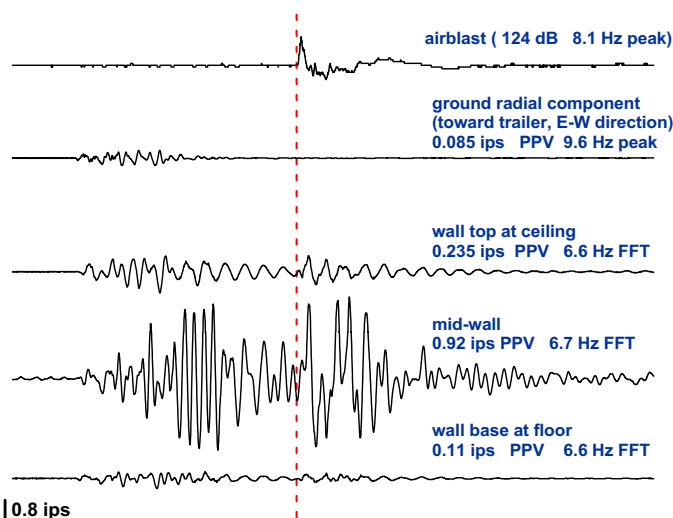


Figure 2 Double-wide trailer: center (connecting) wall response for the horizontal component (5 second waveform)

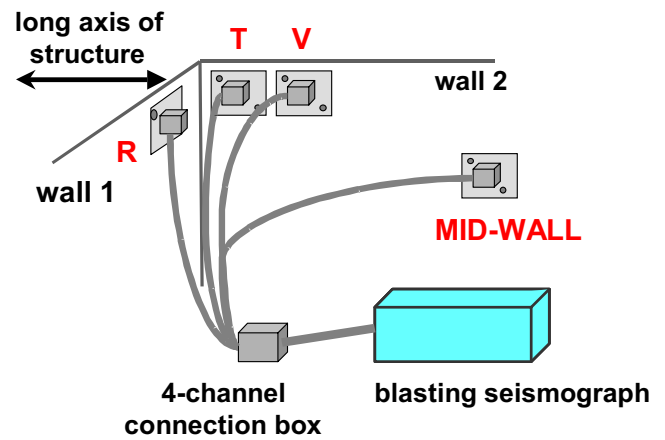


Figure 1 Typical Instrumentation

Data collected during this study will

- Document and compare blast vibrations, vibration characteristics of structures, and site conditions relative to those studied by the U. S. Bureau of Mines and others in establishing the widely-adopted safe level blast vibration criteria
- Outline an evaluation process to include structure uniqueness in the consideration of cracking susceptibility.

Fig. 2 shows the center-wall response of a double-wide manufactured home.

The overall project plan is designed to integrate a high level of scientific quality in the monitoring, analysis, and presentation of structure response data and thoroughly investigate all aspects of structural motions germane to cracking potential.



Log structure



Single-wide trailer



R, T, and V transducers at wall top (left) and wall base (right)

