COUPLING AND COHERENCE ESTIMATES FROM SINGLE-FIRED CYLINDRICAL EXPLOSIONS



Implications for Using Single Hole Waveforms in Multi-Hole Simultations



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OVERVIEW
Single shot characterization (130-650 lbs) Single shot characterization (5500-50000 lbs)
Superposition modeling Identification of blasting anomalies

Single shot characterization (130-650 lbs) Experimental Layout











Single shot characterization (130-650 lbs) Amplitudes







POWER LAW

 $A = A_0 Y^a D^b$

Coupling Results

Single shot characterization (130-650 lbs)

a = 0.94 source coupling

b = -1.88 spatial decay (geology)



Single shot characterization (130-650 lbs) Modeling - Source



a) Explosion Source Mueller-Murphy model

b) Vertical SpallOpening of horizontal crackUnloadingSlapdownPit Depth

c) Horizontal Spall Opening of vertical crack Horizontal slapdown in pit



Single shot characterization (130-650 lbs) Modeling - Propagation







	Table 2 Test site velocity model					
	thickness (m)	V _p (m/sec)	V _s (m/sec)	റ (g/c㎡)	Qp	Qs
Top layer	3.1	500	250	1.7	3	1
Half space		2400	1000	2.0	35	8

Single shot characterization (130-650 lbs) Modeling - Synthetics





Single shot characterization (5500-50000 lbs)

Larger Shots





Shot	Size(lbs)	# Boreholes
1	5500	1
2	5500	1
3	5500	1
4	6000	1
5	12000	3
6	16000	4
7	50000	10



Single shot characterization (5500-50000 lbs) Regional Data





Single shot characterization (5500-50000 lbs)

Regional Coupling



Single shot characterization (5500-50000 lbs) Correlation







Single shot characterization (5500-50000 lbs) Coherence





Single shot characterization (5500-50000 lbs) Source Scaling Data and Model



Single shot characterization (5500-50000 lbs) Regional Amplitudes

Single shot characterization (5500-50000 lbs) Data Visualization

Single shot characterization (5500-50000 lbs) Model Visualization

Identification of blasting anomalies Well performing shot

Identification of blasting anomalies Anomaly 1- Observation

Identification of blasting anomalies Anomaly 1- Model

Identification of blasting anomalies Anomaly 2 - Data

