

DEVELOPMENT OF A 1.2M PROTOTYPE ADVANCED BLAST LOAD SIMULATOR

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ABSTRACT

As described in a separate MABS24 paper, ERDC is establishing a new large-scale blast load simulator with substantially extended performance based on the Advanced Blast Simulator concept using a gaseous detonation Driver. Many features of the facility are unique and will be developed methodically in stages. The current paper describes the design, fabrication, and early testing of a 1.2m working prototype for the intended full-scale facility. The Driver uses a main charge of ethylene-air boosted by a small oxy-acetylene charge, a combination which provides optimal performance considering the P-I envelope as well as operational and safety considerations. By varying the oxygen content, the strength of the Driver detonation can be doubled from 19atm C₂H₄/Air to nearly 33atm for C₂H₄/O₂. Blast amplitude and duration are also controlled by the 'slug length' (length of dispersed fuel in the Driver), controlled venting near the Driver, or by variance of the distance of target station from Driver. A simple means of controlled Driver venting also eliminates re-reflection of the wave from full-reflection wall targets without affecting the initial downstream-running wave.