

A NEW LARGE SHOCK TUBE WITH SQUARE TEST SECTION FOR THE SIMULATION OF BLAST EVENTS

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For many decades shock tubes have been used to test and scientifically investigate the response of structural components against blast loading. Shock tubes offer a safe and highly reproducible generation of pressure waves which can -within certain ranges of parameters- closely resemble blast waves produced by the detonation of high explosives. The usefulness of a shock tube for blast testing depends on its capability to allow a flexible selection of peak overpressures and positive time durations and to offer a sufficiently large cross section for testing original construction components like e.g. windows, doors and masonry. Frequent requests for testing larger components led to the decision to design and build a new enlarged shock tube with square test section of 3 m x 3 m in 2011. A major challenge in the design of this shock tube was the balancing of the major design parameters length, volume and test section diameter, which mutually affect the adjustable range of peak overpressures and time durations, the planarity of the wave in the test section and the required initial pressures in the high pressure section. In our paper we will present results from initial calibration tests, give a survey of the adjustable parameter ranges and discuss the design, which has been achieved by means of numerical simulations.

