EFFECT OF THE DRIVER SHAPE OF AN EXPLOSIVELY DRIVEN SHOCK TUBE ON THE RESULTING AIR BLAST ENVIRONMENT

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We have performed a series of hydrocode calculations to determine the effect of the driver shape and charge configuration on the air blast waveforms produced in an explosively driven shock tube. The results of the calculations support the available experimental data an show that a conical driver generate a peaked waveform and produces a subambiant negative phase similar to that produced by a spherical blast. The calculations show that the relief wave originating at the driver diaphragm focuses as it moves toward the cone apex and is continuously reflected from the driver walls. The reflected relief waves propagate downstream into the shock tube and produce a peak wave form as they overtake the lead shock. It is shown that the same effect can be obtained by allowing the gases to vent from a partially open driver. For this case, the relief wave originating at the open end behaves substantially the same as the relief wave reflected from the walls of a conical driver. For large shock tubes, use of an open-ended cylindrical driver appears to be more practical than tailoring the driver shape, even though a larger volume of driver gas will be required to provide the same impulse.