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Numerical modeling of an experimental shock tube for traumatic brain injury studies MICHAEL PHILLIPS, JONATHAN D. REGELE, Iowa State University — Unfortunately, Improvised Explosive Devices (IEDs) are encountered commonly by both civilians and military soldiers throughout the world. Over a decade of medical history suggests that traumatic brain injury (TBI) may result from exposure to the blast waves created by these explosions, even if the person does not experience any immediate injury or lose consciousness. Medical researchers study the exposure of mice and rats to blast waves created in specially designed shock tubes to understand the effect on brain tissue. A newly developed table-top shock tube with a short driver section has been developed for mice experiments to reduce the time necessary to administer the blast radiation and increase the amount of statistical information available. In this study, numerical simulations of this shock tube are performed to assess how the blast wave takes its shape. The pressure profiles obtained from the numerical results are compared with the pressure histories from the experimental pressure transducers. The results show differences in behavior from what was expected, but the blast wave may still be an effective means of studying TBI.

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