FUNDAMENTAL RESEARCH ON BLAST SIMULATOR FOR BLAST INJURY RESEARCH

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ABSTRACT

Compare to plane shock waves generated inside a shock tube, blast waves have three characteristics. Firstly, blast wave has a sharp peak overpressure following decayed pressure profile. Secondary, at the latter part of the decayed pressure profile, blast wave often has "negative pressure" that is lower than the initial pressure at quiet region. Finally, blast wave has the secondary shock wave that is the reflected shock wave of the implosion shock wave generated by overexpansion of the combustion gas. In order to simulate blast wave for blast injury research, the flow field generated have to have the characteristics described above. To generate blast-like-planer shock waves, modifications of a diaphragm-type-shock tube both on volume and shape of the high-pressure camber, method of high-pressure release, and the cross-section of the low-pressure channel, have been investigated. The shock tube which has cross section of 50-mm by 50-mm, a high-pressure chamber with 500-mm in length, a low-pressure channel with 3040-mm in length, and a middle-pressure chamber with 23-mm in length, has been used. Negative pressure was observed inside the shock tube with an expanded channel which was attached between the high-pressure chamber and the low-pressure channel.