THE SHOCK LOADING OF VARIOUS STEEP WEDGES CALCULATED BY THE STEALTH-CODE AND COMPARED WITH EXPERIMENTAL DATA

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The shock reflection process at plane surfaces was investigated extensively in the past, and that mostly experimentally by performing shock tube runs and by using visualization as well as direct pressure measurement techniques. In this way the shock loading of the flat obstacles resulting from the measured pressures could be gained to some degree of accuracy.

The precise knowledge of the shock loading, however, is of great importance if the structure response of an obstacle is to be calculated, where it enters the corresponding calculation procedure as input data. Therefore, one is forced to support the experimentally determined shock loading data by additional calculations. The purely analytical tools are still weak. So one is lead to use numerical codes.
The STEALTH-code is a Lagrangian code which solve the conservation equations by a time-explicit finite difference method. Shocks are represented by smeared discontinuities calculated with the aid of artificial viscosity. The code contains several material laws, one of them is for air under ideal conditions which was used here.

In order to apply the STEALTH-code a net was constructed which simulate a shock tube with driver and driven section, in the later of which a wedge was modeled. In several calculation runs the wedge angles were altered between 10 and 80 degrees. By choosing weak and moderate incident step-shaped shock waves regular reflection as well as Mach reflection could be produced. The trend of the reflected pressure depending on the parameters will be presented and compared with the corresponding measurements. In
most of the cases the agreement is good, discrepancies arising will be
discussed.