

THE THEORY AND EXPERIMENTAL INVESTIGATION OF REGULAR AND MACH REFLECTION OVER A DOUBLE WEDGE

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Part II: Experimental investigation

The reflection processes of a planar shock wave over concave and convex double wedges have been investigated experimentally in the 7.5 cm x 30 cm shock tube of the University of Victoria. The experimental was conducted using incident shock waves with Mach number in the vicinity of 1.3. The reflection processes along the double wedges were recorded using both a schlieren system with a framing camera, and a single shot direct contact shadowgraphs.

The wave configurations and the fine details of the reflection processes moving from the first to the second wedge were observed and analyzed.

It was found that when a Mach reflection interacts with a secondary compressive wedge it can eventually become a direct Mach reflection propagating away from the second surface on an inverse Mach reflection propagating towards the surface, colliding with it, and transitioning into a regular reflection followed by a normal shock wave which emanates from the reflected shock wave.

The experimental study verified the analysis which predicted 7 different reflection processes; 4 over a concave double wedge and 3 over a convex.

The actual transition wedge angles from regular to Mach reflection over concave double wedges were also recorded.

In the next stage of the experimental study, pressure measurements along the wedge surfaces will be made.