

Shock Formation for Double Ramp Surface

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Abstract : Supersonic flight promises speed, but the design of the air inlet faces an obstacle: shock waves. They prevent air flow in the mixed compression ports, which reduces engine performance. Our research investigates this using supersonic wind tunnels and schlieren imaging to reveal the complex dance between shock waves and airflow. The findings show clear patterns of shock wave formation influenced by internal/external pressure surfaces. We looked at the boundary layer, the slow-moving air near the inlet walls, and its interaction with shock waves. In addition, the study emphasizes the dependence of the shock wave behaviour on the Mach number, which highlights the need for adaptive models. This knowledge is key to optimizing the combined compression inputs, paving the way for more powerful and efficient supersonic vehicles. Future engineers can use this knowledge to improve existing designs and explore innovative configurations for next-generation ultrasonic applications.

Keywords : oblique shock formation, boundary layer interaction, schlieren images, double wedge surface

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