

SHOCK WAVE DIFFRACTION OVER UNDER WATER BODIES

R Arun Kumar and G Rajesh

¹*Indian Institute of Technology Madras, Chennai, Tamilnadu, 600036, India.*

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In this study, the diffraction of shock waves over under water bodies and its effect on the stability of the body has been investigated. The primary shock wave is produced using a shock tube with round cross section. Towards the end of the shock tube, a tank filled with water has been placed, as shown in Figure 1 below. The water surface is maintained at a distance of 15 mm below the driven tube and just beneath the water surface a solid body having a shape similar to that of a submarine has been kept. The primary blast wave from the shock tube is allowed to propagate over the air-water interface and the shock wave refracts into the water. The presence of solid body causes the refracted shock to diffract over it. The shock reflection and diffraction characteristics over the body are then filmed using time resolved schlieren imaging. Figure 2 shows the schlieren image of the propagation of shock wave over the air-water interface. It is clearly seen that the shock wave undergoes a regular reflection from air-water interface. However, the present experiment failed to capture the refraction of shock wave into the water and the subsequent diffraction over under water body, due to the poor quality of water. As a future study, it is planned to repeat the experiments with the use of purified water so that under water region will be also visible. In future, it is also planned to generate the shock wave beneath the water itself and to measure the pressure profile over the body as the shock diffracts over the body.

