

## UNDERWATER SHOCK FACILITY AND EXPLOSION LEVELS EVALUATED BY A SWIMMER

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An underwater shock facility was described and the results of tests conducted to determine the underwater-blast levels that would be comfortable to an unprotected swimmer were presented. Twenty-two tests were carried out in a 220- by 150 ft underwater-test facility (30 feet deep) with explosive charges up to 2.6 lb. Six tests were run in open water (25 and 150 feet deep) with charges up to 190 lb. On most of the tests the underwater-blast waveforms were measured by gauges located at 1-ft depths adjacent to the swimmer. The peak pressures, impulse, and cut-off times were calculated from gauge records and presented along with the sensations described by the swimmer.

Impulses of 1 psi-ms or more were evaluated by the swimmer with his head above the surface for a) peak pressures of 50 to 118 psi from charges fired at or deeper than 10-ft depth of burst (DOB), b) peak pressures of 139-216 psi from charges fired at a 1-ft DOB, c) swimmer near a reflecting surface, and d) swimmer in a wet suit. The noise from underwater explosions was also assessed while the subjects ears were at 1-ft depths, head facing the charges. The sounds from the following underwater blasts were tolerable and did not produce tinnitus: impulse of 0.25 psi-ms to 1.31 psi-ms with respective peak pressures of 12 psi to 52; and impulses of 1 to 2 psi-ms with peak pressures of 48 to 71 psi. Some information on the bottom reflected waves, having atypical waveforms, encountered was included. A 1 psi-ms criterion as an acceptable underwater-blast level for swimmer was discussed.