

33-42 High pressure generation using underwater explosion of spiral detonating cord

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The purpose of the study described in this paper is to obtain the high pressure by the converging process of underwater shock wave from the underwater explosion of detonating cord in a spiral shape. First, the assignment of the spiral shape of detonation was determined from the geometrical consideration and the basic features of the detonation cord itself. Secondly, the converging process of the underwater shock wave from the explosion of such designed shape of detonating cord was photographically observed by using a high speed camera in the framing form. Two time intervals 2 ms and 5 ms were chosen for the interframe time in the framing photography. The photographs confirm that the underwater shock wave moves toward the spiral center in a convergence way. Thirdly, the pressure nearing the spiral center was measured experimentally by means of the pressure transducers. The distance, D_h , between the detonating cord and the transducer was set to be 272 mm. Compared to the case that the detonating cord was placed in straight way, the maximum pressure in the case with the spiral shape is verified to be unchanged but the impulse, however, has a much improvement. This reason may be due to over-greatly set D_h . When the distance D_h was set to 50 mm, the pressure measurement was made again and as a result, the large pressure value was record. Compared to the straightly placed detonating cord, it is shown that 3 times higher peak pressure is available in the spiral detonation cord. The results demonstrate that in a small range the pressure of underwater shock wave is indeed converged and higher pressure value is obtainable. Then, the pressure of the convergent point was measured by using the pressure change vessel.

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