

33-41 An investigation on underwater explosive bonding process

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In this paper, we propose a new explosive bonding method for bonding materials by using the underwater shock wave from the explosion of explosives in water. This method is especially suitable to bond such materials as the thin thickness and the largely dissimilar properties. In bonding those materials, the shock pressure on the flyer plate and the moving velocity of shock wave should be precisely controlled to achieve an optimum bonding conditions. In this method, the bonding conditions can be controlled by variation of the space distance between the explosive and the flyer plate or by inclination of the explosive charge with the flyer plate. We made the experiment to bond the amorphous film with the steel plate. A satisfactory result was gained. At the same time, the numerical analysis was performed to investigate the bonding conditions. The deformation of flyer plate by the action of underwater shock wave was calculated and compared with the experimental observations by the high speed camera under the same conditions. The comparison shows that the numerical analysis is of good reliability on the prediction of the experimental results. Furthermore, the numerical analysis also gives the deformations of the flyer and the base plates, and the pressure and its variation during the collision process.

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