OBLIQUE REFLECION OF DECAYING PRESSURE WAVES

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With the reflection of a pressure wave at an obstacle its loading is produced and its response is excited. The process, however, finds major interest if ft can be visualized by shock tube runs with the aid of an elaborated visualization technique. Of course, then only model scale tests can be performed the models being generic ones, e.g. wedges and cylinders. Regular and irregular shock reflection patterns are recognizable and one is led to the von Neumann Theories with their limiting solutions which are commonly used as criteria for the transition between the reflection types.

These facts are based on incident pressure waves with the constant pressure trend of a square wave signature termed shock waves. In conventional explosions blast waves are produced, indicated by an immediate decay of the pressure and the other parameters behind their fronts. The reflection patterns of blast waves at obstacles, however, show different features in comparison to those of shock waves. When and reflecting the blast wave is attenuated, i.e. the front amplitude decreases with time duration increases. With that parameter the wave length is liar phenomena become obvious if the wave length is in the same order characteristic body dimension. Such features are not found with genuine.

The theoretical treatment using the von Neumann Theories is not possible due to violated boundary conditions, therefore numerical simulations are required. In the present paper the finite difference code SHARC is applied. It is validated by various experimental results in shock wave dynamics and is proved as a reliable tool. Several two-dimensional computations of the reflection of short duration blast waves (t+ < 1 msec) at wedges and cylinders are made. The isopycnics reveal a rather deformed reflected wave front due to its traveling into a region of decreasing, pressure. Consequently the pressure distribution on the wall at a constant time is different from that generated by a shock wave. Regular and irregular reflections appear as well at the front of the primary shock thus being front phenomena. All these features will be demonstrated in the paper together with single shadow-schlieren pictures.