A SIMPLIFIED METHOD TO PREDICT THE INFLUENCE OF THE AIRBLAST WAVEFORM IRREGULARITIES ON THE DYNAMIC STRUCTURAL BEHAVIOR

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Simulated nuclear blast wave produced by non iso-diameter air-driven shock tubes eventually show irregularities due to the converging-diverging driver system. Under well defined conditions, the static overpressure profile shows a short duration low energy peak although apt to disturb the desired response of the target. In order to quantify the influence of such irregularities of the incident wave, an analytical method to predict the dynamic magnification factor had been proposed. That method provides the shape of the dynamic response of any structure assimilable to a 1 degree of freedom system under any loading starting with a sharp rise followed by a rapid decay then reaching a constant magnitude. Such a loading is broken in a sum of simple-shaped loading. The analytical expression of the dynamic response is then calculated by means of the Laplace's transform when resolving the motion equation of the equivalent 1 degree of freedom system related to each simple-shaped loading. As an example, that method is used to predict the overloading an a clamped plate due to a simulated nuclear blast with a peaked-shape irregularity. The results are compared to those of a finite elements code.