

the value zero at the end of the pulse. Initially the structures are at rest and have no displacement.

The case of the simply supported beam is treated in some detail in order to illustrate the method of solution. In the other cases only the conditions necessary to specify the problem and the corresponding solutions for the deflection and strain as functions of the spatial argument and time are given. A numerical example is worked out for the simply supported beam, and the curves of deflection-time and strain-time are given for both during and after the pulse. A method is developed whereby the solutions for the triangular pulse may be modified to give directly the response of the structures to a general pressure-time loading. (Author's abstract)

5045

Baker W E and Allen F J
THE RESPONSE OF ELASTIC SPHERICAL SHELLS TO SPHERICALLY SYMMETRIC INTERNAL BLAST LOADING
Ballistic Research Laboratories, APG, BRLM Report No. 1113, August 1957.

This report presents the results of an analytical study of the reaction of an idealized nuclear reactor containment shell to internal transient loading which could be caused by reactor runaway.

The containment shell is assumed to be an elastic hollow sphere, and the transient loading is assumed spherically symmetric. A general theory of the response, valid for shells of any thickness, is developed. The theory is approximated for thin shells, and compared with experiment. The experiments corroborate the theoretical predictions. (Authors' abstract)

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Cunningham D M and Goldsmith W
SHORT-TIME IMPULSES PRODUCED BY LONGITUDINAL IMPACT
Paper presented at Spring Meeting of the Society for Experimental Stress Analysis, held May 14-16, 1958.

A program for the precise measurement of pulses in narrow rectangular bars generated by longitudinal impact of a 1/2-inch diameter steel ball was executed. The pulses were detected by means of resistance wire strain gages of various lengths and sandwiched piezoelectric quartz crystals, and were compared to the measured change of momentum of both ball and bar. An initial impact velocity up to 190 ft/sec always yielded permanent dents in the bar at the contact point with a depth small compared to the ball radius. Rise times of the order of 10 microseconds and peak forces of about 9,500 pounds were produced. No significant difference in the pulse shapes was observed from the records of wire-resistance strain gages and crystals,

but gages are considerably more convenient to use and are more universal in application. The impulses for longitudinal and transverse impact under similar geometric conditions appear to be comparable. (Authors' abstract)

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Mason P
HIGH-SPEED FRACTURE IN RUBBER
Journal of Applied Physics
1958, Vol. 29, pp. 1146-1150.

Cinematographic observations have been made of crack propagation under well-defined boundary conditions in rubbers at speeds up to 30 m/sec. The fracture markings showed resemblances to those obtained with metals, plastics, and glass, and could be related directly to the corresponding speed of fracture-propagation. In close analogy with Schardin's observations on glass, a noncrystallizing rubber (GR-S) showed a mode of crack propagation in which the fractured surfaces were visually smooth and the speed was about one quarter of the speed of longitudinal elastic waves. A crystallizing rubber (natural rubber) did not show this mode of propagation under the present test conditions. It is suggested that the modes of solid fracture can be usefully classified in three categories: (i) slow propagation, generally with smooth surfaces, obtained by careful control of the boundary conditions; (ii) propagation at intermediate rates with rough surfaces, involving correspondingly greater energy consumption; and (iii) fast propagation with smooth surfaces, the rate of propagation being limited by the speed of elastic waves in the material in accord with Mott's theory. (Author's abstract)