4025 Alverson R C
IMPACT WITH FINITE ACCELERATION TIME ON ELASTIC AND ELASTIC-PLASTIC BEAMS
Brown University, April 1955
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4026 Vigness I
TRANSVERSE WAVES IN BEAMS
Proceedings Society for Experimental Stress Analysis, 1951, Vol. 8, No. 2, pp. 69-82.

4027 Mori D
LATERAL IMPACT ON BARS AND BEAMS
Proceedings Society for Experimental Stress Analysis 1957, Vol. 15, No. 1, pp. 171-178.

Experimental results are presented for the effect of axial load on the propagation of bending waves in slender beams. Theory is presented and compared to experimental results. Application of method to measurement of tensile load in wires by using results of this work.

4028 Goldsmith W and Cunningham D M
OBLIQUE IMPACT OF SPHERES UPON SIMPLY SUPPORTED STEEL BEAMS
Proceedings Society for Experimental Stress Analysis 1956, Vol. 14, No. 1.

4029 Alverson R C
IMPACT WITH FINITE ACCELERATION TIME ON ELASTIC AND ELASTIC-PLASTIC BEAMS
Journal of Applied Mechanics, Trans. ASME 1956, Vol. 78, pp. 411-415.

The purpose of the work described in this paper was to provide information on the elastic and plastic deformation of steel beams subjected to transverse impact. The particular impact problem treated was chosen to correspond to conditions in tests in which a beam initially at rest is struck by a massive hammer, so that a specified change of velocity is imposed at a certain cross section in a small time interval. In the present analysis the initial elastic and subsequent elastic-plastic motions were obtained by methods similar to those used by Bleich and Salvadori (3). As in (3), it is assumed that plastic deformation occurs only at a single stationary plastic hinge (in this case at the struck cross section). Results obtained are compared with those of a "rigid-plastic" solution of the same problem, in which plasticity conditions are correctly taken into account but elastic vibrations are not included.

4030 Dohrenwend C O, Drucker D C and Moore P
TRANSVERSE IMPACT TRANSIENTS
Proceedings Society for Experimental Stress Analysis 1943, Vol. 1, No. 2, pp. 1-10.

4031 Fischer E G
LATERAL VIBRATION AND STRESS IN A BEAM UNDER SHOCK MACHINE LOADING
Proceedings Society for Experimental Stress Analysis
1947, Vol. V, No. 1, pp. 78-89.

4032 Locklin/Mills
DYNAMIC RESPONSE OF THIN BEAMS TO AIR BLAST
Ballistic Research Laboratories, Report No. 787.

This paper presents a comparison of the theoretically predicted and observed elastic responses of thin simply supported beams and of cantilever beams to air-blast loading. The theoretical responses are predicted from the linear "small-deflection" beam theory and compared to motions observed with a high-speed motion picture camera. The agreement of observed deflections with predicted ones is adequate for the thicker beams where the deflections were small, but inadequate for the thinner beams where the deflections were large. (Authors' abstract)

4033 Harris J I
LARGE DEFLECTIONS OF NON-UNIFORM ELASTIC BEAMS SUBJECTED TO TRANSIENT LOADS
Ballistic Research Laboratories, APG, Memo Report No. 1105, October 1957.

This report presents a method of solving the non-linear equation for large flexing motions of thin beams subjected to transient loads. The small deflection linearized equation is solved by successive approximation, and this solution is extended to large deflections by a perturbation scheme. The solution shows that the apparent dynamic load on any normal mode is not equal to the applied load. Because no experimental results on non-uniform beams are available, large deflections for a uniform cantilevered beam are predicted from the general solution and compared with experimental results. Agreement between experimental results and the general solution is better than that between experiment and the predictions from the solution of the linearized equations. (Author's abstract)

4034 Baker W E and Allen F J
THE DAMPING OF TRANSVERSE VIBRATIONS OF THIN BEAMS IN AIR
Ballistic Research Laboratories, APG, BRL Report No. 1033
October 1957.

A non-linear partial differential equation describing the free transverse vibration of thin beams in air is formulated. The equation accounts for two types of force on the beam caused by its motion through the air and for the force caused by internal friction of the beam material, in addition to the usual elastic and inertia forces. An approximate solution to the equation is obtained by a perturbation method.