A series of experiments were conducted at large initial vibration amplitude to corroborate the theory, which predicts that "pressure drag" air damping is proportional to amplitude and that "viscous drag" air damping and internal damping are independent of amplitude. The dependence of pressure drag damping on air pressure is also predicted. The experimental results show reasonable agreement with the theory; however, the importance of viscous air drag damping relative to that of internal friction cannot be determined. (Authors' abstract)

4035 Allen F J
AN ELASTIC-PLASTIC THEORY OF THE RESPONSE OF CANTILEVERS TO AIR BLAST LOADING
Ballistic Research Laboratories, Memorandum Report No. 886.

An elastic-plastic theory of the response of cantilevers loaded by air blast waves is proposed and the predictions obtained from it are compared to experimental results. The theory is capable of providing estimates for the types of beams considered; it is expected to furnish more precise estimates for certain other beams of practical interest.

A method is developed by means of which a high speed digital computing machine can rapidly and accurately predict dynamic elastic strains, moments, and deflections in certain structures. (Author's abstract)

4036 Allen F J and Rally F
A PLASTIC-RIGID THEORY OF THE RESPONSE OF BEAMS TO AIR BLAST LOADING
Ballistic Research Laboratories, Memorandum Report No. 811.

This report presents a "plastic-rigid" theory of cantilever and simply-supported beams subjected to air blast loading. The equations of motion are derived and the theoretical deformations found. Theoretically predicted permanent deformations are compared to experimentally determined permanent deformations of thin rectangular cross-section metal beams subjected to air blast load. The theory predicts correctly the occurrence of localized regions of plastic deformation, but does not accurately predict the amount of this deformation. However, the results suggest a modification of the theory which is expected to be in better agreement with experiment. Authors' abstract)

4037 Plass H J
SOME SOLUTIONS OF THE TIMOSHENKO BEAM EQUATION FOR SHORT PULSE-TYPE LOADING
Journal of Applied Mechanics, Trans. ASME
1958 Vol. 80, pp. 379-385.

A collection of solutions to the Timoshenko beam equation is presented. Various types of support conditions and impact conditions are included. In every case the impact is assumed to be a pulse in the form of a half-sine wave. The results were found numerically, using the method of characteristics, except for one case, which was done in addition by the Laplace transform method, for check purposes. Agreement with experiment is good except for a pulse of duration comparable to the time required for the bending-type wave to travel a distance of one diameter. Discussion is included of the differences among the various cases studied. (Author's abstract)

4038 Abramson H N
FLEXURAL WAVES IN ELASTIC BEAMS OF CIRCULAR CROSS SECTION
Journal of the Acoustical Society of America
1957, Vol. 29, pp. 42-46.

The exact equations of elasticity are employed in an investigation of the flexural vibrations of a solid circular cylinder. Contrary to previous work, it is shown that the phase-velocity-wavelength relation has an infinity of branches, thus overcoming objections, on physical grounds, which have been made to the earlier work. The three lowest branches of this dispersion relation are calculated, and these are used to study the rate of energy transmission in terms of group velocity. (Author's abstract)