

TRANSIENT DYNAMIC AND INELASTIC ANALYSIS OF SHELLS OF REVOLUTION: A SURVEY OF PROGRAMS

V. SVALBONAS

*Engineering Department,
The Franklin Institute Research Laboratories, Philadelphia, Pennsylvania 19103, U.S.A.*

SUMMARY

Advances in the limits of structural use in the aerospace and nuclear power industries over the past years have increased the requirements upon the applicable analytical computer programs to include accurate capabilities for inelastic and transient dynamic analyses. In many minds, however, this advanced capability is unequivocally linked with the large scale, general purpose, finite element programs. This idea is also combined with the view that, therefore, such analyses are prohibitively expensive and should be relegated to the "last resort" classification. While this, in the general sense, may indeed be the case, if, however, the user needs only to analyze structures falling into limited categories, he may find that a variety of smaller special purpose programs are available, which do not put an undue strain upon his resources. One such structural category is shells of revolution.

This survey of programs will concentrate upon the analytical tools which have been developed predominantly for shells of revolution. The survey will be subdivided into three parts: (a) consideration of programs for transient dynamic analysis, (b) consideration of programs for inelastic analysis, and finally, (c) consideration of programs capable of dynamic plasticity analysis. In each part, programs based upon finite difference, finite element, and numerical integration methods will be considered. The programs will be compared on the basis of analytical capabilities, and ease of idealization and use. In each part of the survey sample problems will be utilized to exemplify the state-of-the-art.

