The Contract began on Oct. 1, 1974 and ended on June 30, 1977. The research was directed by Professor Hans Bleich as Chief Investigator.

The Contract and three previous ones, NONR 266(08), NONR 266(86) and N00014-67-A-0108-0029 are principally concerned with dynamic interaction problems between solids and fluids, with emphasis on explosion, impact or acoustic situations of interest to the U.S. Navy. As a secondary subject, static and transient dynamic problems such as shock propagation in inelastic solids have been studied. The results of the investigations are described and recorded in the technical reports listed in the Appendix.

Because of the continuity of the subject, the Appendix lists reports issued under old Contracts listed above consecutively numbered. Reports one to 48 inclusive were issued under the earlier Contracts, Reports 49 to 52 inclusive were issued under this Contract.

It is noted that research on related subjects is being continued by the Chief INVESTIGATOR UNDER Contract N00014-72-C-0119 with the Office of Naval Research.

One significant result obtained under the latest contract is contained in the reports issued under Contract N00014-72-C-0119. The analysis concerns extension of earlier approaches to determine the interaction of a plane shock front with an infinitely long cylindrical shell. The new approach is intended for finite shells with stiffeners and bulk heads.

A second significant result concerns plastic buckling of plates. Unexplained discrepancies of long standing in applying incremental theory of plasticity to plate buckling problems have now been explained, Rpt. No. 50. It appears that in tests on plate buckling frictional effects near the heads of the testing machines occur and can not be avoided. The additional stresses in the plate reduce its carrying capacity appreciably.
Technical Reports Under Project NR-64-428


H. H. Bleich and R. Shaw, Technical Report No. 20, Dominance of Shear Stresses in Early Stages of Impulsive Motion of Beams, October 1957.


D. Ranlet, H. Bleich, F. DiMaggio and M. Baron
"Transient Response of Submerged Shells of Finite Length to
Full Envelopment Type Shock Waves--Part IV: Comparison of
Predicted and Measured Results for Side-On Loading of a
Shell Containing Internal Structures-Configuration 1", ONR

D. Ranlet, F. DiMaggio, H. Bleich and M. Baron, "An Improvement
in the Use of the Doubly Asymtotic Approximation in Predicting
the Transient Response of Submerged Shells of Finite Length
to Full-Envelopment Shock Waves", ONR Contract N00014-72-C-0119,
TR No. 18, Feb. 1975.

S. Shrivastava and H. Bleich
"Inelastic Buckling of Plates Allowing for Shear Effects",
ONR Contract N00014-75-C-0695, TR No. 49, Aug. 1975.

D. Ranlet, H. Bleich, F. DiMaggio and M. Baron,
"Transient Response of Submerged Shells of Finite Length to
Full Envelopment Type Shock Waves--Part V: Comparison of
Predicted and Measured Results for Side-on Loading on a Shell
Containing Internal Structures-Configuration 3", ONR Contract
N00014-72-C-0119, TR No. 19, Aug. 1975.

A. Gjelsvik and G.-S. Lin, "Report No. 50, Plastic Buckling
of Plates with Edge Frictional Shear Effects" ONR Contract
N00014-75-C-0695, July 1976.

H. Bleich, Report No. 51, "Strain Energy Expressions of Rings
of Rectangular, T- and I- Section, Suitable for the Dynamic
Analysis of Ring-Stiffened Cylindrical Shells." ONR Contract
N00014-75-C-0695, Oct. 1976.

G. Nikolakopoulou and F.L. DiMaggio, Report No. 52, Dynamic Elastic-
Plastic Response of Fluid-Filled Containment Vessels,
forthcoming.
Final Report on Contract N00014-75-C-0695.

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List of Technical Reports issued in this and preceding contracts.

Interaction of plane shock wave with stiffened shells of finite length.

Explanation of discrepancies, up to now unexplained, in the theory of plastic buckling of plates.