inverse approach which could yield information on pulse shapes and some of the dynamic properties of the material. The relationships among these quantities have been determined graphically. (Authors' abstract)

1158 Davids N and Kumar S
THE BASIC THEORY OF SCABBING IN MATERIALS WITH TWO SOLIDS IN CONTACT, PART I, ELASTIC THEORY
Interim Technical Report No. 1, OOR Project TB2-0001 (1253), Pennsylvania State University.

Basic relationships for scab formation in a solid are developed from the point of view of elastic materials. Relationships giving the thickness of scabs are obtained for semi-infinite plates and thin rods on the basis of normally-incident pressure pulses of arbitrary form. The effect of a backing medium has been expressed in terms of impedance matching relations between the two media, and these used to determine quantitatively the reduction in stress. Criteria for required thicknesses are developed on the basis of momentum considerations. A preliminary treatment is included for spherically-diverging waves arising from a point explosion in a semi-infinite medium. Some available data are made use of in a discussion for the purpose of evaluating time constants of typical pressure pulses used in the report. (Authors' abstract)

1159 Davids N
STRESS WAVES OF PENETRATION IN PLATES
Interim Technical Report No. 12, OOR Project No. TB2-0001 (1253) Pennsylvania State University.

Scabbing effects in plates may be analyzed theoretically by assuming elastic stress-waves excited periodically at a point-source on its boundary. The usual classical results are inaccurate since, first, the damaging wave is the one penetrating through the plate rather than propagating along it, and second, the dimensions of the plate in practical applications are just of the order of a wavelength. A more precise boundary-value problem is worked out and resulting axial stress-wave distributions for aluminum plates are given. (Author's abstract)

1160 Kumar S
SCABBING IN BARS AND PLATES - FURTHER STUDIES
Interim Technical Report No. 13, OOR Project TB2-0001(1253) Pennsylvania State University.

Scabbing, a fracture phenomenon in materials, due to stress reversal of strong dynamic loads, is first discussed here from a phenomenological point of view. Then an elastic analysis for determining scab lengths both in bars and plates under plane stress and plane strain is presented. As a further refinement, after explaining briefly and applying the basic theory of

elastoplastic wave propagation in solids, a study is made of scabbing possibilities in bars by semi-graphical methods, and also the basis for the elasto-plastic analysis of scabbing in plates. Implications of both the elastic and elastoplastic analyses are compared. Idealized stress-strain relations for 14ST-4 Aluminum, obtained in our laboratory, have been used. (Author's abstract)

1161 Duvall G E
PRESSURE-VOLUME RELATIONS IN SOLIDS
American Journal of Physics
1958, Vol. 26, pp. 235-238.

An equation of state of the form $P(V) = f(V) + Tg(V)$, which is useful for condensed matter, is proposed for the illustration of thermodynamic principles. Pressure-volume relations for adiabatic and shock compressions are derived with the assumption that specific heat at constant volume is independent of temperature. These derived relations are illustrated for a "Murnaghan" equation of state, and constants of this equation for several metals are tabulated. (Author's abstract)

1162 Duvall G E and Zwolinski B J
ENTROPIC EQUATIONS OF STATE AND THEIR APPLICATION TO SHOCK WAVE PHENOMENON IN SOLIDS
Journal of the Acoustical Society of America
1955, Vol. 27, pp. 1054-1058.

1163 Drummond W E
COMMENTS ON THE CUTTING OF METAL PLATES WITH HIGH EXPLOSIVE CHARGES
Journal of Applied Mechanics, Trans. ASME,
1958, Vol. 80, pp. 184-188.

1164 Kumar S
SCABBING AND PULSE PROPAGATION IN MATERIALS
The Pennsylvania State University Interim Technical Report No. 14
OOR Research Project No. TB2-0001 (1253).

1165 Davids N and Kumar S
STRESS WAVES AND SCABBING IN MATERIALS
OOR Technical Memorandum 58-1, May 1958
(73 references).

1166 Katz S, Curran D R and Doran D G
HUGONIOT EQUATION OF STATE OF ALUMINUM AND STEEL FROM OBLIQUE SHOCK MEASUREMENT
Stanford Research Institute, Poulter Laboratories, Lab. Technical Report 018-57, December 1957.