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OFFICE OF NAVAL RESEARCH PROGRAM HIGHLIGHTS
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NEW TEST METHODS PROVIDE FRACTURE-SAFE DESIGN DATA FOR HEAVY SECTION, ULTRAHIGH STRENGTH STEEL STRUCTURES

The NRL developed test methods and fracture analysis diagram concept provides the necessary tools and procedures to insure fracture-safe design with the low hardness, low strength structural steels. However, similar information has not been applicable nor available for the ultrahigh strength materials in heavy sections because of their propensity to develop low-energy-tear failures via fracture modes not encountered with the low strength structural steels.

New test methods, an explosion tear test and a drop weight tear test, were developed at NRL early in 1962 for such materials in thicknesses up to 4 inches. Since then the methods have been used to develop extensive research data on the fracture performance of a wide variety of high strength quenched and tempered steels, maraging steels, and titanium and aluminum alloys. Correlation of the results obtained with both of these new test methods have shown that these new test tools can be used to establish criteria for selection, specification and quality control of the ultrahigh strength materials required for new, advanced designs. Such criteria have already been developed and, with the concurrence of BuShips, have been used to reject unsuitable material for the TRIDENT deep submergence vehicle.

The information developed in these studies is basic to all structural use of high strength materials. While the results represent a big advance many problems remain to be solved notably in the welding of these materials. NRL is continuing its work on these problems. (U)

THE NRL SOLAR RADIATION MONITORING SATELLITE 1964-01D

The NRL Solar Radiation Monitoring Satellite designated 1964-01D is now in orbit. This Satellite observatory is instrumented with five x-ray photometers and is presently making measurements of solar x-ray flux in the bands 2-8, 8-14, 8-16, 44-55 and 44-60 Angstroms. A sixth photometer is included in the instrumentation to make measurements in the 1225-1350 Angstrom band. The satellite is spin-stabilized and was injected into orbit with a spin rate of 1.55 rps with its spin axis perpendicular to the direction of the sun. Precession of the spin axis since launch has been at the rate of 1.75 degrees per day. Two optical sensors are included to measure the aspect angle. The pulse width system is normally used for aspect angles less than 25 degrees and the pulse amplitude system may be substituted by ground command for measurement of angles greater than 25 degrees. The measurement of aspect angle is required to correct or normalize the photometer signals.

Preliminary results indicate that the solar minimum x-ray fluxes are about 1.8×10^{-2} erg cm^{-2} sec^{-1} in the 44-60 Angstrom band for an assumed Planckian distribution of 0.5×10^6 °K. The flux in the 8-14 Angstrom band is presently 1.6×10^{-3} erg cm^{-2} sec^{-1} and in the 2-8 Angstrom band it lies below minimum detectable flux which is 1.4×10^{-4} erg cm^{-2} sec^{-1}.

HANDLE VIA ~~TALENT KEYHOLE~~ CONTROL SYSTEMS JOINTLY

Members of the scientific community are invited to utilize the solar x-ray observatory in their own research programs. A complete description of the satellite instrumentation with required calibration curves [illegible] from Code 7125.0, U. S. Naval Research Laboratory, Washington, D. C. 20390. (U)

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