

THERMAL RADIATION TRANSMISSION THROUGH COMPOSITE MATERIAL

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On 10 June 1993, the Defense Nuclear Agency (DNA) Field Command at White Sands Missile Range conducted a Thermal Radiation Simulator (TRS) test for the Naval Surface Warfare Center (NSWC) during project MINOR UNCLE. The NSWC was interested in measuring the thermal radiation energy absorbed by a fiberglass panel during a nuclear weapon event. The resultant thermocouple data showed an unusual initial high temperature rise and fall, followed by the expected conductive heating. The initial transient was theorized to be thermal radiation transmission through the panels, collecting on the thermocouple. To investigate this theory, NSWC prepared several more panels of different thicknesses, preinstrumented with thermocouples and strain gauges, to be tested with the ARL TRS. ARL also provided additional instrumentation to measure the thermal radiation on the front surface as well as behind the panel. The results showed that there was direct heating of the gauges by thermal radiation heating. The amount of heat transmitted through the panel was measured. This determined the level of heating for components behind the panel, the point of ignition of the front surface, and degree of protection offered by smoke obstruction.