INSTRUMENTED MECHANICAL IMPACT TEST CAPABILITY

SUMMARY

The instrumented mechanical impact test (IMIT) facility is located in the White Sands Test Facility (WSTF) high-pressure test area. Test Cell 105 is solely dedicated to numerous types of mechanical impact testing. It contains a DYNATUP® Model GRC 8250 drop weight impact test machine and associated Model GRC 830-I data acquisition system. The IMIT is set up for local and remote operation, and pressurized testing is conducted inside a specially designed blast enclosure to contain blast wave and test article fragmentation in the event of a burst-upon-impact event. Test articles range in size from 4- by 4-in. material test plaques to full-size pressure vessel type test articles (for example, 13-in. diameter by 25-in. long cylinders or 24-in. diameter spheres). The IMIT has recently been configured to conduct ambient and pressurized LOX and GOX material screening.

FACILITY

The IMIT facility is housed in a cement block test cell. The test articles are supported in a blastproof, steel enclosure. The IMIT can test a variety of materials and components over a wide range of impact velocities, impactor geometries, and test media. Test articles can be impacted in either pressurized or ambient (unpressurized) conditions. Test article orientation can be adjusted to apply impacts at almost any location or angle. Impact energies can range from low-energy rebound to high-energy penetration. Test samples can be tested in LOX or GOX, either at high pressure or at ambient pressure. Full-size test articles are typically tested at ambient temperature conditions. The data acquisition system uses 640 K of memory and has the capability to acquire, analyze, plot, and store the complete record of an instrumented impact event.

TEST CAPABILITY

Impact energy ranges are available from 0.5 to 223 ft-lb. Impact velocity correspondingly can vary from 2.0 to 12.7 ft/s. Test variables typically documented are:

- Redundant high response pressure and temperature data channels
- Impact velocity (ft/s) and impact energy (ft-lb)
- Maximum load (lb) and total energy (ft-lb)
- Time and energy to maximum load (ms)
- Load and energy plots (overlaid on same time scale)
- High-speed cinefilm and standard videotape

TEST LIMITATIONS

Different sizes of test articles and test media are to be determined on a case-by-case basis.

CONTACT

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