# Lesson Info

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|---|---|
| **Lesson Number** | 342 |
| **Lesson Date** | 1994-08-09 |
| **Submitting Organization** | MSFC |

## Similiar Lessons

| | |
|---|---|
| Orbiter Compartment Overpressurization | 1992-08-21 |
| Displacement Leak Detector | 1992-08-05 |
| End-to-End Testing | 2000-03-25 |
| Space Shuttle Program/Orbiter/Crew Escape System | 2001-02-01 |
| ACTS Pyro Separation Band Anomaly (Shuttle Orbiter) | 1994-03-24 |
| Postlanding Orbiter Compartment Vapor Sampling | 1992-10-05 |
| Pyrotechnic Shock Testing | 1999-02-01 |
| Payload Bay Duct Heater Overtemp | 1992-08-20 |
| LO2/LH2 Vent and Relief Position Indicator Switch | 1992-10-28 |
| Lifting Portable Purge Units | 1992-05-08 |

# Subject

*Critical Hardware Functional Verification*

# Abstract

None

# Driving Event

On the STS 51/TOS mission, during payload deployment, commands intended to initiate only the primary SUPER*ZIP explosive cord actually resulted in the simultaneous firing of both the primary explosive cord and back-up explosive cord. This simultaneous explosive cord firing resulted in the rupture of a SUPER*ZIP containment tube and the release of contaminants and high energy debris into the orbiter cargo bay.

# Lesson(s) Learned

All payload systems having catastrophic hazard potential for orbiter/crew as a result of operations in or near the orbiter must use hardware and procedures that have been submitted to a rigorous verification program to verify that the functionality of the system fulfills the safety and design requirements objectives.

# Recommendation(s)

Perform an end to end systems engineering evaluation utilizing end to end functional testing or simulated testing to verify that the functional design is compatible with the requirements at all interfaces and to assure proper system performance and prevent loss or misapplication of safety critical functions.

# Evidence of Recurrence Control Effectiveness

With the end to end testing of the functionality of a system, there is a higher probability of assurance that this type anomaly will be detected and resolved prior to flight.

# Program Relation

N/A

# Program/Project Phase

*No project/program listed*

# Mission Directorate(s)

*None specified*

# Topic(s)

*No topic(s) listed*