

SRB CRITICAL ITEMS LIST

SUBSYSTEM: STRUCTURES & MISCELLANEOUS ITEMS

ITEM NAME: SRB/ET Forward Attach Components

PART NO.: 10179-0006, 0007, 0013, 0055, 0056 FM CODE: A01

ITEM CODE: 60-02-13 REVISION: Basic

CRITICALITY CATEGORY: 1 REACTION TIME: Immediate

NO. REQUIRED: 5 DATE: March 1, 2002

CRITICAL PHASES: Boost, Separation SUPERCEDES: March 1, 2001

FMEA PAGE NO. E-21 ANALYST: Reynolds/S. Parvathaneni

CN 044

SHEET 1 OF 3 APPROVED: S. Parvathaneni

FAILURE MODE AND CAUSES: Structural failure of components caused by:

- O Aerodynamic loads combined with Improper Fabrication, Improper Material, Improper heat treatment, Improper installation, or unusual environment.

FAILURE EFFECT SUMMARY: Loss of mission, vehicle and crew due to debris impacting the Orbiter/ET.

RATIONALE FOR RETENTION:

A. DESIGN

- O The SRB/ET forward attach components were designed to provide aerodynamic protection to the forward crossover cables. The components are formed from 2219 aluminum using welded seams. Standard aerospace fasteners secure the components to the primary structure.
- O The materials used in the design were selected in accordance with 10PLN-0150 (Materials Control and Verification Program Management Plan for SS SRB Program) and MSFC-SPEC-522 (Design Criteria for Controlling Stress Corrosion Cracking). CN 044
- O The design allowables are in compliance with MIL-HDBK-5 (Metallic Materials and Elements for Aerospace Vehicle Structures) and MSFC-HDBK-505 (Structural Strength Program Requirements).
- O The fasteners are installed in accordance with MSFC-STD-486 (Threaded Fasteners, Torque Limits for).
- O The welding is in compliance with MSFC-SPEC-504A (Specification: Welding, Aluminum Alloys). Class II welds receive visual and dye penetrant inspection.

Weld wire controls are in compliance with MSFC-SPEC-655 (Standard Weld Filler, Control Of).

- O The heat treat operations are in compliance with MIL-H-6088 (Heat Treatment of Aluminum Alloys).
- O The crossover components are qualified by analysis as documented in Certificate of Qualification A-STR-7121.
- O Analysis shows that a yield factor of safety of +1.77 exists between the design of the ET forward attach components and the predicted maximum loading during ascent. (Ref. BPC-ANAL-003-87).

B. TESTING

- O No other testing required during each flow applicable to this failure mode.

C. INSPECTION

VENDOR RELATED INSPECTION

- O USA SRBE SIP 1453 controls the USA SRBE QAR inspection criteria at the vendor's facility. (Improper Fabrication)
- O Materials are accepted on the basis of supplier certifications. Certifications are verified by USA SRBE QAR per SIP 1453. (Improper Material)
- O All welding is verified by USA SRBE QAR in compliance with SIP 1453. (Improper Fabrication)

Critical Processes/Inspections:

- o Welding was performed per MSFC-SPEC-504. (Improper Fabrication)
- o Heat treat operations are performed per MIL-H-6088. (Improper Heat Treatment)
- o Dye Penetrant inspection per MSFC-SPEC-504

ASSEMBLY/CHECKOUT RELATED INSPECTIONS

- O After each flight visual inspection is performed by USA SRBE QA. Any physical damage, leaks, corrosion, saltwater intrusion, stains, raised metal, cuts, dents, gouges, cracks, damaged threads, and rounding of nut corners, or unusual conditions are recorded, photographed, documented, and repaired as required. The inspection criteria is contained in 10SPC-0131 (Refurbishment Engineering Specification for Space Shuttle Solid Rocket Booster Assembly Project). (Unusual Environments)

PRELAUNCH CHECKOUT RELATED INSPECTION

- O Final installation of the forward attach components includes verification of proper torque per OMRSD File V, Vol. 1, requirement number B08GEN.010. (Improper Installation)
- O Visual Inspection in accordance with OMRSD File V, Vol I requirement number B08ST0.010 (Improper Installation)
- D. FAILURE HISTORY
 - O Failure Histories may be obtained from the PRACA database.
- E. OPERATIONAL USE
 - o Not applicable to this failure mode.