

**CRITICAL ITEMS LIST (CIL)**

<b>SYSTEM:</b>	Propulsion/Mechanical	<b>FUNCTIONAL CRIT:</b>	1
<b>SUBSYSTEM:</b>	LO2 Propellant Feed	<b>PHASE(S):</b>	a, b, c
<b>REV &amp; DATE:</b>	J, 12-19-97	<b>HAZARD REF:</b>	P.03, P.06, S.11
<b>DCN &amp; DATE:</b>			
<b>ANALYSTS:</b>	J. Atter/H. Claybrook		

**FAILURE MODE:** Fails to Provide Pivotal Support

**FAILURE EFFECT:**

- a) Loss of mission and vehicle/crew due to fire/explosion.
- b) Loss of mission and vehicle/crew due to fire/explosion.  
Loss of mission and vehicle/crew due to premature engine shutdown.
- c) Loss of life due to ET impact outside designated footprint.  
Loss of mission and vehicle/crew due to ET/ORB collision.

**TIME TO EFFECT:** Seconds

**FAILURE CAUSE(S):**

- A: Structural Failure of Strut Assy Component
- B: Bearing Seizure
- C: Fracture of One Attachment Bolt
- D: Structural Failure of Attaching Bracket

**REDUNDANCY SCREENS:** Not Applicable

**FUNCTIONAL DESCRIPTION:** Connects the fwd flange of the fwd elbow to the intertank wall and it restricts lateral motion while allowing motion in the vertical plane of the F/L travel by a pivoting action.

<u>FMEA ITEM CODE(S)</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY</u>	<u>EFFECTIVITY</u>
2.1.19.1	80921111902-020	Strut Assy (Intertank)	1	LWT-54 & Up

**REMARKS:**

CRITICAL ITEMS LIST (CIL)  
CONTINUATION SHEET

SYSTEM: Propulsion/Mechanical  
SUBSYSTEM: LO2 Propellant Feed  
FMEA ITEM CODE(S): 2.1.19.1

REV & DATE: J, 12-19-97  
DCN & DATE:

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RATIONALE FOR RETENTION

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DESIGN:

- A-D: The strut assembly consists of a tube section, two rod end fittings and spherical bearings. The strut is installed from the flange on the forward elbow feedline assembly to a bracket mounted to the Intertank wall and restricts lateral motion while allowing motion in the plane of feedline movement (by a pivoting action). The strut is fabricated from 6061-T6 aluminum tube stock and 6061-T651 aluminum bar rod stock. The attaching bracket is fabricated from 7075-T7351 aluminum plate stock. The total strut assembly has been designed to meet the required ultimate safety factor of 1.4 (ET Stress Report 826-2188). Material selected in accordance with MMC-ET-SE16 and controlled per MMA Approved Vendor Product Assurance Plan assures conformance of composition, material compatibility and properties.
- B: Vitrolube is applied to prevent seizure of the ball and race.
- C: Attachment fasteners were selected from the Approved Standard Parts List (ASPL 826-3500), installed per STP2014 and torqued using valves specified on engineering drawings.

TEST:

The Strut Assy (Intertank) is certified. Reference HCS MMC-ET-TM08-L-P006.

Qualification - Support Strut End Bearings: Testing included radial static limit load (3000 lbs) and radial ultimate load (4500 lbs). Axial static limit load (300 lbs) and axial static ultimate load (450 lbs) were also performed. The bearing met all structural requirements (MMC-ET-RA09-107).

Structural: Testing of a flight strut assembly included a compression test and three tension tests (yield, ultimate and functional capability). There was no evidence of structural failure (MMC-ET-3514-80-008).

MPTA Firings/Tankings: An identical strut has been used throughout the test program without disassembly and has been exposed to 62.5 minutes of firing time. There was no evidence of structural damage or permanent deformation.

INSPECTION:

Vendor Inspection - Lockheed Martin Surveillance:

- A-D: Verify materials selection and verification controls (MMC-ET-SE16, standard drawing 36L11; standard drawings 26L2 and 26L4 for LWT-54; standard drawing 26L2 for LWT-55 & Up; and drawings 80921111902, 80913000402).
- B: Inspect dimensions (Standard drawing 36L11).
- B: Witness lubrication (Standard drawing 36L11).

MAF Quality Inspection:

- B: Inspect for bearing freedom of movement prior to and during installation (drawing 80923011900).
- C: Verify installation and witness torque (drawings 80923011900 and 80921011009).

FAILURE HISTORY:

Current data on test failures, unexplained anomalies and other failures experienced during ground processing activity can be found in the PRACA data base.