NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
		104FM28U		
LEG FABRIC ATTACHMENT RING ITEM 104 (1) LEFT (1) RIGHT ---------- 10155-03 (2)	2/1RB	Loss of primary and secondary bracket retention screws. Defective material; screw, helicoil or thread lock adhesive.	END ITEM: One of two screws missing on one side of brackets. GFE INTERFACE: Load is transferred to second screw. MISSION: None for single failure. CREW/VEHICLE: None with single failure. Loss of crewman with loss of second screw causing loss of primary and secondary restraint brackets. TIME TO EFFECT /ACTIONS: Minutes. TIME AVAILABLE: Days. TIME REQUIRED: Hours. REDUNDANCY SCREENS: A-PASS B-FAIL C-PASS	A. Design - The primary and secondary axial restraint brackets are installed with a single set of four screws fabricated from A-286 stainless steeland are procured to MS or NAS specifications. Loss of the brackets screws is precluded in design by adherence to standard engineering torque requirements for screw installation and the use of thread lock adhesive. Design requirements for proper installation of helicoils are specified in the assembly procedures when the helicoils are installed in the fabric attachment ring. With one of the four screws missing, testing has demonstrated tha the bracket system exhibits a minimum ultimate strength of 2717 lbs. At 4.4 psid (normal operating pressure), this load results in aminimum ultimate safety factor of 4.7 against a S/AD load of 574 lbs. At 5.5 psid (max failure pressure) and 8.8 psid (max BTA operating pressure) the minimum ultimate safety factors are 7.3 and 9.5 respectively. The S/AD minimum ultimate safety factor requirement for hardware is 2.0 at 4.4 psid, 1.5 at both 5.5 psid and 8.8 psid. B. Test - Acceptance - See inspection. PDA Test - The following test is conducted at the brief level in accordance with ILC Document 0111-710112: 1. Proof pressure test at 8.0 + 0.2 - 0.0 psig for a minimum of 5 minutes conducted with the TMG removed. Certification - The Fabric Attachment Ring primary and secondary brackets were successfully tested (manned) during SSA certification to duplicate 458 hours operational life (Ref. ILC Report 0111-711330). The following usage, reflecting requirements of significance to the primary and secondary brackets, was documented during certification: Requirement S/AD Actual ---------- ---- ------ Knee Cycles 9078 20000 Don/Doff 98 400 Pressure Hours 458 916 Walking Steps 4320 77760 The Fabric Attachment Ring primary and secondary axial restraint brackets were successfully subjected to an ultimate pressure of 13.2 psig during SSA certification (Ref. ILC Document 0111-711330). This is 1.5 times maximum BTA operating pressure based on 8.8 psi. The baseline LTA has passed shock, vibration and acceleration testing without loss of screw torque (Ref. Hamilton Standard Test Reports, TER 3067, 3048, 3043 and 3076). The enhanced LTA is certified by similarity to the baseline LTA assembly. C. Inspection - Components and material manufactured to ILC requirements at an approved supplier

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are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the hardware received is as identified in the procurement documents, that no damage has occurred during shipment and the supplier certifications have been received which provide traceability information.

The brackets which are machined from bar stock are magnetic particle inspected to detect the presence of flaws.

The following MIPs are performed during the brief assembly manufacturing process to assure that the failure casues are precluded from the fabricated item:
1. Verification of loctite application.
2. Helicoil installation is verified during source inspection at the supplier.
3. Verification of minimum engagement of 4 1/2 screw threads during screw threaded engagement procedures prior to torquing and thread locking assembly operation of the primary restraint bracket.
4. Brackets are visually inspected upon completion of the primary restraint webbing pull test for signs of defective materials.

During PDA, the following inspection points are performed at the Brief level in accordance with ILC Document 0111-710112:
1. Visual inspection for structural damage to the primary bracket after proof pressure test.
2. Inspect for cleanliness to VC level, damage, wear and material degradation.

D. Failure History -
None.

E. Ground Turnaround -
None, for every component within its limited life requirement.

Every 4 years chronological time or 229 hours of manned pressurized time, during sizing ring maintenance the primary and secondary restraint brackets are removed and reinstalled during which time loctite application and screw torque are verified.

F. Operational Use -
Crew Response -
PreEVA: No response, single failure undetectable by crew. Continue EVA prep.
EVA: No response, single failure undetectable by crew. Continue EVA.

Training -
No training specifically covers this failure mode.

Operational Considerations -
Not applicable.

EXTRAVEHICULAR MOBILITY UNIT

SYSTEMS SAFETY REVIEW PANEL REVIEW

FOR THE

I-104 LOWER TORSO ASSEMBLY (LTA)

CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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