

CRITICAL ITEMS LIST

ASSY NOMENCLATURE: EVA WINCH

SYSTEM: 4.1, 4.2 AND 4.3

ASSY P/N: SED 33101570

SUBSYSTEM: 5.3

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FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRITY	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
3A		EVA WINCH, (2) SED 33101570	2/1R	<p>Mode: Hook breaks</p> <p>Cause: • Material failure</p> <p>1. Unable to cradle RMS which prevents closing payload bay doors (mission phase EVA, RMS).</p> <p>2. Unable to close payload bay doors (mission phase EVA, doors).</p> <p>Redundancy</p> <p>1. RMS jettison system.</p> <p>2. Second EVA winch.</p>	<p>1. Unable to cradle RMS which prevents closing payload bay doors (mission phase EVA, RMS).</p> <p>2. Unable to close payload bay doors (mission phase EVA, doors).</p>	<p>1. Design Features to Minimize Failure Mode</p> <p>a. Safety factor of 1.4.</p> <p>b. Safety margin of 1.</p> <p>c. Working load of 584 lbs.</p> <p>2. Test or Analysis to Detect Failure Mode:</p> <p><u>Acceptance</u></p> <p>Functional Test -- Complete functional testing to assure that the controls operate smoothly and that the rope can be extended and retracted.</p> <p><u>Certification</u></p> <p>a. Qualification test consists of: working load test with 200 lb. and 600 lb. static loads, verification of smooth operation with static loads applied, verification that a max force (during one-hand operation) of approximately 50 lbs. is exerted during ratcheting with the crank grip in the 90° position</p> <p>b. Stress analysis to certify this tool for 584 lb. working load with 1.4 safety factor</p> <p>c. Thermal qualification testing to certify this tool for a temperature environment of -200-F to +150-F for 100 hour.</p> <p><u>interface</u></p> <p>a. Insert 1.25 diameter tube in hook, verify restrained by hook latch.</p> <p>b. Insert 1.12 diameter tube in hook, verify restrained by hook latch</p> <p><u>Turnaround</u></p> <p>a. Complete functional testing will be performed once a year, or after each mission use to assure that the controls operate smoothly and that the rope can be extended and retracted</p> <p>b. Replace Kevlar rope after each mission use.</p> <p>c. Inspect Kevlar rope for fraying or other damage once a year</p>

INITIATED BY: R. J. HARRIS

APPROVED BY: [Signature]

DATE: 11/11/85

CLASS: [Blank]

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FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRITY	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
3A		EVA WINCH, (2) SED 33101570 (Continued)	2/1R	<p>Mode: Hook breaks</p> <p>Cause: • Material failure</p>	<p>1. Unable to cradle RMS which prevents closing payload bay doors (mission phase EVA, RMS).</p> <p>2. Unable to close payload bay doors (mission phase EVA, doors).</p> <p>Redundancy -</p> <p>1. RMS jettison system.</p> <p>2. Second EVA winch.</p>	<p>1. Inspection</p> <p><u>Manufacturing (Completed)</u></p> <p>a. Verify the as-built configuration.</p> <p>b. NDE testing, such as x-ray</p> <p>c. Verify certificate of compliance for materials</p> <p><u>Turnaround</u></p> <p>a. Inspect for visible damage, surface contamination, and clean according to PS2B/PIA 05001</p> <p>b. Verify completion of functional test for reacceptance</p> <p>4. Failure History.</p> <p>IH0004 - A deterioration of the control handle positioning springs that correctly position the spool pawl. New springs and spring guides have been fabricated and installed on all winch assemblies, with the exception of S/B 1001, the qualification unit. All units fitted with the new spring guide assemblies were functionally tested by reeling out 5 feet of rope, retracting by automatic reel in and ratchet handle, and verify ratchet out feature. Reference IPS 28220018.</p> <p>5. Operational Use.</p> <p>a. <u>Operational Effect of failure</u>: Breakage of the hook would upset normal operations in that the winch rope could not be easily attached to the PLBD or the RMS rope reel</p> <p>b. <u>Crew Action</u>: Several simple and common sense crew actions are possible. The rope can be tied directly to the PLBD and rope reel. It could also be tied to a wrist tether or a payload retention device and then that piece of hardware can be attached to the PLBD or rope reel</p> <p>c. <u>Crew Training</u>: These crew actions will be incorporated into the EVA training flow</p> <p>d. <u>Mission constraints</u>: None identified</p> <p>e. <u>In flight Checkout</u>: The crew will visually inspect the hook prior to use</p>

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