

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 02-2A-011100 -X**

SUBSYSTEM NAME: FLIGHT CONTROL MECH - RUDDER SPEED BRAKE & BF
REVISION: 0 02/02/88

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
ASSY	: RUDDER/SPEEDBRAKE (R/SB) SUN	MC621-0053-0068 5004918B
SRU	: POWER DRIVE UNIT ASSEMBLY	

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
POWER DRIVE UNIT ASSEMBLY

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 1
ONE REQUIRED

FUNCTION:
THE POWER DRIVE UNIT TRANSLATES HYDRAULIC PRESSURE INTO A ROTARY MOTION TO POSITION THE LEFT AND RIGHT SURFACE PANELS AS COMMANDED.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 02-2A-011100- 03

REVISION#: 1 08/07/98

SUBSYSTEM NAME: FLIGHT CONTROL MECH - RUDDER SPEED BRAKE & BF

LRU:

CRITICALITY OF THIS

ITEM NAME: POWER DRIVE UNIT ASSEMBLY

FAILURE MODE: 1/1

FAILURE MODE:

EXTERNAL LEAKAGE/LINE RUPTURE, ONE SYSTEM

MISSION PHASE:

DO DE-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:

102	COLUMBIA
103	DISCOVERY
104	ATLANTIS
105	ENDEAVOUR

CAUSE:

MATERIAL DEFECT, IMPROPERLY SWAGED LINE

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN

- A) N/A
- B) N/A
- C) N/A

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF HYDRAULIC POWER TO ONE HYDRAULIC MOTOR/BRAKE ASSEMBLY. REMAINING TWO HYDRAULIC MOTOR RPM/TORQUE OUTPUTS BACKDRIVE INOPERATIVE HYDRAULIC MOTOR/BRAKE (UNTIL FAILED HYDRAULIC SYSTEM SUPPLY PRESSURE DECREASES SUFFICIENTLY TO ENABLE BRAKE FUNCTION). LOSS OF RUDDER OR SPEEDBRAKE FUNCTIONS.

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(B) INTERFACING SUBSYSTEM(S):
LOSS OF ONE HYDRAULIC SYSTEM.

(C) MISSION:
LOSS OF MISSION, CREW/VEHICLE.

(D) CREW, VEHICLE, AND ELEMENT(S):
SAME AS (C)

-DISPOSITION RATIONALE-

(A) DESIGN:
TUBING DESIGNED FOR BURST PRESSURE OF 4 TIMES OPERATING PRESS (12,000 PSI). THE DESIGN PROOF PRESSURE IS 2X OPERATING (6000 PSI). TUBE SWAGED TO FOUR BOLT ATTACHING FITTING WITH SEAL. THE TUBING MATERIAL IS 321 SS.

(B) TEST:
QUALIFICATION TESTS: THERMAL CYCLE (-40 DEG F TO +275 DEG F), FULL LIFE/LIMIT LOAD (400 MISSION DUTY CYCLES), RANDOM VIBRATION, ULTIMATE LOAD, 100,000 PRESSURE IMPULSE CYCLES (1.5 X OPERATING PRESSURE), PDU BURST 2.5 X OPERATING PRESSURE . HYDRAULIC LINES BURST TESTED TO 4 TIMES OPERATING PRESSURE.

ACCEPTANCE TESTS: PROOF PRESSURE AT 4,500 PSI, IMPULSE AND THERMAL CYCLING, DYNAMIC/STATIC LEAKAGE.

GROUND TURNAROUND TEST
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:
RECEIVING INSPECTION
RAW MATERIALS AND PROCESS CERTIFICATIONS VERIFIED.

CONTAMINATION CONTROL

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CONTAMINATION CONTROL PROCEDURES AND COMPLIANCE TO PROCEDURES VERIFIED. CLEANINESS OF INTERNALLY WETTED SURFACES TO LEVEL 190 VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

TUBE AND FITTING INSTALLATION PER DRAWING REQUIREMENTS IS VERIFIED. SSEMBLY AND INSTALLATION OPERATIONS VERIFIED BY SHOP TRAVELER MANDATORY INSPECTION POINTS. TORQUING IS PER DRAWING REQUIREMENTS VERIFIED BY INSPECTION AND RECORDED. BENDING OF HYDRAULIC LINES VERIFIED BY INSPECTION. TUBE BENDING TOOLING IS VERIFIED BY INSPECTION.

CRITICAL PROCESSES

SWAGING PROCESS IS VERIFIED BY INSPECTION.

TESTING ACCEPTANCE

TEST PROCEDURES VERIFIED ACCEPTABLE. END ITEM TEST DEMONSTRATED WITH SUNSTRAND, ROCKWELL, AND GOVERNMENT PERSONNEL IN ATTENDANCE.

(D) FAILURE HISTORY:

CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATA BASE.

(E) OPERATIONAL USE:

NONE.

- APPROVALS -

EDITORIALLY APPROVED : BNA : J. Kimura 8-18-98
TECHNICAL APPROVAL : VIA APPROVAL FORM : 95-CIL-009_02-2A