

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 02-2A-021110 -X**

SUBSYSTEM NAME: FLIGHT CONTROL MECH R/SB & BF
REVISION: 0 02/02/88

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
ASSY	: BODY FLAP ACTUATION	MC621-0056-0083
SRU	: HYDRAULIC BRAKE	

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
HYDRAULIC BRAKE

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 3
THREE

FUNCTION:

COUPLED TO ONE BODY FLAP HYDRAULIC MOTOR, THE BRAKE PREVENTS BACKDRIVING OF THE HYDRAULIC MOTOR IN THE EVENT THE MOTOR'S SUPPLY HYDRAULIC SYSTEM FAILS (I.E., PREVENTS TORQUE SPILL-OUT OF NOMINALLY OPERATING HYDRAULIC MOTOR(S) INTO INOPERATIVE HYDRAULIC MOTOR). DURING NORMAL FLIGHT CONTROL OPERATION, THE BRAKING SURFACE IS KEPT RELEASED BY THE SUPPLY HYDRAULIC SYSTEM PRESSURE WHEN SERVICE COMMANDED, AND THE BRAKE SHAFT TRANSMITS RPM/TORQUE OUTPUT FROM THE HYDRAULIC MOTOR TO THE SUMMER DIFFERENTIALS.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 02-2A-021110- 03

REVISION#: 1 08/07/98

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

LRU:

CRITICALITY OF THIS

ITEM NAME: HYDRAULIC BRAKE

FAILURE MODE: 1R3

FAILURE MODE:

FAILS TO RELEASE

MISSION PHASE: DO DE-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:	102	COLUMBIA
	103	DISCOVERY
	104	ATLANTIS
	105	ENDEAVOUR

CAUSE:

INTERNAL LEAK BY PASSES HYDRAULIC FLUID TO RETURN. JAMMED BRAKE SLIDE, RESTRICTED HYDRAULIC FLUID FLOW (CONTAMINATION).

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN	A) PASS
	B) FAIL
	C) PASS

PASS/FAIL RATIONALE:

A)

B)

FAILS REDUNDANCY SCREEN "B" SINCE 100% RATE IS UNDETECTABLE BY THE CREW.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF ONE HYDRAULIC MOTOR RPM/TORQUE INPUT INTO SUMMER DIFFERENTIAL. BODY FLAP OPERATES WITH REMAINING TWO HYDRAULIC MOTOR RPM/TORQUE INPUTS (100% RATE).

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(B) INTERFACING SUBSYSTEM(S):
NONE.

(C) MISSION:
NONE.

(D) CREW, VEHICLE, AND ELEMENT(S):
POSSIBLE LOSS OF MISSION, CREW/VEHICLE AFTER LOSS OF REMAINING TWO
HYDRAULIC MOTOR RPM/TORQUE INPUTS INTO SUMMER DIFFERENTIAL.

-DISPOSITION RATIONALE-

(A) DESIGN:
5 MICRON HYDRAULIC SYSTEM FILTER UPSTREAM. SYSTEM DESIGNED TO BE FULLY
OPERATIONAL WITH ONE MOTOR OUT. FILTERS DESIGNED TO KEEP CONTAMINATION
FROM BRAKE PISTON.

(B) TEST:
QUALIFICATION TESTS: VIBRATION TESTED (20 TO 2,000 HZ), PERFORMANCE,
OPERATING LIFE, ULTIMATE LOAD, 100,000 PRESSURE IMPULSE CYCLE TESTED AND
THERMAL TEST (-40 DEG F TO +275 DEG F). EACH BRAKE IS TESTED DURING AVIONICS
TEST THEN CHANNELS ARE ISOLATED AND EACH BRAKE MUST ACT INDIVIDUALLY.

ACCEPTANCE TESTS: ACTUATING SPRING CYCLE TESTED AT BRAKE SUB-ASSEMBLY
LEVEL AND AT POWER DRIVE UNIT (PDU) ASSEMBLY QUALIFICATION AND PDU
ACCEPTANCE TEST.

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

(C) INSPECTION:
RECEIVING INSPECTION
MATERIALS AND PROCESSES CERTIFICATIONS VERIFIED BY INSPECTION, INCLUDING
CHEMICAL AND MECHANICAL REQUIREMENTS.

CONTAMINATION CONTROL

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CLEANLINESS AND CORROSION PROTECTION REQUIREMENTS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

OPERATIONS VERIFIED BY SHOP TRAVELER MANDATORY INSPECTION POINTS (MIPS); DIMENSIONAL CHECKS, SURFACE FINISHES, AND TORQUES PER DRAWING REQUIREMENTS ARE VERIFIED. PISTON IS ASSEMBLED AND VERIFIED BY INSPECTION SPRING HEIGHT AND FORCE REQUIREMENTS VERIFIED TO DRAWINGS. LUBRICATION VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION IS VERIFIED BY INSPECTION

CRITICAL PROCESSES

HEAT TREATMENT, PARTS PASSIVATION, AND ANODIZING ARE VERIFIED. DRY FILM LUBRICANT, CHEM FILM AND ELECTROLESS NICKEL PLATING ARE VERIFIED

TESTING

ACCEPTANCE TEST CERTIFICATION AND EXAMINATION OF PRODUCT VERIFIED BY INSPECTION.

HANDLING/PACKAGING

HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED.

(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
TECHNICAL APPROVAL

: BNA
: VIA APPROVAL FORM

J. KEMURA 8-18-98
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