

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE

NUMBER: 02-2A-021200 -X

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

REVISION: 0 02/02/88

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
ASSY	BODY FLAP ACTUATION	
SRU	DRIVE SHAFTS	MC621-0056

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

DRIVE SHAFTS

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 4
FOUR (TWO INBOARD, TWO OUTBOARD)

FUNCTION:

TRANSMITS RPM/TORQUE FROM POWER DRIVE UNIT (PDU) TO ROTARY ACTUATORS,
AND BETWEEN ROTARY ACTUATORS.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 02-2A-021200-01

REVISION#: 1 08/07/98

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

LRU:

ITEM NAME: DRIVE SHAFTS

CRITICALITY OF THIS

FAILURE MODE: 1/1

FAILURE MODE:

FAILS TO TRANSMIT RPM/TORQUE, OPEN DRIVELINE

MISSION PHASE: DO DE-ORBIT

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

CAUSE:

SHEARED SPLINE (COUPLING, CROWN OR HUB), SHEARED POSITIONING BOLT, SHEARED DRIVE SHAFT RIVETS, SHEARED DRIVE SHAFT

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 RPM/TORQUE INPUT INTO ONE OR MORE ROTARY ACTUATORS, RESULTING IN LOSS OF BODY FLAP FUNCTION.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE
NUMBER: 02-2A-021200- 01**

(B) INTERFACING SUBSYSTEM(S):
NONE.

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

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

-DISPOSITION RATIONALE-

(A) DESIGN:
DRIVE SHAFTS, POSITIONING BOLTS AND RIVETS ARE DESIGNED FOR MAXIMUM TORQUE X 1.4 FACTOR OF SAFETY. SPLINES DESIGNED TO ANSI B 92-1. SHAFT SPLINES DESIGNED LIKE GEARS ON ACTUATORS, WITH FATIGUE ANALYSIS BASED ON GREATEST MISSION DUTY CYCLES X 4.

(B) TEST:
QUALIFICATION TESTS: QUALIFICATION TEST - VIBRATION (20 - 2,000 HZ) THERMAL CYCLE (-40 DEG F TO + 275 DEG F), FATIGUE, ULTIMATE LOAD AND LIMIT LOAD.

ACCEPTANCE TESTS: FREEPLAY AND OPERATING HINGE MOMENT AND SURFACE RATE.

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

(C) INSPECTION:
RECEIVING INSPECTION
MATERIALS AND PROCESSES CERTIFICATIONS VERIFIED. RAW MATERIALS CONFORM TO CHEMICAL REQUIREMENTS VERIFIED. HEAT TREAT HARDNESS VERIFIED.

CONTAMINATION CONTROL
CONTAMINATION/CONTROL PROCEDURES AND PRACTICES VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
ASSEMBLY AND INSTALLATION OPERATIONS OF SHAFTS, SPLINES, POSITIONING BOLTS AND RIVETS VERIFIED BY SHOP TRAVELER MIPS. RIVET HOLES MATCH DRILLED AT

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE
NUMBER: 02-2A-021200- 01**

ASSEMBLY, DE-BURRED PER DRAWING, AND VERIFIED BY INSPECTION. ALIGNMENT REQUIREMENTS VERIFIED PER DRAWING REQUIREMENTS. SURFACE TEMPER INSPECTION (NITAL ETCH TO EXAMINE MICROSTRUCTURE) IS VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION
ULTRASONIC INSPECTION AND MAGNETIC PARTICLE INSPECTION ARE VERIFIED.

CRITICAL PROCESSES
SHOT PEEN, DRY FILM LUBRICANT, ELECTROLESS NICKEL PLATING AND GRIT BLAST ARE VERIFIED. HEAT TREATING, INCLUDING CARBURIZATION, VERIFIED BY INSPECTION.

TESTING
ACCEPTANCE TESTS CERTIFICATIONS VERIFIED BY INSPECTION.

HANDLING/PACKAGING
HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED BY INSPECTION.

(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. Kammura 8-18-98
TECHNICAL APPROVAL : VIA APPROVAL FORM : 95-CIL-009_02-2A