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FAILURE MODES EFFECTS ANALYSIS (FMEA) NUMBER: P7-2B-CRW3-X

SUBSYSTEM NAME: SIDE HATCH JETTISON

REVISION : 09/12/88

CLASSIFICATION	NAME	PART NUMBER
SRU	INITIATOR ASSY PYRO	MC325-0005-0004

QUANTITY OF LIKE ITEMS: 2

DESCRIPTION/FUNCTION:

THERE ARE TWO T-HANDLES. ONE T-HANDLE INITIATES HINGE SEVERANCE FUNCTION, COLLAR SEVERANCE FUNCTION AND HATCH JETTISON FUNCTION. THE OTHER T-HANDLE IS DEVOTED TO VENT FUNCTION. THE VENTING T-HANDLE, ALSO USED TO EQUALIZE PRESSURE TO PERMIT THE OVERHEAD WINDOW TO DROP OPEN DURING POSSIBLE GROUND EMERGENCY USE.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) NUMBER: P7-2B-CRW3-X

SUMMARY

SUBSYSTEM NAME: SIDE HATCH JETTISON

ITEM NAME: INITIATOR ASSY PYRO

FMEA NUMBER	ABBREVIATED FAILURE MODE DESCRIPTION	CIL FLG	CRIT	HZD FLG
P7-2B-CRW3-01	NO OUTPUT OR FAILS OFF	X	1 1	

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FAILURE MODES EFFECTS ANALYSIS (FMEA) NUMBER: P7-2B-CRW3-01

REVISION: 09/12/88

SUBSYSTEM: SIDE MATCH JETTISON
ITEM NAME: INITIATOR ASSY PYRO

FAILURE MODE: 1

FAILURE MODE:
LOW OR NO OUTPUT.

MISSION PHASE:

RTLS RETURN TO LAUNCH SITE
TAL TRANS ATLANTIC ABORT
AOA ABORT ONCE AROUND
DO DE-ORBIT
LS LANDING SEQUENCE

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

CAUSE:

DUAL PRIMER FAILURE, DUAL SMDC BOOSTER FAILURE, FIRING PIN MECHANISM JAM, STRUCTURAL FAILURE, CONTAMINATION OF PYRO MIX.

CRITICALITY 1/1 DURING ANY MISSION PHASE OR ABORT? YES

AOA	ABORT ONCE AROUND
DO	DE-ORBIT
LS	LANDING SEQUENCE
RTLS	RETURN TO LAUNCH SITE
TAL	TRANS ATLANTIC ABORT

REDUNDANCY SCREEN A) N/A
B) N/A
C) N/A

PASS/FAIL RATIONALE:

A)
B)
C)

METHOD OF FAULT DETECTION:
NONE.

CORRECTING ACTION: NONE
NO CORRECTIVE ACTION IS POSSIBLE.

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- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF INITIATION CAPABILITY FOR CREW ESCAPE SYSTEM. LOSS OF VENTING FUNCTION RESULTS IN AN INABILITY TO DEPRESSURIZE CREW MODULE IN PREPARATION FOR SIDE HATCH JETTISON.

(B) INTERFACING SUBSYSTEM(S):

SEE (D).

(C) MISSION:

NONE

(D) CREW, VEHICLE, AND ELEMENT(S):

LOSS OF CREW DUE TO INABILITY TO INITIATE CREW ESCAPE SYSTEM. LOSS OF VENTING FUNCTION COULD RESULT IN INJURY TO CREW. JETTISON OF HATCH WITHOUT DEPRESSURIZATION COULD RESULT IN STRUCTURAL DAMAGE TO CREW MODULE, AS WELL AS INJURY TO CREW.

Criticality/

Required Fault Tolerance/Achieved Fault Tolerance: 1/1/0

RATIONALE FOR CRITICALITY:

SINGLE FIRING PIN MECHANISM FAILURE RESULTS IN INABILITY TO INITIATE CREW ESCAPE SYSTEM.

TIME FROM FAILURE TO CRITICAL EFFECT: IMMEDIATE

TIME FROM FAILURE OCCURRENCE TO DETECTION: IMMEDIATE

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: N/A

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT? N/A

NO CORRECTIVE ACTION POSSIBLE.

- DISPOSITION RATIONALE -

(A) DESIGN:

T-HANDLE DESIGNED TO FUNCTION WITH EITHER OF TWO INDEPENDENT REDUNDANT FIRING PIN INPUTS. INTERNAL CROSS-OVER ASSEMBLY ALLOWS DETONATING SIGNAL FROM EITHER DETONATOR ASSEMBLY TO EXCITE REDUNDANT ETS LINES.

(B) TEST:

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QUALIFICATION TEST: SALT FOG, RANDOM AND TRANSIENT VIBRATION, THERMAL CYCLING, PRESSURE CYCLING, SHOCK, FLIGHT SAFETY LOCK MECHANISM RELEASE TEST, +165 DEGREES F/AMBIENT/-65 DEGREES F FIRINGS (WITH SINGLE AND DUAL FIRING PINS).

ACCEPTANCE TEST: EXAMINATION OF PRODUCT, X-RAY, N-RAY, HELIUM LEAK TEST, 200 POUND PULL TEST WITHOUT SAFING PIN, IN-PROCESS 100% FLIGHT SAFETY LOCK MECHANISM RELEASE, LOT ACCEPTANCE FIRINGS ON RANDOM UNITS.

(C) INSPECTION:

RECEIVING INSPECTION

RAW MATERIAL IS VERIFIED BY INSPECTION TO ASSURE SPECIFIED SHUTTLE REQUIREMENTS ARE SATISFIED. ALL SPECIAL PROCESSES ARE VERIFIED BY INSPECTION/CERTIFICATION.

ASSEMBLY/INSTALLATION

PARTS ARE X-RAYED AND N-RAYED TO VERIFY CORRECT ASSEMBLY AND PRESENCE OF ALL DETAIL PARTS AND EXPLOSIVES. X-RAYS AND N-RAYS ARE REVIEWED BY NASA QUALITY AND NASA ENGINEERING, AND DCAS. VISUAL INSPECTION, ID PERFORMED, PARTS PROTECTION VERIFIED BY INSPECTION.

CRITICAL PROCESSES

CRITICAL PROCESSES SUCH AS WELDING, PLATING, HEAT TREATING, PASSIVATION AND ANODIZING ARE VERIFIED.

CONTAMINATION CONTROL

CONTAMINATION CONTROL AND CORROSION PROTECTION PROCESSES AND STORAGE ENVIRONMENTS ARE MONITORED AND VERIFIED BY INSPECTION.

TEST

ATP IS VERIFIED BY INSPECTION.

HANDLING AND PACKAGING

HANDLING AND PACKAGING IS VERIFIED BY INSPECTION PER THE REQUIREMENTS OF APPLICABLE SPECIFICATIONS.

(D) FAILURE HISTORY:

NO HISTORY OF FAILURE. DESIGN CONCEPT TAKEN FROM F-14. EXTENSIVE EXPERIENCE ON SIMILAR DEVICES IN MODERN COMBAT AIRCRAFT.

(E) OPERATIONAL USE:

NONE.

REMARKS:

- APPROVALS -

RELIABILITY ENGINEERING: C. FERRARELLA

cc: P. O. ... 4/1/82

FAILURE MODES EFFECTS ANALYSIS (FMEA)

NUMBER: P7-2B-CRW3-01

DESIGN ENGINEERING - : R. YEE
 QUALITY ENGINEERING : E. GUTIERREZ
 NASA RELIABILITY :
 NASA DESIGN :
 NASA QUALITY ASSURANCE :

: *Ed. for A.C. Ordway 9/11/88*
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