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PRINT DATE: 09/12/88

FAILURE MODES EFFECTS ANALYSIS (FMEA) NUMBER: P7-2B-CRW8-X

SUBSYSTEM NAME: SIDE HATCH JETTISON

REVISION : 09/12/88

CLASSIFICATION NAME PART NUMBER
SRU : VENT SEVERANCE INSTALLATION V070-553413

QUANTITY OF LIKE ITEMS: 1

DESCRIPTION/FUNCTION:

THE VENT SEVERANCE ASSEMBLY CONSISTS OF A CHARGE HOLDER WHICH IS LOADED WITH TWO REDUNDANT LINEAR SHAPED CHARGES (LSC). UPON DETONATION, THE DUAL LINEAR SHAPED CHARGES CUT THE ACCESS PLATE IN THE CREW MODULE ON THE ORBITER 576 BULKHEAD FOR CONTROLLED DEPRESSURIZATION OF THE MODULE, PRIOR TO THE INITIATION OF THE CREW ESCAPE SYSTEM.

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

SUMMARY

SUBSYSTEM NAME: SIDE HATCH JETTISON

ITEM NAME: VENT SEVERANCE INSTALLATION

FMEA NUMBER	ABBREVIATED FAILURE MODE DESCRIPTION	CIL FLG	CRIT	HZ FL
P7-2B-CRWS-01	NO OUTPUT OR FAILS OFF	X	1R2	
P7-2B-CRWS-02	STRUCTURE OR INSULATION FAILURE	X	1 1	
P7-2B-CRWS-03	NO OUTPUT OR FAILS OFF	X	1 1	

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FAILURE MODES EFFECTS ANALYSIS (FMEA) NUMBER: P7-2B-CRW6-01

REVISION: 09/12/88

SUBSYSTEM: SIDE HATCH JETTISON
ITEM NAME: VENT SEVERANCE INSTALLATION

FAILURE MODE: 1R2

FAILURE MODE:
LOW/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:

CONTAMINATION OF PYRO MIX, STRUCTURAL FAILURE, IMPROPER CORE LOADING,
DUAL LSC FAILS TO DETONATE.

CRITICALITY 1/1 DURING ANY MISSION PHASE OR ABORT? NO

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

PASS/FAIL RATIONALE:

A)
NOT APPLICABLE TO PYRO/MECHANICAL SYSTEM.

B)
NOT APPLICABLE TO PYRO/MECHANICAL SYSTEM.

C)
PROXIMITY OF ETS LINES OR T-HANDLE FAILURE ALLOWS POSSIBLE LOSS OF ALL
REDUNDANCY DUE TO A SINGLE EVENT.

METHOD OF FAULT DETECTION:
NONE.

CORRECTING ACTION: NONE
NO CORRECTIVE ACTION POSSIBLE.

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- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF REDUNDANCY WITH LOSS OF ONE CORD.

(B) INTERFACING SUBSYSTEM(S):
SECOND FAILURE RESULTS IN INABILITY TO DEPRESSURIZE CREW MODULE DURING AN EMERGENCY EGRESS, COULD RESULT IN FAILURE OF OVERHEAD WINDOW TO DROP OPEN DUE TO HIGHER PRESSURE IN CREW MODULE AT SOME LANDING SITES.

(C) MISSION:
NONE

(D) CREW, VEHICLE, AND ELEMENT(S):
POSSIBLE LOSS OF CREW DUE TO RAPID DEPRESSURIZATION WHEN SIDE HATCH IS JETTISONED.

Criticality/
Required Fault Tolerance/Achieved Fault Tolerance: 1R/1/1.

RATIONALE FOR CRITICALITY:
EFFECT REQUIRES TWO FAILURES.

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:
THE DESIGN INCORPORATES COMPLETE REDUNDANCY. EITHER LSC IS CAPABLE OF CUTTING THE ACCESS PLATE WHEN LOADED TO 85% OF NOMINAL CORE LOADING AT 35 DEGREES F.

(B) TEST:
QUALIFICATION TESTS: SALT FOG, RANDOM VIBRATION, THERMAL CYCLING, PRESSURE CYCLING, SHOCK, MARGIN DEMONSTRATION FIRING WITH SINGLE LSC LOADED AT 85% AT +35 DEGREES F. FIRINGS OF NOMINAL LOAD ASSEMBLIES (3 AT +35 DEGREES F, 2 AT AMBIENT, 3 AT +120 DEGREES F).

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ACCEPTANCE TEST: EXAMINATION OF PRODUCT, X-RAY, N-RAY, LEAK TEST, EXPLOSIVE CORD CORE LOAD AND SEVERANCE TESTS, ENVIRONMENTAL SEAL TEST. RANDOM SAMPLE FIRING TEST (QUAL TEST FIRINGS FULFILL REQUIREMENT FOR FIRST LOT).

(C) INSPECTION:
RECEIVING INSPECTION
RAW MATERIAL IS VERIFIED BY INSPECTION TO ASSURE SPECIFIC SHUTTLE REQUIREMENTS ARE SATISFIED.

CONTAMINATION CONTROL
CONTAMINATION CONTROL AND CORROSION PROTECTION PROCESSES VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
OPERATIONS VERIFIED BY MIPS ON SHOP TRAVELER.

NONDESTRUCTIVE EVALUATION
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 VENDOR, DCAS, NASA QUALITY AND ENGINEERING. ALL CRITICAL DIMENSIONS ARE INSPECTED.

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

TESTING
ATP IS VERIFIED BY INSPECTION.

STORAGE
STORAGE ENVIRONMENT VERIFIED BY INSPECTION.

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

(D) FAILURE HISTORY:
NO FAILURE HISTORY.

(E) OPERATIONAL USE:
NONE.

REMARKS:

- APPROVALS -

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FAILURE MODES EFFECTS ANALYSIS (FMEA)

NUMBER: P7-2B-CRWB-01

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

: C. P. L. Ordonez Rev 9/12/88
: ~~C. P. L. Ordonez 9/12/88~~
: ~~E. Gutierrez~~
: ~~R. Yee~~
: Thomas S. Ordonez 9-27-88
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