FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE
NUMBER: 07-2D-ES3 -X

SUBSYSTEM NAME: CREW ESCAPE - EMERGENCY EGRESS SLIDE
REVISION: 0 08/01/88

PART DATA

	PART NAME **VENDOR NAME**	**PART NUMBER** **VENDOR NUMBER**
LRU	: SLIDE ASSEMBLY	MC623-0015-0007
SRU	: SUPPORT ASSEMBLY	MC623-0015-0009

QUANTITY OF LIKE ITEMS: 1

FUNCTION:
SLIDE SUPPORT ASSEMBLY - RETAINS SLIDE PACK IN STOWED POSITION BY PROVIDING ATTACH POINT FOR COVER ASSEMBLY, ROTATES WITH PACK FROM STOWED POSITION TO HATCH TUNNEL, ATTACHES UPPER END OF INFLATED SLIDE TO CREW MODULE STRUCTURE OR SIDE HATCH COVER AND REACTS LOADS ON UPPER END OF SLIDE. SECONDARY HINGE LOCKS AFTER FIRST 70 DEGREE ROTATION.

REFERENCE DOCUMENTS: D102930 ISI

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE
NUMBER: 07-2D-ES3- 01

REVISION#: 1 09/02/98

SUBSYSTEM NAME: CREW ESCAPE - EMERGENCY EGRESS SLIDE
LRU: SLIDE ASSEMBLY **CRITICALITY OF THIS**
ITEM NAME: SUPPORT ASSEMBLY **FAILURE MODE:** 1R2

FUNCTIONAL CRITICALITY/
REQUIRED FAULT TOLERANCE/ACHIEVED FAULT TOLERANCE:1R/2/1

FAILURE MODE:
STRUCTURAL FAILURE

MISSION PHASE:
LS LANDING SEQUENCE

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

CAUSE:
EXCESSIVE LOAD, MANUFACTURING DEFECT, IMPROPER INSTALLATION, LOSS OF ATTACHMENT HANDLING DAMAGE.

CRITICALITY 1/1 DURING INTACT ABORT ONLY? YES

LS LANDING SEQUENCE

REDUNDANCY SCREEN
A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:
A)

B)
"B" SCREEN FAILS BECAUSE THERE IS NO TEST AVAILABLE TO DETECT FOR THIS FAILURE IN FLIGHT.

C)

METHOD OF FAULT DETECTION:
CREW OBSERVATION

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CORRECTING ACTION: MANUAL

CORRECTING ACTION DESCRIPTION:
USE DESCENT DEVICE (SKY GENIE) THROUGH SIDE HATCH OPENING OR OVERHEAD WINDOW.

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF ATTACHMENT/SUPPORT FOR UPPER END OF SLIDE.

(B) INTERFACING SUBSYSTEM(S):
NONE

(C) MISSION:
NONE

(D) CREW, VEHICLE, AND ELEMENT(S):
OTHER SUBSYSTEM FAILURES MUST OCCUR BEFORE USE OF THE EMERGENCY SYSTEM IS REQUIRED. POSSIBLE INJURY TO PERSON ON SLIDE. POSSIBLE LOSS OF CREWMEMBERS IF RAPID EMERGENCY EGRESS IS REQUIRED. NO EFFECT ON VEHICLE.

(E) FUNCTIONAL CRITICALITY EFFECTS:
AFTER OTHER SUBSYSTEM FAILURES OCCUR REQUIRING THE USE OF THE EMERGENCY SYSTEM, A SINGLE FAILURE OF THE SLIDE SUPPORT ASSEMBLY CAN RESULT IN POSSIBLE INJURY/LOSS OF CREW.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: IMMEDIATE

TIME FROM FAILURE OCCURRENCE TO DETECTION: IMMEDIATE

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TIME FROM DETECTION TO COMPLETED CORRECTING ACTION: N/A

IS TIME REQUIRED TO IMPLEMENT CORRECTING ACTION LESS THAN TIME TO EFFECT?
NO

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
EMERGENCY EGRESS USING SKY GENIE WOULD EXCEED MAXIMUM ALLOWABLE TIME OF 1 MINUTE.

-DISPOSITION RATIONALE-

(A) DESIGN:
STRUCTURE DESIGNED TO REACT TENSION LOADS AND SIDE LOADS FROM DEPLOYED SLIDE AND FROM LOADS INDUCED BY CREWMAN STANDING ON ONE EDGE OF PANEL IN HATCH OPEN MODE OR IN HATCH JETTISONED MODE. ULTIMATE FACTOR OF SAFETY EQUAL TO 1.4 OVER LIMIT LOAD. POSITIVE MARGINS ON ALL COMPONENTS. PIP PINS USED TO ATTACH SLIDE SUPPORT TO ORBITER STRUCTURE ARE DOUBLE ACTING. SLIDE DIMENSIONS LIMIT NUMBER OF CREWMEMBERS ON SLIDE SIMULTANEOUSLY, PRECLUDING OVERLOAD. ATTACHMENT PINS ARE TETHERED.

(B) TEST:
ACCEPTANCE TESTS INCLUDE TWO DEPLOYMENT CYCLES, ONE EACH MODE.

QUALIFICATION TESTS INCLUDE OPERATING LIFE TESTS (20 CYCLES), HIGH WIND TESTS (11 CYCLES), HIGH/LOW TEMPERATURE TESTS (4 CYCLES), EGRESS TIMELINE TESTS (4 CYCLES) AND SIMULATED DEFLATION (ONE CYCLE). EVACUEES WILL USE THE SLIDE IN 20 OF THESE CYCLES, INCLUDING 19 CYCLES WITH MAXIMUM LOAD CONDITION OF TWO 266 POUND CREWMEMBERS SIMULTANEOUSLY ON SLIDE. CERTIFICATION IS BASED ON QUALIFICATION TESTS OF SLIDE SYSTEM SUPPORTED BY STRUCTURAL ANALYSIS OF SUPPORT ASSEMBLY.

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

(C) INSPECTION:
RECEIVING INSPECTION
CERTIFICATION OF PROCESSES AND MATERIALS INCLUDING STRENGTH, COMPOSITION, HEAT TREATING, AND ANODIZING ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
CLEANLINESS OF SIGNIFICANT SURFACES TO LEVEL GENERALLY CLEAN (GC) AS PER MA0110-301 IS VERIFIED BY INSPECTION.

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ASSEMBLY/INSTALLATION
GIRT ASSEMBLY PIECE PARTS VERIFIED BY INSPECTION. GIRT BAR INSPECTED PRIOR TO SLIDE SUPPORT ASSEMBLY INSTALLATION.

PARTS PROTECTION AND HANDLING PROVISIONS ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES
ANODIZATION OF GIRT SUPPORT. GIRT BAR, HINGE SUPPORT, END CAP AND BRACKET AS PER MIL-A-8625 TYPE II, CLASS 2 CLEAR IS VERIFIED BY INSPECTION.

TESTING
ATP'S WITNESSED BY INSPECTION.

HANDLING/PACKAGING
PACKING, HANDLING AND SHIPPING VERIFIED. PROPER PACKAGING TO LEVEL A OF MIL-STD-7944 IS 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. FAA GENERIC FAILURE HISTORY INDICATES APPROXIMATELY SEVEN FAILURE INCIDENTS WITH THIS FAILURE MODE IN APPROXIMATELY 3000 DEPLOYMENTS.

(E) OPERATIONAL USE:
OPERATIONAL EFFECT OF FAILURE: POSSIBLE LOSS OF LIFE.

CREW ACTION: BRING SKY GENIE DOWN FROM FLIGHT DECK AND EGRESS USING CARABINERS.

CREW TRAINING: CREW IS TRAINED IN ABOVE PROCEDURE.

MISSION CONSTRAINTS: NONE. MISSION WOULD BE TERMINATED PRIOR TO USE OF SLIDE.

INFLIGHT CHECKOUT: NONE.

- APPROVALS -

EDITORIALLY APPROVED	: BNA	: J. Kimura 9-3-98
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 96-CIL-032_07-2D