FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: MO-AA4-515-X

SUBSYSTEM NAME: STABILIZED PAYLOAD DEPLOYMENT SYSTEM
REVISION : 2 06/08/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
SRU :	SPRING, EJECTOR	V790-544027
SRU :	SPRING, EJECTOR	V790-544194

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SPRING - EJECTOR, ORBITER DISCONNECT, PRIMARY/SECONDARY

QUANTITY OF LIKE ITEMS: 2
V790-544027 IS USED ON THE PRIMARY ORBITER DISCONNECT ASSEMBLY
V790-544194 IS USED ON THE SECONDARY ORBITER DISCONNECT ASSEMBLY

FUNCTION:
THE EJECTOR SPRING IS PART OF THE ORBITER DISCONNECT ASSEMBLY. WHEN THE PAYLOAD RELEASE PYROS ARE FIRED AND THE RETRACTORS PULL THE RETAINING PINS ON BOTH RELEASE HEADS, THESE TWO SPRINGS THEN ACT INDEPENDENTLY TO PROVIDE AN EJECTION/SEPARATION FORCE TO THE PAYLOAD. THE TWO SEPARATE SPRINGS (ONE AT THE PRIMARY PEDESTAL, THE OTHER AT THE SECONDARY PEDESTAL) ARE SIZED AT TWO DIFFERENT PRELOAD FORCES TO MATCH THE RELATIVE OFFSET CENTER OF GRAVITY LOCATION OF THE PAYLOAD. SIMULTANEOUS FAILURE OF BOTH SPRINGS IS NOT CONSIDERED TO BE A CREDIBLE FAILURE.

PAGE: 2 PRINT DATE: 06/08/90

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA4-515-01

REVISION# 2 06/08/90

SUBSYSTEM: STABILIZED PAYLOAD DEPLOYMENT SYSTEM

ITEM NAME: SPRING, EJECTOR

CRITICALITY OF THIS FAILURE MODE:2/2

■ FAILURE MODE:
LOSS OF OUTPUT, PARTIAL OUTPUT

MISSION PHASE:
OO ON-ORBIT

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

■ CAUSE:
STRUCTURAL FAILURE

■ CRITICALITY 1/1 DURING INTACT ABORT ONLY? N

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

PASS/FAIL RATIONALE:
■ A)

■ B)

■ C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
FIRST FAILURE RESULTS IN INABILITY TO PROVIDE SEPARATION FORCE WITH THAT PEDESTAL. TWO SPRINGS WORK INDEPENDENTLY TO PERFORM THE PAYLOAD/ ORBITER SEPARATION PROCESS. A SINGLE SPRING IS CAPABLE OF EJECTING A PAYLOAD.

■ (B) INTERFACING SUBSYSTEM(S):
NO EFFECT.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA4-515-01

■ (C) MISSION:
POSSIBLE LOSS OF MISSION DUE TO UNCONTROLLED SEPARATION.

■ (D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT

■ (E) FUNCTIONAL CRITICALITY EFFECTS:
PAYLOAD/ORBITER SEPARATION WOULD OCCUR WITH OR WITHOUT SPRING ACTION.

■

■ HAZARDS: 1
POSSIBLE CONTACT BETWEEN THE ORBITER AND PAYLOAD.

- DISPOSITION RATIONALE -

■ (A) DESIGN:
THE EJECTOR SPRING IS MADE OF HIGH STRENGTH CORROSION RESISTANT MATERIAL FOR SPACE ENVIRONMENT USE.

■ (B) TEST:
QUALIFICATION TESTS HAVE BEEN SUCCESSFULLY COMPLETED FOR THE PDA V790-544004 AND THE DDA V790-544003 IN ACCORDANCE WITH DETAIL TEST REQUIREMENTS (DTP) 5142-801 TO THE TEST REQUIREMENTS OF TR S144028. DETAILS OF THESE TESTS ARE DOCUMENTED IN STS89-0436, ORBITER DISCONNECT QUALIFICATION TEST, DATED MARCH 1989.

■ (C) INSPECTION:
ALL DIMENSIONAL CHARACTERISTICS ARE VERIFIED BY INSPECTION. ALL PROCESSES ARE VERIFIED BY INSPECTION EITHER AT ROCKWELL OR AT SUPPLIER FACILITIES. MATERIAL CERTIFICATION IS VERIFIED BY INSPECTION.

■ (D) FAILURE HISTORY:
NONE.

■ (E) OPERATIONAL USE:
NONE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA4-515-01

- APPROVALS -

RELIABILITY ENGINEERING	W. R. MARLOWE	
DESIGN ENGINEERING	G. CAMPBELL	
QUALITY ENGINEERING	M. F. MERGEN	
NASA RELIABILITY		
NASA SUBSYSTEM MANAGER		
NASA QUALITY ASSURANCE		