

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LANDING/DECELERATION-LGC FMEA NO 02-1A -102 -1 REV:03/03/88

ASSEMBLY : NOSE LANDING GEAR (NLG)					CRIT. FUNC: 1
P/N RI : V070-510751					CRIT. HDW: 1
P/N VENDOR:		VEHICLE	102	103	104
QUANTITY : 1		EFFECTIVITY:	X	X	X
: ONE ASSY		PHASE(S):	PL	LO	OO DO X LS
:					

		REDUNDANCY SCREEN:	A-	B-	C-
PREPARED BY:		APPROVED BY:		APPROVED BY (NASA):	
DES R. A. GORDON		DES <u>R.A. Gordon</u>		SSM <u>Charles C. ...</u>	
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ITEM:  
NOSE LANDING GEAR BOOSTER BUNGEE-DOOR EXTENSION ASSIST

FUNCTION:  
SPRING BUNGEE SYSTEM WHICH CONSISTS OF A COMPRESSION SPRING UNIT MOUNTED SO THAT THE ACTION WOULD BE RELEASED BY DOOR LATCH OPENING, EXERTING FORCE INTO ROLLERS WHICH CONTACT A STRIKER PLATE AND AUGMENTS GEAR DOOR OPENING OPERATION.

FAILURE MODE:  
BUNGEE FAILS TO RELEASE

CAUSE(S):  
STRUCTURAL FAILURE OF A PIECE PART WITHIN THE SPRING BUNGEE RELEASE LINKAGE

EFFECT(S) ON:  
(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE  
  
(A, B) GEAR FAILS TO EXTEND IN TIME, DUE TO ADVERSE PRESSURE DIFFERENTIAL ACROSS THE DOORS.  
  
(C, D) LOSS OF MISSION/CREW/VEHICLE IF NOSE GEAR FAILS TO EXTEND.

DISPOSITION & RATIONALE:  
(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE  
  
(A) DESIGN  
ALL PARTS WITHIN THE SPRING BUNGEE RELEASE LINKAGE ARE DESIGNED TO OPERATE FOR 400 CYCLES WITHOUT STRUCTURAL DEGRADATION. DESIGNED TO A SAFETY FACTOR OF 1.4 WITH STANDARD MATERIAL ALLOWABLES.

(B) TEST  
THE BOOSTER BUNGEE WAS CERTIFIED AS AN INTEGRAL PART OF THE NLG/MLG MECHANISM INSTALLATION (LANDING GEAR OPERATION) - 32 CYCLES OF THE

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LANDING GEAR DURING ALT, 15 DEVELOPMENT CYCLES AND 353 QUALIFICATION LIFE CYCLES FOR A TOTAL OF 400 CYCLES. (THE LANDING GEAR WAS CYCLED FROM UP AND LOCKED TO DOWN AND LOCKED EACH TIME).

ENVIRONMENT:

HIGH TEMP TESTS; 3 CYCLES AT 140 DEG F

COLD TEMP TESTS; 3 CYCLES AT -35 DEG F TO -40 DEG F

ALL OTHER ENVIRONMENT TESTS WERE DONE BY SIMILARITY TO EXISTING HARDWARE.

OMRSD: NLG/MLG DOOR BOOSTER BUNGEE INSPECTION, LH/RH WHEELWELL ZONAL INTERNAL DETAIL INSPECTION; THESE INSPECTIONS VERIFY THE CONDITION AND SECURITY OF THE BUNGEE AND IT'S ATTACHMENTS.

NLG/MLG RETRACT FOR FLIGHT: VERIFIES THAT THE BOOSTER BUNGEE IS COCKED AND GROUND LOCK PINS AND BUNGEE TRIGGER PINS ARE REMOVED. FUNCTION IS VERIFIED BY USING GSE TOOL.

FREQUENCY - ALL VEHICLES AT GROUND TURNAROUND.

(C) INSPECTION

RECEIVING INSPECTION

RECEIVING INSPECTION VERIFIES MATERIALS AND PROCESSES CERTIFICATIONS.

CONTAMINATION CONTROL

INSPECTION VERIFIES CORROSION PROTECTION REQUIREMENTS. INSPECTION VERIFIES CLEANLINESS REQUIREMENTS.

ASSEMBLY/INSTALLATION

FABRICATION OF DETAIL COMPONENTS PER DRAWING AND APPLICABLE SPECIFICATIONS VERIFIED BY INSPECTION ON MANUFACTURING ORDERS. INSTALLATION OF BUNGEE ASSEMBLED COMPONENTS SEQUENTIALLY PLANNED IN ORDER TO MAINTAIN DRAWING CONFIGURATION WHILE ASSEMBLING PARTS PER DRAWING, PAYING CLOSE ATTENTION TO SPECIAL ADJUSTMENTS COVERED PER DRAWING GENERAL NOTES TO OBTAIN DESIRED LOAD ON SPRING MECHANISM. DIMENSIONS AND SURFACE ROUGHNESS ARE VERIFIED BY INSPECTION. INSPECTION VERIFIES ALL THREADED FASTENERS INSTALLATION TO CORRECT TORQUE VALUES SPECIFIC ON DRAWING.

CRITICAL PROCESSES

HEAT TREATING VERIFIED BY INSPECTION

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION OF DETAIL PARTS VERIFIED BY INSPECTION.

TESTING

ATP IS VERIFIED BY INSPECTION.

PACKAGING/HANDLING

HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NONE.

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(E) OPERATIONAL USE  
NONE.