

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LANDING/DECELERATION-LGC FMEA NO 02-1A -034 -2 REV:03/03/88

ASSEMBLY : MAIN LANDING GEAR (MLG) CRIT. FUNC: 1
 P/N RI : V070-510101 CRIT. HDW: 1
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 2 EFFECTIVITY: X X X
 : ONE L/H ASSY PHASE(S): PL LO X OO DO X LS
 : ONE R/H ASSY

REDUNDANCY SCREEN: A- B- C-
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES R. A. GORDON DES *R.A. Gordon* SSM *Robert C Campbell*
 REL J. S. MULLEN REL *J.S. Mullen* REL *...*
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ITEM:
 MAIN 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.

FAILURE MODE:
 PREMATURE 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) LEAKAGE THRU DOOR SEAL EXPOSES COMPARTMENT TO HIGH THERMAL FLOWS. POSSIBLE STRUCTURAL INTERNAL DAMAGE TO COMPARTMENT.
 (C,D) POSSIBLE LOSS OF CREW/VEHICLE DUE TO RE-ENTRY OVERHEATING.

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. RECENT DESIGN IMPROVEMENT VERIFIES CORRECT INSTALLATION/RIGGING WITH DESIGNATED TOOL.

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

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ENVIRONMENTS:

HIGH TEMP TESTS; 3 CYCLES AT 140 DEG F

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

ALL OTHER ENVIRONMENTAL 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

MATERIALS AND PROCESS CERTIFICATIONS ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CONTAMINATION CONTROL AND CORROSION PROTECTION PER MA0608-301 ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

INSTALLATION OF ALL BOOSTER ASSEMBLIES PER DRAWING VERIFIED BY INSPECTION ON MANUFACTURING ORDER BOOK. TOOLING FIXTURE USE FOR ASSISTING MANUFACTURING IN ASSEMBLY VERIFIED. INSTALLATION OF COMPONENTS PLANNED SEQUENTIALLY IN ORDER TO MAINTAIN ASSEMBLY CONFIGURATION, SATISFY SPECIAL TORQUE REQUIREMENTS, AND CRITICAL DRAWING ASSEMBLY NOTES, INCLUDING INSTALLATION OF THREADED FASTENERS PER APPLICABLE SPECIFICATION AFTER FINAL ADJUSTMENTS HAVE BEEN MADE. BEARING, BUSHING, AND BELLEVILLE WASHER INSTALLATION VERIFIED BY INSPECTION.

CRITICAL PROCESSES

HEAT TREAT AND INSTALLATION OF DRY FILM LUBE ARE VERIFIED BY INSPECTION. INSPECTION VERIFIES CADMIUM PLATING AND SUBSEQUENT BAKEOUT (TO PREVENT HYDROGEN EMBRITTLEMENT) OF BELLVILLE WASHERS.

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION OF DETAIL PARTS PER MT0501-504 IS VERIFIED BY INSPECTION.

TESTING

ACCEPTANCE TESTING 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.