

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LANDING/DECELERATION-LGC FMEA NO 02-1A -012 -1

REV: 09/19/88

ASSEMBLY : MAIN LANDING GEAR (MLG)

P/N RI : V070-510201

P/N VENDOR:

QUANTITY : 6

: THREE-LEFT

: THREE-RIGHT

VEHICLE	102	103	104
EFFECTIVITY:	X	X	X
PHASE(S):	PL LO	OO	DO X LS

CRIT. FUNC: 1

CRIT. HDW: 1

PREPARED BY:
 DES R. A. GORDON
 REL J. S. MULLEN
 QE W. J. SMITH

REDUNDANCY SCREEN: A- B- C-
 APPROVED BY:
 DES *R.A. Gordon 9/21/88*
 REL *J.S. Mullen*
 QE *W.J. Smith*

APPROVED BY (NASA):
 SSM *Charles Campbell*
 REL *W.J. Smith 9/27*
 QE *W.J. Smith*

ITEM:

MAIN LANDING GEAR DOOR HOOK PUSHROD ASSEMBLIES

FUNCTION:

PROVIDES DRIVING FORCE TO OPERATE MLG DOOR HOOKS WHICH CLOSE AND LOCK T DOORS.

FAILURE MODE:

STRUCTURAL FAILURE

CAUSE(S):

OVERLOAD, DEFECTIVE PART/MATERIAL.

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A, B) LEAKAGE THRU DOOR SEAL EXPOSES COMPARTMENT TO HI-THERMAL FLOWS. POSSIBLE INTERNAL STRUCTURAL DAMAGE TO COMPARTMENT.

(C, D) POSSIBLE LOSS OF MISSION/CREW/VEHICLE DUE TO RE-ENTRY OVERHEATING

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A) DESIGN

DESIGNED TO A MINIMUM FACTOR OF SAFETY OF 1.4 WITH STANDARD MATERIAL ALLOWABLES. MATERIALS USED ARE NOT SUSCEPTIBLE TO CORROSION DURING EXPOSURE TO EXPECTED ORBITER ENVIRONMENTS.

(B) TEST

QUALIFICATION TESTS: COMPONENTS VERIFIED FOR STRUCTURAL INTEGRITY AND PROOF LOADS, WITH FUNCTIONAL/KINEMATIC/ENDURANCE CYCLING ON SIMULATOR. DOOR LOADS (AERO) VERIFIED IN SIMULATOR FOR WORST CASE CONDITION.

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MLG MECHANISM INSTALLATION (LANDING GEAR OPERATION) - 32 CYCLES OF THE LANDING GEAR DURING ALT, 15 DEVELOPMENT CYCLES AND 353 QUALIFICATION LIFECYCLES FOR A TOTAL OF 400 CYCLES. (THE LANDING GEAR WAS CYCLED FROM UP AND LOCKED TO DOWN AND LOCKED EACH TIME). THESE TESTS WERE PERFORMED WITH MAXIMUM DOOR OPENING AIR LOADS ON THE DOOR WITH THE APPROPRIATE AIR LOADS ON THE SHOCK STRUT ASSEMBLY. THE GEAR ACTUATOR LOAD WAS LIMITED TO 66,800 LBS. WHILE RESTRICTING THE DOWN MOTION OF THE GEAR. THE MAXIMUM TENSION LOAD IN THE RETRACT LINK WAS 22,700 LBS AND MAXIMUM COMPRESSION LOAD WAS 15,500 LBS.

ENVIRONMENT:

HIGH TEMP TESTS; 3 CYCLES AT 140 DEG F
COLD TEMP TESTS; 3 CYCLES AT -35 DEG F TO -49 DEG F

ACCEPTANCE TESTS: ACCEPTANCE INCLUDES VERIFICATION THAT CERTIFIED MATERIALS AND PROCESSES WERE USED. ACCEPTANCE TESTS ALSO VERIFY DIMENSIONS, WEIGHTS AND FINISHES.

OMRSD: LH/RH WHEELWELL ZONAL INTERNAL DETAIL INSPECTION; A VISUAL DETAILED INSPECTION OF THE MLG WHEELWELLS IS PERFORMED TO VERIFY THE CONDITION AND SECURITY OF THESE ITEMS.

FREQUENCY - ALL VEHICLES AT GROUND TURNAROUND.

(C) INSPECTION

RECEIVING INSPECTION

MATERIALS AND PROCESS CERTIFICATIONS ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CLEANLINESS REQUIREMENTS AND CORROSION PROTECTION PER DRAWING AND APPLICABLE SPECIFICATION ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MACHINING VERIFIED ON MANUFACTURING ORDERS TO BE TO DRAWING TOLERANCES AND APPLICABLE MACHINING SPECIFICATIONS. BUSHING INSTALLATION IS PER DRAWING AND BUSHING INSTALLATION SPECIFICATION VERIFIED BY INSPECTION VERIFIED.

CRITICAL PROCESSES

HEAT-TREAT FOR MAXIMUM CRYOGENIC PROPERTIES PER APPLICABLE HEAT TREAT SPECIFICATION PRIOR TO APPLICATION OF PLATING, AND CHROMIUM PLATING PER APPLICABLE SPECIFICATION ARE VERIFIED BY INSPECTION. APPLICATION OF DRY FILM LUBE TO SPECIFIC AREAS PER DRAWING AND DRY FILM LUBE SPECIFICATION

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION OF DETAIL PARTS PER MTO501-504 IS VERIFIED BY INSPECTION.

TESTING

ACCEPTANCE TESTING IS VERIFIED BY INSPECTION.

PACKAGING/HANDLING

HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED BY INSPECTION.

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(D) FAILURE HISTORY
NONE.

(E) OPERATIONAL USE
NONE.

02-1A-30