

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LANDING/DECELERATION-LGC FMEA NO 02-1A -112 -1 REV:09/19/8

ASSEMBLY : NOSE LANDING GEAR (NLG)				CRIT. FUNC:
P/N RI : V070-510601				CRIT. HDW:
P/N VENDOR:		VEHICLE	102	103
QUANTITY : 1		EFFECTIVITY:	X	X
: ONE		PHASE(S):	PL	LO
:			OO	DO X LS

PREPARED BY:		REDUNDANCY SCREEN:	A-	B-	C-
DES R. A. GORDON	APPROVED BY:	DES	<i>R.A. Gordon 9/21/88</i>	APPROVED BY (NASA)	<i>Charles Campbell</i>
REL J. S. MULLEN	REL	REL	<i>J.S. Mullen</i>	REL	<i>R.A. Gordon 9/21/88</i>
QE W. J. SMITH	QE	QE	<i>W.J. Smith</i>	QE	<i>R.A. Gordon</i>

ITEM:  
NOSE LANDING GEAR UPLOCK FITTING

FUNCTION:  
STRUCTURAL SUPPORT FITTING FOR UPLOCK HOOK, LINKAGES, HYDRAULIC AND PYROTECHNIC UPLOCK ACTUATORS.

FAILURE MODE:  
STRUCTURAL FAILURE

CAUSE(S):  
OVERLOAD, DEFECTIVE PART/MATERIAL.

EFFECT(S) ON:

- (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
- (A, B) NOSE GEAR EXTENDS PREMATURELY CAUSING COMPARTMENT EXPOSURE TO HIGH THERMAL FLOWS.
- (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: THE FITTING IS 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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THE UPLOCK FITTING ASSEMBLY WAS ALSO CERTIFIED AS AN INTEGRAL PART OF THE NLG/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 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.

ENVIRONMENT:

HIGH TEMP TESTS; 3 CYCLES AT 140 DEG F

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

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

OMRSD: NLG WHEELWELL ZONAL INTERNAL DETAIL INSPECTION;  
A VISUAL DETAILED INSPECTION OF THE NLG WHEELWELLS IS PERFORMED TO VERIFY THE CONDITION AND SECURITY OF THE UPLOCK FITTING AND IT'S ATTACHMENTS.

FREQUENCY - ALL VEHICLES AT GROUND TURNAROUND.

(C) INSPECTION

RECEIVING INSPECTION

TEST COUPON CERTIFICATION REQUIRED AND VERIFIED BY RECEIVING INSPECTION

CONTAMINATION CONTROL

CLEANLINESS REQUIREMENTS AND CORROSION PROTECTION REQUIREMENTS ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MANUFACTURING, INSTALLATION AND MACHINE SPECIFICATIONS ARE VERIFIED BY INSPECTION. DIMENSIONS AND SURFACE ROUGHNESS ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES

HEAT TREATMENT IS VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION IS VERIFIED BY INSPECTION.

TESTING

ATP IS VERIFIED BY INSPECTION.

PACKAGING/HANDLING

HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NONE.

(E) OPERATIONAL USE

NONE.

02-1A-100