

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LANDING/DECELERATION-LGC FMEA NO 02-1A -109 -1 REV:09/19/8

ASSEMBLY : NOSE LANDING GEAR (NLG) CRIT. FUNC:
P/N RI : VO70-512001 CRIT. HDW:
P/N VENDOR: VEHICLE 102 103 104
QUANTITY : 4 EFFECTIVITY: X X X
: TWO LEFT-TWO RIGHT PHASE(S): PL LO OO DO LS
:

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

ITEM:
NOSE LANDING GEAR FITTING ASSEMBLY, DRAG BRACE AND STRUT TRUNNIONS

FUNCTION:
VEHICLE TO LANDING GEAR STRUT AND DRAG BRACE ATTACH ASSEMBLY

FAILURE MODE:
STRUCTURAL FAILURE

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

EFFECT(S) ON:
(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
(A) LOSS OF LOAD CARRYING CAPABILITY.
(B) DAMAGE TO VEHICLE STRUCTURE.
(C,D) POSSIBLE LOSS OF MISSION/CREW/VEHICLE DUE TO NLG COLLAPSE.

DISPOSITION & RATIONALE:
(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A) DESIGN
THE FITTINGS ARE DESIGNED TO OPERATE FOR 400 CYCLES WITHOUT STRUCTURAL DEGRADATION. 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.

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(B) TEST

QUALIFICATION TEST: THE FITTINGS WERE 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 FROM UP AND LOCKED TO DOWN AND LOCKED EACH TIME).

ENVIRONMENTS:

HIGH TEMP TESTS; 3 CYCLES AT 140 DEG F

COLD TEMP TESTS; 3 CYCLES AT -25 DEG F TO -40 DEG F

OMRSD: NLG WHEELWELL ZONAL INTERNAL DETAIL INSPECTION;
A VISUAL DETAILED INSPECTION OF THE NLG WHEELWELLS IS PERFORMED TO VERIFY THE CONDITION AND SECURITY OF THESE ITEMS.
FREQUENCY - ALL VEHICLES AT GROUND TURNAROUND.

OMRSD: NLG WHEELWELL DETAIL INTERNAL INSPECTION; NOSE GEAR STRUT TRUNNION FITTINGS AND DRAG BRACE FITTINGS ARE INSPECTED FOR EVIDENCE OF STRUCTURAL DEGRADATION.
FREQUENCY: NINTH FLIGHT OF EVERY VEHICLE AND EVERY EIGHTH FLIGHT THEREAFTER.

(C) INSPECTION

RECEIVING INSPECTION

INSPECTION VERIFIES ALL RAW MATERIALS TO COMPLY WITH MATERIAL REQUIREMENTS THROUGH PERIODIC COUPON ANALYSIS.

CONTAMINATION CONTROL

ALL CLEANLINESS LEVELS VERIFIED BY INSPECTION. CORROSION PROTECTION REQUIREMENTS ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

ALL MATERIALS AND PROCESSES VERIFIED BY MANDATORY INSPECTION POINTS (MIP'S) TO NEXT MANUFACTURING OPERATIONS. TORQUE VALUES SPECIFIED ON DRAWINGS ARE VERIFIED AT THE TIME OF ACCOMPLISHMENT. INSTALLATION OF COTTER PIN AND LOCK WIRE VERIFIED AT ASSEMBLY LEVEL WHERE APPLICABLE. DIMENSIONS AND SURFACE ROUGHNESS ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES

HEAT TREATMENT, PLATING AND SHOT PEENING ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

MATERIAL SURFACE DEFECTS ARE IDENTIFIED BY MAGNETIC PARTICLE, NITAL ETCH AND FLUORESCENT PENETRANT INSPECTION, 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.

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