USA Ground Operations CIL Sheet AUG 9 2000

Critical Item: Jackscrew
NASA Part No: None
Mfg/Part No: - Limitorque Corp / SB-15-MSJ-UK-96-S
System: External Tank Gaseous Oxygen Vent System

Criticality Category: 1
Total Quantity: 2

Find No.	Qty	Area	PMN	Baseline	Drawing / Sheet
34	1	Pad-A	U78-0001	006.02	79K26353 / 1
34	1	Pad-B	U78-0001	006.02	79K26353 / 1

Function:

The secondary jackscrew provides mechanical motion to raise and lower the GOX Vent Hood over the External Tank.

Failure Mode No. Failure Mode	Failure Cause Failure Effect	Detection Method Time to Effect	Crit Cat
09VE54-003.002 Lift Screw Disengagement from Drive Sleeve	Mechanical wear of Drive Sleeve beyond operational limits, structural failure, improper maintenance Mechanical failure of the jackscrew would allow uncontrolled descent of the GOX Vent Hood. During GOX Vent Arm extension or retraction, the GOX Vent Hood is held at approximately 48 degrees inclination by the jackscrew mechanism. While the GOX Vent Arm is being rotated, should the failure mode occur during the time the hood is moving over the ET allowing uncontrolled descent of the vent hood, impact with the External Tank exists, and possible rupture of the ET LOX tank is possible. If failure occurs after the ET LOX tank has been filled, rupture of the ET LOX tank would result in an oxygen rich environment, with potential for fire and explosion, resulting in loss of life/vehicle.	Visual Immediate	1

ACCEPTANCE RATIONALE

Design:

- The jackscrew is rated at 15 Tons. Maximum calculated load is approximately 7000 lbs @ 0 degrees inclination (hood level to horizontal), yielding a 4:1 operational safety factor.
- The manufacturer states that the screwjack is serviceable until the backlash reaches 2/3 (66%) of screw thread thickness.
- Manufacturer states that they are ISO 9001 certified and parts meet ASTM standards.

Test:

- OMRSD File VI requires performance of an annual backlash test of the jackscrew to determine wear on the mechanism in accordance with KSC-5600-4610, Jackscrew Wear Inspection.

Inspection:

- OMI G6151 requires a quarterly inspection of the jackscrew shaft for corrosion and damage, and application of lubricant if required. Also, inspect the jackscrew shaft key for looseness and damage.

Failure History:

- Current data on test failures, unexplained anomalies, and other failures experienced during ground processing activities can be found in the PRACA database. The PRACA database was researched and the following data was found on this component in the critical failure mode.

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- A failure of another jackscrew did occur in the ET Gox Vent Arm hood on 4/6/98 (PR PV-6-336823). The NASA KSC Malfunction Lab inspected the failed unit (Report # MSL-0422-1998) and attributed it failure to worn out threads on the drive sleeve unit.

Operational Use:

Correcting Action	Timeframe
There is no action which can be taken to mitigate the failure effect.	Since no correcting action is available, timeframe does not apply.