

USA Ground Operations CIL Sheet

5050234 HQ
Attachment
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Criticality Category: 2
Total Quantity: 4

Critical Item: Hoist Planetary Gear Assembly
NASA Part No: None
Mfg/Part No: Fairfield Manufacturing Co., Inc. / S10A14481
System: ROPCO Straddle Lift

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Find No.	Qty	Area	PMN	Baseline	Drawing / Sheet
40	4	SRM Onload Facility	H77-8430-01	259.00	E16712 / 1

Function:

The hoist planetary gearbox transmits power from the hoist motor to the drum.

Failure Mode No. Failure Mode	Failure Cause Failure Effect	Detection Method Time to Effect	Crit Cat.
09F708-043.001 Gear disengages	Structural failure of gears, shafts, or components One hoist planetary gearbox failure will cause one end of the SRB segment to drop. Failure could cause loss or non-reusability of major SRB hardware.	Visual Immediate	2

ACCEPTANCE RATIONALE

Design:

- The gearbox is an off-the-shelf item manufactured by Fairfield Manufacturing Co., Inc.
- The American Gear Manufacturers Association (AGMA) specifications are used as guidelines in the manufacture of and establishing the ratings of the torque hub gearbox.
- All gears and pinions are splined to shafts or integrally machined and are mounted on anti-friction bearings which are prelubricated.
- The load bearing members, such as the gear case and shafts, have been designed so that the calculated static stress, based upon the rated load (60,000 lbs. per hoist), does not exceed 20% of the average ultimate strength of the material 5.4:1 Safety Factor).
- Planet gears captured in planet gear frame provides high torque capabilities by splitting the torque path, thereby dividing and balancing the load over more teeth. This assures longer life and reduced maintenance.
- These hoists are subjected to an extremely limited annual duty cycle compared to normal commercial use.
- All gears are carburized and hardened to Rockwell C in the range of 58 to 62. All planet gears are shaved for higher quality tooth form and alignment.
- Gear housing is constructed of AS1043 forged steel.
- The output shaft of the gearbox is constructed of 8620 carburized and hardened steel for fatigue resistance and strength.

Test:

- A load test at 100% of the rated load is performed annually in accordance with NSS/GO 1740.9 requirement and DM B6402.
- An acceptance proofload test at 125% of the rated load was performed within the period of 7/89.
- A pre-mission operational test is performed per DM B6402.

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- The OMRSD File VI requires annual performance of a rated load test to verify system integrity.

Inspection:

- An inspection of the hoists is performed prior to each operation and includes the following:
 - Corrosion, cracks, or damaged hardware
 - Oil leaks, loose or missing hardware
 - The planetary Gearbox is checked for lubrication

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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 no data was found on this component in the critical failure mode.
- The GIDEP failure data interchange was researched and no failure data was found on this component in the critical mode.

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.