

SEP 11 1995

B/L: 390.00

SYS: 1-Ton Monorail

Hoist

Critical Item: Hoist Gearbox Assembly (1 Item Total)
Find Number: None
Criticality Category: 2

SAA No: 09FY12-012	System/Area: 1-Ton Monorail Hoist/VAB
NASA	PMN/ K60-0540
Part No: None	Name: 2 1/2-Ton Monorail Hoist
Mfg/ P & H Harnischfeger	Drawing/ TM4-147-39 (Vols. I & II)
Part No: HL710-15	Sheet No:

Function: The hoist gear reduction assembly reduces motor rotational speed and transmits power to the rope drum.

Critical Failure Mode/Failure Mode No: Gear disengagement/09FY12-012.001

Failure Cause: Structural failure of gears, shaft, and/or gearbox housing.

Failure Effect: There will be loss of control of hoisting or lowering operation. Load may descend faster than desired resulting in loss (damage) to flight hardware. Failure is detectable by abnormal noises and movements up to and including dropping the load. Time to Effect: Seconds.

ACCEPTANCE RATIONALE

Design:

- The gearbox is an off-the-shelf item manufactured by P & H Harnischfeger. Its design complies with Crane Manufacturers Association of America (CMAA) and American Gear Manufacturers Association (AGMA) Standards.
- The gear reducer is a planetary type. The drum gear is an integral part of the drum which is driven by the planetary drive.
- Load-bearing members, such as the gear case and shaft, have been designed so that the calculated static stress, based upon the rated load (5000 lbs.), does not exceed 20% of the average ultimate strength of the material (5:1 SF)
- The hoist was originally rated for 5000 lbs. and de-rated to 2000 lbs. The maximum load in use is approximately 1500 lbs. This yields an operational safety factor of 3.33:1 based on the original rated capacity.

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Test:

- Pre-operational set-up (positioning the hook over the load) to support lifting operations verifies proper operation of hoist components and all functions.
- A load test at 100% of the rated load is performed annually per OMI-Q6011 in accordance with NSS/GO-1740.9 requirements.
- OMRSD File VI requires performance of a rated load test annually.

Inspection:

- OMI-Q6011 requires monthly inspections for general condition of all operating mechanisms in addition to visual checks for structural damage, missing hardware, greasing, evidence of corrosion, cracks or deformation of chain or hook assemblies, scratches/gouges/excessive wear indications, ID and safety markings and wire rope condition.
- Inspection of the gearbox oil level and oil condition are performed annually.

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 failure 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 failure mode.

Operational Use:

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