

APR 28 1995

B/L: 398.01, 398.02
SYS. AP 48 JIB
HOISTS

Critical Item: Hoist Gearcase Assembly (4 Items Total)
Find Number: None
Criticality Category: 2

SAA No: 09FY02-015	System/Area: AP 48 Jib Hoists VAB HB-3,1
NASA Part No: None	PMN/Name: K60-0554-01, K60-0555-01 AP 48 Jib Hoists, VAB HB-3,1
Mfg/Part No: Yale Industries/ 642602203	Drawing/Sheet No: 79K33183

Function: The hoist gearcase transmits power from the hoist motor to the wire rope drum.

Critical Failure Mode/Failure Mode No: Gear disengagement/09FY02-015.001

Failure Cause: Structural failure of gears, shafts, mechanical load brake components and the gear case housing.

Failure Effect: Load suspended from crane (Stacking Bridge or EO4 and EO5 Platforms) will drop. Possible loss (damage) of an ET or SRB aft skirt. Failure is detectable by abnormal noises and movements up to and including dropping the load. Time to effect: seconds.

ACCEPTANCE RATIONALE

Design:

- The gearcase is an off-the-shelf item manufactured by Yale Industries. Its design complies with Hoist Manufacturers Institute (HMI) Duty Class H4 and American Gear Manufacturers Association (AGMA) Standards.
- All gearing design is based upon AGMA standards 220.02, "Rating of the Strength of Spur Gear Teeth" and 210.02, "Surface Durability (pitting) of Spur Gear Teeth."
- The gears are splined to shafts or integrally machined and are retained in place by shoulders within the confines of the gearcase.
- Load bearing members, such as the gear case and shafts, have been designed so that the calculated static stress, based on the rated load, does not exceed 20% of the average ultimate strength of the material, i.e. 5:1 factor of safety.
- The hoist is rated for 2000 lbs, a stacking bridge weighs approximately 1600 lbs., yielding a minimum operational safety factor of 1.25:1.

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- These hoists are subjected to an extremely limited duty cycle compared to commercial use.

Test:

- Load test at 100% of rated load is performed annually by OMI Q6320 in accordance with a NSS/GO-1740.9 requirement.
- OMRSD File VI requires performance of the rated load test annually.
- An annual operational check of the hoist is performed under full rated load in accordance with OMI Q6320.
- Proof load test at 125% of the rated load was performed on initial installation.
- A full operational check of the hoist is performed semi-annually (no load) in accordance with OMI Q6320.

Inspection:

- A visual inspection of the hoist gearcase for signs of the following conditions is performed semi-annually, OMI Q6320 requirement:
 - Corrosion
 - Loose fasteners
 - Oil level/leakage

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.

Attachment
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