

NOV 16 1994

B/L: 380.00
SYS: 1/2 Ton Elevon
Actuator Bridge
Cranes

Critical Item: Yale 1/2 Ton Manual Chain Hoist and Trolley (2 Items Total)
Find Number: 2
Criticality Category: 2

SAA No: 09FTP3-011

System/Area: 1/2 Ton Elevon Actuator Bridge
Cranes/OPF HB 3

**NASA
Part No:** None

**PMN/
Name:** H70-1378-01
1/2 Ton Elevon Actuator Bridge
Cranes

**Mfg/
Part No:** Yale Industries
LTP (825-03400)

**Drawing/
Sheet No:** 80K52910/
Sheet 1

Function: Provides mechanical advantage to raise and lower loads up to 1/2 ton with a small applied force. Provides the ability to hold a suspended load up to 1/2 ton.

Critical Failure Mode/Failure Mode No:

- a. Gearbox Failure (FMN 09FTP3-011.001)
- b. Mechanical Load Brake Failure (FMN 09FTP3-011.002)

Failure Cause:

- a. Mechanical linkage is lost between gearbox components due to worn or damaged load gear, pinion gear, or intermediate gear and pinion.
- b. Mechanical linkage between handwheel and gearbox is lost due to worn or damaged 6-tooth holding pawl, brake lining, brake plate, or 24-tooth holding ratchet.

Failure Effect:

- a. Load will drop without means of control, resulting in possible loss (damage) of a vehicle system. The failure is detectable by abnormal noises and movements. Time to effect is immediate.
- b. Load will drop without means of control resulting in possible loss (damage) of a vehicle system. The failure is detectable by abnormal movements when the hand chain is not held and abnormal noises. The time to effect is immediate.

*Attachment
S050234DB
sheet 2 of 5*

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ACCEPTANCE RATIONALE

Design:

- The hoist is an off-the-shelf item manufactured by Yale and is designed to handle a 1/2-ton working load. The minimum safety factor is 5:1 and is in accordance with NSS/GO-1740.9. The maximum lifting load of the actuator, dynamometer, and sling is 250 lbs which provides an operational safety factor of 20:1.
- The Yale hoist design is in accordance with Hoist Manufacturers Institute standards (HMI 200 Class II Hoist) and the American Gear Manufacturers Association (AGMA) Standards.
- The gears are splined to shafts or integrally machined and are retained in place by shoulders within the confines of the gearbox.
- All gearing design is based upon AGMA Standard 220.02, "Rating of the Strength of Spur Gear Teeth" and 210.02, "Surface Durability (pitting) of Spur Gear Teeth."
- These hoists are subjected to a low number of cycles compared to commercial use. This diminished usage should provide for better long term reliability.

Test:

- OMRSD File VI requires annual performance of rated load test.
- A load test of 100% of rated load will be performed annually by OMI V6H24 in accordance with a NSS/GO 1740.9 requirement.
- Acceptance test at 125% of the rated load will be performed on initial installation.
- Pre-operational positioning of the hoist per OMI V5F01 verifies proper operation of all hoist functions.
- An annual operational check of the hoist under full rated load will be performed in accordance with OMI V6H24.

Inspection:

- The hoist will be inspected per OMI V5F01 for an active or current load test validation tag which will be legible along with any warning plates prior to operation.
- Inspections are performed in accordance with NSS/GO-1740.9 requirements.
- Visual inspections will be completed annually in accordance with OMI V6H24 and include:
 - Inspections of the load bearing part (suspension bolts, shafts, bearings, support structure) for wear, cracks, and distortions without disassembly of the hoist.
 - Inspection for lubrication leakage.
 - Chain wear (twists, damage links, foreign matter) hook deformations, corrosion, and damage inspections.
- When the annual 100% rated load is in progress, a check for evidence of brake slippage under rated load is completed.

*Attachment
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Sheet 3 of 5*

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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 failure data were found on this component or other similar components in the critical failure modes.
- The GIDEP failure data interchange system has been researched and no failures of this component were found in the critical failure modes.

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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