

SAA09FTP3-012
REV. A

NOV 20 1995

B/L: 380.00
SYS: ELEVON
POSITIONING
HOISTS

Critical Item: Chain Hoist (4 Items Total)
Find Number: 5
Criticality Category: 2

SAA No: 09FTP3-012	System/Area: Elevon Positioning Hoists/ OPF HB-3
NASA Part No: None	PMN/ Name: H70-1507 Elevon Positioning Hoists
Mfg/ Part No: Yale Industries LH (824-05100)	Drawing/ Sheet No: 80K52912/ Sheet 1

Function: Provides mechanical advantage to raise, lower, and hold the elevon.

Critical Failure Mode/Failure Mode No: Gearbox Failure/(FMN 09FTP3-012.001)
Mechanical Load Brake Failure/(FMN 09FTP3-012.002)

Failure Cause:

Gearbox Failure -

Linkage is lost between gearbox components due to worn or damaged pinion gear (teeth) or intermediate gear (teeth)

Mechanical Load Brake Failure -

Mechanical linkage between handwheel and gearbox is lost due to worn or damaged brake lining, 6 tooth holding pawl, or brake plate.

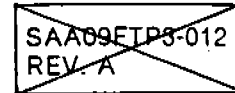
Failure Effect:

Gearbox Failure -

Load will drop without means of control resulting in possible loss (damage) of a vehicle system. The gearbox failure is detectable by abnormal noises and movements. Time to effect is immediate.

Mechanical Load Brake Failure -

Load will drop without means of control resulting in possible loss (damage) of a vehicle system. The mechanical load brake failure is detectable by abnormal movements when the hand chain is held. Time to effect is immediate.



ACCEPTANCE RATIONALE

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Design:

- The hoist is an off-the-shelf item manufactured by Yale and is designed to handle a one-ton working load. The minimum safety factor is 5:1 (ultimate) and is in accordance with NSS/GO-1740-9. The maximum allowed lifting load is 1200 lbs which provides an operational safety factor of 1:6:1.
- 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.
- The gears are permanently lubricated at the factory.

Test:

- OMRS File VI requires the annual performance of a 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.
- An annual operational check of the hoist under full rated load is performed in accordance with OMI V6H24.
- Acceptance test at 125% of the rated load was performed on initial installation per NSS/GO 1740.9 and the installation drawings.
- Pre-operational positioning of the hoist per OMI V5F01 verifies proper operation of all hoist functions.

Inspection:

- The hoist is 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 are completed annually in accordance with OMI V6H24 and include:
 - a. An inspection of the load bearing parts (suspension bolts, shafts, bearings, support structure) for wear, cracks, and distortions without disassembly of the hoist.
 - b. Inspection for lubrication leakage.
 - c. Inspections of chain wear (twists, damage links, foreign matters) 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.

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Failure History:

- The PRACA database was researched and no failure data was found on this component in the critical failure modes.
- The GIDEP failure data interchange system was researched and no failure data was found on this component in the critical failure modes.

Operational Use:

- Correcting Action:

Gearbox Failure - There is no action which can be taken to mitigate this effect.

Mechanical Load Brake Failure - The operator may mitigate failure effects by stopping hand chain movement.

- Timeframe:

Gearbox Failure - Since no correcting action is available, timeframe does not apply.

Mechanical Load Brake Failure - Seconds