NOV 2 0 1995

Critical Item: Yale 2 Ton Manual Chain Hoist and Trolley (2 Items)

Find Number: 2

Criticality Category: 2

SAA No: 09FTP3-007

System/Area: 2 Ton Bridge Cranes/ OPF HB 3

NASA Part No: None

PMN/ Name: H70-1377-01/ 2 Ton Bridge Cranes

Mfg/ Part No: Yale Industries LTP (825-07400)

Drawing/ Sheet No: 80K52909/ Sheet 1

Function:

o Provides mechanical advantage to raise and lower loads up to 2 tons with a small applied force. Also provides the ability to hold a suspended load up to 2 tons. Provides movement in North and South direction.

Critical Failure Mode/Failure Mode No:

A. Gearbox Failure/(FMN 09FTP3-007.001)

B. Mechanical Load Brake Failure/(FMN 09FTP3-007.002)

Failure Causes:

A. Linkage is lost between gearbox components due to worn or damaged pinion gear (teeth), speed reducer (teeth), or load gear (teeth).

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

Failure Effect:

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

B. 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 not held and abnormal noises. The failure has an immediate time to effect.

~~SAA09FTP3-007~~
B/L: 380.00
2 Ton Bridge
Cranes

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Hoist and Trolley

Acceptance Rationale

Design:

- The hoist is an off-the-shelf item manufactured by Yale and is designed to handle a two-ton working load. The minimum safety factor of 5:1 which is acceptable in accordance with NSS/GO-1740.9.
- 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 premanently 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.
- An annual operational check of the hoist under full rated load will be performed in accordance with OMI V6H24.
- Acceptance test at 125% of the rated load will be performed on initial installation.
- Tests are performed in accordance with NSS/GO-1740.9 requirements.
- Pre-operational positioning of the hoist verifies proper operation of all hoist functions.

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Inspection:

- o The hoist will be inspected for an active or current load test validation tag which will be legible along with any warning plates previous to operation.
- o Inspections are performed in accordance with NSS/GO-1740.9 requirements.
- o Visual inspections will be completed annually in accordance with OMI V6H24 and include:
  - Inspection of the load bearing parts (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.
- o When the annual 100% rated load test is in progress, a check for evidence of brake slippage under rated load is completed.

Failure History:

- o The PRACA database was queried and no failure data was retrieved against the Yale 2 Ton Manual Chain Hoist and Trolley in the OPF HB 1 and 2.
- o The GIDEP failure data interchange system has been researched and no failures of this component was found.

Operational Use:

- o Correcting Action:
  - A. There is no action which can be taken to mitigate the failure effect.
  - B. The operator may mitigate failure effects by stopping hand chain movement.
- o Timeframe:
  - A. Since no correcting action is available, timeframe does not apply.
  - B. Seconds.