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

NOV 2 0 1995

<u>Critical Item</u>: 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/ H70-1377-01/

Name: 2 Ton Bridge Cranes

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

Drawing/ 80K52909/ Sheet No: 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)

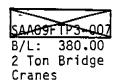
### Failure Causes:

- 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.

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Yale 2 Ton Manual Chain (Continued) Hoist and Trolley

## Acceptance Rationale

#### Design:

- o 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.
- o 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.
- o The gears are splined to shafts or integrally machined and are retained in place by shoulders within the confines of the gearbox.
- o 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."
- o These hoists are subjected to a low number of cycles compared to commercial use. This diminished usage should provide for better long term reliability.
- o The gears are premanently lubricated at the factory.

#### Test:

- o OMRS File VI requires the annual performance of a rated load test.
- o A load test of 100% of rated load will be performed annually by OMI V6H24.
- o An annual operational check of the hoist under full rated load will be performed in accordance with OMI V6H24.
- o Acceptance test at 125% of the rated load will be performed on initial installation.
- o Tests are performed in accordance with NSS/GO-1740.9 requirements.
- o 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.
- 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.