

SAA09FTP3-010  
B/L: 288.00  
SYS: PAYLOAD BAY AREA  
ACCESS BRIDGE,  
OPF-3

Critical Item: Hoist Gearbox (4 Items Total) JAN 24 1995

Find Number: None

Criticality Category: 1

SAA No: 09FTP3-010

System/Area: Payload Bay Area Access  
Bridge System/OPF-3

NASA  
Part No: None

PMN/ A70-0883-01/Payload Bay Area  
Name: Access Bridge

Mfg/ Shepard Niles/GZ1EOH2  
Part No: (137133-137136)

Drawing/  
Sheet No: 80K53218/12

Function: Transmits power from hoist motor to wire rope drum to raise, lower, and hold suspended load (bucket).

Critical Failure Mode/Failure Mode No: Gears Disengage/09FTP3-010.001  
09FTP3-010.006

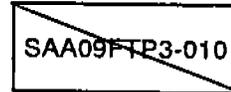
Failure Cause: Structural failure of gears, shafts, and the gearbox housing.

Failure Effect: Loss of supporting force to bucket. Bucket will drop resulting in possible loss of life. Time to effect: seconds.

#### Acceptance Rationale

##### Design:

- o The gearbox is an off-the-shelf item manufactured by Shepard Niles Crane & Hoist Corporation. Its design complies with Crane Manufacturers Association of America (CMAA) and 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 Load bearing members, such as the gear case and shafts, have been designed so that the calculated static stress, based upon the rated load, does not exceed 20% of the average ultimate strength of the material (i.e. 5:1 safety factor).



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**Hoist Gearbox (Continued)**

- The rated load of the hoist is 4000 pounds. The maximum applied load is 1875 pounds. This results in an operational safety factor of 11:1.

**Test:**

- An acceptance proofload test at 150% of the rated load was performed at initial installation. An acceptance stability test at 133% of the rated load was also performed at this time.
- A load test at 100% rated load is performed annually in accordance with manufacturer operating procedures per OMI V6H60. An operational check of the hoist under full rated load will also be performed at this time.
- All tests will be performed in accordance with the requirements in paragraph 702 of NSS/GO-1740.9.
- The OMRS File VI Volume I requires performance of a rated load test annually to verify system integrity.
- Oil sample testing is performed semi-annually by ferrography for trend analysis in accordance with 79K14900 (OMRSD).
- Hoist gearbox vibration data is obtained periodically for trend analysis in accordance with 79K14900 (OMRSD).

**Inspection:**

- A periodic inspection of the hoist is performed annually and monthly per OMI V6H60 to inspect external hoist components for deformation, cracks, excessive wear, corroded members, oil level, and sign of oil leakage.
- All inspections are performed in accordance with the requirements in paragraph 703 of NSS/GO-1740.9.

**Failure History:**

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

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- o The manufacturer was contacted and stated there had been hoist gearbox failures in commercial use. However, the failures were not due to faulty design or manufacturer defects but were attributed to operator misuse (i.e. shock loading while attempting lifts of higher than rated loads).

Operational Use:

- o Correcting Action:

There is no action which can be taken to mitigate the failure effect.

- o Timeframe:

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