U.S. Gov't

SAA09CRCK-001

B/L: 425.00
SYS: 5 TON BRIDGE CRANES

MAR 2 4 1993

Critical Item: Hoist Main Gear Drive (2 Items Total)

Find Number: None

Criticality Category: 2

SAA No:	09CRCK-001	**System/Area:**	5 Ton Bridge Cranes / Logistics Facility (K6-1547)
NASA Part No:	None	**PMN/ Name:**	K61-1610 / 5 Ton Bridge Cranes
Mfg/ Part No:	Shepard Niles Crane Corp / GE1L3K2	**Drawing/ Sheet No:**	CKFMH-60 / 29

Function: The hoist main gear drive transmits power from the hoist compound gear reducer to the wire rope drum.

Critical Failure Mode/Failure Mode No: Gear disengagement / 09CRCK-001.001

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

Failure Effect: Load (RMS in shipping container) suspended from hoist will drop, possibly resulting in loss (damage) of the RMS. Failure is detectable by abnormal noises and movements up to and including dropping the load. Time to effect: seconds.

ACCEPTANCE RATIONALE

Design:

- The gearbox is an off-the-shelf item manufactured by Shepard Niles. Its design complies with Crane Manufacturers Association of America (CMAA) and 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.
- Load bearing members, such as the gear case, gears, 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. (5:1 S.F.)
- All gearing design is based upon AGMA standards 220.02, "Rating of the Strength of Spur Gear Teeth" and 210.02, "Surface Durability (pitting) of Spur Gear Teeth."
- The rated load is 10,000 pounds, the applied load of one end of the RMS, strongback and shipping container combined is 4,250 pounds.

S050239BB
Attachment

U.S. Gov't

SAA09CRCK-001

MAR 2 4 1993

Test:

- Pre-operational set up (positioning and attaching load hook to lifting sling) verifies proper operation of crane components and all functions.
- OMRSD File VI requires verification of current load test annually.
- A load test at 100% of rated load is performed annually by OMI Q6337 in accordance with NSS/GO 1740.9 requirements.
- An annual operational check of the hoist under full rated load is performed in accordance with OMI Q6337.
- An acceptance test at 125% of the rated load was performed on initial installation.

Inspection:

- OMI Q6337 requires a monthly inspection to verify the general condition of all operating mechanisms and the reduction of gear oil level.

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.
- Shepard Niles was contacted and stated there had been hoist gear drive failures in commercial use. The manufacturer stated that no failures were due to faulty design or manufacturer defects. In every instance failure had been attributed to operator misuse (i.e. shock loading while attempting lifts at higher than rated loads).

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.

S050234BB
Attachment
Page 10 of 11

WORKSHEET 5312-013