10/24/2001

Critical Item : Hoist Gear Case (40-Ton Hoist) (2 each)

Find Number : 14

Criticality Category : 2

SAA No: 29AF13-003

System/Area: 40/10/10-Ton Bridge Crane
CCAFS - Hangar AF

NASA Part No : None

PMN/ Name: K60-0734, K60-0735

Mfg. / Part No: LiftTech Intl., Inc. 213846

Drawing / Sheet No: 81K01516 / 3

Function : Transfers torque from the 40 - Ton hoist motor to the hoist drum assembly.

Critical Failure Mode: Gears disengage / FM29AF13-003.004

Cause : Gear teeth shear; key shears

Failure Effect: Torque for holding load will be lost. Load will drop. Possible loss or damage to SRB / SRM hardware.

Time to Effect: Immediate

Acceptance Rationale

Design :

- Shaft, gear design and installation is in accordance with American Gear Manufacturers Association (AGMA) standards. Gear design is in accordance with strength and durability equations of AGMA.
- Gear shafts are fixed at each end by engagement of shaft shoulders against collars which are bolted to the gear case housing.
- Intermediate gears are prevented from becoming disengaged by restricted movement within the housing.
- The basic overall mechanical design safety factor for the crane is 5 to 1.
- Dual upper limit switches utilized to prevent overload.

Test :

OMRSD requires:

- Proof Load Test : all new, extensively repaired, modified, or altered hoist shall be load tested at 125% rated load.

- An operational test of the hoist is performed monthly by maintenance personnel and prior to each lift by the crane user.

    1. Drive hook up and verify hook motion is smooth and hoist gear case does not produce excessive noise.

    2. Drive the hook down and verify hook motion is smooth and hoist gear case does not produce excessive noise.

- Annual Test: The crane is load tested at 100% rated load.

    1. Raise the load approximately one (1) foot above the floor. Set the hoist brakes. Measure the distance between load and floor. After three minutes, repeat measurement to verify no movement.

    2. Raise the rated load three (3) feet above the floor and set the holding brakes. Verify that brake stops and holds the rated load without slippage.

    3. Drive the hoist down, allowing the hoist to attain full speed and release the control button. Verify that the hoist motion stops immediately, without coasting, when the power is removed from the brakes.

    4. Test independently both hoist disk and magnetic brakes to ensure each brake stops the crane motion.

Inspection :

OMRSD requires:

- Semi-Annual Inspection: Check for evidence of distortion, cracks, oil leakage, loose or missing bolt and excessive noises. Check oil level.

- Annual Inspection : Sample gear case oil; check for metallic particles, water or sediment.

Operational Use :

- Operation of the crane is only by trained and certified operators (KMI 6730.3, Examination and licensing of KSC Heavy Equipment or Facility Cranes/Hoists Operators).

10/24/2001

Failure History :

- The GIDEP system was checked and no failure data related to this item was found.
- No failures were reported in the Anomaly Report, Quality Deficiency Report (QDR), and PRACA for this component as of 10/02/2000.
- There is one Quality Assurance Inspection Report (QAIR) which revealed a cracked spider plate and twisted drum shaft during a visual inspection of the hoist gear case. These defects were discovered over a period of time from 12-15-87 through 02-26-88 as inspection progressed. These defects did not result in a worst case failure effect.