

SAA09FY12-006
REV. B

B/L: 389.00
SYS: 175-TON
BRIDGE
CRANE, VAB

AUG 20 1993

Critical Item: Motor - Generator Set, Main Hoist
Find Number: M12-G4
Criticality Category: 1

SAA No: 09FY12-006	System/Area: 175-Ton Bridge Crane/VAB
NASA Part No: NA	PMN/ Name: K60-0520/ 175-Ton Bridge Crane/VAB
Mfg/ Part No: Motor: Imperial Electric/ Type C06X Form C Gen: Imperial Electric/ Type D Form C	Drawing/ Sheet No: 67-K-L-11348/ 15

Function: Consists of a 300 HP motor coupled to a 170 KW DC generator to provide power to the armatures of the two 100 HP main hoist motors.

Critical Failure Mode/Failure Mode No: No output/09FY12-006.004

Failure Cause: Brush/commutator failure, open/shorted armature winding, structural failure (brush spring, brush yoke, brush rigging), open/shorted field winding, open/shorted cable or connector.

Failure Effect: Loss of main hoist motor armature current. Loss of main hoist motor torque while the command is being given to raise, lower, or float and the brakes are released. The load will drop without regenerative braking. The worst case would be the aft end of the orbiter being hoisted, lowered, or floated at approximately 80 feet above the VAB floor or the orbiter transporter, the failure occurring, and the effect being the aft end of the orbiter descending and striking the VAB floor or transporter at a speed of 210 ft/min resulting in a potential loss of life and/or vehicle. Time to effect: seconds.

ACCEPTANCE RATIONALE

Design:

Motor

300 HP
480 VAC
1750 rpm
323 A

Generator

170 KW
480 VDC
1750 rpm
354 A

- This was designed for crane use and selected by the crane manufacturer for this application.

Test:

- OMRSD file VI requires verification of proper performance of hoist operational test annually.
- OMI Q3008, Operating Instructions, requires all crane systems be operated briefly in all speeds to verify satisfactory operation before lifting operations.
- OMI Q3008, Pre-Operation Setup Instructions, requires current limit checks prior to all major lifts of flight hardware (verifies motor, generator, generator field DC input controller, float control loop and DC power loop components are operational).

Inspection:

- OMI Q3008, Pre-Operation Setup Instructions require visual and audible check of commutators on motor-generator set generator for proper operation and condition.
- OMI Q6003, Maintenance Instructions, requires semiannual inspection of brushes on motor-generator set generators for freedom of movement, wear, clearance, security and cleanliness.
- OMI Q6003, Maintenance Instructions, requires semiannual inspection of motor-generator set motors and motor-generator set generators for acceptable condition or damage.
- OMI Q6003, Maintenance Instructions, requires semiannual inspection of armature loop insulation resistance at each motor-generator set.

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.

Operational Use:

- **Correcting Action:**
 - 1) The failures can be recognized via the Selsyn (positions change) that is in view of both operators.
 - 2) When the failure indication is noticed, the operator can stop all crane operations by pressing the E-Stop button.
 - 3) Operators are trained and certified to operate these cranes and know and understand what to do if a failure indication is present.
 - 4) During all critical lifts, there is at least one remote Emergency Stop (E-Stop) operator observing the load lift, and can stop the crane if a failure indication is noticed.
- **Timeframe:**
 - Estimated operator reaction time is 3 to 10 seconds.