

SAA09FY12-005
REV. B

MAR 11 1994

B/L: 389.00
SYS: 250-TON
BRIDGE
CRANE, VAB

Critical Item: Motor - Generator Set, Main Hoist (2 Total, 1/Crane)
Find Number: M12-G4
Criticality Category: 1

SAA No: 09FY12-005	System/Area: 250-Ton Bridge Crane (#1 & #2)/VAB
NASA Part No: NA	PMN/ Name: K60-0533, K60-0534/ 250-Ton Bridge Crane (#1 & #2)/VAB
Mfg/ Part No: Motor: Imperial Electric/ Type C06X Form C Gen: Imperial Electric/ Type D Form C	Drawing/ Sheet No: 60-K-L-11388/ 15

Function: Consists of a 500 HP motor coupled to a 250 KW DC generator to provide power to the armatures of the two 150 HP main hoist motors.

Critical Failure Mode/Failure Mode No: No output/09FY12-005.004

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 a critical load (SRB segment, Orbiter, or ET) being hoisted, lowered, or floated, the failure occurring, and the effect being the critical load descending and striking the VAB floor, transporter, work platforms, MLP, or Shuttle Stack resulting in a potential loss of life and/or vehicle, or damage to a vehicle system. Time to effect: seconds.

ACCEPTANCE RATIONALE

Design:

Motor

500 HP
480 VAC
1750 rpm

Generator

250 KW
480 VDC
1750 rpm

Attachment
S050234CK
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- 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 to 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 semi-annual inspection of brushes on motor-generator set generators for freedom of movement, wear, clearance, security and cleanliness.
- OMI Q6003, Maintenance Instructions, requires semi-annual inspection of motor-generator set motors and motor-generator set generators for acceptable condition or damage.
- OMI Q6003, Maintenance Instructions, requires semi-annual 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 failure can be recognized via the ammeter (lack of current) and 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.
 - 5) During final SRB mate, all crane operations are ceased and final mate is accomplished by use of the 250-Ton Hydra-Set.

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- Timeframe:

- Estimated operator reaction time is 3 to 10 seconds.