

# **Safety Bulletin**

## **TIVOLI MFG. LTD.**

Bulletin No: ORSA002A

Pages: 4

Ride Type: Orbiter (aka Typhoon, Predator) Rides Included: All Rides

Date: March 30, 2004

Parts supplied: Yes

**This Safety Bulletin is being issued in cooperation with the U.S. Consumer Product Safety Commission who will monitor its implementation and effectiveness. It supersedes AmTech safety bulletins ORSA001 and ORSA002.**

(NOTE: Changes in inspection procedure and parts availability)

**Purpose: Inspection of top center hub area.**

On February 1, 2004, an Orbiter amusement ride caught fire while operating at a fair in West Palm Beach, Florida. The fire originated in the top center hub area of the ride. A fire was initiated when bolts securing the motor mounting plate became loose and eventually sheared allowing the motor plate to turn causing one or more hydraulic hoses to pull loose from their crimps, spraying fluid into the top hub area. The source of ignition is still under investigation at this time. As a precaution Tivoli Mfg. Ltd. requires that the inspection recommendations described below be carried out **immediately** on all Orbiter rides.

**It is absolutely necessary that all testing, inspections, and work be done by professional personnel capable of understanding the function of the components and who are trained in the uses of the equipment necessary to complete the work described in this bulletin.**

- **Inspection of B10 hydraulic motor pinion mountings.** The pinions on the orbiter are attached in one of two ways; 1) a bolt and washer screwed into the end of the output shaft or; 2) two allen set screws threaded into the top shoulder of the pinion gear. These fasteners are to be checked for tightness and assured that they are properly secured with Loc-Tite® (242).  
**Note: If applying Loc-Tite®, the threaded areas must be free of grease or oil before installing.**
- **Inspect all bolts securing motors to mounting plate.**
  - 5 – 12 mm x 45mm bolts for each hydraulic motor.

If loose, damaged or show signs of re-use, replace immediately with new bolts and tighten to correct torque.

- **Replace all nine (9) bolts securing motors mounting plate to hub.**
  - 9 – 12mm x 45mm bolts spread equal distance around outside parameter of plate. See Attached drawing ORSA002A (See Attached)

**Bolt Specification for three motors and motor mounting plate.**

**Bolt:** Hex head, 12 mm x 45 mm x 1.75, grade 8.8, partial thread, black finish. Ref: DIN 931 / ISO4014

**Washers:** 12 mm, flat hardened washers, 13 mm ID, 24 mm OD, 3 mm thick. C45. Ref: DIN 6916

**Tightening Torque Requirements:** Tighten bolts to 65 ft-lbs.

- Inspect all wiring in top center area and repair any loose or broken wires. Assure sweep wiring is free and clear of entanglements with hydraulic hoses. Check all wiring connections on slip rings and flasher enclosures.
- Clean area of oil and debris.
- Inspect hydraulic hoses and fittings, replace any hoses found to be damaged or worn; repair any leaks.
- Inspect slip ring assembly and assure proper alignment.
- Assure all top aluminum tread plate covers are in place and fastened on the top of the ride.
- Install a 10 lb ABC fire extinguisher in control booth that is easily accessible by operator.
- Train personnel in proper fire and evacuation procedures.
  - Instruct operators that in case of fire press “**STOP RIDE**” button to bring the ride down to a normal stop. Do not use “**Ride Abort**” button, as this will stop ride with the center in the raised position making it more difficult to evacuate passengers.
  - Evacuate all passengers before attempting to extinguish the fire.
  - If conditions warrant proceed to extinguish fire with fire extinguisher.

- Notify Fire department immediately.

### **Inspection Requirements:**

Routine inspections of the top area of the ride must include inspection of the motor mounting plate to detect any damage, missing, or visibly loose bolts, loose or frayed wiring, or damaged slip ring assembly. Bolts securing the motor mounting plate must be tested for tightness **every six (6) months** of operation.

### **Bolt Testing procedure:**

In order to test and assure motor mounting bolts have remained tight to their recommended torque value the following procedure must be followed;

- Obtain a torque wrench (or equivalent) capable of attaining a tightening torque between 0 and 100 ft-lbs. **Important:** Assure the torque wrench is in good working order and is properly calibrated.
- Use a 19mm socket with wrench.
- Set torque for 60 ft-lbs. **Do not set over this value.**
- Using torque wrench attempt to tighten each bolt until the torque wrench indicates (clicks) 60 ft-lbs.
- As the bolt is tightened visually check socket for rotation.
  - The socket should not turn before the indication (click) is reached. This will indicate that the bolt is remaining at its correct torque. **If each bolt passes this test there is no further testing required**
  - If the socket turns before the indication (click) is reached, the bolt has loosened and both bolt and washer must be replaced.
    - If loose bolts are detected notify Tivoli Mfg. Ltd. or AmTech in order to determine if further testing or investigation is necessary.

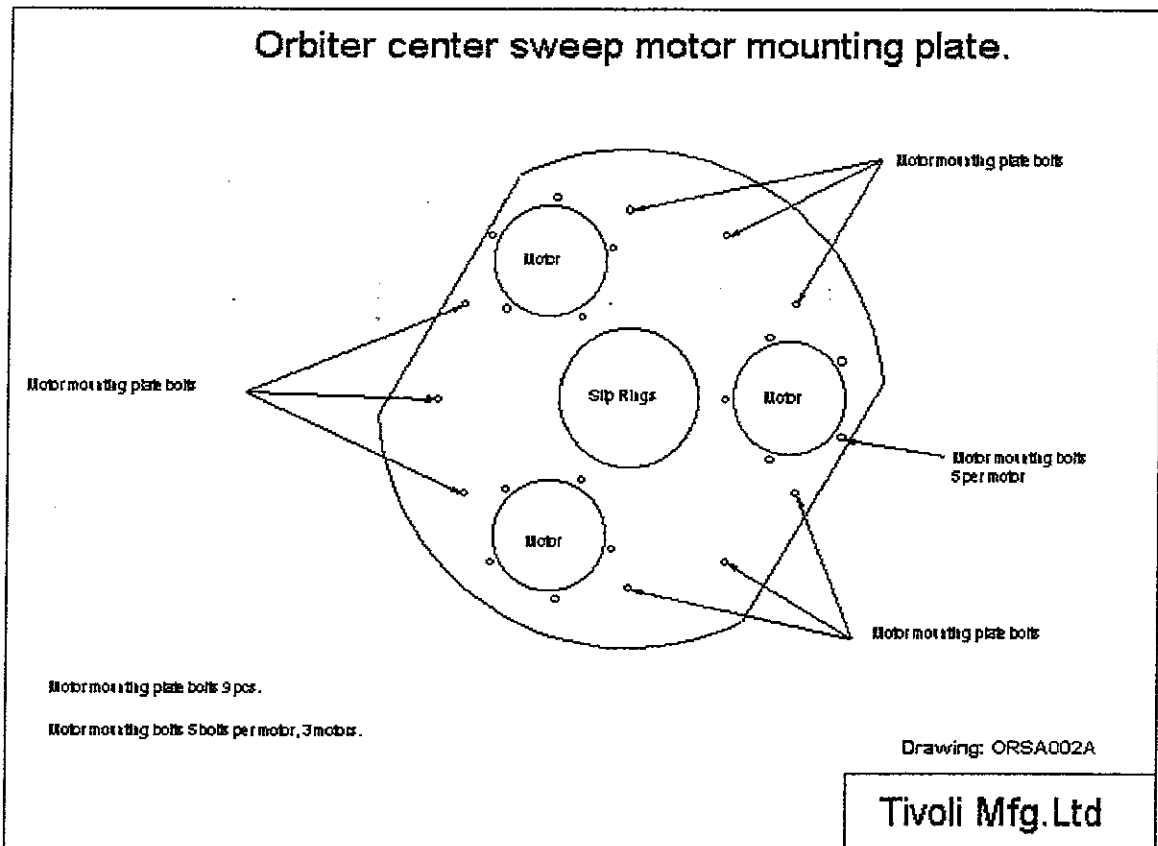
**Replacement motor mounting plate bolts and washers (9 bolts and 9 washers) manufactured to the above specifications are available free of charge, freight paid (UPS ground only). Faster service available at cost.**

Contact: AmTech at 817-641-5045 or Fax: 817-645-9109. Please have ride serial number available when ordering.

Tivoli has developed a guard that can be placed around the slip ring assembly in order to help reduce its exposure to the elements. These will be made available in approximately 6 weeks. Please contact Jim Ziaja at AmTech (817-641-5045) for availability.

The ride will be ready for operation when all the above are inspected, certified, documented and completed in accordance with the manufacturer's instructions. The ride owner/operator will be responsible for maintaining written records of all ride inspections and parts replacements.

If there are any questions or additional information required in order to complete what has been outlined in this bulletin please contact Tivoli Mfg. Ltd or AmTech/ Amusement Technologies Intl. Inc. (817-641-5045).



Tivoli MFG. Ltd.