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Page 1 of 1

SAFETY ALERT

Ride Manufacturer: Eli Bridge Company **Affected Production Dates:** All **Affected Serial Nos:** All

Ride Names: Eagle 16 Wheels, Double Eagle 16 Wheels, HY-5II Wheels

Abstract of Issues: 1) A Double Eagle had a removable drive-rim bolt failure due to the bolt having been in operation beyond its useful life. The threads on the nut and bolt had lost their elasticity and were backing off and being retightened several times a week. During the time the bolt was loose, it wore the hole in the spoke tab into an oval, to the point where a load was applied to the nut, which was not intended by the design. The nut and bolt should always be tight so that the only loads on the bolt are a compression load from the tightening of the nut and bolt and a sheer load on the shank where the aluminum drive rim and the steel spoke tab meet.

2) Both the removable nut and bolt and the pivot nut and bolt should be kept lubricated to avoid rust and corrosion, especially where the steel is in contact with the aluminum drive rim

Reason For Release: 1) There was an incident on a Double Load BIG ELI Eagle #16 where a drive-rim removable bolt broke during operation. With the cooperation of the owner and his staff, the Ohio State Inspection Department, and the other Wheel owners in Ohio, there has been an investigation as to the cause of the break. The crack started at the end of the threads closest to the shank of the removable bolt and proceeded to break into the shank. By design, there should be no bending load on the threads of the removable drive-rim bolt. If the nut and bolt do not remain tightened, the aluminum drive rim and the steel spoke tab which are being held together by the nut and bolt will be allowed to move up and down against each other and eventually wear the holes into ovals. This looseness lets the pin move and the result is that a load is put on the nut by the tab. This load is transferred to the threads as a bending load, thus eventually cracking the thread until ultimate failure occurs as a break.

2) During the investigation we found that occasionally when Eagles & HY-5II's are assembled or disassembled the pivot pin is broken by the torque applied when the drive rim is folded or unfolded if the pivot pin had corroded against the aluminum rim.

Actions to be taken:

- 1) All Drive-Rim Removable Bolts (and nuts) and Pivot Bolts (and nuts) over five (5) years old must be replaced with new ones before opening the season or by March 15, 2006 if the Wheel is already operating.
- 2) Any bolt and nut, no matter the age, should be replaced if the nut starts repeatedly backing off the threads after being properly torqued.
- 3) Drive Rim Bolts (both removable and pivot bolts) need to be torqued to between 75- and 100-foot-pounds each time they are installed.
- 4) If the nut is bottoming out on the threads before the proper torque is reached, then a flat washer of adequate thickness (not a lock or split washer) should be inserted between the nut and spoke tab to rectify this problem.
- 5) All existing Drive-Rim Removable Bolts (and nuts) and Pivot Bolts (and nuts) must be replaced with new ones every five years.
- 6) Both bolts should be kept lubricated and "Never-Seize" (or equivalent) must be applied on the large shoulder of the Pivot Bolts before beginning each season, more often if it operates in climates that cause it to disintegrate in less than a year.
- 7) The Spoke Tenon Bolt (often called "hub bolt) connections should be checked for wear at least once per year: preferably before the season starts in the Spring, more if the wear is close to the tolerances. Excessive wear on these causes faster wear of drive rim bolts.
 - a) If either the bolt or banana is worn 1/32" or more on one side of the spoke stack, it should be replaced with a new one. AND the bolt and/or banana in the same position on the other side of the spoke stack should be replaced at the same time. Failure to replace them both could allow the stack to pull to one side or the other when raising the tower and setting the Wheel up.
 - b) If the spoke tenon hole is worn more than 1/32" call Eli Bridge.
- 8) If your spoke tab holes are wearing into ovals, the tabs should be replaced or they should be reamed out and bushed to bring the hole back to original size. This will help deter the bending stress on the threads. Parts/reamers for both of these options are available from Eli Bridge Company.

NOTE: In February 2006 there will be some minor modifications (for instance, slightly larger radii in the pivot and removable drive-rim bolts for the Eagle and Double Eagle to provide an even more robust design of these bolts.