Fretting corrosion

Fretting corrosion or pressure rust refers to deterioration of two surfaces that are in close contact to one another, such as the bearing and the bearing journal on the axle stub. These to surfaces are nominally at rest but are nevertheless subjected to vibration. Fretting corrosion is present in many tight-fitting parts which are designed not to have movement between the contacting surfaces, but due to vibration and pressure fluctuations these surfaces have relative motion to one another.

Mechanisms of fretting corrosion

Fretting corrosion is affected by the vibration frequency and the loading of the two mating surfaces, see Photo 1.

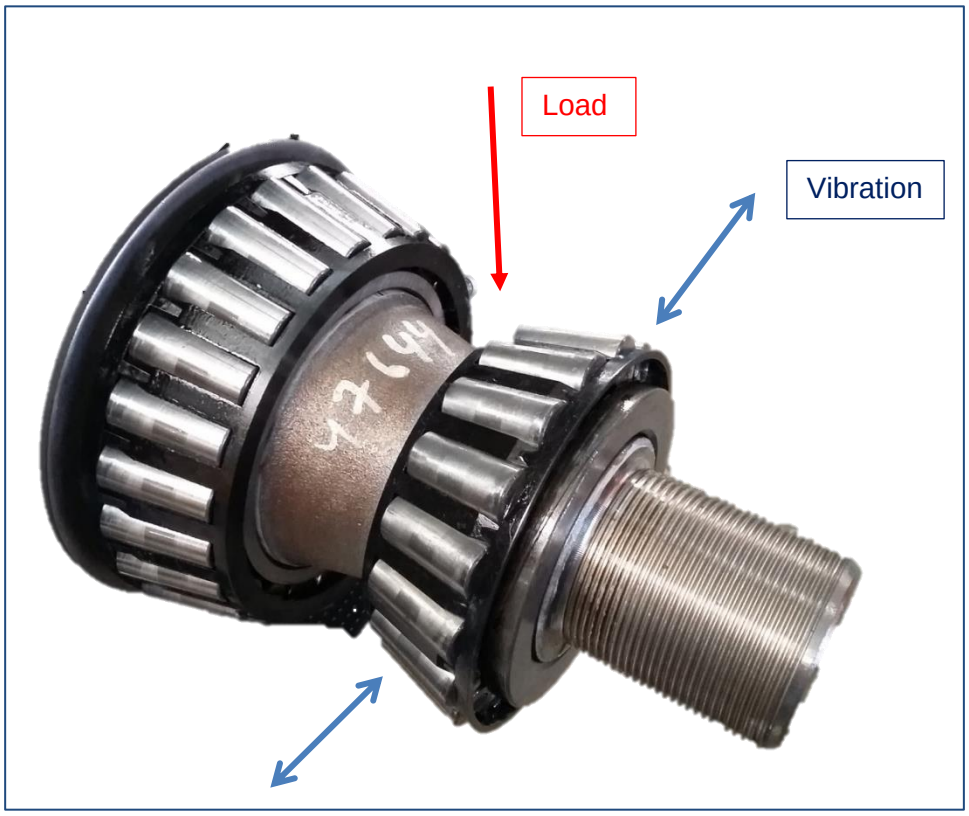

Photo 1

There are two theories on the mechanism of fretting corrosion:

1. Micro welds form at the contact points of the two mating surfaces which the vibrations then cause to break off
2. Frictional heat causes an oxide layer to form, which then deteriorates the two mating surfaces

Prevention of fretting corrosion

One cannot completely get rid of fretting corrosion just minimise its effects. This type of preventative maintenance needs to be done at every re-grease of the hub unit. Once the hub unit is removed and the axle stub is cleaned off the excess grease, the bearing journal must be inspected as it may have a brown stain on it (pressure rust), see Photo 2. Every sign of this stain must be removed with the use of scotch pad.

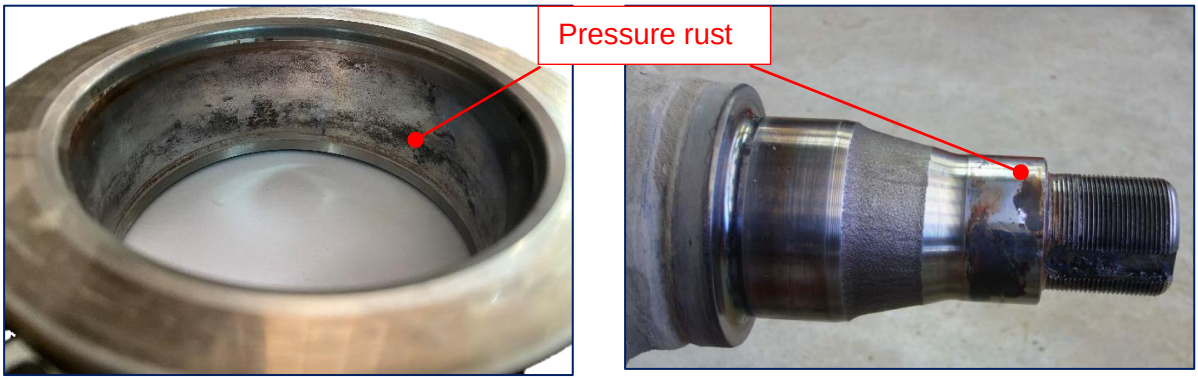

Photo 2

Before assembling the hub back onto the axle, it must be ensured that the bearing surfaces are clean. Once the bearing journals are clean, apply a thin layer of ECO-Li Plus grease to the bearing journal and axle beam threads (see Photo 3). It is important that the pressure rust always remains moist as dry pressure rust will cause damage to the mating surfaces and will cause bearings to seize on the axle stub.

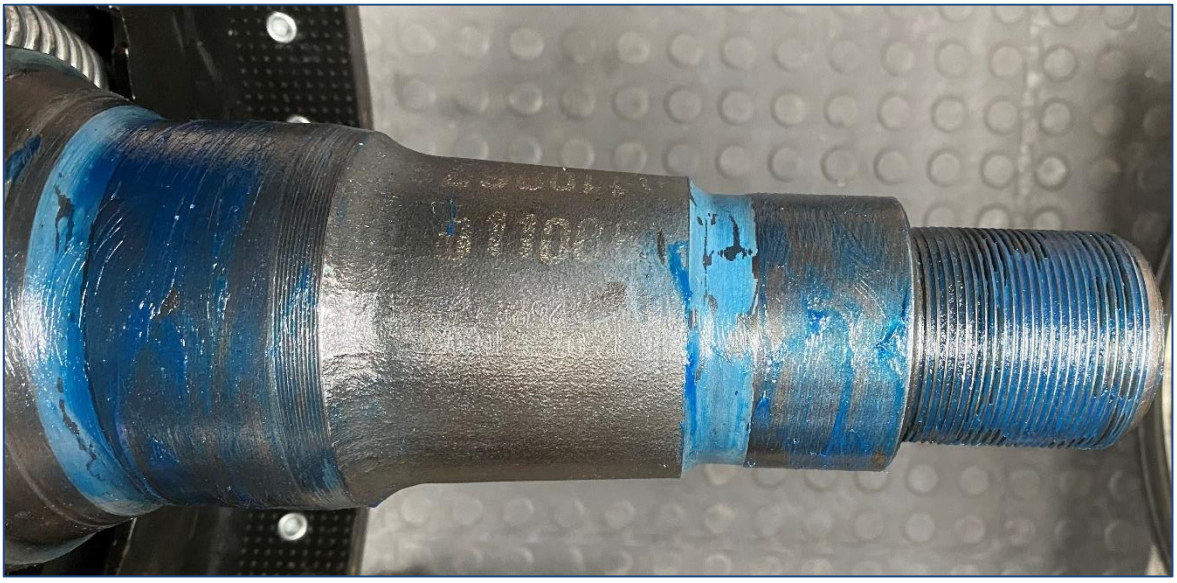

Photo 3