

Work execution:

Alignment and soft foot

Reliability bulletin WE 1002



Problem:

Machine feet perform many important functions. They constrain the machine for normal operating loads and in the event of a sudden failure such as a shaft lockup or a bearing seizure. Additionally, the feet are used to position the machine with respect to the other machine components in the train. The feet are also an important part of the machines structural or vibration dynamics.

A change in the bolted condition of the machine feet from the manufacturer's recommendations can affect any or all of these important functions. The use of improper bolt grade, for example, may alter the strength of a foot joint and may not perform as designed in machine accident. Improper bolt torque techniques, damaged washers, and uneven bolting surfaces prevent precision machinery movements while aligning

and create a constantly moving target. Changes in bolting stiffness due to incorrect clamping forces can alter machine/base stiffness and may induce resonances in a machine that used to perform well.

Notice in the photograph the uneven foot surface due to a rough casting and repeated bolt tightening. A soft washer was cut at one time in an attempt to fit the radius of the foot pad and is now so severely cupped that it is impossible to accurately position the machine horizontally.

Solution:

As part of any machine alignment or installation, always inspect the bolts and washers to ensure they are of the proper type and length and that they are in serviceable condition. Replace any soft washers with hardened washers. If the clearance hole in foot is enlarged, damaged, or rough, the use of a ground plate and/or machining of the foot surface will ensure the best possible clamping condition.

Last, and most important, always use a torque wrench with the proper sockets and adaptors when tightening machine feet. Follow a tightening sequence and if all of the softfoot has been removed in advance, the machine will move predictably through the alignment remain in position when placed in service.