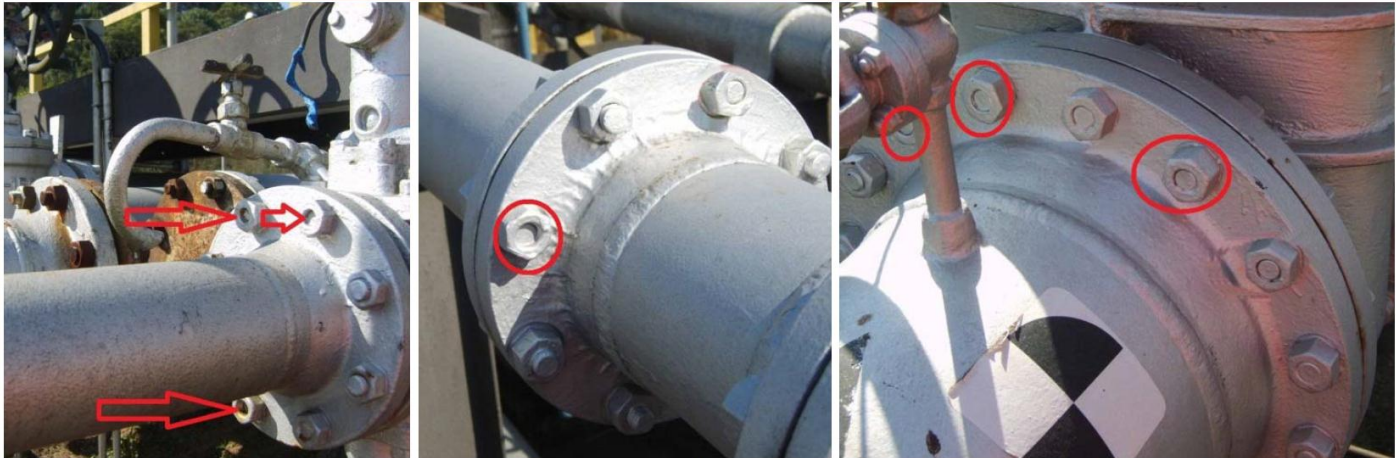


## **Mechanical Integrity – The Bolts Are Too Short!**

February 2012



### **...or they aren't all there!**



The pictures show improperly bolted flanges that a plant found during safety inspections. In the top pictures, some or all of the bolts are too short, and the nuts are not completely on the bolts. This means that the joint may not be as strong as it should be. Flanges are designed so that the entire nut-bolt combination holds the forces on the flange. If the nut is only partially screwed onto the bolt, the connection may not be strong enough.

In the picture to the left, two of the four bolts are missing. This flange will only be about half as strong as the piping designer intended!

## **What can you do?**

- ➔ If your job includes putting equipment together, assembling flanged pipe, bolting manhole covers or other bolted connections on equipment, or other equipment assembly, remember that the job is not complete until all of the bolts are properly installed and tightened.
- ➔ Some equipment requires special bolt tightening procedures. For example, you may have to use a torque wrench to correctly tighten the bolts to the specification, or tighten the bolts in a special order. Make sure that you follow the correct procedure, use the correct tools, and that you are properly trained in the equipment assembly procedure.
- ➔ Check pipes and equipment for properly bolted flanges as part of your plant safety inspections. As simple guidance, bolts that do not extend beyond the nuts should be reviewed by a plant piping craftsman or engineer.
- ➔ If you observe improperly bolted flanges in your plant, report them so they can be repaired, and make sure the required repairs are completed.
- ➔ Inspect new equipment, or equipment which has been re-assembled after maintenance, to make sure it is correctly assembled and properly bolted before starting up.

***Finish the job – make sure flanges are properly bolted!***