

Water Faucet Fitting Failure Causes Significant Damage

EMPHASIS: Fastener Failure

by:

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Faucets are typically secured to a sink using metal threaded pipes and polymer nuts as shown in **Figure 1**. In the particular case seen in **Figure 1**, the threaded pipe failed in the vicinity of the nut, causing significant damage to a home. This was on the hot water side of the faucet.

Figure 2 shows the fracture area of the cast brass faucet fixture. **Figure 3** and **Figure 4** show close-up photos of the fracture surface. The arrows in **Figure 3** and **Figure 4** are in the area of the fracture origin and also show the apparent thinner wall thickness in this area.

The cast brass pipe had a nonuniform wall thickness along

the circumference. The thickest portion of the pipe wall is at the 10 o'clock position. The thinnest is at the 5 o'clock position, near the arrows.

Cutting of the pipe thread further reduced the cross section, especially at the thinned area indicated by the arrows. This condition resulted in increased stress from installation preloads and thermal loads.

The thermal cycling provided fatigue-related loading, which lead to the eventual failure of the threaded fitting. The defect here is the circumferential variation of pipe wall thickness such that the thin section of the pipe wall is over-stressed, which is most likely a quality control manufacturing problem.

For further discussion, contact the author by emailing him at ccr@croberts.com.

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Fig. 1 — Faucets are usually secured to a sink using metal threaded pipes and polymer nuts.



Fig. 2 — Fracture area of cast brass faucet fixture.

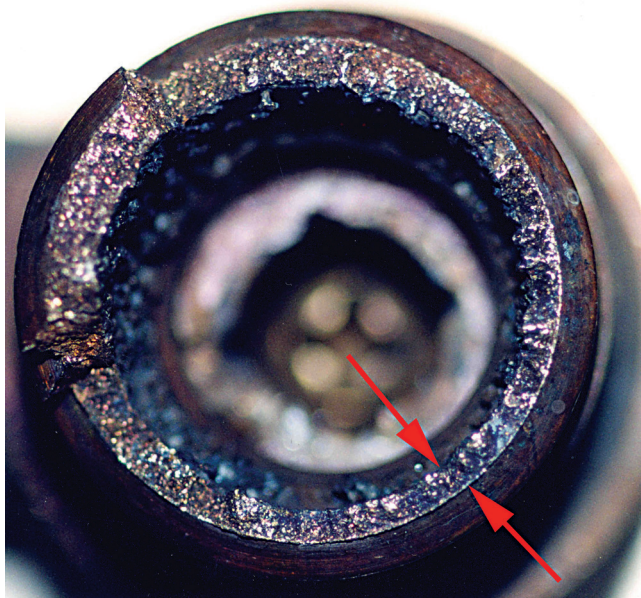


Fig. 3 — Close-up of fracture surface.

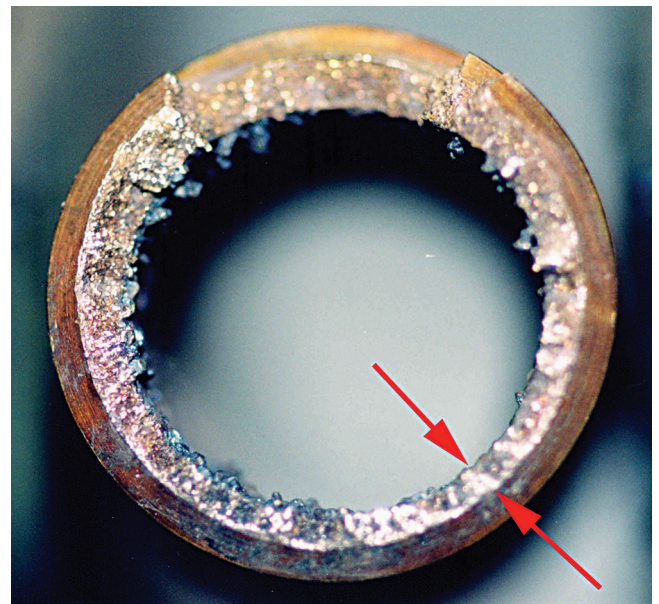


Fig. 4 — Close-up of fracture surface.