Crack!

First off, don't let the title fool you, this has nothing to do with finding a plumber or general plumbing repair. It is however about finding cracks in parts that are susceptible to fatigue failure. There is more that one way to find a crack in a part. The obvious would be visually but the crack may be so small that it can't easily be detected with the naked eye (yet). Another popular method is magnetic particle inspection better known as Magnaflux®. To inspect a part with magnetic particle your going to have to take it to a machine shop that has this ability. They pass a huge amount of current through the part and the crack will show up as the tiny iron fines they use to inspect with gather at the break. Crankshafts should be checked in this manner if doing an overhaul. I put no faith in the "ring test" described in the red book on the engine for inspecting crankshafts. Spend the $15 and have crankshaft magnetic particle inspected before spending any money to have one reground.

Over 100 years ago, the railroads developed dye penetrant inspections to inspect highly stressed parts on in service locomotives. This method works well and if the part can't be easily magnetized, it is a viable alternative, as it doesn't require disassembly. This method is often employed in the inspection program of aircraft structure today to find failures early.

Here is how it works. You first clean the part by removing all the oil and grease. Then you wipe it down with the solvent that is sold as a companion to the penetrant. Next, spray the dye on and allow it to dwell on the part the recommended time. This is usually 5-10 minutes. Now, wipe off the dye using a rag. This stuff once on your hands has to wear off so you really need to wear disposable gloves. Finally, lightly spray the part with the developer and cracks will appear as a bright red line. Allow the developer to work for 10 minutes or so to pull the dye to the surface.

These items can be purchased at a welding supply store for around $20. Cheap insurance before using that "good" axle shaft in your next rebuild.

Beware of false indications. Scratches and tool marks may show up as an indication of a crack. Follow this basic rule, if the indication is in a straight line then it is a scratch. Use a good magnifying glass and look closely if in doubt.

Typical scratch or tool mark

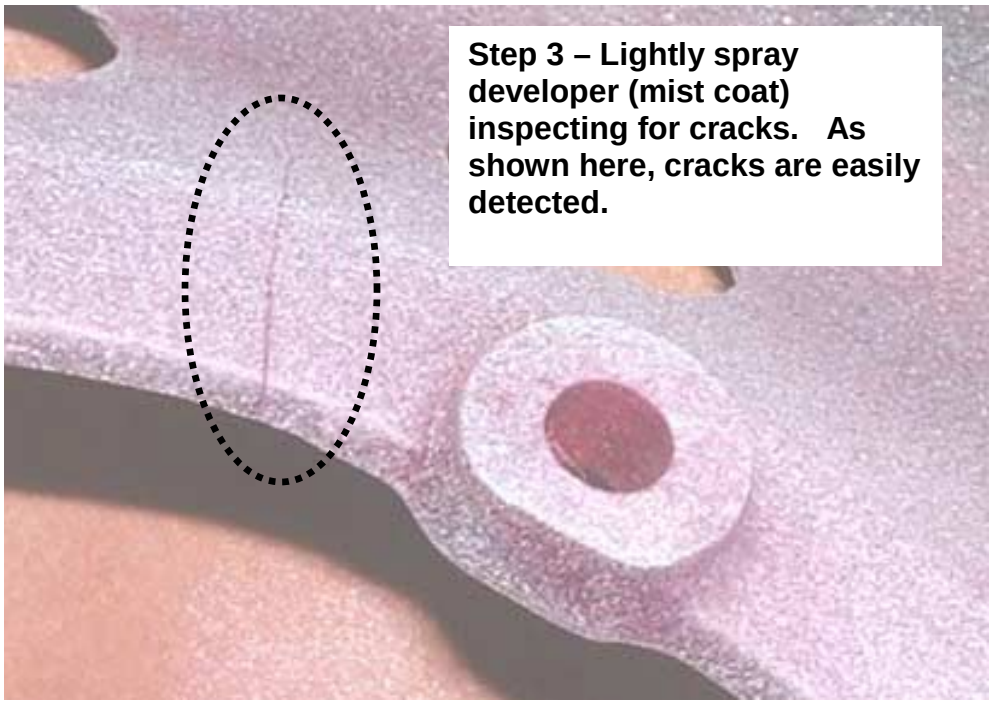
Typical crack. Cracks will appear as jagged edges when looked at closely. Use a magnifying glass if necessary

I would suggest this method on any part that has a known high probability of failure such as transmission drums, crankcase corners, steering columns near the rivets, around frame rivets, etc., etc. As you can see, there are many areas where it would be beneficial to detect problems early. I would venture to guess a considerable percentage of parts that appear to be good to the bare eye would show signs of impending failure if checked with dye.

There is a variation of this method that uses a florescent dye. You then examine the part under a black light. The florescent penetrant method is actually more sensitive and the only one being used in the aerospace industry anymore.
Having said that, any method is better than no method at all.

<u>After</u> a good cleaning, apply penetrant to areas of concern and allow to sit the recommended time.

Wipe excess dye off of part. Using a rag moistened with solvent get the heavy stuff off. Don't worry about getting it all. Once the developer is applied the part will have a pink tinge to it. Cracks however will readily be evident.



Continue to be safe for the upcoming year of touring and look closely before putting "good" parts into service. ***Gary***