

The Bellows Bottom Line

Practical advice on expansion joints

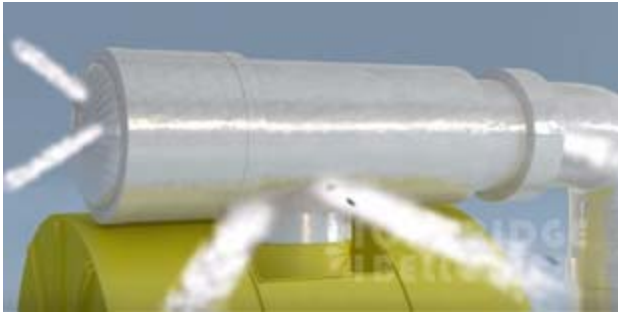
by Greg Perkins

JUNE 2017

This month - **Forced Outage Emergency Recovery Tip** *Desperate repair on GE crossovers that will make you look like a genius*

Scotty! Get those warp drives back on line now!

Power plant maintenance personnel managed to fix a GE steam turbine crossover expansion joint blowout with a clever repair; earning a hats-off from the impressed Oakridge Bellows engineering team. Sirs, we salute you.



This usually means an extended unscheduled outage

We don't see this every day

We get a lot of GE (and Westinghouse) crossover rebuilds every Spring and Fall, and not much surprises us when we pull off the outer casing covers, until we noticed this obvious blowout. This rebuild order was placed months in advance so that the bellows cartridges were ready for the standard 2 week turnaround once the low boy truck pulls up with the cross-over piping – no way the utility could have operated with this size hole.

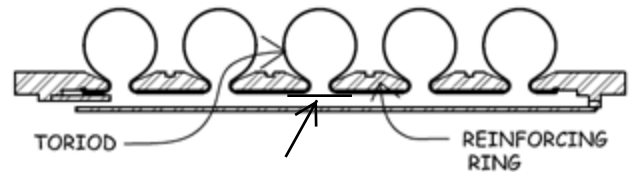


Notice the band as seen from the outside - Mystery solved

And then we saw the weld band on the inside. The GE toroid design is the gold standard of metal bellows, and

its unique flat spot between convolutions makes it possible to seal off the individual toroid without having to make a weld anywhere near the 'flexing zone'. Again, this repair is unique to the GE toroid bellows.

And yes, it locked up a needed convolution and forced the others to take more movement, but hey – desperate times call for desperate measures. Although the plant management sweated it out during the 8 months until their scheduled outage, they made it.



A welded band sealed off the leaking toroid convolution. Brilliant.

The Bottom Line - Don't ignore the warning signs

The plant personnel did notice steam leaks under the casing covers for some time before the blowout but were not sure of the source. Folks, always put your money on the bellows as the leak source. It is rarely anything else. A word of caution to plant managers - blowouts like this not only cause unscheduled outages, but can also injure people on the turbine deck.

After 25 years of service, GE recommends having the toroid cartridges changed out; that is the proactive approach to steam turbine equipment maintenance.

But when all else fails – remember this repair tip.