

The Bellows Bottom Line

Practical advice on expansion joints

by Greg Perkins

Oct 2010

This month - **GE Cross-Over Expansion Joint Repairs** *Critical steam turbine pre-outage planning tips*

So much for pre-planning

You're in the middle of a four week outage and find out that the bellows on the steam turbine cross-over expansion joint is leaking. The standard option is to ship it to an experienced expansion joint manufacturer who will replace the bellows and retest. Unfortunately the current *expedited* lead time is 4 weeks – a full 2 weeks beyond the outage which does not even include another 3 days of reinstallation on the turbine.

Plan ahead now so that this unpleasant experience doesn't happen to you.

A toroid has a long lead time - so order ahead

A large time consumer in refurbishing a GE cross-over is manufacturing the toroidal bellows. Underneath the heavy load-bearing cover is a specialized style of bellows that is almost exclusively used in these old 'wrapper' style cross-over's - and for good reason as this design has proven to last +25 years.

One design detail that makes these bellows hard to produce within the outage schedule is the reinforcing rings, which are machined forgings. Also the toroidal bellows has a circular cross-section that takes more set-up time to form, which then needs a heat-treatment in order to duplicate the original part.



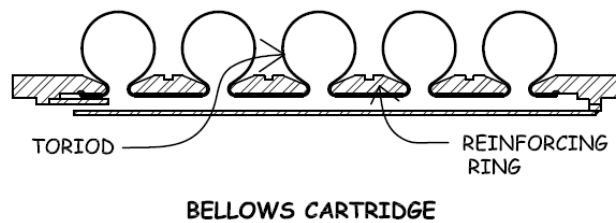
OEM cross-over expansion joint - GE Wrapper Style

Keep on schedule with a cartridge bellows

The good news – if you have a cartridges in-stock, the cartridges can be installed and the cross-over unit retested within a one week window. The key is that the cartridges needs to be ordered at least 12 weeks in advance of the outage to avoid expediting charges.

The toroids are standardized designs which means that the only information you need to give us is the piping diameter and the convolution count. A simple but effective way to get the number of convolutions is to poke a stick under the wrapper and count the bumps.

Yes, this may mean you order a part that may or may not be needed for the upcoming outage. True, but if the existing cross-over expansion joint is over 25+ years, it is living on borrowed time; having a replacement cartridge in the warehouse is the right move to make. Another plus is the cost savings of avoiding expedite charges. Remember - both bellows should be replaced at the same time.



Link to our video on this topic -

<http://www.oakridgebellows.com/metal-expansion-joints/power-plant-expansion-joints/ge-cross-over-steam-turbine-expansion-joint.html>

The bottom Line

The next time the turbine is down, have a section of the insulation removed and take a convolution count (even easier if drawings are available). With that information the bellows cartridge can be put on order so that your replacement options are pre-planned.

