



## Proven and Cost Effective

- 20+ years of vane pinning experience
- 200+ gas turbines are running with pinned vanes
- Many fleet leaders have operated 100,000+ hours

Frame 5, 6B, 7B/E/EA, 9E, 6FA, 7FA and 9FA are operating with pins

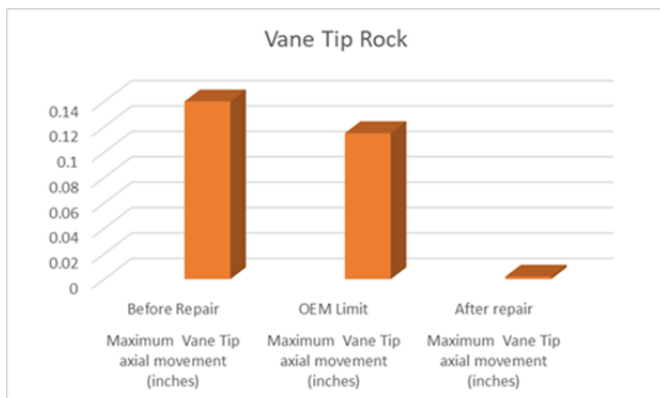
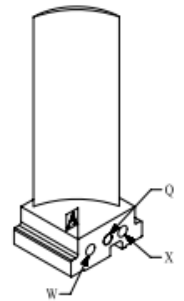
## VANE PINNING NEWSLETTER – OCTOBER 2023

7FA Stage 14-16 **Big Foot Pinning Solutions** are now available from CTTS. While clearly a more robust vane base design, this OEM solution fails to address the need for dampening of the individual vanes and therefore fretting remains a problem. There is good news for customers who have invested in the OEM Big Foot solution. The casing and vanes themselves can continue to be used assuming the fretting is caught in time. The solution uses a somewhat modified vane pinning solution that stays within our successful field experience.

### In general, compressor vane failures remain a hot topic in our industry.

A few themes are apparent:

- There are multiple causes or contributors for stator vanes:
  - Foremost is localized flow/pressure variations creating stimulus at casing geometry transitions, air extractions and back-end stages.
    - Protruding shims/platform lifting can contribute
    - Based on anecdotal evidence it appears that operating **compressors in off-design conditions** are more vulnerable as evidenced by
      - Units in cold climates
      - Units operating at part loads with IGV's being used to control mass flow for emissions control



- Loose vanes are most vulnerable...as evidenced by circumferential location of issues (e.g. horizontal joint)....  
**Check vane tip rock and inspect for fretting at every casing removal...it only takes one loose vane!**
- **Starts and time are the enemy...vibration increases with looseness and looseness increases with vibration**
  - Starts can contribute to vane looseness due to thermally created movement/forces
  - Starts create more time in high resonant zones

## We Stock Pins, Shims, Tools and Fixtures to Support Your Outage!

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