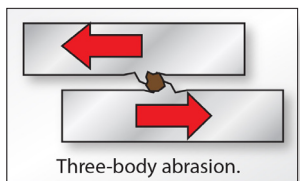
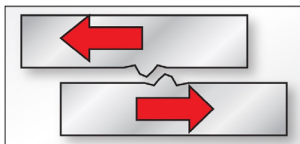
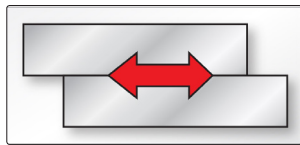


Dimensional Restoration Restoration and Anti-Fretting Coatings

Understanding Wear.

During service, wear can occur between the turbine blade and the mating turbine wheel or disk. The wear is usually caused by some combination of mechanical wear due to fretting or abrasion and chemical damages due to corrosion or oxidation.



Likely, the primary mode of wear is fretting. Fretting issues are exacerbated on peaking machines because of movement of the blade in turbine wheel while on turning gear. Also remember that wear damage is not linear. The wear rate will increase as the gap between the two parts increases because of the increased relative surface motion.

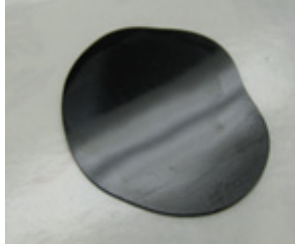
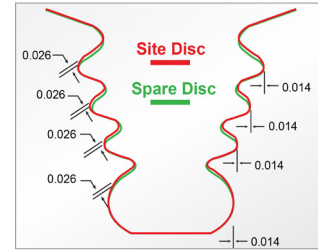
Similar wear can also occur on stationary components of a gas turbine due to vibrations and removal/installation during service.





Measuring and analyzing wear.

Prior to addressing wear, proper measurement of wear and determination of primary damage mechanisms are necessary. Physical measurements should be taken using feeler gauges and micrometers to determine if clearances have changed and if they are still within specifications. Sulzer can also utilize 3D scanning equipment and CAD programs to compare dimensions of component in question to original dimensions.



Addressing wear with coatings

Coatings are often a relatively inexpensive solution to wear. In addition to dimensional restoration, coatings can reduce the further fretting wear and reduce chemical damage of corrosion or oxidation. Fretting wear is reduced by applying a coating with lower coefficient of friction to the surface. Corrosion or oxidation damage can be reduced by applying a sacrificial corrosion or oxidation resistant material.

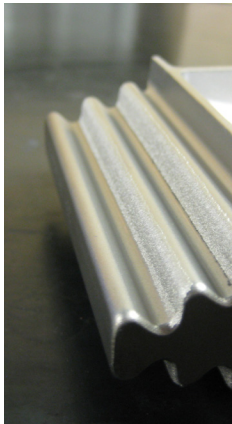
Possible coating solutions

P52



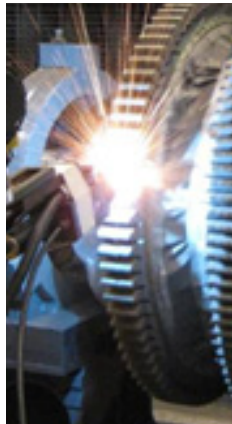
Plasma applied copper nickel Indium. This coating provides reduced friction between surfaces and resists wear due to fretting. Applications include compressor blades, stator blades, or stator ring hook fits.

P42



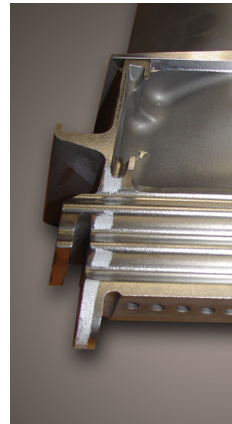
Plasma applied nickel aluminum. This coating is used for dimensional restoration. The coating has high bond strength and flexibility up to 25 mils. Note dimensional restoration coating should be applied to the unloaded side of the hook fit or serration.

T5



Twin arc wire applied nickel aluminum. This coating is used for dimensional restoration. The coating has high bond strength and flexibility up to 50 mils. (Same chemistry as P42) Note dimensional restoration coating should be applied to the unloaded side of the hook fit or serration.

T12



Twin arc wire applied aluminum. This aluminum coating is used to provide seal between turbine blades and wheels serrations for cooling air. The soft aluminum coating works well for this application because excess will shear during installation. (Same chemistry as P06)

A08 / A21



A08 / A21 Air spray (HVLP) applied metallic-ceramic. This coating provides sacrificial oxidation and corrosion resistance.

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