

# Liburdi Turbine Services - Component Repair Newsletter



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## FSR™ Full Solution Rejuvenation™ New Life for Aged Components

## Full Solution Rejuvenation™

**Full Solution Rejuvenation™ restores component alloys and is the key technology to enabling high hour blades to safely deliver extended service beyond conventional life expectations –As much as 2 to 3 times the convention service life.**

**All new-make gas turbine blades have safety margins built into the design in order to achieve a reliable conventional service life. For many blade designs, life limitations are based on an alloy strength that depletes over the conventional service life - typically 50,000 hours, at which point the FSR process is needed.**

FSR™ is a new (more descriptive) title to this Liburdi developed process – but be assured it is the same proven process that Liburdi has applied to customer's blades for over 20 years – Liburdi introduced the process to the industry in 1980 and has since then developed an FSR™ Rejuvenation™ for each of the alloys commonly used for turbine blades.

It is the same proven FSR™ process that has been used by major operators such as TransCanada, Shell, BP, ExxonMobil, Duke Energy, Xcel Energy, Progress Energy and many others to save maintenance expense by restoring expensive blade sets instead of retiring them.

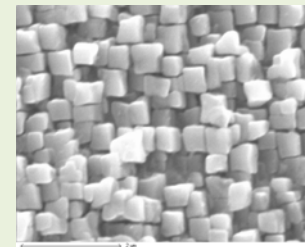
It is important to note that the high temperatures dictated by a Full Solution Rejuvenation™ require removal of all coatings – Internal as well as External coatings. Even partial heat treatments cannot be safely applied without this critical coating removal process. The chemical removal of internal coatings is another unique and key technology developed by Liburdi.

Liburdi Turbine Services has over 20 years of experience using our FSR™ process, restoring the alloy Creep Life safety margin back to the same level as new components.

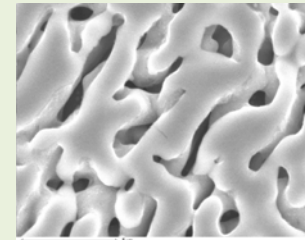
Some service providers are now offering heat treatment processes as a part of their repair offering. Many times they are providing a lower temperature process that may at best be only a partial improvement. Only Liburdi Turbine Services has the FSR™ process with a proven track record of full restoration and full service intervals achieved reliably, every time.

At Liburdi Turbine Services, over 1,000 sets of blades have been processed using FSR™ - on both aero-derivative and heavy-duty frame turbines for all current gas turbine models including those from General Electric, Rolls-Royce, Siemens, Siemens/Westinghouse, Siemens/Ruston, MHI, and others.

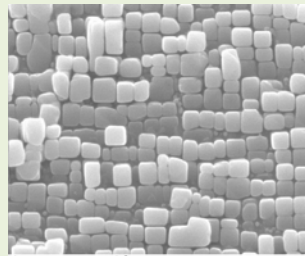
**Contact us for a copy of:  
Rejuvenation – Frequently Asked Questions**



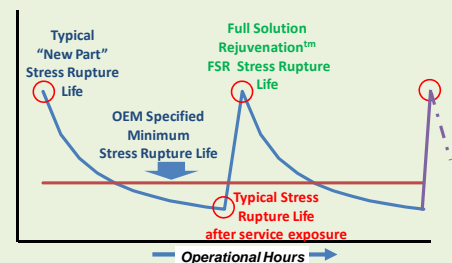
New-Part micro-structure for full material creep strength



Micro-structure ages in service and is severely weakened



With Full Solution Rejuvenation™ the micro-structure and strength restored



**New Life for Aged Components,  
Exclusively Available Utilizing  
Liburdi's Full Solution Rejuvenation™**

For further information on these and other exciting repairs offered by Liburdi,  
**Please Call Doug Nagy or Lloyd Cooke 905-689-0734**

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or go to our web site at [www.liburdi.com](http://www.liburdi.com)

