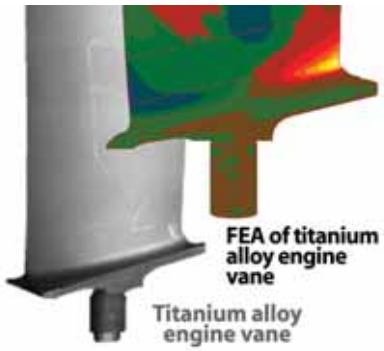
LAMBDA Technologies Group.

Application Note

IMPROVING COMPONENT LIFE AND PERFORMANCE

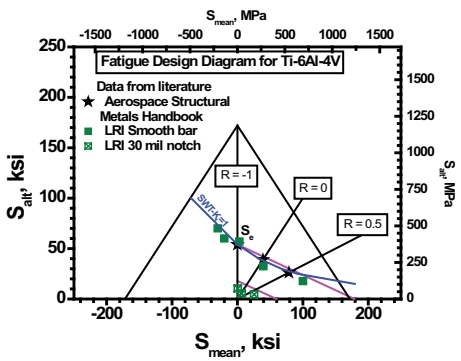
FATIGUE DESIGN DIAGRAM

DESIGNING RESIDUAL STRESSES



The Fatigue Design Diagram (FDD) provides a means of designing compressive residual stress distributions into metallic components necessary to achieve optimal fatigue performance and to mitigate typical damage conditions.

- Cancel Applied Tension
- Mitigate Damage Mechanisms
- Impart Residual Stress Stability
- Improve Fatigue Performance in Design



The patented FDD approach is a reliable method for taking credit for compressive residual stresses in design. With FDD, the appropriate level of compressive residual stresses can be designed in a metallic component through surface treatments such as LPB®, thereby improving its fatigue performance and resistance to other stress-induced failure mechanisms.

www.lambdatechs.com

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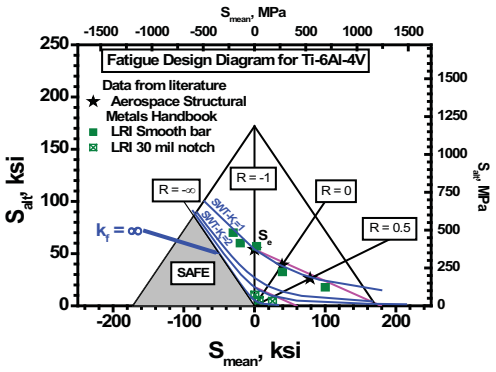
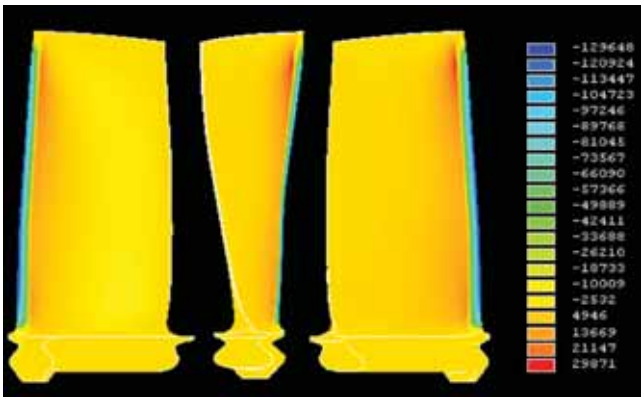
Engineering Compression

Residual stress is not just a side effect. It can and should be used to enhance the performance of damage-limited parts. FDD has been the backbone for every surface enhancement process at Lambda Technologies since the program was implemented in 2002. Applications have been developed for turbine blades, pipelines, aircraft structures, hip implants, nuclear casks, and various other components. The program has been incorporated into projects for NAVAIR, US Steel, Delta TechOps, NASA, and many other government and commercial organizations. FDD is easy for engineers to use and allows the utilization of residual stress to improve component life and performance.

FDD enables the prediction of fatigue behavior in the presence of both damage and residual stress, and more importantly, provides a design guideline to determine the compressive residual stress magnitude needed to achieve a target damage tolerance.



Incorporating FDD into the design process allows for the use of less expensive materials, lowers production costs, extends component service life, improves performance, and saves money on maintenance and replacement costs. This increases time in service, providing further cost savings, and improves efficiency and production.



To learn more about FDD, please visit www.LambdaTechs.com or contact Kim Bellamy at (513) 561-0883.

References:

- R. Ravindranath, N. Jayaraman, P. Prevey. "Design Credit for Compressive Residual Stresses in Turbine Engine Components." March 2005, http://www.lambdatechs.com/html/resources/256.pdf.
- R. Ravindranath, N. Jayaraman, P. Prevey. "Introduction of Residual Stress to Enhance Fatigue Performance in the Initial Design." June 2004, http://www.lambdatechs.com/html/resources/243.pdf.

http://www.lambdatechs.com/publications/publications.html

Accreditation:

- ISO/IEC 17025 Accredited Laboratory
- ISO 9001:2008 Certified

For more information on Lambda, FDD or to read complete papers, please visit www.LambdaTechs.com

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