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FOR IMMEDIATE RELEASE

Lambda Technologies patents method of residual stress design for enhanced fatigue strength

Technology will assist designers in producing more durable, longer lasting components.

Cincinnati, Ohio – September 24, 2007, – Lambda Technologies has been issued a U.S. patent for their revolutionary method of designing beneficial, compressive residual stresses (RS) into metallic components for enhanced fatigue performance. This patented methodology will significantly influence the implementation of compressive residual stresses in metallic components used in many industries critical to the U.S. economy and its' national security such as the aerospace, automotive, medical implants, and power generation markets. In the absence of a proper residual stress design, surface enhancement processes can produce little improvement in fatigue strength, high compensatory tensile stresses and/or unacceptable distortion.

U.S. Patent No. 7,219,044 entitled "Method and System for Improving a Part's Resistance to Stress Induced Failure" pertains to a detailed design protocol developed to allow the compressive residual stress to be tailored for a given component. The protocol comprises of a series of successive design steps that ultimately allow the engineer to converge on a unique compressive residual stress field for a given application.

At the outset, the performance criteria, failure mechanisms and operating conditions of the component are assessed and a total stress state is determined from the sum of the RS and applied stresses acting on the part during service. Traditional design techniques do not take into account the existing RS imparted to the component during manufacturing operations such as casting, forming, welding, heat treatment or machining. Instead, existing design techniques generally assume that the component is free of residual stress, which can lead to a significant error in the predicted compressive residual stresses required. Lambda Technologies method accounts for any manufacture related residual stresses. The method enables the designer to reliably use compressive RS to offset the applied tensile stresses thereby reducing or eliminating the effects of tensile RS within the part.

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Next, using the patented fatigue design diagram (FDD), a customized compressive field can be developed for a finite element model of the applied stresses to produce a targeted high cycle fatigue performance given the mean and alternating applied stresses, and the level of damage to be mitigated in different parts of the component. Finite element analysis is used to predict the level of distortion and compensatory tension. Finally, the customized compressive field is placed into the component using the appropriate surface treatment such as Lambda Technologies patented Low Plasticity Burnishing (LPB) process.

In its entirety, U.S. Patent No. 7,219,044 will not only impact the design of components from a fatigue performance standpoint; moreover it will provide tremendous cost savings to organizations that elect to adopt it into their design standards. The methodology allows reduced use of excess material, which is a common practice in traditional “over” design. This not only provides a significant weight savings in the part but also serves to lower production costs. Furthermore, Lambda Technologies method and system provides a cost savings by enhancing component service life and making it no longer necessary to maintain and replace parts as frequently, thereby reducing labor as well as costly aircraft and machine downtime.

To discover how implementing Lambda Technologies patented fatigue design methodology and testing protocol into your process will improve component performance, or to download the Fatigue Design Diagram (FDD) Engineering Application Note, visit www.lambdatechs.com and navigate to the “Discover LPB” web page.

Lambda Technologies is an innovative company incorporating a premier materials research laboratory with a world-class engineering and production enterprise dedicated to the development and optimization of surface treatments to improve component performance. For additional information on Lambda Technologies or licensing the LPB process, contact Lambda’s Client Support Department at (513) 561-0883 or visit www.lambdatechs.com.

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