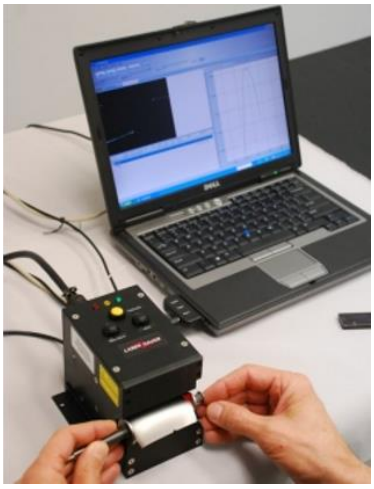
APPLICATION DATASHEET

Leading Edge | Benchtop

INSPECTION PROBLEM



The leading edge of a vane or blade used in aircraft or power system engines must maintain its designed contour within an acceptable range for safe and efficient operation of the engine. Measurements that are critical include the edge radius and the width or thickness of the blade at varying distances away from the edge.

Previously, the only reliable method of inspecting the blade was to use a coordinate measurement machine (CMM). However, this process is very time-consuming and requires each part to be transported to a central location for inspection.

REQUIREMENTS

Measurements – The leading edge inspection algorithm utilizes engineering data to configure a template and match the part to the template at multiple locations. The leading edge is accurately scanned to ± 0.0005" and compared to the template to determine if the contour falls within the acceptable range. All out-of-spec conditions are noted graphically and numerically to the display.

Instrument – The Leading Edge Bench Top sensor can be used at a fixed location, such as a polishing station, or moved from part to part. The sensor has an air fitting on the rear panel to provide a positive purge air flow to help eliminate dust.

LASERGAUGE® SOLUTION

LASERGAUGE® SYSTEM

A custom sensor was adapted with cross-vector capability to simultaneously capture surface data around the leading edge and on both sides of the blade. The bench top sensor is available in two different setback ranges: model RS730LE-F04, has a 0.250" setback range and is used on smaller blades, and model RS730LE-F06 has a 0.375" setback range which will work with larger blades. "Setback" is the distance from the tip of the blade to the furthest point on each side that can be scanned. Anything beyond this is unseen by the sensor.

The sensor is connected through a USB cable to a laptop computer running the Windows™ 10 operating system. The profile of the blade is sent from the leading-edge sensor to the computer where the image is processed and displayed, and the measurements recorded.

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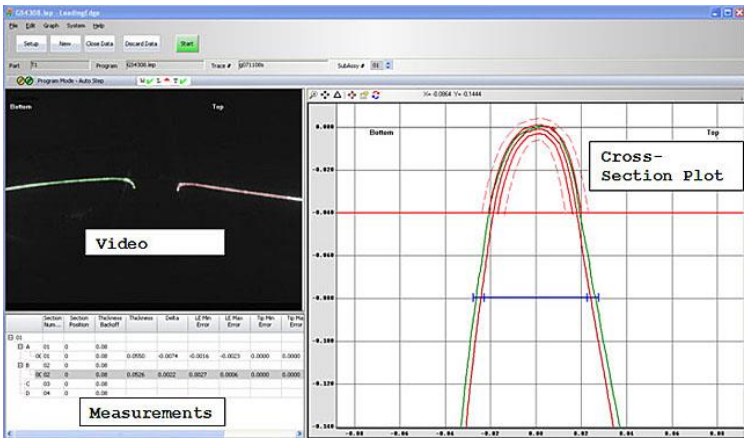
OPERATION

The blade is positioned on the sensor at the required measurement point. Scans can be taken at each location with multiple distances from the leading edge utilizing the trigger button on the sensor, or a remote foot switch. The raw scan of both sides of the blade is shown in the display, and the combined plotted profile of the blade is shown as well.

MEASUREMENTS

Made automatically as the operator scans the blade and are associated with a user-defined section number and position. The measurements include:



- Thickness of the blade at the selected offset distance from the leading edge and the delta difference. Up to 10 thickness calculations are available.
- Leading edge MIN and MAX error relative to template.
- Tip MIN and MAX error relative to template.

DOCUMENTATION

Data displayed in the table can be saved as documentation of the measurements. A scan or profile can also be saved to a file. The file is a flat tabular file with x,y,z coordinates of each point in the scan, with the x value representing the position along the blade.

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