

INSPECTION PROBLEM

After fasteners are installed on the exterior of an aircraft, the face of the fastener is often below the surface. A dielectric fill or substrate is added and then sanded or polished to be level with the surrounding surface. Measuring the depressions/raised material pre and post sanding is difficult, particularly on multiple type surfaces or those with complex curves.

Mechanical devices measure the height at one single point on a filled hole and an operator must position the stylus many times on one hole just to find the highest point. This can be a very time-consuming process. 3D mapping of the surfaces is not feasible; it requires expensive equipment, is very time-consuming and the equipment is not practical to use on the flight line.



REQUIREMENTS

Measurements – The maximum height or depth of the surface between the 2 edges relative to the surrounding surface must be measured to within thousandths of an inch. Depth or height that measure outside the tolerance range must be identified immediately. The read-out must flag any out-of-spec conditions so the operator can mark the fill or take corrective action.

Instrument – Fasteners and fill are located all over the outer skin of the aircraft, on the fuselage, wings and tail. The measurement instrument must not only be portable, but also lightweight so the operator can inspect any accessible fastener and fill on the plane. A measurement cannot take more than a few seconds because there are hundreds of fasteners to be inspected. Documentation may be required for all measurements or for only those that are out-of-spec.

LASERGAUGE® SOLUTION

LASERGAUGE® SYSTEM

Depending on the diameter of the fastener and the resolution required, an HS702 sensor with either a 1.2" or 1.9" field-of-view is recommended. This DSP sensor displays the profile of the fill in real-time on the LCD so that the operator can make sure that the sensor is positioned correctly over the fastener.

APPLICATION DATASHEET

Dielectric Fill

MEASUREMENTS

Measurements are automatic. The operator positions the laser stripe over the fastener/fill and releases the trigger. The edges of the dielectric are identified and the height and/or depth is calculated for both the depressions left edge and right edge relative to a surface line-fit. The surface can be either flat or curved.

Each measurement takes approximately less than two seconds to complete and to display the results in the data table. SPC or tolerance limits can be specified and any measurements that are outside the spec range are shown in red. The data table is automatically saved for documentation of the measurements taken.

ADVANTAGES REALIZED

Time Savings – Hundreds of fasteners can be inspected in a matter of minutes, and the measurements automatically documented.

Cost Savings – Due to its speed and portability, one LaserGauge® system can be used to support several repair facilities saving the cost of duplicate equipment.

Accurate & Repeatable – With sensor resolution in the thousandths of an inch, measurements are much more accurate than conventional methods.

RELATED APPLICATIONS

FASTENER HEIGHT / PIN PROTRUSION

Fasteners or tooling pins on the exterior of aircraft must be flush to the surface within a certain tolerance. A fastener that protrudes above or one that is driven below the adjacent surface may adversely affect performance in flight.

Depending on the diameter of the fastener and the resolution required, an HS702 sensor with either a 1.2" or 1.9" field-of-view is recommended. This DSP sensor displays the profile of the fastener head in real-time on the LCD so that the operator can make sure that the sensor is positioned correctly over the fastener.

