

How to Inspect FOD on Exterior Airframes

WHAT IS FOD?

Foreign object damage (FOD) is a big problem in the aviation maintenance and manufacturing industries. "FOD" is defined as damage attributed to a foreign object that can be expressed in physical or economic terms which may or may not degrade the product's required safety and/or performance characteristics. Accurate numbers are difficult to find, but some estimates show that FOD costs the civilian aviation sector between \$4 billion and \$13 billion annually in damaged equipment, flight delays, reduced efficiency, litigation and other costs (<https://www.faa.gov/news>).

For the sake of this discussion, we will only be concerned with damage to the exterior airframe. Common instances of FOD to the exterior structure can be caused by:

- Metal or wire clippings, solder balls and debris between sheets of surface material
- Scratches or scuffs occurring during transportation of panels from one area to another or moving from machine to machine
- Tools, rigging, stands, hardware, or debris falling onto the surfaces during construction or maintenance
- Aircraft parts, rocks, broken pavement, ramp equipment and other debris lying on runways, ramps and taxiways that strike the surface
- Inclement weather, ice, salt, corrosive liquid or ESD
- Bird collisions and other animals

ORIGIN TECHNOLOGIES CORPORATION'S BLUE LASER TECHNOLOGY

Prevention of FOD is the basic strategy for avoiding associated cost of rework. However, in instances where FOD has occurred, Origin Technologies Corporation has the features in its LaserGauge TS800 with Blue Laser Technology to inspect and measure scratches, nicks, dents, gouges, pitting, corrosion, abrasions, wear, fretting, scratches, burrs, etc., which may be detrimental to the function and integrity of the part or assembly. This Blue Laser Technology allows exceptional measurements to be taken due to a sharper laser that provides finer detail, fewer reflection issues from surface material and reduced scanning noise. Coupled with Origin's accurate



Virtual Gauges, high speed processing and portability, inspecting these types of features with greater accuracy is now possible.

To get started, select a TS800-B-F08 model. This sensor has a 0.5" FOV (field of view), utilizing 1280 data points that provides an exceptional depth accuracy of +/-0.0005" (13µm) and a horizontal scanning resolution of 0.0004" (10µm). Sensor features that allow even the smallest abrasion to be measured. And not just on flat surfaces. FOD on tubes, pipes and other surfaces with complex curves or features lines may be measured to determine how much material has been removed, and thus, how much of the original surface or wall is remaining. Depth micrometres and other mechanical devices cannot provide meaningful measurements because of the contour of the surfaces and the small features that have to be measured.



Simply hold the palm sized sensor so the standoffs straddle the surface feature you want to inspect and press the trigger. As the blue laser strikes the surface feature, high resolution optics take an image. High speed processors analyze the image and advance algorithms are then applied to extract the numerical data. Results are displayed in both visual 2d scans or profiles in addition to numerical data in a table. Measurements take less than one second! Values can even be color-coded to indicate in-spec and out-of-spec conditions for immediate feedback to determine next step in rework process.

CONCLUSION

LaserGauge TS800-B-F08 allows the inspection and measurement of a wide range of FOD, on curved or flat surfaces made with multiple types of materials quickly and accurately. Available for operation with either a Windows PC/laptop/tablet or a LaserGauge portable controller.



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