

High-Speed, On-Line Inspection & Measurement

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High-performance inspection and measurement system provides total in-line solution for critical tube, pipe and wire and cable products.

LaserLinc announces the launch of its high-speed, on-line inspection and measurement system, FlawSense. The system allows manufacturers of high-specification tube, pipe and wire and cable to detect surface defects that may arise during the manufacturing process and to correct the process to eliminate these. The system tracks the defects so that these sections of product can be rejected thus ensuring end customers receive perfect, within specification product. FlawSense also provides highly accurate measurement of tube diameter and ovality, in fact significantly more accurately than laser micrometer systems and camera vision technology. FlawSense therefore provides a single instrument measurement solution for the manufacturer with the data visualized in TotalVu, LaserLinc's well-renowned graphical user interface.

The technology behind FlawSense is ingenious. It consists of at least three laser sources, which are symmetrically disposed about the tube or pipe or wire. Each laser beam passes through optics to project a linear array of light and a CMOS array sensor collects light reflected from the surface of the product. The sensor array effectively provides multipoint measurements of triangulation across the field of view of the laser and allows a profile to be computed using sophisticated algorithms and point cloud data manipulation. The high resolution and frame rate of the camera allows detection of the smallest defects be they ridges, dips, splits, etc., and this is portrayed as a 3D image, the third dimension being gained from movement of the tube through the field of view in the machine direction.

Superior Performance to Conventional Technologies

FlawSense offers superior performance to conventional inspection systems due to its ultra-high resolution laser technology, allowing flaws only 5 microns across to be detected, some 10 times better resolution than camera-based systems. This capability really matters when looking at products used in demanding end user applications. These would include medical tubing, catheters, hydraulic hoses in automobile and aerospace where defects such as punctures, slits or extrusion surface defects could result in catastrophic failure of the product in the end user application. Tolerances need to be extremely precise in medical tubing where such devices are used in invasive surgery and must pass unhindered through a patient's vein for example.

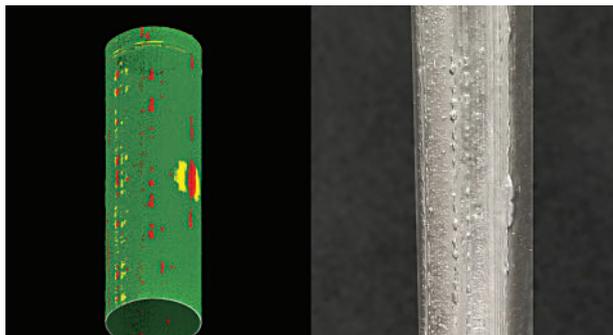
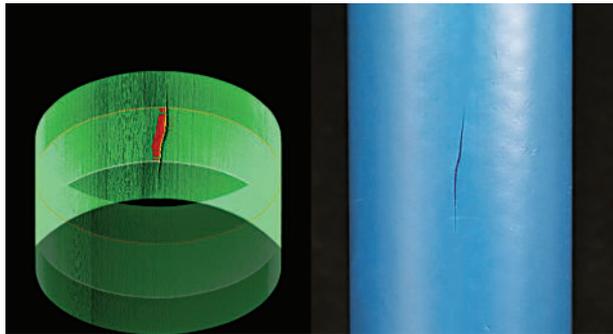
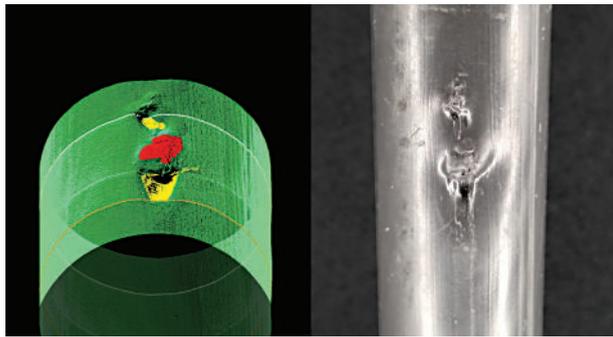
In short, any application where a product is deployed in highly demanding applications will benefit from in line inspection during manufacturing. In wire and cable manufacturing, defect detection is equally important especially with complex

LaserLinc FlawSense high-speed, on-line inspection and measurement system, with close-up of measuring sensor shown below.



armored or subterranean cables since these products involve multistage processes with little chance of rework and so scrap costs can be high.

FlawSense takes a 360° view of a round product ensuring nothing is missed! The high speed of the system combined with its ultra-high resolution means it detects flaws that may be missed by other systems. Its defect detection capability stands out from competitive offerings, providing complete details about each detected flaw. It is eminently capable of identifying slits, cracks, pits, bumps, blisters, lumps, scratches, neckdowns, wrinkles and even braid breaks in composite products. Knowledge of the type of defect from the 3D image,



makes it a powerful diagnostic tool to identify and correct the process problem(s) causing the defect.

Traditionally, manufacturers have attempted to use a range of techniques to detect flaws and defects including spark detection, eddy current inspection, lump and neck detectors (dimensional threshold systems), but these are either slow, indirect methods or basic geometric systems which can miss many of the common flaws and the structure therein.

Camera systems while more capable than these other systems mentioned, are complex to use as defect images need classification (teaching) to learn what the defects are and secondly, they may be confused by printing or text on the surface of the tube/wire/cable. FlawSense does not see text or print since it is building a 3D image of the defect/flaw. While a camera system can offer a diameter measurement it does not match the accuracy of FlawSense as it only measures the perceived width of the product from the recorded image.

Due to the prevailing difficulties of identifying flaws in real time some customers have reverted to human inspection and sometimes use hand feel to sense flaws. This in practice can be a potentially dangerous approach, especially if there are slits or raised areas or broken braiding on the surface and there have been instances of personnel injuries.

High-Speed: Over 10,000 Frames/Second

The speed of FlawSense is unique, and with modern production lines this is critical to allow it to capture all defects as the product passes through the instrument. The system can capture more than 10,000 frames per second, which is two orders of magnitude faster than camera-based vision systems, which operate at lower frequency and require longer exposure times due to relatively weak illumination. FlawSense can operate so much faster exploiting the high luminosity of its lasers.

FlawSense is simply installed online with the tube or similar running through the center of the instrument. It is important to control tube location to optimize detection success and resolution, but these are minor requirements compared to the gains that are to be made in a manufacturing process in defect detection and classification.

Range of Accessories & Capabilities

LaserLinc provides a range of accessories to ensure optimal tube guidance through the instrument. The instrument comes in two configurations to accommodate differing product sizing allowing highly accurate measurement on products with diameters from 1 to 29 mm or 3 to 69 mm.

Measuring product directly online gives the greatest benefit, but in some processes this approach may not be possible. In these cases, FlawSense can be integrated into the LaserLinc, Metron quality control system for off-line measurements.

In Summary

FlawSense offers a total solution for flaw detection and critical geometric measurements of round products particularly those to be used in demanding, high risk applications where tight tolerances and the aim towards zero defects is important. The FlawSense data can be transmitted to TotalVu, LaserLinc's well-known graphical user interface software, which is used extensively throughout the industries mentioned for capturing data from other LaserLinc on-line instruments such as laser micrometers, ultrasonic gauges, etc., and indeed even other supplier's instruments. It is straightforward to connect FlawSense to this industry standard software since the LaserLinc product range shares a common architecture. .

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Company Profile: LaserLinc is a USA business based in Fairborn, OH, USA, providing industrial in-line and at-line measurement, control and process data display systems to the medical tubing, automotive and aerospace hoses and wire and cable industries. LaserLinc's focus has always been in providing visualization of processes through its industry-standard TotalVu software to allow scalable, intuitive interpretation and correction of process issues. The company has been in business for more than 25 years and is a respected global player in these key industrial markets.

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