



Ford Otosan

standardizes on Nikon Metrology for faster-turnaround vehicle body inspection



3D laser scanning increases inspection productivity 65% at Turkey's leading carmaker

Ford Otosan, Turkey's automotive industry leader, uses a Nikon Metrology XC65D laser scanner for the inspection of small commercial vehicles. As an early adopter, Ford Otosan saw laser scanning technology evolve from smaller niche applications to the full-vehicle body inspection of its popular Transit Connect model. Detailed Cross Scanner benchmark tests confirmed similar data quality compared to tactile inspection, and revealed 65% higher throughput. Ford Otosan plans to retrofit 6 cross-departmental CMMs with Nikon Metrology laser scanners, to speed up commercial vehicle production even further.

Technology-driven commercial vehicle manufacturing

Ford Otosan's success story started in 1961, when Ford Motor Company and Koç Holding established the company in Turkey. Half a century later, Ford Otosan is the undisputed leader in the fast-growing Turkish automotive industry. In

2010, the company extended total manufacturing capacity to 330.000 units.

"In 2004 the Kocaeli plant became Transit's main worldwide production center, owing to the production quality of Turkish workers and state-of-the-art manufacturing technology," says Murat Öztürk, Dimensional Control Team Leader at the Ford Otosan commercial vehicle plant in Kocaeli, Turkey. "3D laser scanning is an example of an enabling inspection technology currently being deployed more widely at Ford Otosan. We are long-time users of the LC50 laser scanner for a variety of inspection applications. Today we use an XC65D Cross Scanner to inspect full-vehicle body structures of the Transit Connect, and decided to purchase an additional Nikon Metrology scanner."

The XC65D is a "3-in-1" scanner incorporating 3 laser/camera sets mounted in a cross pattern. Nikon Metrology pioneered multi-sensor scanner technology because it allows geometric features to be captured from different sides simultaneously. This is how the Cross Scanner accurately digitizes the complete shape of slots, sleeves, holes and other feature types in a single scan. The scanner is equally suitable for digitizing freeform surfaces and edges.



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Laser scanning versus tactile inspection

The purchase resulted from a detailed comparative study involving both laser scanning and touch probe measurement. Murat Öztürk explained that the study entailed the serial inspection of a number of Connect vehicle bodies. One CMM captured the right half of the body using the XC65D laser scanner, while the other took touch probe measurements on the left half of the body. The tactile inspection CMM was equipped with a TP20 probe mounted on a PH10M indexing head. Both automated inspection methods were set up to measure exactly the same features, pillars, panels, etc. in a mirrored layout.

“Tactile inspection on a single vehicle body lasted 36 minutes, whereas laser scanning completed the same job in less than 13 minutes,” says Öztürk. “For data acquisition alone time savings exceeded 65% compared to tactile point-by-point data capture. The XC65D laser scanner generates point cloud data at a high scan rate, allowing it to digitize the body surface relatively fast. The Cross Scanner saves additional time by capturing the complete geometry of features without requiring repeated scans taken from different directions.”

In terms of data quality, there was hardly any difference between laser scanning and touch sensor measurement. Detailed analysis of inspection results revealed that overall laser scanning results were slightly better. Although both technologies meet the 20-50 micron precision level required for sheet metal, the multitude of measuring points captured by laser scanners makes a difference. This aspect is critical in digitizing freeform surfaces completely and extracting geometric features accurately. Acquiring the accurate positions of features, edges and surface shapes is imperative to verify the process quality of mating parts and judge vehicle body assembly accuracy.



Ford Otosan stirs Turkey's light commercial vehicle segment, with 19,5% market share for the Transit Connect.



Ford Otosan successfully made the shift to the XC65D laser scanner for mainstream vehicle body inspection.



The Nikon Metrology XC65D laser scanner captures geometric features from 3 sides simultaneously.



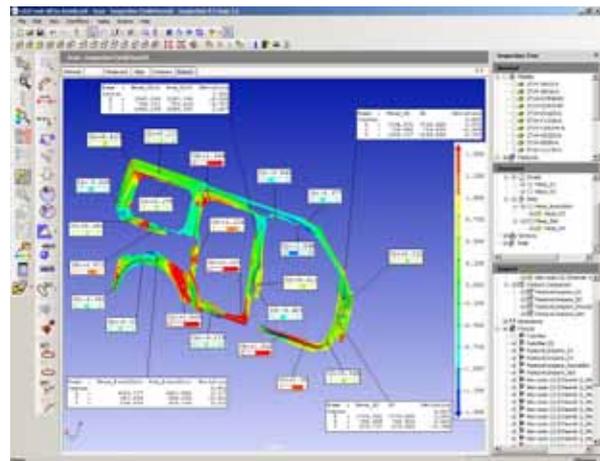
Faster inspection – Better insight – Higher quality

According to Öztürk, laser scanning simplified the entire vehicle body inspection process. “Defining the straightforward scanner travel paths is easier for us than specifying individual touch probe points. After acquiring the data, the Nikon Metrology Focus software automatically filters the resulting point cloud and fits a 3D surface through the points. Focus processes the scan data for numerical analysis as well as graphic comparison against nominal CAD. Color-coded visual inspection reports help us understand the source of the slightest deviation in feature positioning or surface geometry. This information provides the insight we need to take appropriate preventive measures in the vehicle body assembly line.”

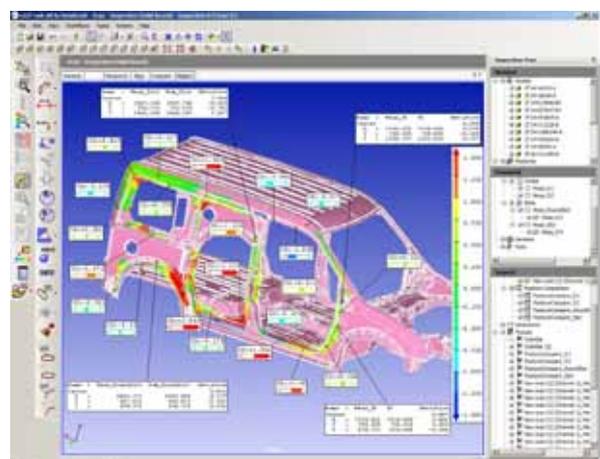
“Non-contact vehicle body measurement speeds up every step in the process, and delivers more profound insight to take better-informed manufacturing decisions,” concludes Öztürk. “With our latest scanner purchase, we will have a dual-arm CMM fully operational with laser scanning and Focus point cloud processing software. Also during new model vehicle launch projects, we use laser scanning to digitize complete individual parts for analysis purposes. In this regard, detailed scan reports are very useful for in-depth evaluations run in our own department as well as collaborative work done with other departments. For the future, we consider having 6 CMMs in different departments equipped with laser scanners from Nikon Metrology. This complies with Ford Otosan’s strategy to strengthen our competitive edge through technologies that increase product quality and process efficiency.”

More information about Ford Otosan can be found at <http://www.fordotosan.com.tr/en/default.htm>

More information about Laser Scanners can be found at http://www.nikonmetrology.com/cmm_scanners/



Graphic comparison against nominal CAD steers preventive measures in the vehicle body assembly line.



Laser scanners acquire point clouds that support accurate geometric feature extraction from the cloud.