



Plastics consultancy installs multi-sensor metrology to bring more inspection in-house

Inspection lead-times cut threefold to typically one week



CASE STUDY

Leading technical consultancy Plazology, with centres in Leeds and Liverpool, UK, was founded in 2009 to work alongside its customers' engineering teams internationally to provide a range of Industry 4.0-compatible services to support the development and production of plastic injection moulded components. The company has recently boosted the metrology that it can carry out in-house following the installation of an iNEXIV VMA4540, a combined optical and tactile measuring machine from Nikon Metrology.

Plazology's services include design for manufacture, advanced injection moulding simulation using Moldex3D software, process validation and the application of DOE (design of experiments) statistics to achieve optimum processes for the design and production of injection moulded plastic components. Each service is designed to reduce development times and to bring customers' products to market faster within budget and more efficiently. Using the Moldex3d moulding

simulation software is crucial to optimising the component in the 'virtual world' prior to spending cost and time cutting the steel. With this virtual moulding ability strengthening its internal measurement capability, the firm has been able to shorten project lead-times.

Jared Poh, Technical Project Manager in the engineering department in Liverpool commented, "We provide our services mainly to the FMCG (fast-moving consumer goods), automotive and medical sectors. We use metrology as one form of validation of moulds and processes for the manufacture of such parts as caps and closures, vehicle pump components and medical devices.

"This is important in different ways. In terms of validation, we need to ensure we are cutting tool steel to the correct dimensions, while making sure we are optimising the process window to make the lives of our customers easier when they are producing the components.

"In terms of root cause analysis, we are able to understand dimensionally where the components are in terms of specification. This helps us to ensure we are focused on troubleshooting the

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right problems and have data to back up our hypotheses.”

Prior to acquiring the CMM+ vision system, typically Plazology would outsource the complex components to an inspection bureau that use coordinate measuring machines and X-ray CT, for example. This led to lower inspection productivity and turnaround was unpredictable, as the metrology supplier would normally determine the time scale. Moreover as a third party had performed the measurements, Plazology had to rely on someone else’s results and had less overall confidence in their accuracy, repeatability and reproducibility, which sometimes led to scepticism of the entire process.

Mr Poh added, “Previously, we would typically help our customers validate their moulds but would have to outsource measurement of the plastic components produced. We then had to wait up to three weeks before we received the data and were able to make any decisions.

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Jared Poh, Technical Project Manager in the engineering department in Liverpool

“We therefore wanted to bring metrology in house and ensure we had a greater level of overall control. The idea was to be able to offer more added value and complete the loop for the services we offer.”

He explained that the new measuring equipment had to be able to deliver robust and accurate results. The company was particularly interested in a vision system, as components often have to be inspected whose complexity makes access by a touch probe difficult.

Several potential suppliers were considered but the iNEXIV VMA4540 CNC video metrology system from Nikon Metrology was deemed to be the best solution, not least due to the level of support offered by the manufacturer. This was particularly important to Plazology, as the instrument was the first coordinate measuring machine to be installed in the company, albeit a vision-based variant. The backup was helpful during installation and commissioning of the machine, which Mr Poh described as “perfect, smooth and effortless”.

Despite the difficulty in accessing some features of Plazology’s components by tactile inspection, the decision was taken to add a Renishaw touch



probe to the iNEXIV. It enables measurement of features on more complex 3D parts, where probing can complement the video measurement making the system even more versatile. Both optical and tactile measurements can be combined in a single inspection cycle, providing the speed and accuracy of video measurement system with the additional benefits of a CMM.

The instrument has a wide field of view, a long working distance and provides a measuring volume of 450 mm x 400 mm x 200 mm. High speed, automated video edge detection using a choice of three types of illumination offers rapid throughput of components. The low incidence angle of the ring illuminator is especially effective for measuring Plazology’s moulds and other three-dimensional parts.

The CMM-Manager software package has powerful programming, measuring and reporting capabilities, the main features being CAD-based, collision-free path definition, virtual path simulation and accurate feature measurement using both tactile and vision data acquisition. The interface is task-oriented, with a convenient drag and drop structure.

Mr Poh concluded, “We now have more trust in the accuracy of our metrology, which is to a greater extent under our control internally, so we have more confidence in the data and understand better how dimensions work and affect each other.

“The initial installation and training were good but the after-care was even better. We needed on-the-job experience before we knew what questions to ask and Nikon’s engineers were always there to help.

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As a postscript, he added that the equipment looks clean and professional and is a useful marketing tool when customers visit the facility.