Measuring the dimensions of the key features of a shaving product

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The King of Shaves Hyperglide System Razor. Credit: King of Shaves Company Ltd

The UK shaving and skincare company King of Shaves set NPL Huddersfield the challenge of measuring the dimensions of the key features of one of its shaving products, a cartridge for the Hyperglide System Razor that contains five individual blades.

The measurements needed to be made on regular batches of the cartridges to monitor the consistency of the products and assess the

effects of any changes made to their design. The project evolved continuously to ensure that NPL Huddersfield supplied the best and most suitable measurements throughout.

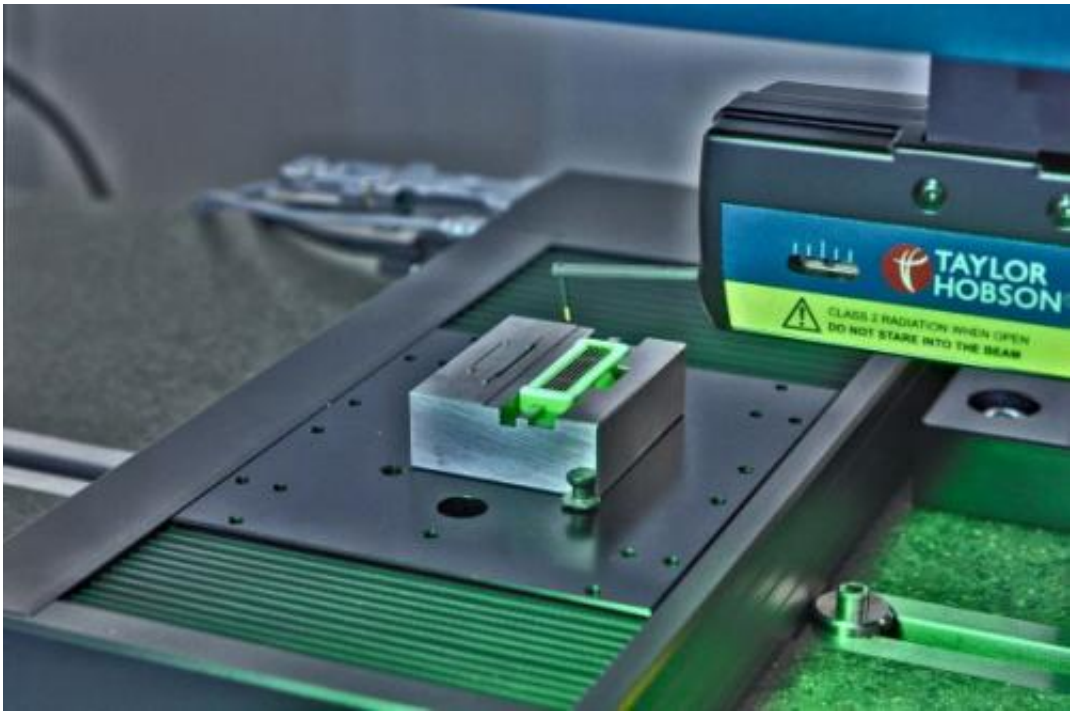
Measuring the dimensions of razor blade cartridges is complicated by the small size of the individual components, as well as the inherent sharpness of the blades, which makes it difficult to measure along and across them. The first stage of the work was to program a Co-ordinate Measuring Machine (CMM) to make the measurements and provide the required data.

When making measurements like these, the razor blade cartridge needs to be mounted to hold it in place while the CMM operates. Initially the cartridge was mounted in a home-built fixture designed by the NPL team. This mount was then replaced with a 3D printed fixture that was printed in the 3M Buckley Innovation Centre, where the NPL Huddersfield laboratory is based. The 3D printed mount was ultimately superseded by a metallic special-to-type fixture which included an 'off-part' datum, in addition to a solid repeatable mounting.

Each of these upgrades improved the measurements, with the final, dedicated fixture offering reduced uncertainty and increased repeatability.

Refining the process

The NPL Huddersfield team measured several batches of cartridges, giving King of Shaves the data required to evaluate its product and feed-back valuable findings to the supplier. Throughout the project, the CMM program was amended and refined to provide exactly the data required by King of Shaves, following evaluation of each batch. This resulted in a low-cost, rapid measurement process that met the required fast turnaround times.



The King of Shaves razor blade cartridge in the dedicated mounting fixture being measured with the Taylor Hobson Form Talysurf PGI instrument

NPL Huddersfield then set out to find an even faster, lower-cost measurement solution, capable of measuring the most important features of the product, as demonstrated by the CMM data.

The team transferred the measurement process to a new instrument - a Taylor Hobson Form Talysurf PGI, which is normally used to measure surface finish properties. This new solution made the measurements 50% faster, while measuring a few less parameters, and was also very quick and easy to set up.

The results

King of Shaves now has a relatively low-cost and quick turnaround for batches of cartridges, allowing the company to respond quickly to production pressures and rapidly evaluate changes made to the manufacturing process.

Andy Morris, NPL Huddersfield Laboratory Manager, said:

"The shift from a general purpose fixture to one dedicated for the job, along with the adoption of a completely different measuring system to that originally used for this project, has allowed NPL to meet the customer's needs for price, delivery times, and lead times."

Andy Hill, Operations & Innovations Director at King of Shaves, said:

"The open minded and flexible approach shown by NPL has helped steer us to the most appropriate and cost effective solution for our needs, that delivers on Quality, Price and Service. We look forward to continuing to work with NPL to augment our ongoing QC and development work."

NPL Huddersfield (located in the University of Huddersfield's 3M Buckley Innovation Centre) specialises in precision measurement of components and assemblies and the provision of measurement advice and support to manufacturing industries.

King of Shaves is a range of innovative and performance razors, shaving, skincare and electrical styling products for men and women. The company sells a product every three seconds worldwide and is regarded as one of the world's most innovative and successful challenger brands.

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