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Gauging time and costs cut by 80% and accuracy maintained despite a 21°C range

Customer:
Kishan Auto parts Pvt. Ltd.

Industry:
Automotive

Challenge:
Dramatically reduce costs, gauging cycle time and thermal effects to ensure high quality, efficient connecting rods (conrods) production.

Solution:
A versatile, thermally insensitive shopfloor gauging system providing traceability and extra capacity.

Kishan Auto parts Pvt. Ltd., Rajkot (Gujarat, India) is a world leader in the manufacture of connecting rods for major names in the car, compressor, heavy commercial vehicle, tractor, marine engine and earth mover manufacturing industries. Kishan recently purchased a Renishaw Equator flexible gauging comparator, and have seen an immediate reduction in cost and gauging cycle times of more than 80%.

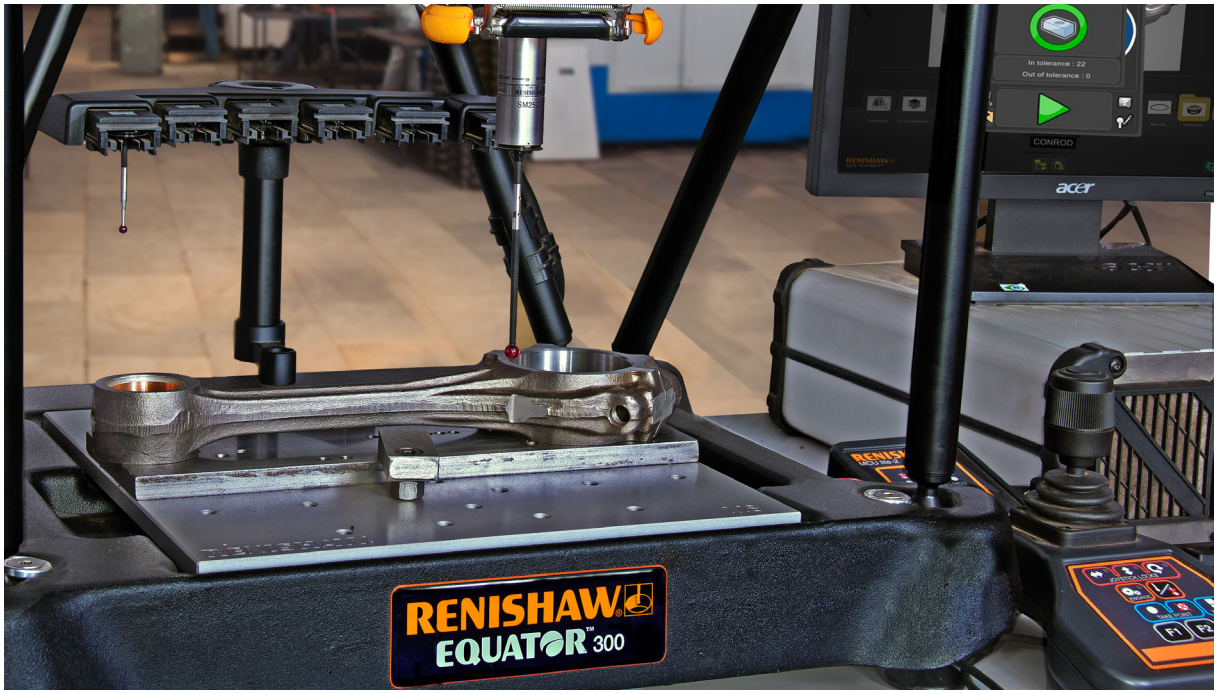
Additionally, despite shop floor temperature variations of more than 21°C (43°F), measuring performance has been unaffected due to Equator's unique comparator method which uses master parts calibrated on Kishan's co-ordinate measuring machine (CMM).

Versatile gauging on the shop floor

Kishan Auto is now using Equator to gauge multiple variants of connecting rods, and is adding more every day. Typical gauging times of 55 seconds per connecting rod are a significant reduction over previous methods. The operators can use one Equator machine for many different parts, gauging all the features in a single operation with an immediate pass/fail decision, along with a report of the component dimensions.

Despite its location in Rajkot, Gujarat, where temperatures soar to 40°C (104°F) and drop to 19°C (66°F), Kishan is seeing repeatable results from its Equator system. This is achieved by re-mastering at least every 3 hours, or when they know the temperature has changed significantly - 're-zeroing' the system removes the effect of thermal growth from the measurements, and therefore guarantees component quality. The master part must be kept close to the machine and subject to the same thermal conditions as the production parts. If at any time the ambient temperature changes rapidly and a part goes out of tolerance, an operator can measure the master part to re-set the system and check the reported 'fail' is not due to the environment.

> "Quality is critical to us, we constantly strive to achieve 100% quality, at the same time as improving efficiency and passing those savings on to the customer. Equator has taken us to another level."
>
> **Kishan Auto parts Pvt. Ltd (India)**



Kishan con-rod on fixture plate on Equator 300

Traceability and extra capacity

The master parts are 'calibrated' on Kishan's CMM, which gives them the traceable accuracy they rely on to guarantee quality. However, the high thermal variation means that the CMM has to be used within the company's temperature-controlled room. Equator gives Kishan the opportunity to extend the certified accuracy to the shop floor whatever the conditions. For this particular requirement, Equator has removed the need to purchase an additional CMM with scanning capability, as Mr Shantibhai Changela, Managing Director at Kishan Auto, comments, "Essentially Equator and the CMM complement each other perfectly, one providing the traceable certified accuracy, the other providing the thermal capability and extra capacity."

Before Equator

For many years Kishan Auto has been using air gauges for checking diameter, circularity and 'bend and twist'. For each of 360 variants of connecting rod they have used 3 or 4 different gauges. On larger connecting rods for heavy use applications, this can be at a 100% sample rate.

In Kishan's experience these hard gauges usually last up to 10,000 uses, and then have to be reworked. For each different connecting rod, 3 of the 4 gauges cost Rs 6,000 (approx US$120), while the display costs Rs 30,000 (approx US$600). However with the 4th gauge, measuring 'bend and twist', the cost goes up to around Rs 300,000 (approx US$6000) – this includes a golden part which can be easily damaged and often has to be replaced.

In addition the whole process can take 120 seconds for each air gauge, so for each part tested the whole process can take more than 8 minutes. With increased demand for their products Kishan needed a faster method of gauging.

The search for a fast inspection system

During September 2011 managers from Kishan Auto were in Germany for business meetings and to visit the EMO Hannover exhibition. Having searched without success for more than 2 years for an inspection system that could achieve the speed of operation they required, they did not have high hopes of finding a solution. It was only as they were on the point of leaving the show that they spotted one of the Equator system demonstrations on the Renishaw stand which was gauging a connecting rod - it was a chance encounter that ultimately solved their problems.

They requested a demonstration within a few days of returning to India, and having seen an Equator gauging their own parts, immediately decided to purchase a system.


Con-rod master being 'calibrated' on a CMM in a temperature controlled room.

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Cutting the cost of gauging

Time and ability to cope with temperature are not the only issues for Kishan Auto; more important is the cost of gauging. They have identified 77 variants of connecting rods which the Equator system can accommodate, and operators use the system to measure 500 units per day in a 10 hour shift. If Kishan Auto were to invest in hard gauging for all 77 variants, it would mean an investment of Rs 23 millions (approx US$450,000), just for the hardware alone. There are also other costs to consider, such as skilled labour to set up and maintain these gauges, storage, and running costs.

Kishan goes from strength to strength

The company was started by Mr. Changela in 1988. Kishan started by manufacturing 2,000 connecting rods per month and today they manufacture up to 50,000 per month with 360 variants. The customer list reads like a who's who in the world of cars, compressors, heavy commercial vehicles, tractors, marine engines and earth movers.

Kishan exports 90% of its production to leading industrial and developed nations including the USA, UK, Germany, Singapore, Italy, China, Poland, Brazil, and the Netherlands.

The company has a reputation for high quality within required tolerances, but also at a competitive price. It specialises in manufacturing connecting rods from raw material to finished product within their own forging plants, with a lead time of 60-90 days.

Quality is Kishan Auto's mantra

For Kishan, quality is the result of the right work ethic and processes for both management and operators, plus having the right equipment to achieve the required aims. The introduction of the Renishaw Equator gauging system has significantly enhanced quality, such that the company is now in a position to operate 100% inspection of components, quickly and easily, and are happy to guarantee 100% quality assurance on all parts.

Mr. Changela, MD Kishan Auto

As Mr Changela comments "Quality is critical to us, we constantly strive to achieve 100% quality, at the same time as improving efficiency and passing those savings on to the customer. Equator has taken us to another level."

For more information visit, **www.renishaw.com/kishanauto**

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