

## Automated Inspection System Using Teledyne DALSA Sherlock™ Software Enables Timken India Limited to Ensure Accurate Parts Inspection and Maximize Customer Satisfaction

The Timken Company is a manufacturer of bearings, gear drives, belts, and chains used in the production of a range of diverse products. The leading authority on tapered roller bearings, Timken manufactures these and other roller bearing components in facilities around the world, including through Timken India Limited.

The automotive manufacturing market in India has grown significantly, making it one of the largest in the world for industrial roller bearings. With this growth forecast to continue at a rate of 13 percent per year, manufacturers are seeking ways to boost production while ensuring high quality. At Timken India Limited's facility in Bangalore, hundreds of thousands of tapered roller bearings are manufactured each day. During production, a small but significant percentage of bearings can escape the manufacturing line with defects. Historically, the manufacturer has relied on a manual inspection process to check for these defects, selecting samples randomly to inspect, but wanted to improve its quality-control focus using an automated inspection system.

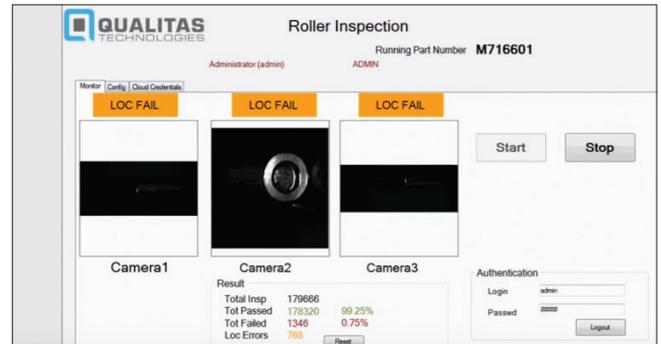
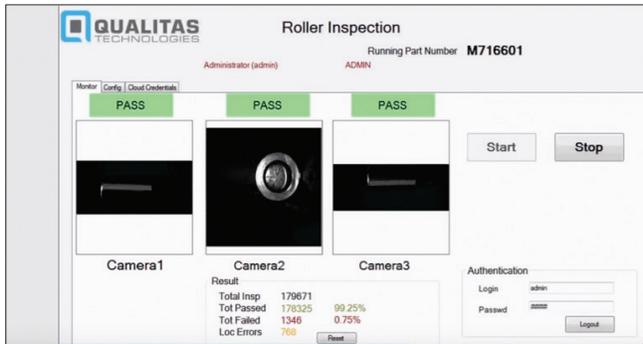
### Sherlock Software Ensures a Fully Customizable Inspection Process

A Timken facility in the U.S. deployed Teledyne DALSA machine vision technology to perform automated inspections, and in an effort to replicate that system at the plant in Bangalore, Timken

India Limited approached Teledyne DALSA partner Qualitas Technologies, an industrial automation solutions expert in the region. Their experience with Teledyne DALSA solutions and the expertise needed to facilitate the deployment, made them an ideal partner. With the market for roller bearings in Asia being extremely competitive, manufacturers must ensure a high level of customer satisfaction with the products they deliver. Since random, manual inspections were no longer enough; they needed to implement a more effective way to inspect entire batches of their finished products before they were sent to their customers. With their counterpart in the U.S. able to achieve impressive results through automated inspection using Teledyne DALSA technology, they wanted to implement a similar inspection process at their plant in India.

The team at Qualitas designed a vision system using Teledyne DALSA's Sherlock machine vision software configured to operate three-cameras. Two cameras are positioned on each side of the manufacturing line and the third is positioned with a view of the flat surface at the end of each roller bearing, allowing for a 360-degree cylindrical surface inspection. In particular, the vision system inspects the roller bearings for unfinished end faces, missing plating, and rust or tool marks, as well as dents and scratches.

Before inspection, the roller bearings go through a final turning and honing operation to taper the ends and smooth the finish. This process is completed using large quantities of lubricant, and while the manufacturing process also includes a step to remove the oil, it is possible that the surface of some bearings will still be coated with a film as they are inspected. "The potential for differences in the inspection surface is just one of the variations that can make accurate inspection a challenge,



To ensure an accurate inspection, Teledyne DALSA's Sherlock machine vision software operates three cameras, allowing for a 360-degree cylindrical surface view of each roller bearing. Sherlock's open architecture enables customizable algorithms that can account for surface changes for a more accurate inspection.



and Teledyne DALSA's Sherlock software is ideal for accommodating any challenging inspection," notes Raghava Kashyapa, Qualitas director. "Sherlock's open architecture and advanced design allows us to develop algorithms that are flexible enough to account for changes in the surface, as well as any other variations in the roller bearings, and still ensure a high degree of accuracy. In this application, we relied on Sherlock's advanced image processing capabilities and extensive software development library to develop a fully customizable user interface." In addition, Sherlock easily integrates to share images and statistical inspection data with Timken India Limited's database, facilitating communication between the vision system and the facility's existing technology. Cloud-based image storage provides operators with convenient access to monitor inspection results and overall performance, analyze defects for trends, and then make adjustments to inspection parameters as needed.

### Everything in Its Place

It was critical to Timken India Limited that the vision system be installed so that it integrated seamlessly with other phases of the production process. The customer recognized that accurate inspection was an important goal, but didn't want to sacrifice production speed; the automated inspection phase of manufacturing needed to operate as just one more step in the process. To ensure integration with the least risk, Qualitas retrofit the machine vision application into the existing footprint on the manufacturing line, even using a conveyor that was the exact same size as other conveyors on the line to move the roller bearings to the cameras. "With inspection integrated into the manufacturing process, we also needed to accommodate for other types of testing that were completed before inspection," Kashyapa continues. "For example, roller bearings that failed strength testing earlier in the process were tagged as defective, but still routed toward the vision system. We needed to direct these roller bearings to specific rejection gates, and it was Sherlock's PLC aggregation capabilities that made this possible. Sherlock is able to work with multiple protocols and communicate easily with all the other systems in place."

The solution was implemented earlier this year on a single production line to inspect more than 12 different types of roller bearings that range in length from just 10 to 59 mm, and Timken India Limited expects that the vision system will be replicated across the facility's remaining seven production lines within the next few months. Today, with the vision system and Teledyne DALSA Sherlock software, Timken India Limited is able to inspect roller bearings at a rate of three per second on a production line that operates for more than 18 hours each day giving their customers a very high degree of confidence in the quality and consistency of the roller bearings they'll receive.

---

[www.teledynedalsa.com](http://www.teledynedalsa.com)

#### Americas

Boston, USA  
+1 978-670-2000  
[sales.americas@teledynedalsa.com](mailto:sales.americas@teledynedalsa.com)

#### Europe

Krailling, Germany  
+49 89-89-54-57-3-80  
[sales.europe@teledynedalsa.com](mailto:sales.europe@teledynedalsa.com)

#### Asia Pacific

Tokyo, Japan  
+81 3-5960-6353  
[sales.asia@teledynedalsa.com](mailto:sales.asia@teledynedalsa.com)

Shanghai, China  
+86 21-3368-0027  
[sales.asia@teledynedalsa.com](mailto:sales.asia@teledynedalsa.com)