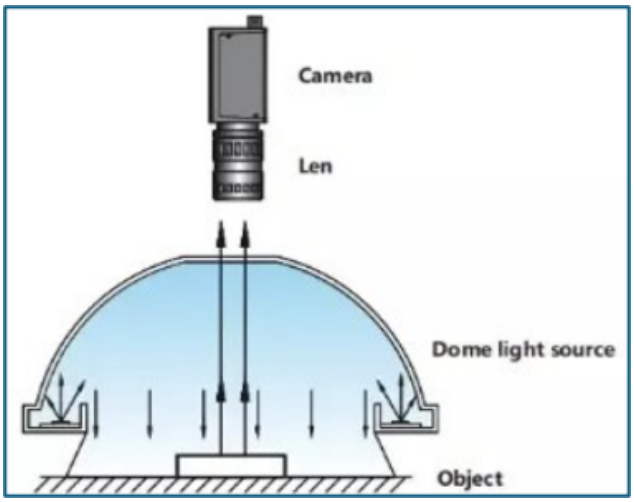
ELECTRIC & ELECTRONICS

Precision Radius Measurement for Improved Quality Control in Plastic Container Manufacturing

Problem Identified

The manufacturing process faced challenges in accurately inspecting fine components due to depth-of-field (DOF) limitations and incomplete field-of-view (FOV) coverage. A 20MP color camera with a telecentric lens and dome light setup failed to capture certain wires at the sides, resulting in blind spots. When samples were titled at 5 degrees, specific regions became visible, indicating inconsistent coverage.

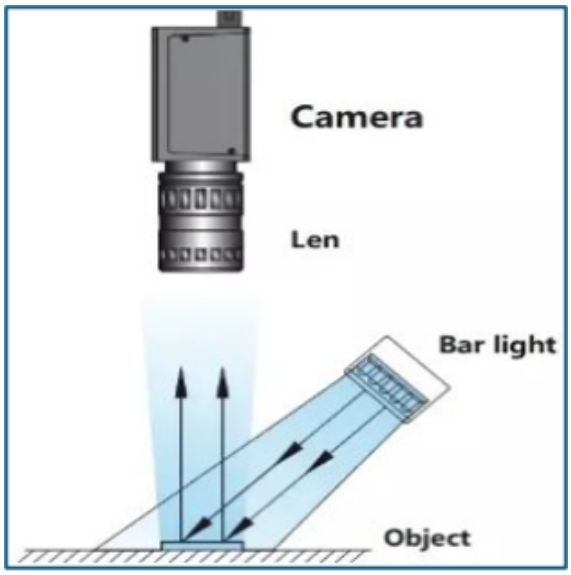
DOF issues persisted, leading to out-of-focus areas in both lower and upper inspection positions. This impacted on the detection accuracy and efficiency of the quality control process.



Solution Provided

The solution involved upgrading the vision system configuration to use an angled bar light (x4) with the existing 20MP telecentric setup. This lighting approach significantly improved illumination, covering more than 90% of the wires compared to the dome light arrangement. The angled lighting reduced shadowing effects and improved visibility of components even when samples were slightly tilted.

Although the DOF limitation remained due to the lens specification, the overall image clarity and coverage were enhanced. This improvement allowed for more consistent and reliable inspection results with minimal manual intervention.



Results & Summary

The implementation of angled bar lighting led to a substantial increase in inspection coverage and component visibility. More than 90% of the wires were clearly illuminated, significantly reducing the number of missed detection. The system produced clearer images with reduced shadowing, making defect identification faster and more accurate. While the DOF challenge persisted, the improvements in coverage and lighting uniformity increased overall inspection efficiency. This upgrade enabled the manufacturing line to maintain higher quality assurance standards with fewer inspection errors.

This case study highlights how optimizing a vision inspection system's lighting configuration can address critical detection challenges in electronics manufacturing.