Application Case Study – Superpak, Singapore

Machine Vision Provides Fast and Precise Defect Detection in Electronics Packaging

Customer Profile

Since 1985, Superpak has been a one-stop solution for meeting customer packaging needs, with a legacy of expertise producing tailored products for several diverse industries. Superpak's clientele extends into markets ranging from computer and electronics, telecommunications, pharmaceutical, and food industries. While maintaining a broad portfolio of packaging solutions, Superpak has achieved steady growth and an outstanding track record by focusing on quality and continuous improvements in its processes using the latest innovative technologies.

The Challenge

Components in the electronics industry continue to decrease in size, driving a need for greater precision and accuracy in the manufacture of component packaging. As a leading supplier of carrier tapes to electronics and semiconductor industries, Superpak makes calculated operational investments to ensure that all packaging meets increasingly small component specifications in their high-volume manufacturing environment. Part of the investment includes automated systems to measure the forming quality of the carrier tape and accuracy of the punching process.

Superpak carrier tape and reel products.

Inline vision system: A Microscan Vision HAWK Smart Camera is installed directly on the machine to perform 100% of the required visual inspection.

Quality checking of carrier tape at Superpak has traditionally been done with a manual measuring tool. However, as customer requirements for part accuracy

- **Requirement:** Prevent shipment of defective carrier tape reels to customers while meeting required production quotas.
- **Project:** Implement an automated system to replace manual processes for checking dimensional measurements on parts.
- **Solution:** Machine vision inspection system using Microscan C-Mount Vision HAWK Smart Cameras and NERLITE® Edge to Edge Backlights to detect product defects.
- **Result:** Increased production capacity along with peace of mind that no shipments will be rejected due to defective parts.

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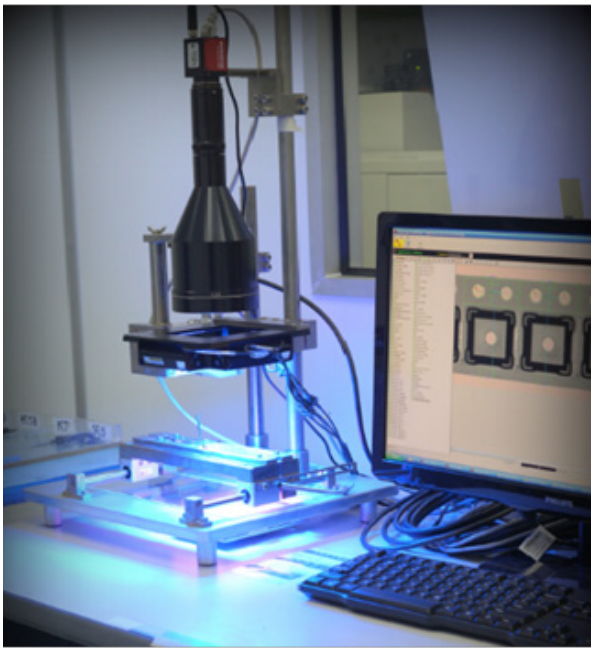
and production rates increased, manual inspection was no longer able to ensure customer satisfaction. With daily production runs of kilometers per machine, a large number of employees working around the clock were needed to meet required quantities, resulting in low efficiency and high labor intensity and cost. Superpak recognized that more reliable and efficient automated inspection methods were needed to meet the industry's high standard for precise dimensional measurements and surface appearance of the tape. Additionally, an automated system would be able to support their high-volume manufacturing demands without the risk of human error or exhaustion of human operators performing manual inspections.

The Solution

At Superpak, carrier tape is manufactured as plastic material enters a packaging machine and is tailored to fit component specifications by a mechanical punching process. Through the course of several production steps, and especially after mechanical punching, some deformations in the tape are inevitable. By the end of the manufacturing line, a product may contain several small defects, which, if left unresolved, may impact the integrity of the packaging and cause problems for the end customer. To prevent poor-quality products from being shipped, Superpak integrated a machine vision inspection system into their existing machinery to identify and reject defective tape based on incorrect dimensional measurements of each punch.



Offline vision system: An automated measurement step is performed offline to ensure proper setup of the job and perform process quality control.

Microscan Visionscape® Machine Vision Software is used to capture and store images of defective product for further analysis.

Compared to manual inspection, a machine vision system offers improved accuracy, increased consistency, and works non-stop without fatigue. Well aware of these benefits, Superpak looked to Microscan partner Zincode Technologies, located in Singapore, to deliver an automated solution to strictly control product quality and prevent the unnecessary cost of a large, round-the-clock workforce.

Zincode Technologies is a leading company in automatic identification and data collection industry in Asia, dedicated to providing high performance solutions that are durable, reliable, and cost-effective. Zincode provides customized barcode and machine vision systems to address a broad range of user requirements, from product tracking and identification to quality inspection. In accordance with Superpak's requirements for precise dimensional measurements in their product, Zincode developed a system incorporating Microscan's Vision HAWK Smart Camera to perform inspections of the carrier tape both inline on their machinery and offline for routine process control checks.

The Vision HAWK is a flexible, industrial smart camera that delivers powerful machine vision capabilities in a compact, easy-to-use package. Developed for vision users of all experience levels in a broad range of applications, the Vision HAWK features an intuitive software interface, integrated lighting, high-resolution optical zoom, and simple plug-and-play connectivity. With the Vision HAWK, Superpak was able to employ a scalable, fully integrated vision solution to reliably address any inspection, verification, or auto ID application regardless of future project requirements or changes in project scope.

Zincode's solution for Superpak incorporates a Vision Hawk C-Mount Smart Camera with NERLITE® Edge to Edge Backlights. As the tape enters the punching process on

Superpak's line, a Vision HAWK measures and detects defects inline from its position mounted above the machine, while a backlight illuminates the part from below. Images and inspection results taken by the camera are then sent to a centralized PC, where they can be used for a number of quality control tasks. At Superpak, several vision systems have been networked across their lines to ensure quality control for their constant, high-volume production. Inspection data acquired by each Vision HAWK camera is sent to a centralized PC for quality check by a quality manager. An alarm is also programmed to sound when any defective products are detected, and these products are immediately removed from the line before shipping.

Microscan Vision HAWK C-Mount Smart Camera

The Benefits

With Zincode's automated vision inspection system installed on their lines, Superpak is easily able to meet its customers' high expectations for product quality and production throughput. In addition, Superpak can have the confidence and peace of mind that none of its shipments will be returned because of defective packaging. Mr. T.P. Long, General Manager of Superpak summarized the benefit of adding machine vision to their operations saying, "Thanks to Zincode systems and Microscan smart cameras, we have gone six months without receiving a customer complaint about any quality issues. We are happy with this result, and we hope this will continue. Zincode and Microscan have offered us very good support on this project and we hope to have a plan to employ this automated measurement system in all of our packaging lines in the region."

OVERVIEW:

- **Customer:** Superpak
- **Industry:** Packaging
- **Application:** Machine vision inspection of dimensional measurements in carrier tape
- **Products:** Vision HAWK C-Mount Smart Cameras and NERLITE® Edge to Edge Backlights
- **Reseller/integrator:** Zincode Technologies Pte. Ltd.

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