SUCCESS STORY

Improving Production Processes with a Surface Scan System and Basler ace GigE Cameras

Customer

- Argutec, s.r.o.
- Location: Czech Republic
- Industry: Machine Vision
- Year of Implementation: 2014

Application

Grain-oriented electrical steel: although nearly invisible, it is an omnipresent part of our everyday life. It is used in important and useful devices like transformers and electric motors. Packages of these steel sheets are piled and used in transformer cores. This kind of steel must be specially processed, so that its magnetic properties, including the magnitude and homogeneity of the magnetic flux, are suitable for use in power applications. Precision manufacturing techniques and stringent quality control are necessary to achieve the desired outcomes.

In the past, the product quality was measured by a human eye. But this method had many disadvantages. The operator had to control the production line, and each operator had a different metric to use in evaluating defects. Also, this method generated no information about the exact positions of the defects.

The users need a surface scan system that helps them obtain a maximum amount of top-grade material, to reduce production and labor costs for the end product. To do this, the system must provide precise data on locations of defects, both within the strip and at its boundaries.

But that’s not all. The system also needs to help improve the production process and control warranty claims. Therefore, historical and statistical data must be stored, and be retrievable by the system upon request.

Solution and Benefits

In the field of machine vision, the Czech company Argutec created a Surface Scan System for this purpose. It is a contactless monitoring system for evaluating defects on grain-oriented electrical steel strips. The purpose of the system is to monitor manufacturing quality in real-time, while analyzing and archiving evaluated data. The Surface Scan System evaluates surface defects on a steel strip, while the accompanying Shape Scan System monitors flatness. Both products are designed on the principle of easy integration into the customer’s production process. Client applications use ergonomic design to match user needs at individual workstations.

At the core of the system are four Basler ace area scan cameras and a custom-designed Argutec lighting system for surface defect evaluation. A system of lasers measures flatness in cooperation with one Basler ace area scan camera. For this part of the inspection task, high resolution is crucial for accuracy in the flatness measurement; high speed is important for real-time capability.

Surface Scan System
As shown above, one Basler ace camera observes the top side, while three Basler ace cameras observe the bottom side, where there is a higher occurrence of defects and more potential types of defects.

The system handles a strip with a 1050mm maximum width, at a maximum production line speed of 30m/min.

In this system, the minimum detectable defect size is 1×1mm, while minimum detected flatness deviation from the ideal shape is 1mm.

This system offers clear benefits for the manufacturer. Non-conforming material can be identified and segregated easily. The precise information about location of defects on a strip allows savings in material when the defects are removed, where possible. Thus, a maximum yield of top-grade steel sheets can be obtained.

With accurate and fast information about surface and boundary defects, the line operators can respond immediately by removing the defects. Furthermore, the system enables better process control, root-cause analysis and immediate response, as well as accurate information in the case of warranty claims.

The customer can receive complete reports about the delivered quality of a steel coil, making comparison of different suppliers easier.

“The core of the system is implemented in Microsoft .NET C#, and it was easy to integrate Basler cameras thanks to the Basler pylon Camera Software Suite. We decided to use Basler cameras because of their good image quality, easy integration and fast data transmission”, says Martin Placek, Chief Executive Officer from Argutec.

Technologies Used

- Basler ac2500gc and Basler ac2500gm

More Information

http://www.argutec.eu/

Basler ace ac2500gc/gm