CASE STUDY

Surface Inspection on Packaging

Discovery SmartPQ Streamlines Surface Inspection for Laminate Production

Our client is a large and long-established producer of paper and board laminates used for consumer packaging, within the premium retail sectors such as fine spirits, tobacco, confectionery and beauty. Laminated packaging boards are widely used for high-end folding cartons, packaging inserts and book covers which are fully over-printable on the high speed commercial printing lines.

For a product to succeed today, the packaging has to stand out from the crowd. Their innovative designs and use of metallic, holographic and pigmented base materials enhance the visual appeal of products, helping their customers to communicate brand values and authenticity.

HIGH VALUE PACKAGING

With health warnings increasingly dominating tobacco packaging and the escalating need to combat counterfeiting, tobacco companies are demanding innovative, complex and specialist packaging that deliver greater visual impact and shelf appeal whilst offering maximum counterfeit protection.

Being well positioned to meet these growing requirements, our client invested heavily in specialist, high performance roll-to-roll lamination machines, with web widths of up to 1.5m, running at close to 300 metres/min (985 fpm).

However, any defects such as wrinkling, bubbling due to air pockets or waving, blistering, dimpling issues due to moisture on the surface of packaging material, devalue the product and the brand, resulting in a loss of business and potentially opens the door to counterfeiters. Less than perfect tobacco packaging enables counterfeiters to produce convincing copies using widely available "offset" printing technology. Whereas error free and complex, metallic and holographic base packaging, using specialist manufacturing techniques, creates a technical and economical barrier to illicit trade.

Being committed to the highest standards of quality and technical excellence, our client initiated a program to revamp their existing quality control processes. The aim was to produce metallic laminated material that met the strict quality specifications set out by their customers.

CHALLENGE

As with many graphic finishing processes, film lamination can create its share of challenges. Many factors such as temperature, static, moisture, dust levels and roll tension issues can create lamination problems, resulting in creases, tears, spots and holes on the laminated surface.

"With the high quality specifications we had to meet, depending on the operators to visually detect surface faults was just not practical, especially when the web is traveling at 300 metres per minute!", explained the Production Manager. "We were able to catch regular lamination film splicing joins, but we were missing quite a few of the smaller defects."

Even when some of these defects were caught, the operator could only estimate their location, resulting in the inaccurate placement of marker tabs. When the full rolls were mounted onto a slitter, the operators had to visually inspect large sections of the roll, before and after the marker to locate the defect. This extended the time taken to process each roll and increased overall production costs.

Our client added "We were getting on average 4 customer complaints per month, due to rolls being sent out with defects. Our high quality standards meant that we had to recreate the entire roll again, further impacting our operations. Automating our QC process became a priority for us, if we were to maintain satisfaction levels and our profitability."

BUSINESS CHALLENGES

- To produce and deliver high volumes of metallic laminated material that met the strict quality specifications set by their customers
- The existing quality assurance process, where the operators manually inspect the reels during production, fell short of their customers' requirements and increased production costs
- The company determined that they needed an in-line automated surface inspection system that inspected 100% of the roll.

SOLUTION SUMMARY

- Implemented Discovery SmartPQ with an 8K linescan camera, mounted on a Laminator, producing 1.5m wide laminated material running up to 300 m/min (985 fpm)
- Discovery SmartPQ configured to surface inspect defects greater than a specified size and frequency
- Operators are able to view the entire web in high definition, and select critical areas to zoom in and view in real time
- When defects are detected, a tabbing device is activated to precisely mark the roll edge and the details of each defect (type, location, severity) are automatically logged
- Full rolls are mounted on an slitter where each defect is quickly located using the roll tabs and the defect is spliced out, as required, to meet the specification.

CASE STUDY
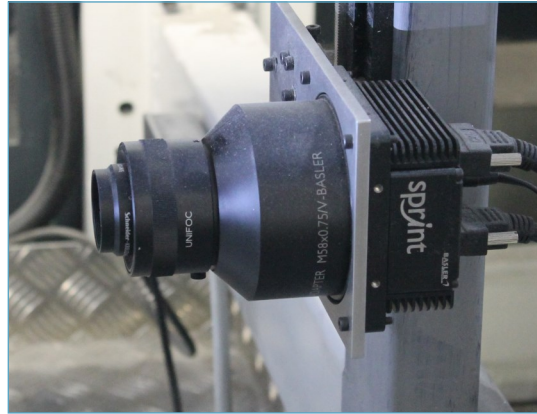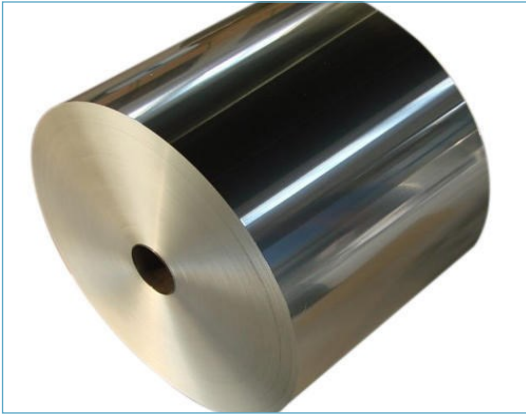
SOLUTION

"When researching the market, we came across many providers that offered surface inspection features that we just did not need. Their systems were either too overpowering or too rigid, and came at a price that was way beyond our budget." the Production Manager commented. "Lake Image Systems was one of the few companies we came across that was affordable, had a flexible surface inspection solution and were willing to work closely with us in meeting our all requirements."

Lake Image implemented its Discovery SmartPQ surface inspection system directly onto the Laminating line, with an 8K line-scan camera to capture high resolution images of the entire 1.5m wide web, running at speeds up to 300 m/min (985 fpm).

Expertly mounted LED illumination enabled sub-millimetre defects to become visible. Discovery SmartPQ's intuitive interface enabled operations to quickly set-up the system to analyse and detect common surface defects. Tolerance levels were easily set to enable the system to detect defects beyond a certain size, or if the number of defects exceeded a specified threshold. This enabled them to meet the precise quality specifications set by their customers.

When a defect was detected, Discovery SmartPQ triggers a tabber that marked the exact location of the defect on the roll edge. A detailed log of every defect, its size and location on the web is recorded, together with associated job, time-stamp and operator data. This provided them with useful management information to monitor and report on the quality of the raw materials used, the impact of environmental conditions and the quality of each roll produced.

IMPACT

The solution proved to be highly successful in helping our client to improve the quality of every roll that they send out. According to our client, "We are now getting only one customer complaint a month and we plan to get this down to zero once all of our operators are fully trained on the system."

Today the Discovery SmartPQ system is an integral part of their daily operation. Being intuitive and easy to use, the SmartPQ system has become a big hit with the operations staff.

"The reduction in complaints not only means that we have more satisfied customers, but the precise tabbing the Lake system gives us, means that our operations staff now only spend a fraction of the time to locate and splice out the defects - a major efficiency gain for us."

The success of the SmartPQ system has given our client the confidence to expand their business and implement the solution onto their other laminating lines. As the client concludes, "Being highly impressed by the way the system has performed and by the expert, responsive customer support we have been given, we are now looking to implement the Lake system on our second laminating line. The improvements in quality, the resultant drop in complaints and the increase in our process efficiency we have seen, has allowed us to easily justify a second system."

This solution has allowed our client to deliver a quality product in an increasingly demanding packaging environment and has strengthened its reputation as one of the leading suppliers of laminated packaging products.

BUSINESS BENEFITS

- Automating the QC process to detect defects on laminates has significantly reduced complaint rates and has satisfied a key requirement for their major, prestigious customer base

- The SmartPQ system has also considerably reduced the time spent to splice out defects, increasing the operational efficiency and profitability of the laminating line

- Due to the growing confidence in the SmartPQ system, combined with the quality of the service received from Lake Image Systems, a second SmartPQ system is being considered for an adjacent laminator line

- By being able to offer high quality laminated board, the company has strengthened its position as one of the leading supplier of laminated packaging productions.

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> Production Manager