

# PC-controlled image processing ensures Billy quality

IKEA Industry Poland produces furniture boards that are automatically film-laminated. The edges are particularly critical and it is necessary to precisely check quality, a task undertaken by an automated inspection system incorporating vision software.

IKEA is a company that has always pursued innovative paths and it has recognised the importance of automation since the early 1970s. The company has around 12,000 items in its product range. One well-known product is the 'Billy' shelving system. Its shelving components are made from plastic-coated, veneered particle board with the edges covered by glued on plastic strips. A key step in the production process is lamination which entails a film being applied to the particle board.

At IKEA Industry Poland a laminating machine is used to apply a film with glue to both sides of the board. A cutting machine subsequently trims the excess material at the edges to the correct length. If even a single process parameter is not precisely kept to, this can quickly lead to the film not being glued on properly, spoiling the visual appearance, particularly at the edges of the boards.

Currently, around 3,000 boards are laminated during each shift, resulting in an average output of 375 pieces per hour.

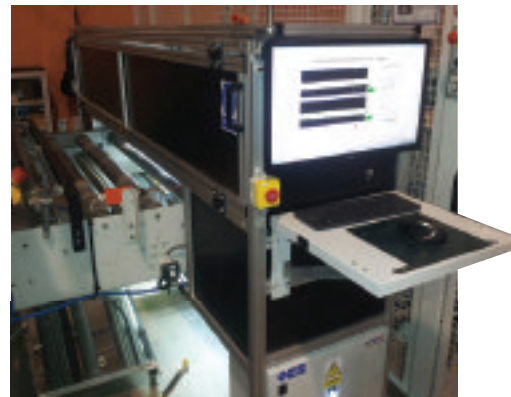
No defects are allowed in the finished products. In theory, therefore, a skilled worker should perform a visual inspection of the board edges on the conveyor belt. It has transpired, however, that manual checking is not effective. A worker alone cannot check both sides of the board at the same time – not to mention the fact that it would not be possible to spot all the defects with the conveyor belt travelling at speeds of up to 52m/min.

Manual checking would also be hazardous for those performing the inspections on the conveyor belt, as they would have to get very close to the moving parts in order to spot defects – which could lead to injuries and accidents. Consequently, a Polish systems integrator, Automatech, was tasked with developing a machine for checking the laminated boards with an inspection system based on machine vision technology from Cognex.

For IKEA, Automatech devised a fully automated inspection facility, which allows a 100% quality inspection to be carried out on shelving boards. The machine vision system is based entirely on the technology from Cognex, including the Cognex Designer software and VisionPro toolbox. On the hardware side, a CIO-24 card and multiple 2-GigE high-resolution cameras are used. The components are installed inside a machine enclosure with lighting through which the boards pass in rapid succession.

The system inspects the quality of the decorative film on both sides of the board without manual intervention and is designed specifically for the wood-processing industry to minimise waste owing to faulty edges. IKEA's prime aim was to detect and eliminate defects such as excess glue, incomplete lamination, or detachment of the film. Only a few boards per shift fail the checks.

Defective boards are being processed by cutting off the parts which have been identified as failures. All defective parts



*The data generated by a standard PC and displayed instantly on the monitor is used to assess whether or not the lamination has been applied correctly.*

will be marked as damaged and sorted out manually. In this application, it has been crucial for IKEA to avoid boards with defective edges entering the regular production process eliminating the need for constant manual checks.

## Technical implementation

In the IKEA application, the 2-GigE cameras and lighting modules are being moved by precision servomotors because the width of the boards are variable, between 600 and 1300mm and the inspected area has to be approached and brought into focus quickly and precisely. This data is processed immediately after the images have been recorded.

On the software side, Cognex Designer facilitates rapid creation of complete machine vision applications which enables users to immediately enjoy the full capabilities of the accompanying VisionPro software – a smart tool that ignores non critical changes in the appearance of test areas and which concentrates entirely on critical features. Various calibration tools correct lens distortions, camera rotation and tilt.

On the basis of these Cognex components, Automatech has developed a highly efficient system for streamlining the inspection process at IKEA. It cuts waste from production and gives the furniture giant the certainty that its products fully satisfy the quality requirements.