

INDUSTRY 4.0 NETWORK SITE VISITS

Bremworth



Company Profile:

Bremworth is an iconic New Zealand brand offering premium wool carpets and rugs uniquely designed and made in New Zealand.

With over 60 years in the flooring business, Bremworth's ingenuity to innovate with natural materials aims to make homes more sustainable, safer and desirable places to live.

Through operations in Auckland, Napier and Whanganui, Bremworth sources the best quality New Zealand wool for crafting woollen yarn into premium carpets and rugs that quietly work away to enhance your home and health.

Background:

Bremworth's spinning plants located in Napier and Whanganui have been producing yarn from 100% New Zealand wool for decades using largely unaltered manufacturing techniques. Over 40 legacy machines and assets are used to complete the manufacturing process. With the transformation to 100% wool carpets (removal of synthetic carpets from Bremworth's product range) there has been a lift in demand for wool yarn.

A key step in the production of carpet yarn is the dyeing process. Historically dye vats were run partially filled to order which results in some loss of manufacturing capacity, a change was made to increase vat utilisation and lift overall capacity. This change in business process required better ways of monitoring the process and increasing visibility of shop floor status.

There were several gaps in the flow of information to and from the factory floor. Although some sensors were already in place on the vats, these were not connected to deliver an overall view of production. Process and formula control was

also very manual, and paper based.

Objectives:

Integrating existing systems for collecting and processing data from the shop floor

Automating process and formula control to the shop floor and integrating with enterprise-level systems

Ensuring the resultant system maintains machine efficiency, production throughput, and data integrity

Solutions:

Bremworth was simultaneously replacing and consolidating legacy financial, inventory control and other systems with Dynamics365 (D365). D365 integrates data throughout the organisation and makes a seamless connection between all available information systems. Despite its capabilities to manage enterprise-level information, D365 does not provide enough granularity for shopfloor data management and lacks efficient communication with sensors, PLCs, and production systems in general.

A manufacturing execution system (MES) for scheduling production processes and controlling shop floor machines and equipment in real-time was needed that integrates with D365. The Ignition platform by Inductive Automation was selected as the preferred MES. If fully utilised and integrated with other production systems, the Ignition platform can:

- Provide better visibility of the production process with shopfloor-wide traceability.
- Enhance equipment effectiveness and reduce downtime.
- Assist with making better decisions using real-time data.

The Ignition platform provides control, traceability, and documentation of the transformation of raw materials into finished goods in real-time.

Project Roll-out

A new cloud ERP (Dynamics365) was implemented at yarn manufacturing plants in Napier and Whanganui. The D365 cloud-based ERP system would be used for finance, inventory, procurement, sales and MRP, which would then pass on the production requirements to the MES (Ignition).

An interface was developed between ERP (D365) and MES (Ignition). The ERP generated dyed fibre production orders to the MES where they could then be scheduled to run on specific dye vats. This brought together the product order details with the actual production data – start stop times, temperatures, pressures, cycles, chemicals, dyes used etc. Orders are displayed on a Gantt chart showing specific dye vat loading by date and sequenced by colour.

Results

- The MES system provides data/visibility into the specific production details so a clearer understanding of plant, equipment and product performance could be achieved.
- Visibility was improved throughout the process, allowing visualisation of OEE, production schedule, actual versus targeted production, machine status, delayed production, and more in real-time.
- Schedule entries were automatically adjusted to

accommodate production progress, breaks, and other factors that affect production in real-time.

- Each dye vat was connected to the MES to show current machine status, pressure, temperature and setting. Operators also could see what the dye vat was currently dyeing and what was next.
- All machine/vat data relating to the dye/shade order are saved to providing 'big data' for future analysis.
- Start and end of each dye order was identified by using the sensor data from the machines, which allowed auto-scheduling of 80-85% of the dye orders by applying the same scheduling criteria programmatically as the human planners were doing manually.

Next Steps:

- Rolling out the project throughout the whole production line and connecting all the machines on the shop floor to MES (Ignition).
- Employing Machine Learning and advanced data analytics on the collected data to optimize dye cycle times and chemical usage.
- Root cause analysis by using quality inspection results and production data collected from MES, ERP, and other production systems.

About the site visits & Industry 4.0

The purpose of the Demonstration Network is to drive uptake of Industry 4.0 technologies among New Zealand manufacturers with the aim of increasing their productivity and global competitiveness. The Network of Site Visits (NSV) are part of the [Industry 4.0 Demonstration Network](#), which also includes a mobile showcase and smart factory showing cutting-edge industry 4.0 technologies in action. The NSV takes selected companies through a fully-funded assessment process to help them accelerate their own journey towards Industry 4.0, and sees them share their knowledge with other manufacturers.

Further questions?

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