Oswestry
Shropshire
United Kingdom
+44 (0)33 3011 2908 phone
www.havenshire.com

Case Study: Modernising a Factory

The first step toward this project was network separation from a parent company. This was more complex than it sounds. The factory's original single owner sold off elements so that the site was occupied by three separate companies. IT systems, warehouse space and other aspects of the site that had become a patchwork quilt over a span of decades had to be separated.

After separation, a company which we will call 'Tyre Corders' (to preserve commercial confidentiality) decided it had to improve its performance from approximately break-even. Tyre Corders spin industrial nylon cord used in the manufacture of tyres for large construction vehicles, a highly competitive market.

Initial Strategic Decisions

The Operations team decided to upgrade winders on its equipment from an old model that required human string-up and doffing to a new model that automatically strings up and doffs bobbins. They also bought a new conveyor and scale for the case-wrapping area.

IT Implications

Tyre Corders turned to IT consultancy Seneschal Inc for help with the IT implications of these equipment changes.

First priority was making the Manufacturing Execution System (MES) capable of supporting the way the new winders behave. The new winders offered the capability to fill all or just half of the bobbin threadlines on each spinning position. When running only half, if that portion of a winder broke down, the winders could easily switch from one half to the other half. This would minimise waste and downtime.

Unfortunately, the vendor providing the MES said it was 'impossible' for their software to accommodate such behaviour unless recipes were changed to treat every position as though it is an entire spinning machine. Loading a recipe for one machine would become loading 32 recipes for 32 pseudo-machines, which had ugly ramifications and presented large openings for human error.

There was not enough time to replace the MES before scheduled arrival of new winders. Seneschal's team devised a plan to upgrade the MES system and, while doing so, radically modify it to be able to do what the vendor had declared impossible.

Success Factor: Tyre Corders got a second opinion whenever an expert's advice seemed like a dead end or a one way street to less-than-optimal results.

Moving On to Fit IT to New Human Procedures

Manufacturing Execution System and Recipe Management

Upon finding that upgrading the MES vendor's recipe management system also would not suit operational needs, Seneschal worked with Tyre Corders' team to design a recipe system that fit desired new human procedures. Seneschal's design was implemented by Tyre Corders' team. This included extensive work so that recipes would no longer take effect immediately when downloaded, a feature that had in the past left the site vulnerable to costly glitches. Instead, through creation of an entire new MES feature by Seneschal, recipe downloads would be 'staged' within the MES and examined by supervisors to make sure they were correct, then activated through the new Recipe Manager upon a supervisor's approval.

Success Factor: Tyre Corders and Seneschal divided work based on who had the best skills and availability, and acted like a seamless team where a project required close collaboration. Nothing else was allowed to override that strategy.

Outcome: The MES modifications and new recipe management system together reduced problems due to mistakes or communication errors in recipe changes, and increased spinning yield from 85% to 95%.

Packing and Long Term Product History

Seneschal's and Tyre Corders' teams collaborated to replace very old packing and long term historical systems. The packing system was built by Tyre Corders and the historian by Seneschal. Every aspect of the new IT required thorough exploration of radically changed shop floor workflow to ensure systems worked for both people and technology. Extensive consultation occurred with Operations throughout design, development and testing.

Packing moved from a separate area onsite to workstations at the end of the spinning aisles so bobbins could be packed as soon as they doff. The long term historian got data within an hour instead of a few times a day.

Because packing would now happen before lab tests came in to verify quality, occasional repacking had to be accommodated. Rework of cases could tap both the short term MES and the long term historian, so it could cope with bobbins of any age.

Success Factor: Although systems had to be dealt with in a specific sequence to put usable systems in place before new equipment was installed, no system was viewed in isolation. How each system fit into As Is, To Be and intermediate scenarios for the entire manufacturing 'ecosystem' were always kept in mind.

Decisions were not always easy. For example, at one point a human procedure was proposed by the top executive in the country. Both Seneschal and Tyre Corders' IT teams believed it to pose severe problems for tracking product quality. The executive came from a country where executive decisions are not questioned, so challenging the procedure could sour relations with the executive suite. Instead, in a meeting Seneschal asked for clarification by walking through the procedure under the executive's guidance. The walk-through let the executive see for himself where the procedure fell apart. He adjusted his stance with the face-saving and lack of friction that differences in culture required. His revised decision became a crucial element of performance improvements won by the project.

Success Factor: Determining exactly how new procedures and software should interact was not always easy, but both teams stayed focused on getting the right result and avoided making disagreements personal.

Outcome: Time from product doff to shipment fell from 2 days to 2 hours. Combined with the increased yield, this project kept the factory from having to completely shut down during the downturn that hit in 2008. Quality and reliability rose. The site rose from the verge of closure to profitability.

Wrap-Up

Tyre Corders followed through on this project throughout its shop floor. Seneschal subsequently worked with Tyre Corders to streamline and modernise the rest of the shop floor systems on the site from MES to the IT interface with the warehouse. Some existing systems were kept with updates to software, notably DCS and PLC systems that manage the machinery.

Tyre Corders made a strategic decision to utilise Seneschal primarily for architecture and design, and the internal factory IT team for implementation and maintenance. Seneschal continued to provide maintenance and enhancements to the MES system, as the third party MES vendor was deemed to have come up short handling its own software and the terms offered by Seneschal were more flexible.

Outcome: More than a decade after the project:

- **The systems are aging well.**
- **IT systems continue to be generally more cohesive, more supportable, more readily enhanced and more amenable to upgrades of their platforms and toolsets.**
- **The site has reduced its outside IT support contracts and the size of its internal IT team while having earned status as Tyre Corders' flagship for its product line.**
- **The factory is often specifically requested by customers as their source for quality reasons even when a closer factory can offer lower shipping costs.**

Note: Seneschal Inc is a USA-based sister company to Havenshire Limited.