ST REGIS KEMSLEY TIGHTENS CONTROL LOOPS TO ACHIEVE MASSIVE COST SAVINGS AND QUALITY IMPROVEMENTS

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St Regis Kemsley tightens control loops to achieve massive cost savings and quality improvements

St Regis Kemsley has installed a major IT system to tighten control loops and move beyond a partially manual, end-of-line quality control system which was wasteful of fibre, chemicals and energy – the mill tended to overspecify basis weight to remain within quality parameters.

The new QIS system brought savings of £100,000 – in fibre and chemical costs – in the first eight months of operation. It enables on line quality control by providing real-time feedback from the process.

The system has been extended to the other St Regis mills – Taplow, Sud - brook, Wansbrough and Hollins – which are now interlinked using Citrix thin client technology on a cen - tral server.

St Regis Paper, the paper making division of David S Smith is one of the largest paper and packaging producers in the UK. Between 1987 and 1992 they invested £120 million in their Kemsley mill for the high volume production of corrugated case materials. Today the mill produces 500,000 tonnes of case material, fluting and linings each year along with a small industrial towelling output, *figures 1 and 2.*

A permanent quest for higher quality, productivity and lower costs led to a review of their process monitoring systems in the mid 1990's to achieve a tighter control loop. Tim Perris – the project manager seconded to oversee the project at the time, and now business development manager with QISoft, explains how the project unfolded and has developed.

The Problem: Plant control was exercised by a combination of automated and manual data collection followed by manual collation and analysis that was both time consuming and retrospective. This was the key problem arising from an otherwise high-speed process. Control was mostly an end-of-line issue and based on monitoring paper quality. Therefore, to make sure that product was within specification there was a tendency to produce over weight material incurring higher fibre, chemical and energy costs.

Figure 1 Kemsley mill produces 500,000 tpy – case materials, fluting and linings and some industrial towelling.

Figure 2 Kemsley mill is a 24 hour operation running 362 days a year. Quality can be monitored and process adjustments made from terminals at multiple points along the 300 metre production line.

ISO 9000 introduced a new quality paradigm to the mill. This was based on right-first-time principles, rather than post production inspection. To achieve this tight control loop of mill operations required real-time data collection, analysis and transmission. Implicit in ISO 9000 is the involvement and empowerment of line operatives to achieve a quality product. These changes clearly required a major IT investment and the management was acutely aware of the potential pitfalls that could arise.

The application of large scale IT projects provide many examples of failure. The reasons are many and often interrelated. For example:

- The introduction of a scale of change that is too great to absorb can cause severe problems as can mismatch between the selected system and actual production methods. This is a common problem where systems of process control developed for one industry are adapted for another.
- Adaptation of technology can also create a need for bespoke programming to meet the special requirements of the process resulting in delays in implementing systems
- Changes in system requirements and specification over the implementation period can also frustrate the introduction
- Last, but certainly not least are problems arising from resistance or rejection of new methods by one or more work groups.

For these reasons the management decided to involve outside consultants in the selection, application and implementation of the new control system. As Iebe Ypma, an executive consultant with Compass Management Consulting who worked on the assignment explained, "Many companies seeking IT solutions fail because they are dazzled by the vendor's image and presentation. We wanted to get beyond the sales force and talk to the actual development and project management staff working on the solutions – working on the application screens rather than admiring overheads."

A four stage methodology to the implementation of the Kemsley system

There were four stages: i) a call for information; ii) presentation; iii) pilot, and iv) implementation.

The methodology was designed from the outset to be agenda-based and highly participative. The main goal was to achieve a statistical process control (SPC) ability accessible to everyone, including operatives who were not SPC trained. An evaluation panel of 10 staff, including technical and operational personnel, was established to represent all interests.

Call for information: Five vendors were invited to offer proposals. The invitation to tender gave full details of the plant, outlined the existing quality control procedures and specified key performance criteria. Sample data was provided so that vendors could demonstrate how their system would interface with plant monitoring systems, present their analysis and explain how this would contribute to the achievement of quality objectives.

Presentation: Based on this agenda, vendors were then invited to make a presentation to show their understanding of the mill process and how their products conformed to requirements. The evaluation panel was then able to score and rank each vendor according to compliance to the agenda.

Three suppliers came through this initial test but QIS from QISoft emerged from this ranking process as the leading contender. Nevertheless, there were still areas of non-compliance that were subject to negotiation to find working solutions. These were examined in turn and work-arounds developed that avoided the need for bespoke software or major re-engineering, enabling the selection process to move to the next evaluation phase.

Pilot: A live pilot project was set up to monitor processes; this provided a laboratory for testing the system against real life conditions. Problems identified were worked through and solutions found without affecting the plant.

By this iterative process the QIS system was fine tuned to the plant. The pilot became a demonstration and training resource for the plant operators, allowing them to participate in the development of the system and to become familiar with its processes. Plant operators taking ownership of quality issues in this way became so successful to the extent that they were a key driving force to ensure the swift deployment of the system.

Implementation and Refinement

Implementation at the Kemsley mill took place between April and November 1997 and was phased by machine area. The quality manager conducted weekly meetings with foremen to review progress, identify problems and refine the system operation, and give support and training where required. Senior management, particularly managing director, Mike Smith drove and encouraged this process. Sceptics were soon won over by the savings – £100,000 in fibre and chemical costs in the first eight months,

The QIS system was subsequently rolled out at other St Regis mills in Taplow, Sudbrook, Wansbrough, Hollins and the divisional quality laboratory. Software cost

was approximately £130,000. Associated terminals, servers and network hardware took initial cost to £400,000.

Initially installed as independent networks at each site and working under DOS, QIS v4.0 systems have been progressively upgraded. All now use the universal Window's environment. Sites are now interlinked, using Citrix thin client technology on a central server so that programmes can be upgraded and managed easily and quickly from a single location. Plans are in hand to introduce an advanced version of the software QIS v5 to all location soon.

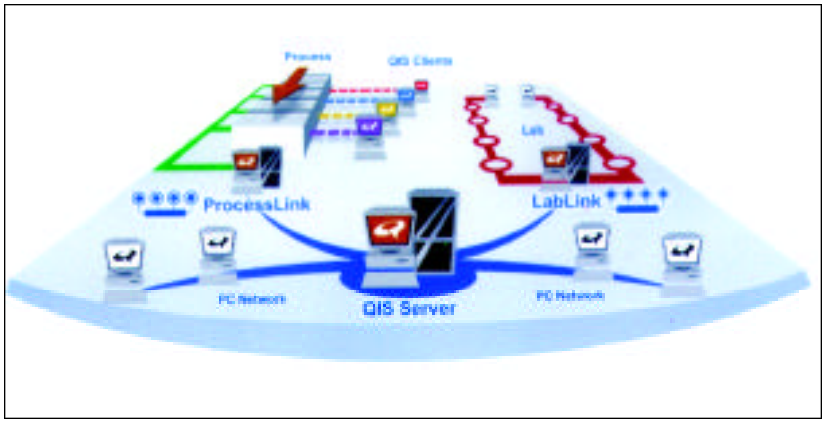

Figure 3 The QISoft process monitoring software gathers real-time data, gives instant analysis and presents this together with lab data. Full history and trend data is also available so that processes can be trimmed to ensure product conformance.

Figure 4 Total traceability is assured by having full QA information on a reel by reel basis – from raw material input through every stage of the production process. Non-conforming material can be precisely pinpointed for removal and regrading.

Real-time quality management in practice: The QIS system provides real-time data from manufacturing processes and timely feedback of key parameters, *figure 3*. Up to 100 quality information variables are monitored across the mill at different locations. Facilities exist to collect data manually or automatically via links to third party business and process systems. In addition, off-line analysis from the lab is also presented to the mills so that operators and local managers have the full picture of quality and production performance. All points of process are monitored: stock prep, wet end control, grade/grammage, machine throughput, temperature, pressure, flow rate, weight, thickness, colour. This enables operators to control the process within defined limits.

Typically, there are up to 50 users per mill, each having full access to data for every stage of the process. These are shown data in geographical presentations which are clear and easy to interpret. Operators are therefore able to see upstream product conditions and adjust their process to compensate. Cross mill communication via the data screens enables the shift supervisor to take control of a problem at any point on the line from any screen in the mill.

Over and above the initial savings in fibre and chemical other benefits have emerged. Reel by reel data enables non-conforming material to be precisely pinpointed resulting in lower waste and downgrade levels, *figure 4*. Higher productivity has also resulted from faster machine speeds made possible by reducing drying time due to closer control of wet end conditions. Automated process monitoring gives greater accuracy and reliability of data over manual methods. It also allows for built-in compensation where the system detects variability in measurement.

Conclusion: Many industrial process control projects fail because of conflict between needs and specification, delays in application, lack of management or workforce commitment or an inability to adapt as future needs change. St Regis Paper have successfully overcome these problems by having realistic and achievable goals. These encouraged participation so that work groups could "buy-in" to the idea and ensure quick implementation to produce early gains that reinforced adoption.

The quest for higher quality and lower costs continues. St Regis Paper have been keen to build on their early gains by consolidating quality systems and developing techniques to embrace a greater range of measurements will allow even closer control. In parallel with this they have updated both QIS software and hardware to take advantage of improvements.