

Improved process performance: BTG brings a fresh approach to an old problem

While it's still early days for BTG Consulting, the concept is taking root fast. A new business is growing up alongside BTG's traditional instrumentation activities, and an approach that's already proven highly successful in other industries is gaining an exciting new dimension in the world of pulp and paper.

BTG's newest and fastest-growing business unit, BTG Consulting was established with the aim of helping customers find new ways of improving plant performance. The strategy: combining BTG's unrivalled industry expertise and leading-edge technologies with a radical new way of looking at process control.

The approach has already been proving itself in several on-line applications in European mills, delivering substantial quality improvements, process and plant-wide optimization, better efficiency, reduced costs and increased throughput, geared to the precise operational and commercial imperatives of each customer.

The man leading the new venture is New Zealand-born Paul Austin, who began his career at Tasman Pulp & Paper (now Norske Skog Tasman) before going on to earn a PhD in advanced control system design from Cambridge University. Now based in the UK, Austin is a veteran of numerous consulting, academic and research positions in the pulp and paper industry.

He joined BTG last year with the mission of pioneering a new process improvement business that would harness BTG's in-depth pulp and paper know-how and integrate it with advanced new tools and service packages designed to help customers dramatically upgrade the performance of their mills.

"Right now we're raising the flag," says Austin. "We've been quietly working on a number of projects where we've shown we can deliver real value. Now it's time to spread the word."

New perspectives on process control

BTG has built a global reputation on its state-of-the-art technical expertise, in-depth local knowledge and hands-on involvement helping clients solve their process problems. But Austin's approach goes much further, bringing a completely new set of techniques to the party, along with a new team of experts who will work alongside existing BTG staff to put real power behind the words BTG Consulting.

"BTG Consulting isn't about offering clients a particular instrument or software tool," says Austin. "It's about deploying a set of unique, purpose-built tools according to the precise requirements of each customer, to achieve what might otherwise have been elusive performance improvements."

"These are powerful, sophisticated and complex tools, but they're also designed to be very user-friendly. Our experience so far shows that operators typically choose to use them online for more than 95% of machine run time," he says.

In-depth insight

One of the cornerstones of BTG Consulting is a new approach known as Advanced Process Control (APC), a radical technique that allows the complexity of pulp and papermaking applications to be modeled holistically, rather than via the traditional single-variable-at-a-time approach.

“APC is the core of what we’re doing at BTG Consulting,” explains Austin. “While it’s essentially a set of techniques for multivariable process analysis and controller synthesis, what it really provides is a pathway to performance improvements on a completely new scale.”

To illustrate the point, Austin proffers a simple example. “When you want to regulate a quality parameter like basis weight, the standard approach is to set up a control loop to adjust a single variable like the rate of stock delivery.

“That’s fine as far as it goes, but there may be many other variables that are also affecting weight. What we do is to build a mathematical model that maps the effect all variables of influence can have on the weight.”

While new to the pulp and paper industry, this multivariable approach has been used with great success in the petrochemical industry for some 25 years. Austin was one of the first to start applying the same concept to pulp and paper, developing the first paper-specific APC systems in the mid-1990s.

APC will quickly establish itself as the new industry benchmark for performance improvements in coming years, he says, because the benefits it can deliver in pulp and paper are just as startling as those seen in petrochemicals, where it’s now a mature technology.

A unique new service

“BTG Consulting was not established as an extension of BTG’s instruments sales strategy, designed to drive sales of our own products,” stresses Austin. “We’re a totally new BTG business unit offering an entirely new kind of service. Our software systems work across the board – with any DCS system, any machine, and across all parts of the machine. We believe that not only makes us unique, it gives us a real chance to change the way things are done and really help our customers to improve their plant’s performance.”

At present, Austin says, his team is working as much on performance improvement as straight productivity improvement. “Not all mills are required to run at full speed these days, so it’s even more critical to find ways to reduce chemical and energy costs, raise efficiency and improve quality. In short, to deliver the kind of performance improvements that are precisely our raison d’etre.”

APC takes process control to previously unattainable levels, achieving customers’ performance goals within project payback times that are typically well under one year.

Customer Case Studies

In Britain, BTG used APC on a newsprint machine to better regulate wet end stability and manage broke flow rates, minimizing the impact of broke and recovered fiber on wet end stability:

Improvements: coordinated control of the three retention aid flow rates and the flow and consistency of fresh feed and broke

Benefits: greatly improved runnability due to enhanced machine stability

Payback time: less than six months

Custom-tailored approach

No two mills are alike when it comes to performance imperatives, notes Austin. "We don't take models from one mill to another – each situation is just too different. When we go into a mill, we bring our expertise and industry experience, our methodology and a highly developed set of software tools – but never a fixed mindset about how to proceed. Each new job means starting from scratch and collecting data which enables us to build models that accurately relate outputs to inputs."

The first step is typically a pre-study, which can take anything from two days to four weeks per process unit, depending on customer requirements. Operating data is analyzed and an assessment made of actual performance against objectives.

"Based on statistical tests and our team's experience resolving similar issues, we make a conservative estimate of the benefits our technologies could deliver, and prepare a detailed proposal outlining the objectives and cost of the project. We also estimate project payback time," says Austin, adding that, to date, return on investment for this type of project has always been less than a year.

Once the customer gives the green light, it typically takes around six to nine months to design, implement and commission an appropriate system, he adds.

State-of-the-art software

In addition to putting together a new team of highly specialized engineers, BTG Consulting has also signed an exclusive alliance with UK-based software developer Perceptive Engineering.

"The sophisticated software toolsets developed by Perceptive Engineering are the culmination of a significant R&D investment over many years," notes Austin. He says BTG Consulting will continue to work closely with the company's software specialists to develop software that revamps the way processes are viewed, operated and optimized.

"We see BTG Consulting growing as part of the local field organization globally as the business grows," says Austin. "This will be a core part of our future business and a very exciting growth process for the company."

To learn more about how BTG Consulting can improve your productivity, visit www.btg.com

Customer Case Studies

BTG implemented a plant-wide APC system at a British de-inking plant to better regulate brightness and residual ink while minimizing chemical consumption, improving yield, and precisely matching throughput to demand.

The APC controller also manages the pulpers, ensuring they feed the dump tanks at a rate required by the rest of the plant, and manages water treatment, ensuring water turbidities are kept constant and polymer use minimized.

Improvements: standard deviation of brightness is now consistently maintained at under 0.3 points, with similar reductions in residual ink variation.

Benefits: More than 25% reduction in the use of bleach and associated chemicals, yield improvements of over 2%, and increased throughput of between 10% and 18%, depending on feed stock

Payback time: a few weeks

In France, BTG used APC to achieve better control of white water consistency, ash formation, and the broke and recovered fiber system on a fine paper machine:

Improvements: Coordinated control of fresh feed fractions, coated and uncoated broke streams, the recovered fiber system, retention aid and filler flow rates

Benefits: dramatic reduction in the variability of white water consistency and sheet and headbox ash, increased production, fewer and shorter sheet breaks, reduced off-quality losses

Payback: 3% increase in production, 10% improvement in average value of formation index, and large reduction in variation

BTG used APC on a British 3-ply board machine to improve wet end stability:

Improvements: Control of back water solids using retention aid flow rates; broke and starch flow rates and top layer refining are all determined by the operator as feed-forward variables

Benefits: major reduction in sheet breaks, increased average running speed

Payback: 7% increase in saleable production