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Driving efficiency

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Integrated software solutions help process manufacturers to optimise their engineering, manufacturing and supply chain operations

Software innovation is boosting design and production optimisation, says Paul Taylor

Optimisation is no longer an option. It is a commercial necessity. The fluctuating marketplace for feedstock and energy prices means that the competitive advantage for refining, petrochemical and chemical production is being squeezed. Many companies can no longer rely on cost advantage, so there is little room for error. For industry leaders today, the imperative is to meet customer needs and be commercially profitable. Before they can achieve this goal, firms have many business

challenges to overcome, including optimising complex operations, efficiently designing facilities to provide greater energy and capital cost savings, and maximising manufacturing effectiveness through efficient supply chain management. To conquer complexity and drive efficiency measures across the operation, companies today are implementing flexible technology to achieve design and production optimisation.

The refining and petrochemical industry has reached a turning point due to global changes in feedstock availability and price, which has created a more challenging market. Companies will need to excel in their pursuit of commercial and operating excellence to remain competitive and preserve global market share.

Many projects are in the process of being constructed and commissioned, particularly in Asia and the Middle East. This presents 'growing pains' for operators as these new operations supplement the current facilities. Each new operational process must be designed to be both safe and reliable. In addition, the industry continues to suffer from a shortage of skilled and experienced engineers across all areas of the business.

Feedstock and product prices have fluctuated dramatically in recent times and consequently affected supply and demand. With global competition and regional imbalances, the need to implement more stringent safety and environmental regulations is equally essential for companies to mitigate risk against unplanned events. The potential effect of this on the producers is significant as margins are reduced and new production capacity shifts to embrace new feedstock sources. The USA's shale gas/shale oil industry is already putting tremendous pressure on operators across the markets as some regions are now caught in between cheap chemical imports from the USA and the Middle East.

Therefore, to be a high quality, low cost manufacturer, there is a need not only for more engineering expertise, but also for cutting-edge technologies to help bridge the skills gap and address operational challenges.

Best practice

In today's market, it is vital to squeeze as much value as possible from the operation where costs and risks are high. To deliver this, companies need to adopt best practice using integrated software to achieve superior cost results, including a number of key disciplines.

Commercial excellence is the first of these disciplines. Companies are focused on creating integrated plants that are world-class in both size and complexity. There is a need to work hard to establish what to produce, how or when to ramp up production,

where to sell products, how to distribute them and quickly determine the return on investment. By standardising on optimisation software, companies will improve margins, increase yields, meet customer demand and gain competitive advantage.

Operational excellence is the next priority. To survive in this fast-changing environment, companies need to be leaner, more efficient and able to adapt quickly to customer needs. To be exemplary in terms of operational excellence, companies are implementing flexible and integrated software technology to bridge the gap between strategic planning and scheduling. Using integrated software to avoid silo practices will help empower engineers to make better decisions when they come to address feedstock planning, operational efficiency, energy optimisation and safety analysis. The use of advanced process control (APC) achieves greater control over plant to meet operational and energy efficiency targets, as well as improve product quality.

CAPEX efficiency must also be considered. Together with better analysis, the ability to easily evaluate capital investment projects faster early in design process along with better analysis helps engineers understand the economic implications of decisions. Crucially, the project scalability, improved workflow and the ability to achieve better predictability and accuracy during FEED reduces the total project life-cycle. With better cost trade-offs in making incremental capital investment decisions, companies will become more profitable.

Compliance and sustainability is another point to be factored in. Efficient design of facilities is vital to achieve outstanding environmental, health & safety (EHS) performance and reduce operational risk and prevent injury to staff. Excellence in process safety starts by ensuring facilities are designed, operated and maintained in a way that minimises the potential for process safety incidents. Risk is also managed by quickly identifying hazards, assessing consequences and implementing prevention and mitigation measures.

Finally, skills development must be considered. Companies are focused on addressing a shortage of skilled and experienced chemical engineers. With integrated software, new and occasional users become proficient faster and experienced users can do more.

It is a combination of these elements that industry players need to undertake to respond effectively to the commercial and operational issues affecting their business. The use of integrated automated software, in particular, delivers accurate real-time information and helps operational decision-making to be more efficient with fewer resources and less time to complete tasks. Sustainability is, therefore, enhanced through more efficient use of energy and less raw material wastage, whilst quality is improved. The latest software streamlines workflow and manages orders more effectively to be on time and measurably meet customer satisfaction requirements.

Manufacturers that standardise on optimisation software across the enterprise will minimise lead times, maximise asset utilisation, speed up time-to-market, increase production visibility and strengthen competitiveness. Many refineries have adopted AspenTech's AspenOne software suite to optimise process manufacturing. With integrated software solutions, process manufacturers can implement best practices for optimising their engineering, manufacturing and supply chain operations. AspenTech customers have increased capacity, reduced costs, achieved energy efficiency and become more profitable.

With the AspenOne licensing model, companies have access to all products in the suite and can use software tools on a 'check out – check in' basis and track usage whilst adjusting when and where the software is used, based on their changing requirements. As priorities change, this flexible software model transforms the way companies can conduct business and whether the software is installed on premise or in the cloud, customers have access to the full range of innovative software applications to meet project demands.

Breakthrough innovations in the latest releases of the software allow new and occasional users to become proficient faster, bringing the power of optimisation to more people in engineering, operations, planning and scheduling across the enterprise.

The model for success

Navigating uncertainty is essential in today's market. The companies that will thrive must be leaner, efficient and able to adapt quickly to market dynamics. Using innovative and flexible technology will improve profit margins. Better integrated planning, scheduling and execution also optimises the manufacturing operations and supply chain.

As economic storm clouds continue to threaten, standardising on optimisation software allows business to achieve commercial competitiveness and operational excellence, which will substantially contribute to conquering complexity and driving efficiency in a turbulent marketplace.

Paul Taylor is with **AspenTech** (<http://www.aspentech.com>).

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