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How integrated technology optimises operations

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Operational excellence is a systematic approach that consistently reaches the highest possible return from a plant asset. Many energy and chemical companies have trillions of dollars' worth of capital investment tied up in their process plants. To unlock this potential and to achieve excellence across the enterprise involves strategies that address all aspects of the business and the people working at the plant floor up to the boardroom.

Adopting best practice

For an asset to remain viable over the long term, it must be continually improved over time. Therefore, technology is a strategic platform for implementing sustainable measures that will attain excellence from design through production and to deliver results.

Interestingly, the Greek Philosopher Aristotle once said,

"Excellence is an art won by training and habituation. We do not act rightly because we have virtue or excellence, but we rather have those because we have acted rightly. We are what we repeatedly do. Excellence, then, is not an act, but a habit."

Bad habits are a haven for inefficiencies, which are expensive and could leave an operation at a competitive disadvantage. However, the companies at the forefront of innovation adopt best practice and consistently use integrated software to plan, execute and schedule their plants more effectively. For example, the ability to adapt quickly and evaluate the impact of rapidly shifting oil and natural gas prices on the business is essential to remain profitable today. In addition, identifying new ways to improve process safety, implementing energy-efficient measures across all refinery assets and bridging the gap between planning and scheduling helps achieve operational excellence and increase profit margins.

Today's best-in-class refineries and petrochemical firms with the least exposure to risk use various crude types and have high value adding outputs. They take advantage of the light/heavy crude price differential and are equipped to refine various types of crude oil (i.e. sour crude, sweet crude or a mixture). Crucially, they can deliver high value adding outputs, including a high percentage of LPG, light and middle distillates, as well as a low percentage of heavies and fuel oil. By being fully integrated with downstream petrochemical units, plants that compete with greater commercial success have the ability to blend different components and offer strategic value. To achieve best practice, the priorities include:

- Developing better operational communications (i.e. collaboration between planning > scheduling > control > execution > supply chain)
- Improving asset/equipment reliability
- Reducing plant operations/energy costs
- Improving throughput and product quality
- Improving plant safety and reliability
- Empowering engineers and operators with cutting-edge integrated software tools to optimise the operation

Operational excellence is a multi-discipline and collaborative process consisting of planning, scheduling, analysing, controlling, reporting and maximising the performance of plant assets to meet business objectives. Manufacturers adopting best practice typically manage their operations utilising real-time data and can distribute, visualise and analyse information intelligently to operate plants profitably. For example, for refiners and strategic planners, it is vital to develop plans that will meet customer demand, yet cope with changes in product supply and specifications. The volatility in crude prices puts pressures on the operation to remain profitable. Change could occur in sales and operations planning (S&OP), where specialist planning software helps with the monthly plan and to satisfy customer demand. At the same time, planners must identify quickly whether the plant can optimally make the product and how efficiently and profitably it can be executed. This is a vital function of manufacturing because if planning decisions go

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wrong at this stage, an organisation cannot compensate effectively once they are committed to a customer. Subsequently, once the plan is determined, then the plant production can establish the schedule using detailed models, sequence optimisation and software to produce the products optimally through to supply chain delivery. The manufacturing execution system (MES) needs to receive the orders and link them to the right execution procedure along with key information. Hence, the process order execution will invoke all relevant resources and activities in a timely manner to organise and execute production according to the plan. By transforming asset data that contextualises information, the real-time knowledge can be used to bring benefits to all areas of the operation from the plant floor up to executive boardroom.

A truly integrated operation has streamlined work processes that facilitate better collaboration between the key functions of the plant. It ensures safer operations and asset integrity, which lowers risk and results in fewer incidents. Another major benefit of this approach is a better rating on the Solomon Index of energy intensity of refineries. Site-wide, companies can significantly reduce energy expenditures by 5-30%.

A strategic platform

The role of technology for the process industries is crucial to the sustainability of a business. A recent PwC report stated that 80% of Energy CEOs believe that technological advances (i.e. social media, mobile HTML5, big data) will transform their industries in the next 5 years, whereas 68% of Chemicals CEOs believed that technology is a strategic platform for profit, safety, environment and skills development for the process industries.

Increasing operational agility with integrated planning and scheduling improves the procurement, production and supply chain processes. Process modelling and simulation support optimises the plant's entire lifecycle, from design through production on a daily basis. Therefore, technology should be seen as a competitive differentiator and not simply a cost of doing business. Manufacturers who 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.

Excellence in asset optimisation

Achieving operational excellence is the cornerstone of competitiveness. Asset optimisation and efficient productivity are key drivers for greater profitability. As Aristotle also said, "With regard to excellence, it is not enough to know, but we must try to have and use it."

Managing the lifecycle of plant assets with process optimisation software helps refineries and petrochemical companies to maintain the highest standards across the operation and radically improves production. Strategic thinking delivers continuous improvement and drives standards across the operation to reduce costs and enable the leaner business to respond to market fluctuations. By embracing a system of integrated tools that push the boundaries of innovation from design through production, manufacturers can achieve excellence in asset optimisation that delivers increased profit.

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