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THE NEW ERA IN ADVANCED PROCESS CONTROL

Phil Black - Editor of PII had a Q&A session with Norbert Meierhoefer, business consulting director, AspenTech about the recent introduction of their new Adaptive Process Control solution.

PB: Why do oil & gas and chemicals companies implement Advanced Process Control technology?

NM: Advanced technology delivers the most effective solutions for any process task or problem. As modern process plants become more complex Advanced Process Control (APC), in particular, is a necessary deployment in addition to basic process controls to meet the operational targets and customer demands. Refineries and chemical companies are under constant pressure to improve throughput, save energy, meet operational constraints and improve time management amongst many others. By optimising their assets using advanced technology, industry leaders will see greater return on investment and truly maximise process profitability.

PB: What challenges do APC engineers need to overcome and what can they achieve using APC software tools to meet operational objectives?

NM: Today, APC engineers need to exert tighter control of operations in order to squeeze out more production at lower cost from complex and demanding processes. Standard APC applications are typically built with an underlying assumption that the model developed by the engineer will always be accurate and properly structured. However, as process plant performance and economic objectives change, this may cease to be the case as the behaviour of the process changes over time. Although a controller may be accurate enough when implemented, at some point in the future it may not be, so the aim should be to automatically detect this occurrence and correct it on a continuous basis.

When issues with model fidelity are detected, the tuning of the controller should also change to mitigate the potential negative impact. So, it is important that the engineer is equipped with valuable insight into process behaviour and understanding of process characteristics. Crucially, it is the ability to shape the properties of the controller across testing, operation, maintenance and enhancement phases that will improve benefits, reduce the cost of ownership and mitigate risks associated with model accuracy issues.

PB: What is AspenTech's involvement in APC software?

NM: For more than 20 years, AspenTech's Aspen DMCplus® software has been the industry standard for advanced process control software. Now, with a completely re-designed modelling environment and the introduction of AspenTech's Adaptive Process Control solution, the process industries have a powerful new tool available to manage their operation with greater control that will deliver greater operational profitability – Aspen DMC3 software. This technology provides a complete range of economic trade-offs for managing step testing and model construction. Essentially, that eliminates the need to approach APC maintenance as a project and creates a continuous background process of assessing model quality, collecting current data and generating new models as the behaviour of the plant changes over time. The Adaptive Process Control initiative was born from a need to address the current problems associated with building and maintaining control applications. This smart software can detect, isolate and correct problems without increasing the burden on engineering staff.

PB: Can you describe further the benefits of AspenTech's Adaptive Process Control capability?

NM: Adaptive Process Control capability helps organisations ensure controller models are continually analysed for accuracy, poorly performing areas of models are identified, non-disruptive background testing collects new process data while units are being optimised; new data is monitored in real time and bad data automatically identified and removed. By making it easier to generate data, manage step tests and produce results, APC becomes more accessible and efficient.

There is a crucial difference between the traditional approach to controller

maintenance (sustained value) and Adaptive Process Control capability. With sustained value, revamping the controller is typically carried out as part of a lengthy and costly project. Under Adaptive Process Control, however, the clever controller is modified over time in a background process that is not disruptive to plant operations. Adaptive Process Control improves long-term profitability by reducing process variability and allows plants to be operated optimally. Refiners and chemical companies have seen great value returns in product yield improvement and minimised energy costs with financial pay-back within short time periods. For existing controllers, keeping applications running at peak performance is a big challenge. We are all aware that quicker and more efficient control projects improve the return on investment and, therefore, Adaptive Process Control opens up new opportunities to implement APC with this clever approach. AspenTech control technology is distributed control system (DCS) agnostic, which is crucial in today's environment of mixed DCS. The Adaptive Process Control functionality makes it possible to create high quality models without turning off the controller while significantly reducing time consuming jobs

PB: What Advanced Process Control innovations are shaping today's industry?

NM: Today, the technology game has been taken to a new level. AspenTech's DMC3 software combines industry leading DMCplus technology with the most innovative tools for building and maintaining controllers – all in one place. Aspen DMC3 software provides the control engineer with key capabilities that modify the behaviour of the controller based on the lifecycle needs (i.e. lifecycle needs defined by changing process plant performance and economic objectives). The new gain constrained model identification in Aspen DMC3 leverages process knowledge to create more effective model predictive control applications.

Innovation and economics go hand in hand. On the one hand Aspen DMC3's Adaptive Process Control solution provides a complete range of economic trade-offs for managing step testing and model construction. On the other hand, the Robustness feature of Aspen DMC3 software provides the same ability to shape the performance of the controller when in optimising control mode. By setting the Robustness factor, the controller aggressiveness can be set by the engineer to mitigate the risk of poor model conditioning. Binary choices are replaced with a continuously variable scale giving fine control over the technical and economic trade-offs involved in APC. The benefits to companies are also significant and include better control to shape the economics of APC solutions to continuously meet changing business objectives. In addition, users can now shape the behaviour of the controller during testing, model construction and deployment phases.

PB: How does APC add value and impact the profitability of process plants?

NM: Operating a process with greater control increases efficiency and safety to improve product quality. Robust control provides risk mitigation against poor model conditioning. Innovative APC software allows plants to operate at the highest possible throughputs, maximise the yield of the highest value products and perform at the optimum energy usage possible.

Aspen DMC3 software marks a new era in APC technology. By mitigating model errors and improving the performance of control over time, this ground-breaking innovation optimises the production process, eliminates waste and reduces the overall cost in the manufacturing process. With this latest APC technology, implementation and maintenance of APC is no longer an arduous project, but more of a continuous programme of improvement – the bottom line is that companies now have truly robust control and 'cost-to-payback' return on investment with dramatic and uplifting results. ●

