

# Column of Strength

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# Column of strength

AspenTech provides an insight into how visualising hydraulic behaviour and the related product ecosystem can lead to efficient operations.

**G**REATER VISIBILITY INTO asset performance can help chemical and energy companies gain a competitive edge. Having a better understanding of column hydraulic performance can significantly improve asset utilisation and reduce capital costs in revamp projects and new designs. Predicting the performance of units is a critical component in the simulation of towers for process design, performance and reconciliation purposes. And being able to see precisely what is happening to the behaviour of trayed and packed columns means that process engineers can quickly get to the root cause of operational issues and make informed decisions that impact the entire operation.

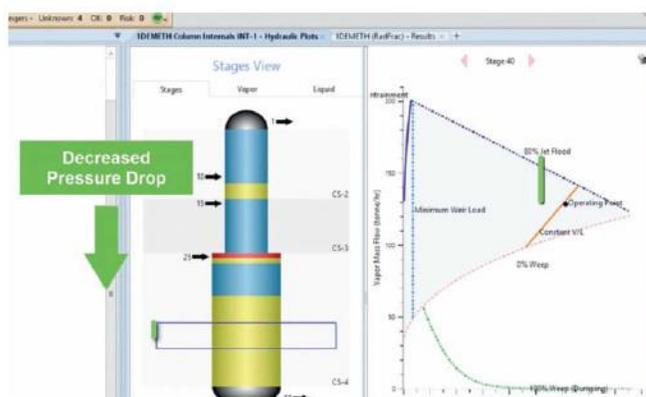
With advanced simulation tools, engineers can easily look inside the column to troubleshoot operational issues and evaluate the best options for efficiently designing new and existing units. Using interactive functionalities with enhanced software calculations, engineers are able to visualise the entire column's behaviour. Essentially, better decision-support reduces costs, time and project and operability risks.

### A highly complex system

Distillation column analysis is one of the key areas of focus for chemical engineers. Gaining detailed knowledge of column internals is a high priority for engineers, especially with regards to the behaviour of equipment and processes. As one of the most expensive and energy consuming units in a plant, the fluid dynamics of the column can be complex.

Depending on the complexity of the task, further help from in-house column experts or engineering firms may be needed.

Oil prices, especially in the Middle East, are expected to remain low for the near future, although it would not surprise if the volatility returns. The availability of light crude oils and low natural gas prices particularly in the Middle East is propelling debottlenecking projects related to columns



AspenTech's Aspen Plus helps improve column operations with column analysis

in both the chemicals and energy sectors. When capital is needed to debottleneck a process, engineers within engineering and construction companies (E&Cs) are similarly focused on minimising project capital expenditure (CAPEX) by reusing existing equipment (i.e. shell and piping), investing in lower cost adjacent equipment like feed heaters and coolers, or replacing the column internals, as well as evaluating different internal configurations to find the most economical option.

In improving operations, process engineers are focused on driving efficiencies and ensuring they make safe, confident decisions. For owner-operators, it is vital to increase capacity, minimise operational expenditure (OPEX), optimise product quality and troubleshoot operational issues. By determining issues quickly, it is possible to reduce costly shutdowns and expensive physical investigations. Pushing the capacity of the column, while operating closely to safety constraints, is important to optimise production performance.

Cutting-edge simulation technology helps

users to better understand the behaviour of columns and enables them to swiftly address or predict operational issues by seeing the entire column in one view using visual presentations of inputs and results. In addition, engineers can look at the column as part of the larger process with an interactive solver for quick evaluations of multiple design options and operating cases.

Now users can improve workflow by creating and analysing column tray and packed sections for hydraulic design and rating using an interactive sizing mode. With intuitively designed functions, the engineers can tune their designs to perform within hydraulic limits by using hydraulic plots and clear system messages to quickly compare the results of multiple designs.

### Understanding column performance

New technologies allow engineers to optimise energy use in columns and quickly pinpoint potential issues affecting the unit whether at the design stage, troubleshooting poor operational

→ IT

performance or for revamp projects.

With enhanced hydraulic correlations, it is possible to decrease assumptions and produce more accurate modelling for column analysis. The use of intuitive, interactive and visual graphics for tray geometry or packing inputs and the resulting hydraulic plots for every stage gives greater detail on the hydraulic behaviour of the individual stages while simultaneously providing a view of performance of the whole column. The ability to easily evaluate the effects of changes in flowsheet inputs, as well as internals geometry on hydraulic performance, allows for better troubleshooting and design.

AspenTech recommends the use of Aspen Plus and Aspen HYSYS for column analysis, and the solutions include:

- Quicker insights into column performance problems and behaviour based on current operating conditions
- See the column as part of the larger process with an interactive solver for quick evaluations of multiple design options and operating cases
- Evaluate interactivity between columns and other equipment before making

operations/revamp decisions

- Ability to evaluate multiple revamp options for more informed discussion with vendors
- Automated sizing capabilities and design templates save time and effort when designing a new column and assist less experienced users in getting up to speed
- Reduce time and manual labour

**Seeing the whole picture**

Greater visibility into asset performance provides the platform for better decision-making. Advanced process simulation offers engineers powerful chemical engineering capabilities for column analysis. Gaining insight into key processes enables better and faster problem solving. With new column analysis capabilities, new and experienced engineers can troubleshoot operational issues and evaluate new and revamp options with an interactive tool.

Now, column design and rating no longer needs to be done in isolation or viewed as a mysterious black box. Visualising operations can be achieved within an advanced process simulator to fully understand the behaviour of a critical capital and energy intensive



**Luc Chantepy, regional sales vice-president for Middle East and North Africa region at AspenTech**

piece of equipment. As a result, engineers can minimise capital expenditure and make discerning design decisions that affect the entire plant performance – great news for improving performance and increasing profitability. ■

—By Luc Chantepy, regional sales vice-president for Middle East and North Africa region at AspenTech

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