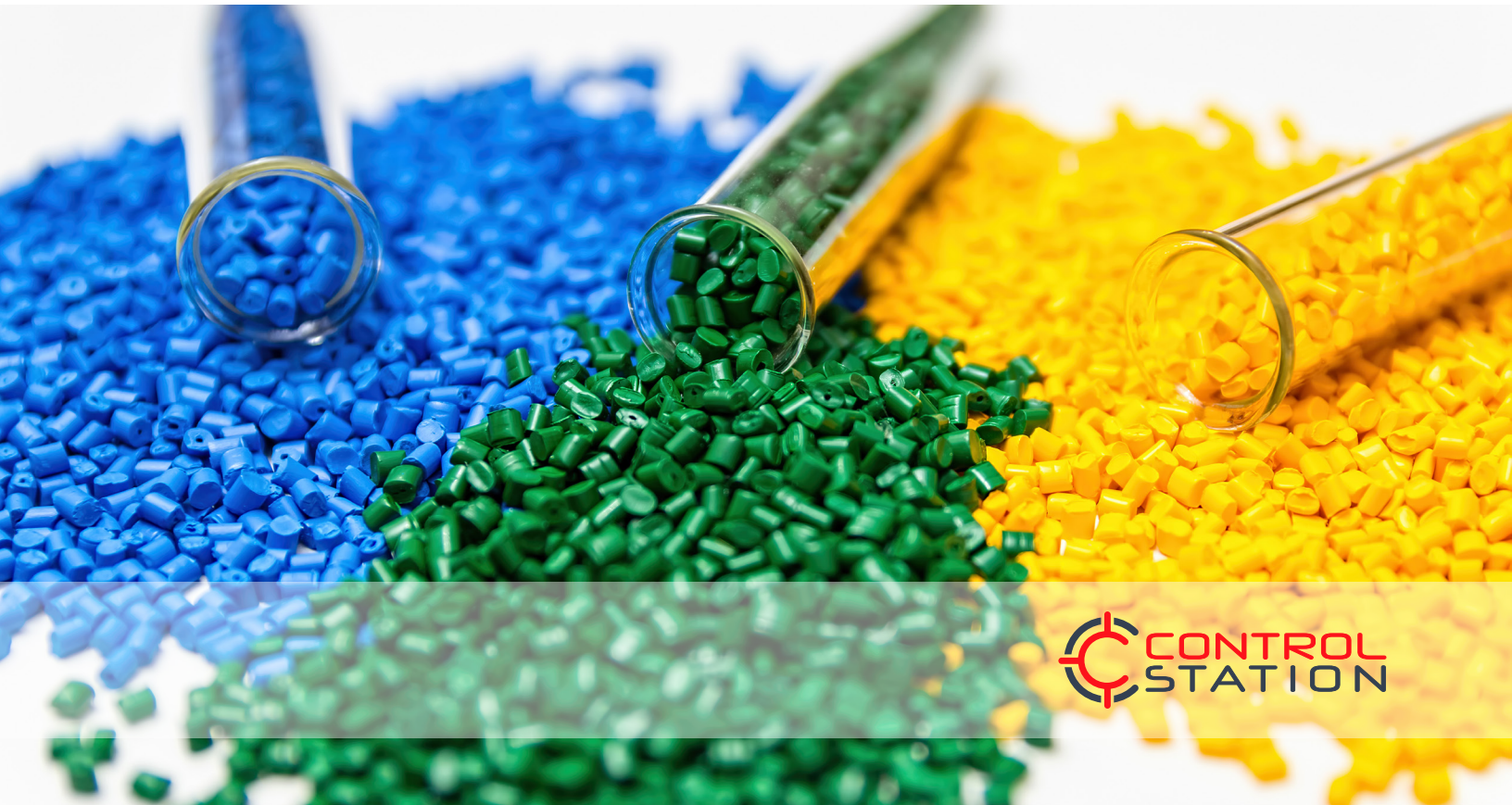
Can Your Process Handle the Pressure?

Phenol is a vital raw material in the production of high-impact resins that are used in the construction, transportation and other industries. Located along the Ohio River, Haverhill Chemicals produces a broad range of chemicals in technologically advanced operations. The plant includes operations of both phenol and bis-phenol A production units.

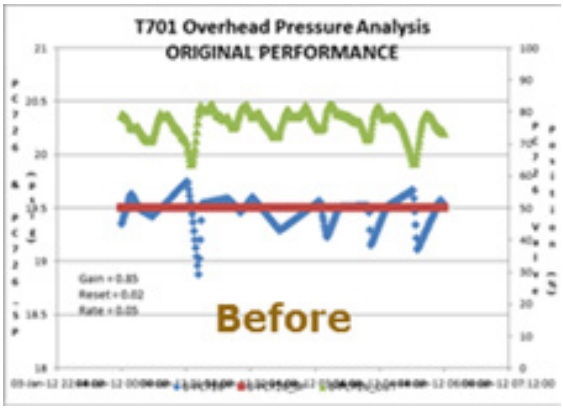
When the performance and stability of critical production processes began to erode, engineering staff struggled with answers. Controllers responsible for maintaining consistent pressure within the plant's distillation column fluctuated excessively. Variability in pressure made control more difficult, and it significantly reduced the unit's performance. Staff found that manual tuning was more 'miss' than 'hit', and available tuning software required a near constant state in order to function. That's when Haverhill Chemicals turned to Control Station and the company's Loop-Pro™ Product Suite.



"I am consistently amazed by the flexibility and power of Loop-Pro™. With the improvements in performance we clearly understand the benefit of well-tuned control loops. This software works magic."

Michael Hagans - ***Process Engineer,*** **Haverhill Chemicals**

When a Picture Tells a Thousand Words



On the left is a trend showcasing variability in overhead pressure of ~20%. The lack of stability resulted in issues with downstream reactions as well as with the loss of a valuable production resources. Engineering staff used Loop-Pro™ to accurately model the process' oscillatory dynamics and identify appropriate tuning parameters. Shown on the right is the loop's performance after tuning - variation was reduced to <1%.

Maintaining stable overhead pressure on the plant's main tower presented production staff with unique challenges. Variation on the order of 20% hampered the process' stability, and it resulted in both incomplete reactions and the loss of a key production resource. These same dynamics also prevented staff from tuning the controller for more stable performance.

The plant employed a fail-open valve to control overhead pressure. Pressure equaled 0% when the valve output was fully open and it equaled 100% when the valve was fully closed.

Whenever the valve reached 60% output the process then diverted surplus vapor flow to a secondary unit where it was dumped. This protected the tower from damage associated excessive pressure. However, it also resulted in incomplete reactions downstream and poor feed composition back to the tower itself.

Loop-Pro™ is equipped with a patent-pending capability that accurately models oscillatory and noisy process data. The software allowed the plant's engineering staff to properly tune the overhead pressure controller and to reduce the 20% swing in valve position to <1%. As a result the process operates with greater stability. That produced benefits for both the tower and the downstream process.