

TUNING OFF-KEY LEVEL LOOPS

CONTROL recently had the opportunity to preview a soon-to-be-released product from Expertune, called the Level Control Wizard. Expertune (www.expertune.com) regularly wins the loop tuning software category in CONTROL's Readers' Choice Award poll, and is considered one of the market leaders in the category. Expertune's president, John Gerry, shared with us that level is one of the more difficult loop types to tune, because many operators and engineers don't understand the dynamics of level measurements. Expertune developed this new product in reaction to the demand from their customer base for an easier way to tune level loops.

"Level loops present a unique challenge to process control," Gerry says, "since they contain an integrator. This is further complicated because different level loops have different goals."

Gerry continues, "The performance goal of one level loop may be the opposite of another. For example, many level loops provide better benefit to the plant when 'tuned' sluggishly."

Different level loops have different goals or requirements. Sometimes plants need fast and accurate control of level, other times it is best for the level to

OPTIMIZING LEVEL LOOPS

Expertune OPC Tuner - Level control wizard

Averaging level control (with integral action)

Range of manipulated flow: 300 US gal/min
(or if a valve, 1.3 x design flow)

Distance from setpoint to nearest limit (or alarm): 20 %

Normally expected flow upset: 100 US gal/min

Controller Gain: 1.67

Your tank is a surge vessel. This type of level control is called Averaging Level Control. You selected to use integral action. The integral action will cause the level to slowly return to setpoint.

This window calculates the Controller Gain. Please make sure you select the correct flow units. This is used in the following windows to calculate Integral action.

Help < Back Next > Cancel

Expertune's soon to be released OPC Level Control Wizard knows what questions to ask.

"float" so the vessel can absorb flow upsets. Gerry designed the wizard so that it guides users through the process of identifying the goals for the level loop; choosing the level control strategy that matches the plant's goals; and finding the best P, PI or PID parameters to meet those goals.

The software wizard optimizes level

loops by pursuing the following level control goals:

- Fast and accurate control of level to setpoint with and without D (derivative). This helps optimize the speed of recovery back to setpoint in the face of upsets.
- Averaging level (in surge tank applications to help smooth flow). Between two tanks, averaging level helps reduce the effects of upstream disturbances. When one unit is feeding a second, it should disturb the second unit as little as possible.
- Averaging level with P (proportional) action only. In this case, if level is floating, averaging level with P optimizes a surge vessel's ability to smooth flow upsets.
- Averaging level with P and I (integral) action. Here it allows the level to float and slowly return to setpoint.

Note that averaging level techniques may use tank volume. According to Gerry, the Level Control Wizard automatically determines tank volume and controller settings using test data.

Averaging level techniques may use tank volume. Using test data, the Expertune Level Control Wizard automatically determines tank volume and controller settings.