PiControl Solutions LLC

Course Name: DMC Maintenance

Course #: APC700 (Classroom 9 AM – 5 PM)
APC700X (Online 6:30 AM – 8:30 AM US CDT)
APC700Y (Online 10:30 PM – 1:30 AM US CDT)

All three courses – APC700, APC700X and APC700Y cover the same material. APC700 is a classroom course, APC700X and APC700Y are online (web-based) courses in different time zones to make it convenient for attendees worldwide.

Duration:	**3 Days**
Audience:	**Process Control Engineers, DCS Technicians and Supervisors.**
Prerequisites:	**Knowledge of primary process control, PIDs etc. and preferably a few months of plant experience especially on a DCS.**
Course Material:	**Training slides and DMC software.**

Course Description and Objectives:
This course trains on the use of DMC (dynamic matrix control) software. It starts from the fundamentals: the history behind DMC, the need for DMC, how DMC is superior when used right and where other control methodologies could be more appropriate. The course covers how to conduct step tests and identify DMC models, designing and building the DMC controller, startup and commissioning. The course also covers DMC maintenance, how to modify and improve DMC models after years of operation or after significant process changes. It covers automated step testing, PRBS and other new techniques.

Learning Outcomes:
At the end of the course, attendees will be equipped with the skills to design, maintain and troubleshoot DMC controllers. They will be able to use the modern 3G closed-loop dynamics identification technology to improve DMI models using Pitops-TFI. They will have the skills to observe plant trends and troubleshoot the DMC controller and discuss with operations and control engineers on how to improve the control.

Day 1: (8:30 AM to 4:30 PM)
History of DMC, benefits of DMC, areas where DMC is vastly superior
Applications where DMC should not be used, alternate control methodologies
DMC software product overview, different modules and building procedure
DMC algorithm overview – how it works – prediction, correction and time shift
Conducting step tests, rules for conducting good tests
Getting DMI models, techniques and procedures for getting good models

Day 2: (8:30 AM to 4:30 PM)
Eliminating models and relationships that can harm control quality
Building the DMC controller, running in prediction mode
LP algorithm, LP versus SQP, determining correct LP costs to ensure stable LP solution
Using DMC to locally optimize the process operations
Practical examples to illustrate DMC design and optimization
DMC LP optimizer and Turbo-Max online nonlinear optimizer

<u>Day 3</u>: (8:30 AM to 4:30 PM)
DMC controller maintenance
Using Pitops TFI to improve DMC models using short-duration closed-loop data
Effect of small gain models, how to reduce/eliminate cycling and instability
Prediction error feedforward
Adaptive gains, nonlinear control challenges and how to overcome them
DMC Web-server and remote access
Online maintenance examples to improve DMC operation and monetary benefits
Advanced DMC tips and procedures