



Advanced Process Plant Optimisation Course: Throughput, Yield, Energy and OEE



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Introduction:

Advanced process plant optimisation, covering throughput, yield, energy and OEE, is a 1-week course for process, production and plant engineers and production supervisors in chemicals, petrochemicals, food, pharmaceuticals, cement and metals plants, ending with a Plant Optimisation Model and Business Case. Many process plants run below their real capacity because losses are hidden in averages, bottlenecks move unnoticed and control loops hold the unit far from its constraints. Nominees already run or support a process unit daily, and teaching is by modelling build on plant data. CoreConcept Training Center delivers this process plant optimisation course.

Course Objectives:

- Measure OEE for continuous and batch process lines and break losses down into availability, rate and quality components
- Find the active constraint of a process unit using capacity analysis and reconciled mass and energy balances
- Quantify yield and material losses and set priorities by their value to the plant
- Reduce batch cycle times and grade or product changeover losses with structured time-and-motion analysis
- Judge where advanced process control, real-time optimisation and SPC will move the unit closer to its constraints
- Build a Plant Optimisation Model and Business Case with energy intensity, throughput and yield targets

Target Audience:

- Process engineers responsible for unit performance, yield and energy use
 - Production engineers responsible for throughput, scheduling and changeovers
 - Production supervisors responsible for shift output and loss reporting
 - Control and instrumentation engineers responsible for control performance on process units
 - Continuous improvement engineers responsible for plant optimisation projects
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Course Outline:

Day 1: Process Plant Performance and Loss Baseline

- Continuous and Batch Process Plant Performance Characteristics
- OEE Definitions Adapted for Process Lines
- Production Loss Categories and Loss Tree Construction
- Energy Intensity and Specific Consumption Indicators
- Plant Baseline Review Using Historian and Shift Data

Day 2: Capacity, Balance and Constraint Models

- Mass Balance Reconciliation Across Units and Tanks
- Energy Balance and Utility Consumption Mapping
- Theory of Constraints Bottleneck Identification for Process Units
- Nameplate, Demonstrated and Sustainable Capacity Comparison
- Yield Accounting and Loss Valuation Model

Day 3: Throughput, Batch and Changeover Optimisation

- Rate Loss Analysis From Historian Trends
- Batch Cycle Time Breakdown and Critical Path Reduction
- Grade and Product Changeover Reduction Methods
- Production Planning and Campaign Scheduling for Process Plants
- Shift Handover and Loss Reporting Discipline

Day 4: Process Control, Variability and Problem Cases

- SPC Control Charts for Key Process Variables
- Control Loop Performance Assessment and Variability Reduction
- Advanced Process Control Benefit Estimation Methods
- Real-Time Optimisation Concepts and Applicability Limits
- Moving Bottlenecks, Fouling and Catalyst Decline Cases

Day 5: Modelling Build and the Optimisation Business Case

- OEE and Loss Tree Build on a Petrochemical Unit
 - Batch Plant Cycle Time Model for a Food or Pharmaceutical Line
 - Energy Intensity Reduction Model for a Cement or Metals Plant
 - Optimisation Option Ranking by Value and Effort
 - Plant Optimisation Model and Business Case Completion
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Skills You Will Gain:

- OEE Measurement for Process Lines
- Loss Tree Analysis
- Mass and Energy Balance Reconciliation
- Bottleneck Analysis
- Batch Cycle Time Reduction
- Process Variability Reduction
- Energy Intensity Management
- Optimisation Business Case Development

Why Attend This Course:

- Deliver a Plant Optimisation Model and Business Case to the plant manager and the technical and operations heads
- Decide which bottleneck, yield loss or energy saving to attack first and what investment each needs
- Avoid capital spent on extra capacity while losses, variability and slow changeovers hold the existing plant back
- Coach shift supervisors and engineers on the loss tree, balance and OEE methods built during the course

Conclusion:

Back at work, the participant gives the Plant Optimisation Model and Business Case to the plant manager, the technical manager and the operations team. They use it to agree which optimisation options to fund, who leads each one and which targets for throughput, yield and energy intensity apply. After the first quarter of running, the plant should compare OEE, yield and specific energy consumption with the model baseline and refresh the loss tree as the bottleneck moves.

Frequently Asked Questions FAQ:

What should participants know before an advanced process plant optimisation course?

Participants should already run or support a continuous or batch process unit and be comfortable with mass balances and spreadsheet analysis. Bringing anonymised historian extracts, shift reports or batch records helps them build the optimisation model on their own plant.

How does an advanced process plant optimisation course differ from a Lean manufacturing course?

Lean courses address waste in discrete production and office processes. This course works on process plants: balances, constraints, yield accounting, control variability, batch cycle times and energy intensity, where losses sit inside the process rather than on the shop floor.

Why is OEE in process plant optimisation measured differently from discrete manufacturing?

Process lines rarely stop completely; they run below rate, make off-specification product or lose time in grade changes. OEE for process plants measures rate and quality losses against demonstrated capacity, so hidden losses become visible.

What do participants take back from the advanced process plant optimisation course?

Participants take back a Plant Optimisation Model with an OEE and loss tree, reconciled balances and constraint analysis, plus a ranked Business Case of throughput, yield and energy options ready for management review.