



Open Pit Mine Planning and Design Course: Pit Optimisation, Pushbacks and Scheduling



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Introduction:

Open pit mine planning and design training covering pit optimisation, pushbacks and scheduling is a 5-day course for mining engineering, mine planning and resource geology staff, ending with a Pit Design and Life-of-Mine Schedule Outline. Operations lose value when pit limits rest on stale prices, pushbacks are too narrow to mine, slopes ignore structural data and schedules swing between stripping peaks and plant starvation. Nominees already build or use block models, pit designs or mine schedules and develop each planning artefact through modelling build exercises. CoreConcept Training Center delivers this open pit mine planning course.

Course Objectives:

- Structure a block model and planning inputs that match the study stage, from scoping through pre-feasibility to feasibility
- Calculate economic block values and marginal and break-even cut-off grades from recovery, price and cost assumptions
- Generate and interpret nested pit shells with revenue factors and select an ultimate pit from pit-by-pit results
- Design benches, berms, haul ramps, pushback phases and waste dumps that respect geotechnical slope sets and minimum mining widths
- Build a life-of-mine production schedule with stockpiles, stripping ratio smoothing and a matched truck and shovel fleet
- Set drill and blast pattern geometry targets and track reconciliation factors and mine plan KPIs against the schedule

Target Audience:

- Mining engineering staff who design pits, ramps and waste dumps for operating mines and projects
 - Mine planning staff who prepare long-term and medium-term production schedules and budgets
 - Resource geology staff who build block models and hand them over for optimisation
 - Grade control staff who define ore boundaries and reconcile mined grades against the model
 - Technical services staff who set fleet, drill and blast and stockpile assumptions for the mine plan
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Course Outline:

Day 1: Mine Planning Process, Study Stages and the Block Model

- Mine Planning Hierarchy From Strategic to Short-Term Plans
- Scoping, Pre-Feasibility and Feasibility Study Planning Deliverables
- Geological Block Model Structure, Block Size and Attributes
- Resource Classification Flags Carried Into the Planning Model
- Current Mine Plan Gap Review Using a Planning Checklist

Day 2: Cut-Off Grade, Economic Block Values and Pit Optimisation

- Economic Block Value Calculation From Recovery, Price and Costs
- Marginal and Break-Even Cut-Off Grade Calculation Methods
- Nested Pit Shells Generated by Revenue Factor Scaling
- Pit-by-Pit Graph Analysis for Ultimate Pit Selection
- Overall Slope Angle Sets Applied by Geotechnical Domain

Day 3: Pit Design, Pushbacks, Waste Dumps and Geotechnical Inputs

- Bench Height, Berm Width and Batter Angle Design Criteria
- Haul Ramp Gradient, Width and Switchback Layout
- Pushback Phase Design With Minimum Mining Width Checks
- Rock Mass Rating and Structural Data in Slope Design
- Waste Dump Lift Height, Setback and Haul Profile Design

Day 4: Production Scheduling, Stockpiling, Fleet Matching and Blast Planning

- Life-of-Mine Production Schedule With Stripping Ratio Smoothing
- Grade Stockpile Strategy and Blending Rules for Plant Feed
- Truck and Shovel Fleet Sizing From Haul Cycle Estimates
- Blast Pattern Burden, Spacing and Fragmentation Target Planning
- Reconciliation Factors Between Resource Model, Grade Control and Mill

Day 5: Modelling Build of the Pit Design and Life-of-Mine Schedule Outline

- Case Deposit Briefing and Block Model Interrogation
 - Optimisation Run Review and Ultimate Pit Shell Selection
 - Pit and Pushback Design Drafting for the Case Deposit
 - Mine Plan KPI Set for Tonnes, Grade and Strip Ratio
 - Pit Design and Life-of-Mine Schedule Outline Completion
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Skills You Will Gain:

- Block Model Interrogation
- Cut-Off Grade Determination
- Pit Shell Optimisation
- Pushback Phase Design
- Slope Design Integration
- Waste Dump Layout
- Life-of-Mine Scheduling
- Mine Reconciliation Analysis

Why Attend This Course:

- Deliver a Pit Design and Life-of-Mine Schedule Outline to the technical services manager or mine planning lead as a reference for the next plan revision
- Decide which pit shell, pushback sequence and cut-off grade policy best balances stripping, plant feed and mineable geometry
- Prevent unmineable pushbacks, unstable walls and plant starvation by checking widths, slope sets and stockpile balances before the plan is issued
- Share block value sheets, bench and ramp geometry tables and schedule KPI templates with junior engineers and geologists in the planning team

Conclusion:

Back at work, the participant gives the technical services manager or mine planning lead a Pit Design and Life-of-Mine Schedule Outline that sets the ultimate pit basis, pushback sequence, bench and ramp geometry, stockpile rules and plan KPIs. The planning team uses it when the block model is updated or prices and costs change, to decide whether pit limits and phase timing still hold. After the first quarter of mining against the outline, the unit should review reconciliation factors, stripping ratio delivered and plant feed grade against plan.

Frequently Asked Questions FAQ:

What should participants know before the open pit mine planning and design course?

Participants should understand basic mining terms such as grade, tonnage, bench and stripping ratio, and should already work with block models, pit designs or schedules. Bringing a pit plan, block model summary or schedule extract from their own site helps them apply each exercise.

How does this open pit mine planning and design course differ from a mining overview course for non-technical staff?

This course trains technical staff to produce planning artefacts: block values, pit shells, pushback designs and schedules. An overview course explains the mine life cycle, reporting and finance to business functions so they can read plans, not build them.

Why do open pit mine planning teams use nested pit shells instead of one optimised pit?

Nested shells show how pit size and value change as revenue assumptions change. Planners use the sequence to choose an ultimate pit that stays robust under price shifts and to locate natural pushback boundaries for staged mining.

What does a participant take back from the open pit mine planning and design course?

Each participant returns with a Pit Design and Life-of-Mine Schedule Outline for a case deposit, plus block value sheets, bench and ramp geometry tables and a KPI set that can be adapted to the next plan revision at their own operation.
