MINE PLANNING AND DESIGN - PROFESSIONAL SERIES
Deswik.CAD, Deswik.GO, and Deswik.LHS

MINE PLANNING AND DESIGN SERIES

Location

- **Online and Face-to-Face Courses**

Dates

- **2026 Schedule – See the table**

Registration Options

Participants can register in a single course, combination of courses, or all the courses in the series based on their interests. Please take note of the registration closing dates. We need to secure classroom and the software to assure professional delivery of the courses. Corporate training is available as online or on-site delivery as per request.

Instructor

Hooman Askari is a professor of mining engineering in the School of Mining and Petroleum Engineering at the University of Alberta, Canada. He teaches and conducts research into mine planning & design and simulation of mining systems. Hooman is a registered professional mining engineer with more than 25 years of operational, consulting, research, and teaching experience in the area of open pit mine planning and design. He consults as the Principal Engineer through OptiTek Mining Consulting Ltd.

Registration

For the registration forms. Please contact:
registration@optitek.ca
For more information, contact Hooman Askari at:
hooman@optitek.ca
Phone: +1 (780) 893-9365

Mine Planning and Design Series – Online - Spanish Interpretation- Mountain Time 8:30AM-5:00PM – Suitable for Africa PM							
Course Name	Course Component	Dates	Registration Closing Date	PD Hours	Single Course Fee	Combined Course	Five Weeks Series Fee
Global Optimization - Strategic Mine Planning	MINP 103- Deswik.GO for Open Pit Metals- 4 days	July 20-23, 2026	July 6	32	CA$4,000	-	
CAD Essentials + Open Pit Mine and Waste Dump Design	MINP 203 - Deswik.CAD Essentials - 2 days	July 6-7, 2026	June 22	16	CA$2,000	CA$4,500	
	MINP 204 - Open Pit Design Deswik.CAD - 3 days	July 8-10, 2026	June 22	24	CA$3,000		
Surface Mine Production Scheduling - Tactical Planning	MINP 303 -Deswik.Sched + Deswik.IS	Under Development	-	-	-	-	
	MINP 304- Deswik.OPTS + Deswik.LHS	Under Development	-	-	-		

*All fees in Canadian Dollars $CAD

MINP 103– Strategic Mine Planning and Optimization

Deswik.GO – Deswik Pseudoflow for Open Pit Metals

Capital Investment, Operating Costs, Discount Rate → Maximize NPV, DCF, IRR

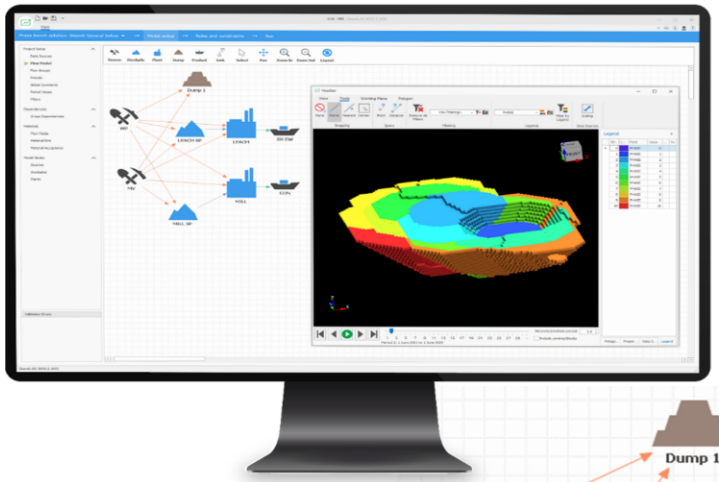
MINP 103 - Global Optimization | Block Model > Puseudoflow | Pit Limit / Practical Push-Backs | Phase-Bench Scheduling (PBS) | Direct Block Scheduling (DBS) | Fixed Extraction Sequence (FES) | Stockpiles /Cut-off / Blending

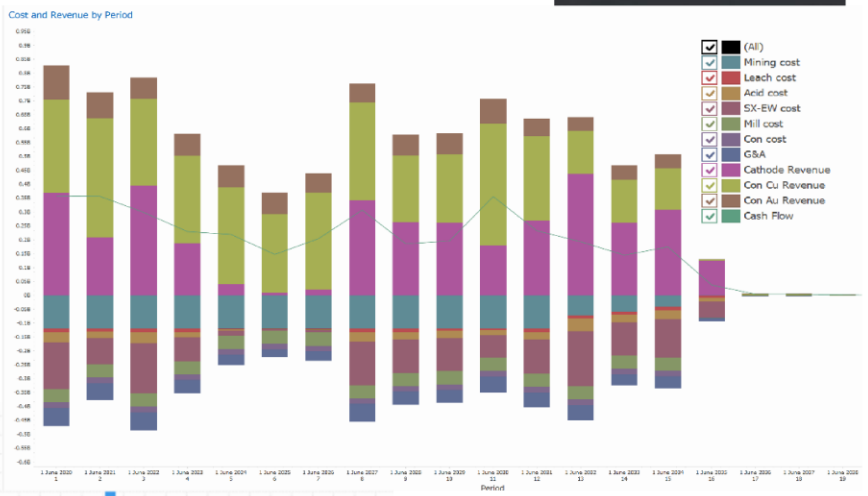
Deswik.Pseudoflow + Deswik.GO

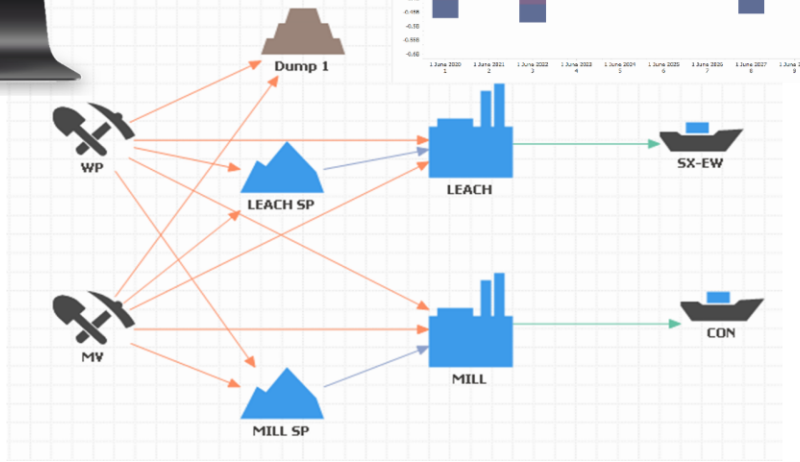
OptiTek Mining Consulting Ltd.

Deswik.GO

Deswik







MINP 103– Strategic Mine Planning and Optimization

Deswik.GO – Deswik Pseudoflow for Open Pit Metals

MINP 103 – Strategic Mine Planning and Global Optimization – Deswik.GO

This training provides a comprehensive introduction to open-pit optimization using Deswik.CAD Pseudoflow command. Pseudoflow is a powerful and efficient network-flow–based algorithm that generates optimal and nested pit shells across a range of revenue factors. The method incorporates slope dependencies, variable mining and processing costs, recoveries, and economic parameters to determine the most profitable extraction boundary for a deposit. In this training, participants learn how to prepare and interrogate a block model, apply geotechnical and economic inputs, and configure and run multiple Pseudoflow passes to assess mining options and determine the maximum economic pit shell.

Strategic mine planning optimization is at the core of value generation in open pit mining. Misaligned pit limits, the absence of practical stage designs, inappropriate economic parameters, or suboptimal schedules can result in significant financial underperformance, sterilized resources, and increased operational risk. A well-structured optimization framework ensures that mine plans remain technically robust, operationally practical, and economically defensible.

This course integrates the theoretical foundations of open-pit optimization—including pit-limit algorithms, cut-off grade theory, slope and geotechnical constraints, cost and revenue modeling, capacity limits, and scheduling principles—with practical, hands-on implementation in Deswik Pseudoflow and Deswik.GO. Participants learn how to progress from raw geological and economic data through pit optimization, stage-shell generation, and finally strategic long-range scheduling using advanced Mixed-Integer Linear Programming (MILP) and the Bienstock–Zuckerberg (BZ) algorithm.

Outcomes of the course

Participants will learn how to:

- Understand fundamentals of strategic mine planning
- Prepare block models for optimization in Deswik.CAD
- Apply geotechnical slope constraints
- Setup economic parameters, revenues and costs
- Run Pseudoflow and interpret pit optimization results
- Generate investment-constrained and staged pit shells
- Analyze nested shells and pit-by-pit economics
- Analyze push-back and stage selection
- Build strategic mine schedule in Deswik.GO
- Create strategic destination planning in Deswik.GO
- Use MILP and BZ optimization to maximize NPV
- Set up flow models and flow groups
- Set up material rules, objectives, and constraints
- Incorporate blending and stockpiling
- Incorporate capacity constraints into optimization
- Produce dashboards, budget reports
- Produce comparative scenario analyses
- Compare multiple planning scenarios
- Quantify economic trade-offs
- Complete hands-on Iron Ore and Gold–Copper project

DAY 1

Foundations of Strategic Mine Planning + Pseudoflow Preparation

- Theoretical Basis for Open Pit Optimization
  - Strategic mine planning overview
  - Block value fundamentals:
    - Revenues, recoveries, dilution, mining recovery
    - Mining and processing costs
    - Overhead and time-dependent costs
  - Cut-off grade theory
  - Marginal, breakeven & cash-flow cut-offs
  - Multi-element cut-offs and cut-over logic
  - Geotechnical fundamentals
    - Overall slope angles
    - Rock-type and structural domains
    - Slope dependencies in optimization
- Data Management & Block Models in Deswik.CAD
  - Tutorial information, licenses, prerequisites
  - Customize toolbars, project environment setup
  - Importing required files (Iron Ore dataset)
  - Reviewing block model extents, fields, formats
  - Creating slices, filters, legends, statistical summaries
  - Custom views for model interrogation
  - Using CAD for visual validation and quality control
- Block Model Preparation for Pseudoflow
  - Regularization (re-blocking)
  - Adding geotechnical constraints to the block model
  - Calculating cost and revenue fields
  - Assigning ore/waste parameters
  - Understanding Pseudoflow's learning process flow
  - Setting global constants and project attributes
- Additional Concepts
  - Understanding model resolution vs SMU effects
  - Evaluating block model variability
  - Evaluating grade distribution in the block model
  - Best practices in file and version control
  - Linking geology domains to slope regions
  - Impact of cost & recovery assumptions on limits

DAY 2

Pit Optimization Theory + Pseudoflow Passes

- Optimization Algorithms and Concepts
  - Comparing 2D LG, 3D LG, and Pseudoflow
  - Revenue factor (RF) theory
  - Fixed RF vs geometric RF
  - Nested pit shells and operational limits

MINP 103– Strategic Mine Planning and Optimization

Deswik.GO – Deswik Pseudoflow for Open Pit Metals

- Ore selection:
  - Value mode, profit mode
  - Cash-flow-based selection
  - Cut-off sensitivity
- Sensitivity of cut-offs to minima and maxima
- Sensitivity of cut-offs to cost and price variations

- Pseudoflow Optimization Workflow
- Pseudoflow Pass 1 — Baseline RF = 1 Shell
  - Input validation (costs, revenues, slopes)
  - Running baseline Pseudoflow
  - Visualizing shell geometry and benches
- Pseudoflow Pass 2 — Investment-Constrained Optimization
  - Capital limits
  - Mining rate constraints
  - Processing bottlenecks
  - Comparing constrained vs unconstrained shells
  - Evaluating feasibility of operationally constrained shells
- Pseudoflow Pass 3 — Stage Shell Generation
  - Tonnage-based stage selection
  - Depth, NPV, and operational criteria
  - Generating practical, minable pushbacks
  - Stage-by-stage interrogation and reporting
- Reporting & Analysis
  - Grade-tonnage curves
  - Pit-by-pit analysis
  - Shell interrogation tools
  - Exporting reports and model outputs
- Additional Concepts
  - Influence of geotechnical variability on shell transitions
  - Testing sensitivity to cost ±10% and slope ±2°
  - Using shell progression for design handover
  - Differences between Pseudoflow and LG when slopes are complex

DAY 3

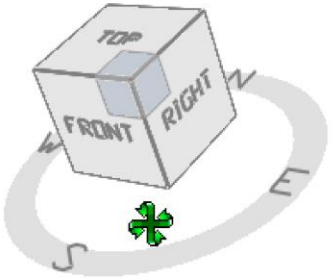
Strategic Scheduling Theory + Deswik.GO (Direct Block Scheduling)

- Scheduling Concepts for Long-Range Planning
  - Ultimate pit vs pushbacks vs stages
  - Benchmark schedules
  - Worst-case, best-case, constrained schedules
  - Time value of money: discounting, cashflow, NPV
  - Effects of mining capacity and processing rates
  - Lag/lead logic in scheduling
  - Contractor hiring and its impact on NPV
- Deswik.GO — Direct Block Scheduling (DBS)
  - Creating a new GO project (Iron Ore dataset)
  - Loading the block model
  - Creating filters, model views, and legends
  - Creating flow models, flow groups, and global constants
  - Defining slope dependencies inside GO Material acceptance criteria
  - Creating flow fields (tonnes, grade, value, recovery, constraints)
  - Defining objectives (maximize NPV, minimize deviations, etc.)
  - Running the DBS schedule
  - Generating phases from optimization
  - Dashboards and economic summaries
  - Exporting and reviewing block models in Deswik.CAD

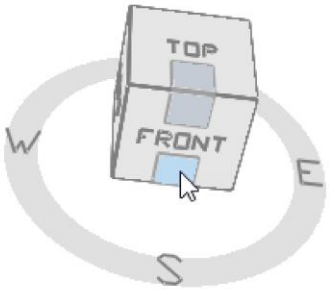
DAY 4

MILP/BZ Scheduling, Blending, Stockpiling, Scenario Optimization

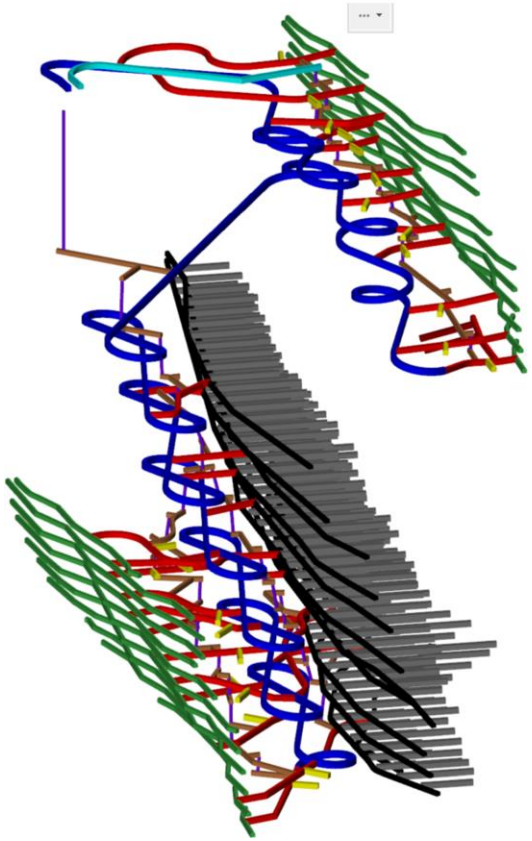
- Advanced Optimization and Scheduling Theory
  - MILP vs BZ formulation for open pit scheduling
  - Differences between Deswik.GO and Deswik.Blend
  - Impact of constraints on NPV:
    - Mining rate
    - Processing limits
    - Blending quality constraints
    - Truck hours and haulage factors
- Phase-Bench Scheduling (PBS) in Deswik.GO
  - Reload block model and update model objects
  - Updating flow models, groups, and fields
  - Using penalties for constraint relaxation
  - Adding period values
  - Adding flow constraints and bin definitions
  - Running and analyzing PBS optimization
  - Reviewing Dashboard KPIs (tonnage, grade, NPV, phase extraction)
- Fixed Extraction Sequence (FES) Scheduling
  - Destination scheduling for multi-process operations
  - Review of objectives, material acceptance, and constraints
  - Scenario evaluation under fixed mining sequences Dashboard interpretation
- Blending, Stockpiling & Multi-Scenario Comparison
  - Bulk vs extractive blending
  - Stockpile input-output logic
  - Cut-off calculation for stockpiles
  - Multi-element, multi-bin blending
  - Influence of blending on head-grade and throughput
  - Comparative scenario analysis and reporting
- Additional Concepts:
  - Using GO dashboards for budget planning
  - Evaluating operational readiness of schedules
  - How blending affects recovery and NPV
  - Multi-scenario evaluation and ranking
  - Flow-model logic and process mapping
  - Linking block constraints to m/p limits
  - Evaluating grade smoothing over time

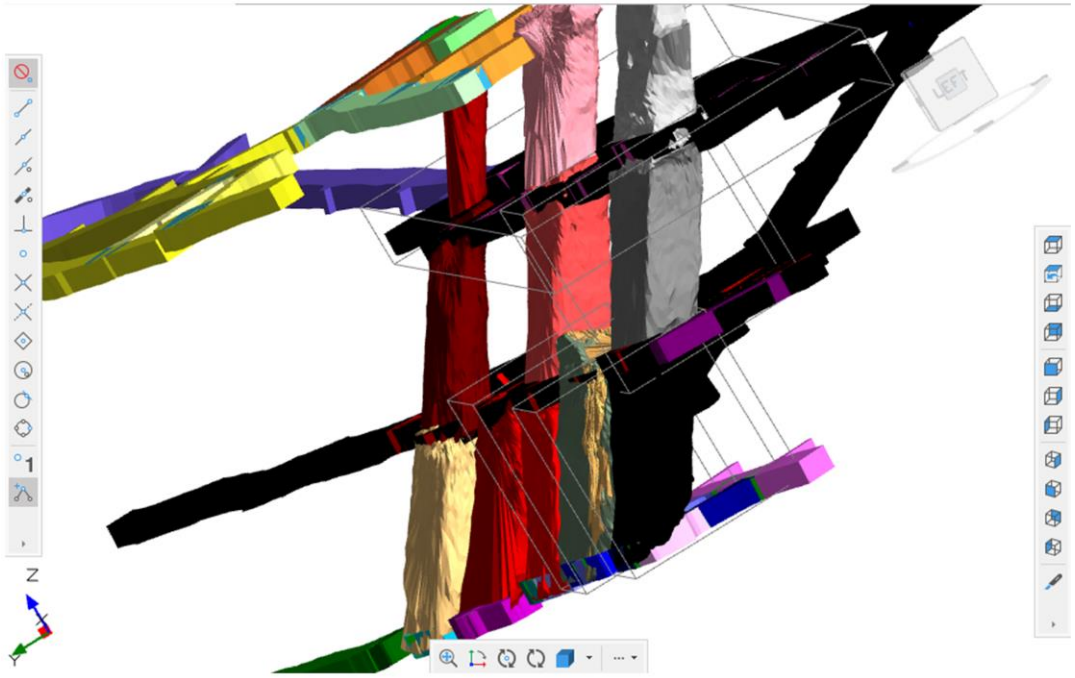


Deswik.CAD
Design & Solids Modeling



Deswik.CAD





MINP 203 – Deswik.CAD Essentials

MINP 203 – Deswik.CAD Essentials

Deswik.CAD Essentials is the starting point for all Deswik users who wish to learn the foundational skills required to operate Deswik.CAD or progress to more advanced Deswik training modules. This course introduces the core concepts, interface components, and data-handling tools that underpin every Deswik workflow.

By completing this module, participants develop the ability to confidently navigate the Deswik.CAD environment, manage files and layers, view and interrogate models, edit entities, and use essential drawing and modification tools. The course also provides a structured introduction to Deswik Process Maps—visual flowcharts that automate CAD actions and help standardize repetitive tasks across teams.

Deswik Process Maps allow users to streamline routine activities, reduce errors, and apply consistent workflows across projects. Participants will learn how to use existing process maps, modify command nodes, and design their own maps incorporating layers, menus, and task logic.

DAY 1

Deswik.CAD Environment, Navigation, Layers & Viewing Tools

User Interface Fundamentals

- Model space overview
  - Basic workspace structure,
  - Navigation areas, display conventions.
  - Differences between model space and CAD output windows.
- Menu bars, Quick Launch, and toolbars
  - Locations of frequently used commands and customizable interface components.
  - How to add, move, and manage toolbars.
- Layer Control and Output windows
  - Understanding CAD layers, visibility controls, and output display.
  - Managing layer trees and identifying active versus selected layers.
- Properties and Status Bar
  - Using the Properties panel to inspect and edit entities.
  - Monitoring prompts, grid coordinates, and system messages.
- Process Map panel
  - Overview of process maps and how Deswik uses them for automation.
  - Launching, viewing, and executing basic map commands.
- Model space shortcuts & common controls
  - Standard CAD navigation and selection shortcuts.
  - Using keyboard and mouse controls efficiently.
- Prompts and optional prompts
  - Understanding Deswik's prompt-based command execution system.
  - How optional prompts expand user control during workflows.

File Management

- Deswik.CAD file types and formats
  - Understanding .dwg, .dxf, .dmxml, .dgd, and model-linked formats.
  - How Deswik stores CAD and metadata.
- Automatic backups and recovery
  - Setting backup frequency and restoring earlier versions.
  - Navigating backup directories and recovery logic.

Layer Management

- Layer tree components
  - Structure of parent/child layer groups and organizational strategies.
  - Benefits of structured layer naming and families.
- Layer control shortcuts
  - Techniques for rapid layer visibility control.
  - Toggle, isolate, highlight, and manage layer states.
- Active and selected layers
  - How drawing and modification behaviors relate to layer states.
  - Common mistakes when editing on the wrong layer.
- Layer presets
  - Saving visibility states for repeated tasks.
  - Creating presets for planning, geology, design, and QA views.
- Layer visibility filters
  - Filtering entities by layer attributes.
  - Dynamic search and hard filter creation.

View and Navigation Tools

- Zoom, pan, and navigation cube
  - Efficiently navigating 2D and 3D environments.
  - Resetting to default views and rotating the view plane.
- Visual styles & multi-view windows
  - Working with wireframe, shaded, transparency, and other styles.
  - Switching between plan and section views.
- Rotate and adjust view planes
  - Rotating the working plane relative to geometry.
  - Distinguishing between twisting and rotating visual orientation.

Entity Selection

- Selection methods
  - Solid, box, grips, highlight, and selection fences.
  - Blue vs green selection logic.
- Select by entity type
  - Filtering selection to specific CAD objects.
  - Targeted selection tasks for polylines and solids.
- Properties and Attributes
  - Entity properties overview

MINP 203 – Deswik.CAD Essentials

- Fixed, variable, and attribute values.
- Editing multiple entities from the Properties window.

- Vertex lists
  - Viewing and editing vertex-level information.
  - Use cases for polyline refinement and geometry cleanup.

DAY 2

Drawing, Modifying, Interrogation, Filters, Legends & Process Maps

Working Plane Tools

- Working plane guide and properties
  - Managing elevation, orientation, and alignment.
  - Updating planes through point selection and shortcuts.
- Clipping tools
  - Controlling visible depth to simplify complex models.
  - Using far clipping for underground and bench-level views.

Drawing and Modification Tools

- Snapping and grip editing
  - Precision drawing tools for CAD entities.
  - Apparent intersections and snap overrides.
- Points and polyline editing
  - Inserting, deleting, and modifying vertex geometry.
  - Maintaining geometric integrity during editing.
- Connect, Break, Trim, Extend
  - Core CAD modification tools for design work.
  - Manual vs automatic connection logic.
- Register and Adjust tools
  - Registering polylines to surfaces and applying gradients.
  - Vertical adjustments and alignment with digital terrain models.
- Labeling tools
  - Creating label rules and dynamic text entities.
  - Labeling attributes, vertices, and elevation data.
- Follow prompts & Draw text
  - Using prompts for controlled geometry creation.
  - Modifying and relocating text entities.
- Duplicate, Move, Offset, Tessellate
  - Common workflows for generating mine design geometry.
  - Offsetting haul roads, projecting designs, generating surfaces.
- Boolean operations
  - Cutting, merging, and combining solids.
  - Practical applications for pit, dump, and stope solids.

Attributes & Interrogation

- Attribute creation and formulas
  - Creating new attributes and calculated fields.
  - Using formulas for grade, dilution, and elevation descriptors.
- Querying attributes
  - Generating reports and attribute summaries.
  - Batch interrogation of solids against block models.
- Interrogation against block and seam models
  - Extracting tonnes, grade, volume, and intersections.
  - Use cases for design validation and QA/QC.

Filters and Legends

- Hard and interactive filters
  - Isolating entities by attribute, type, or layer.
  - Building reusable filters for design review.
- Sorting and filtering results
  - Managing filtered entity sets for bulk editing.
  - Creating complex filters step-by-step.
- Legends
  - Creating value-bin and range-bin legends.
  - Applying color schemes and exporting legend images.

Plane Definitions

- Creating, using, and modifying plane definitions
  - Saving custom views and applying keyboard shortcuts.
  - Efficient switching between descriptive view presets.

Animation

- Creating 3D animations of mining sequences
  - Animating solids across time periods.
  - Exporting animations for presentations and reporting.

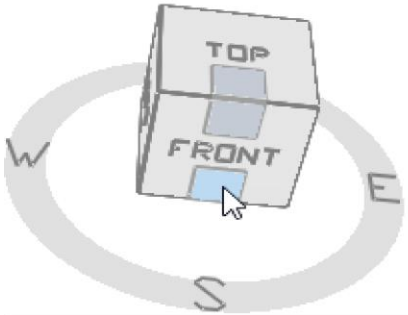
Import & Export

- Importing CAD and model files
  - Drag-and-drop workflows and validation tools.
  - Ensuring imported geometry passes Deswik validation rules.
- Export options
  - Exporting entities to Vulcan solids and other formats.
  - Managing coordinate systems during export.

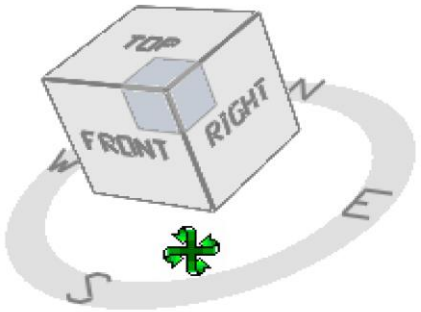
Process Maps (Core Skill for Automation)

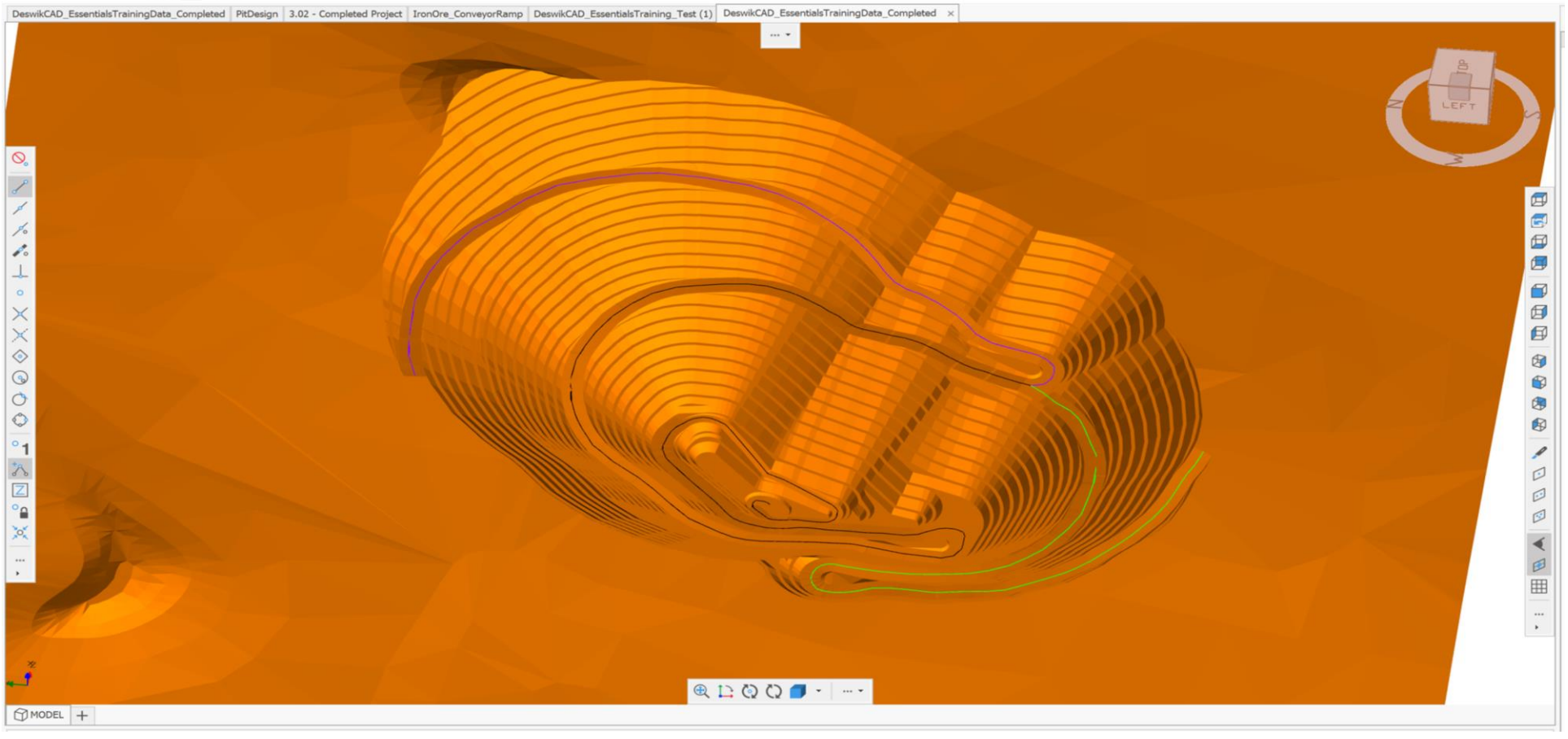
- Understanding process maps
  - Purpose, structure, and benefits for repeated workflows.
  - Where process maps live and how to share them.
- Using and modifying maps
  - Editing nodes, commands, and control flow.
  - Running multi-node sequences and chained actions.
- Designing process maps
  - Logic, structure, and reliability considerations.
  - Using layers, menus, and status nodes for robust automation.
- Creating process maps
  - Building new maps to automate layer settings and actions.
  - Developing multi-layer maps with user menus and prompts.

MINP 204 – Open Pit Mine and Waste Dump Design using Deswik.CAD



Deswik.CAD
Design & Solids Modeling





MINP 204 – Open Pit Mine and Waste Dump Design using Deswik.CAD

MINP 204 – Open Pit Mine and Waste Dump Design – Deswik.CAD

Open Pit Mine and Waste Dump Design using Deswik.CAD is a three- or four-day advanced course for mine planners, mining engineers, and geologists who design pits, ramps, switchbacks, slots, and waste dumps. The course is suited to professionals seeking deeper understanding of modern open pit design theory and hands-on application using Deswik.CAD's specialized pit-design tools.

Participants complete a full pit-design and waste-dump project based on a realistic mining scenario. The course covers open pit design terminology, pit geometry, appropriate design parameters, haul-road and switchback design, bench configuration, geotechnical constraints, and operational considerations affecting pit and dump development.

The course begins with pit optimization inputs (using Pseudoflow or practical shells), then transitions into top-down and bottom-up pit design in Deswik.CAD. Participants create surfaces, triangulations, solids, and reporting outputs including tonnage–grade tables by bench, rock type, and cutoff category. Waste dump design concepts and tools are also covered, including capacity estimation, expansion geometry, dump surface generation, and reconciliation.

Outcomes of the course include:

User Interface Fundamentals

- Model space overview
  - Basic workspace structure,
  - Navigation areas, display conventions.
  - Differences between model space and CAD output windows.
- Menu bars, Quick Launch, and toolbars
  - Locations of frequently used commands and customizable interface components.
  - How to add, move, and manage toolbars.

Understanding pit design parameters and components

- Bench geometry, berm formation, crest and toe relationships, pit slopes, and sequencing rules, including pit-expansion theory, geometric cut sequencing, minimum operating-room requirements, and load–haul interactions that influence pit shape.

Integrating optimization shells into practical pit design

- Use of optimal pit shells from Whittle or Deswik Pseudoflow as starting points for pit limits and staging, incorporating geotechnical domains, rock-type-dependent slopes, and multi-bench strategies.

Developing detailed pit and waste-dump designs

- Creation of detailed pit and dump designs including ramps, switchbacks, slots, and multi-routing options, supported by triangulated surfaces, solid modeling, and bench-by-bench volume, grade, rock-type, and cut–fill calculations.

Applying haul-road geometric design principles

- Design of haul roads using geometric requirements such as curvature, super-elevation, runout, vertical curves, rolling resistance, and truck-based specifications to meet operational and safety constraints.

Completing a full design and reporting workflow

- Execution of a complete design project using Deswik.CAD, including report generation, dashboards, reconciliations, volume and grade extractions, material classifications, and comparative scenario outputs.

Day 1

Data, Geology, Model Setup & Geotechnical Constraints

- Initial Data Setup in Deswik.CAD
  - Configure project settings and customizable toolbars
  - Setting layer presets and model attributes
  - Import topography, geology, and structural data
  - Preparing data for downstream design workflows
  - Create model-layer structure
  - Layer rules, naming conventions, visibility control
- Geology and Block Model Preparation
  - Analyze block model properties
  - Grade fields, rock types, domains, metadata
  - View block model using slices, legends, filters
  - Dynamic slices, block model table viewer
  - Load drillhole data and create geological interpretations
  - Drillhole visualization and import options
- Surface & Data Management for Pit Design
  - Importing and validating data
  - Topographic DTM, year-end surfaces, pushbacks
  - Creating custom views
  - Layer presets, plane definitions
- Geotechnical Analysis
  - Set geotechnical design constraints
  - Overall slope angle, variable slopes by rock type
  - Face projection rules and slope dependencies
  - Integrating slope parameters into pit design
  - Create geotechnical attributes in the block model
  - Material codes, geotechnical zones, slope tables

Day 2

Pit Geometry, Expansion, Pit Design Tools & Solid Modeling

- Introduction to Open Pit Geometry
  - Basic bench geometry
  - Bench face, crest, toe, berm, batter angle
  - Pit slope geometry
  - Final slope angle, overall slope angle, variable slopes
  - Pit expansion concepts
  - Bench-by-bench broadening, berm placement
  - Geometric sequencing
  - Frontal cuts, drive-by cuts, parallel cuts
  - Required operating room and cut sequencing

MINP 204 – Open Pit Mine and Waste Dump Design using Deswik.CAD

- Pit Shell Interpretation and Expansion Polygons
  - Use pit solid slices and expansion layers
  - Extracting rings for design
  - Creating expansion polygons
  - Polylines defining boundary for each bench
  - Using practical shells from optimization
  - LG shells, Pseudoflow shells, long-term schedule constraints
- Deswik Pit Design Process
  - Pit design layer setup
  - Bench height, elevation limits, layer controls
  - Pit design rules
  - Face projection, berm offsets, double-lane ramp rules
  - Create the initial pit design
  - Selecting the base, mapping crest/toe lines
- Ramp & Switchback Design Tools
  - Add ramps and faces
  - Ramp design logic, lane width, gradients
  - Switchbacks and slot design
  - Geometric positioning and safety considerations
  - Opposite ramping
  - Designing ramps in constrained geometry
- Updating Designs & Creating Surfaces
  - Update and edit designs
  - Modifying berms, benches, and lines
  - Create surfaces and closed solids
  - DTM creation, triangulation, surface validation

Day 3

Advanced Pit Design, Waste Dumps & Volume/Grade Reporting

- Pit Design Workflows & Multi-Bench Development
  - Bottom-up design
  - Expanding bench-by-bench
  - Top-down design
  - Using final shell as control boundary
  - Expanding single or multiple benches
  - Expansion by bench height, berm width
- Waste Dump Design
  - General dump design parameters
  - Bench height, slope angle, berm width
  - Define initial toe/crest
  - Starting elevation, footprint and constraints
  - Dump expansion workflow
  - Expand single bench, expand multiple benches
  - Ramp entrances for dumps
  - Haul access logic for upstream/downstream dumping
  - Design a full waste dump
  - Geometry generation using Deswik tools
  - Calculate dump volume
  - Solids and surface-based volume reporting
- Volume, Grade & Spatial Reporting
  - Create surfaces of pit design
  - Clean strings, generate triangulated surfaces
  - Intersect pit design with topography
  - Determine cut/fill zones
  - Generate volumetric reports
  - Tonnes, grades, volumes by bench and material
  - Block model interrogation
  - Grade/tonnage reporting using solids
  - Categorize and summarize material movement
  - Surface-to-surface volumes
  - Bench-by-bench reports
  - Rock type and grade range statistics

Day 4

Haul Road Design, Switchbacks, Curves, Safety & Integration

- Haul Road Design Theory
  - Road geometric design parameters
  - Ramp width, gradient, curve radius
  - Spiral roads inside pit walls
  - Geometric considerations and safety
  - Switchback geometry
  - Turning radius, visibility, super-elevation
  - Road volume calculations
  - Cut/fill volumes for roads
- Road Section and Curve Design
  - Straight segments
  - Alignment and directional controls
  - Curve geometry
  - Turning circles, minimum radius
  - Parallel berm design
  - Conventional vs median berm
  - Vertical and horizontal alignment
  - Sight distance, stopping distance
  - Vertical curves, inflection points
  - Super-elevation and runout
- Road-Design Workflows in Deswik
  - Road design with curve-based tools
  - Curve End, Curve Tangent
  - Design a road at constant gradient along contours
  - Alignment with pit walls and terrain
  - Variable-width road outlines
  - Traffic requirements, dual-lane constraints
- Road Design Module in Deswik
  - Create horizontal curves
  - Drape centerline over DTM
  - Create longitudinal profile
  - Generate vertical inflection points
  - Develop vertical curves
  - Apply longitudinal profile and create full road outline
  - Road volume calculations
  - Cut volume, fill volume