



# TRUCK & SHOVEL MINING SYSTEMS

## PROFESSIONAL DEVELOPMENT COURSE

### PURPOSE

The aim of this course is to provide a comprehensive overview of the planning and operational methods associated with truck and loader management in open cut mines. During the course, participants will build a haulage simulation model. Using this model they will then learn how to manipulate operating techniques to maximise fleet productivity and minimise unit-mining costs.

### WHO SHOULD ATTEND?

This course is recommended for technical and field staff involved in, or interested in, truck and loader operations. Typical participants might include mine planning engineers, senior field personnel, technical and financial personnel, equipment supplier personnel, maintenance and support personnel and mine surveyors.

### PRE-REQUISITE SKILLS

Participants should have knowledge of mine truck and loader equipment and operation, or have completed a Mining for Non Miners course. Knowledge of TALPAC is encouraged however not necessary. For details of this course please refer to [Our Courses](#) section of this web site.

### DURATION

3 Days

### DATES & LOCATIONS

This course is delivered regularly at a variety of international venues and can also be delivered on the client site. For further information please refer to the [Calendar](#) section of this web site.

### LEARNING OUTCOMES

At the completion of this course participants will be able to:

- Understand the factors that impact on fleet productivity and cost.
- Design the layout of surface mines to suit equipment characteristics and maximise equipment productivities.
- Build a haulage model to simulate loading & hauling operations.
- Use a haulage model for equipment selection & operating decisions and to investigate options for maximising fleet performance and minimising cost.

### DELIVERY METHOD

Classroom-style delivery with a heavy emphasis on workshops, participant involvement and case studies. A number of the workshops use TALPAC software (provided).



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### COURSE CONTENT

#### Module 1: Overview

- Suitability of truck haulage methods in open pit mining
- Typical applications

#### Module 2: Mine Design and Layout

- Cost effective mining methods
- Mine design approach
- Impact on scheduling

#### Module 3: Haulage Trucks

- Overview and operational characteristics
- Rear dump trucks
- Bottom dump trucks
- Trolley assist
- Components of large mining trucks
- Future technologies

#### Module 4: Loading Units

- Overview and operational characteristics
- Rope shovels
- Hydraulic shovels
- Hydraulic excavators
- Front end loaders
- Surface miners

#### Module 5: Operating Techniques

- Working area dimensions
  - Optimum bench heights
  - Bench widths
- Maintaining bench grade
- Haulroad design and maintenance
- Loading techniques
  - Rope shovel
  - Hydraulic shovels and excavators
  - Front end loaders
- Truck dumping

#### Module 6: Productivity Estimation

- Truck productivities
  - Truck travel time estimations
  - Cycle time influences
  - Performance curves
- Loader productivities
- Integrated truck and loader fleet productivity
  - Monte Carlo simulation
  - Estimating fleet productivity

#### Module 7: Factors Affecting Fleet Productivity and Cost

- Loader buckets
  - Correct matching
  - Operating rules
- Loading philosophy – single or double sided
- Truck and loader match
- Impact of travel time on optimum truck match
- Haul roads and rolling resistance
- Other operational factors and methods
  - Mixed truck sizes

#### Module 8: Mining Economics

- Time value relationships
- Marginal costing
- Discounted average cost
- Ownership costs
- Operating costs
- Fleet costs

#### Workshops

- 📖 Introduction to Marginal Costing
- 📖 Truck Specification Sheet Interpretation
- 📖 Loader Specification Sheet Interpretation
- 📖 Discounted Average Cost of Mining
- 📖 Creation of a Haul Profile & Travel Time Analysis
- 📖 Dump Design - Haul Higher or Longer
- 📖 Dumping Strategy - When to Assign Another Truck?
- 📖 Dump Routes – Which is the lowest cost
- 📖 Operational Decisions - Road Diversions
- 📖 Estimation of Truck and Loader Productivity
- 📖 Which Truck Type - Rear Dump or Bottom Dump
- 📖 Operational Decisions - Cost of Rehandling
- 📖 Estimating Fleet Numbers and Costs for an OB Removal Contract
- 📖 Variation in Haulage Costs with Depth and Distance
- 📖 Optimising Truck Fleet Size
- 📖 Optimum Equipment Fleet for 10 Year Mining Schedule
- 📖 Material Fragmentation – What effect on loading and hauling costs
- 📖 Factors Affecting Fleet Productivity