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COURSE BROCHURE

Advanced Earthmoving Equipment Selection and Productivity Training Course

4 – 15 July 2027
Muscat

Advanced Earthmoving Equipment Selection and Productivity Training Course

Ref: 222_6854 **Date:** 4 – 15 July 2027 **Location:** Muscat **Fees:** 11700 GBP

Earthmoving Equipment Selection and Productivity is a 2-week training course for plant managers, earthworks engineers and equipment planners who choose, deploy and cost excavators, dozers, scrapers, loaders, haul trucks, graders and compactors, and who leave with an earthworks fleet selection and productivity plan. Fuel, operator scarcity and tight earthworks windows now make fleet choice a margin decision. Jupiter Prime Training offers this course on earthmoving equipment selection and productivity.

Why Earthmoving Equipment Selection and Productivity Matter Now

Three forces shape earthmoving equipment selection and productivity today: larger cut-and-fill volumes on highways, rail, airport and industrial platform projects; rising fuel, tyre and component costs alongside a shortage of skilled operators; and telematics and machine guidance that expose every idle minute and wasted pass. Organisations that match machines to material, haul distance and compaction specification move more cubic metres per hour at lower unit cost; those that pick fleets by habit pay for queuing trucks, over-sized loaders and rework on failed compaction. The course rests on the Owning and Operating O&O cost method and Mean Time Between Failures MTBF reliability measures.

Who Gains Most from Earthmoving Equipment Selection and Productivity

- Plant leads who decide which machines to buy, rent or retire and where to deploy them
- Earthworks engineers who plan cut, fill, haul routes and compaction for a project
- Equipment planners who estimate outputs, fleet sizes and durations for tenders
- Maintenance leads who schedule servicing, component replacement and availability targets
- Site production leads who balance loaders, trucks and spreading crews each shift

Plant departments of civil contractors and quarrying or mining operators gain most when a plant manager, an earthworks engineer and an estimator attend together.

Earthmoving Equipment Selection and Productivity Capabilities

Participants move from manufacturer brochure figures to outputs they can defend for their own soil, haul road and site conditions.

- Calculate hourly production from bucket payload, fill factor, cycle time and job efficiency — Tender Estimators
- Apply swell, shrinkage and load factors to convert bank, loose and compacted volumes — Earthworks Engineers
- Assess rimpull, rolling resistance and grade resistance to predict haul speeds — Haul Route Designers
- Design a balanced loader and truck fleet using match factor and queuing checks — Plant Managers
- Weigh owning and operating cost per cubic metre for buy, rent and subcontract options — Commercial Directors
- Specify maintenance intervals and availability targets that protect fleet output — Maintenance Leads

Key Earthmoving Equipment Selection and Productivity Terms

- Swell Factor — the increase in volume when soil or rock is excavated and loosened, compared with its undisturbed bank volume.
- Cycle Time — the total time for one load, haul, dump and return sequence of an earthmoving machine.
- Rimpull — the tractive force available at the drive wheels to overcome rolling and grade resistance.
- Match Factor — the ratio of truck arrival rate to loader service rate, showing whether loaders or trucks wait.
- Owning and Operating Cost — the hourly cost of a machine combining depreciation, finance, fuel, tyres, wear parts, repairs and operator.
- Optimum Moisture Content — the moisture level at which a soil reaches its maximum dry density under a set compaction effort.

Earthmoving Equipment Selection and Productivity Day by Day

Day 1: Earthworks Context and Machine Families

- Earthworks Quantity Take-Off — Sizing Cut, Fill and Haul Volumes
- Machine Family Comparison — Excavators, Dozers, Scrapers, Loaders and Graders
- Mass Haul Diagrams — Choosing Haul Distances and Borrow Sources
- Telematics and Machine Guidance Data — Measuring Real Fleet Use
- Earthworks Risk Registers — Weather, Ground and Access Constraints

Day 2: Soil Properties and Volume Change

- Soil and Rock Classification — Predicting Diggability and Ripping Needs
- Swell, Shrinkage and Load Factors — Converting Bank, Loose and Compacted Volumes
- Bulk Density and Moisture Tests — Estimating Payload Weight per Load
- Rippability Assessment With Seismic Velocity — Choosing Ripping or Blasting
- Material Balance Sheets — Matching Excavated Volumes to Fill Needs

Day 3: Excavator and Loader Productivity

- Bucket Payload and Fill Factor — Setting Realistic Load Volumes
- Swing Angle and Dig Depth Corrections — Adjusting Excavator Cycle Times
- Wheel Loader Load-and-Carry Cycles — Comparing Against Truck Loading
- Job Efficiency and Operator Factors — Converting Peak to Sustained Output
- Excavator Versus Loader Selection — Matching Face Conditions and Mobility

Day 4: Dozers, Scrapers and Graders

- Dozer Blade Capacity and Push Distance — Estimating Dozing Production
- Push-Pull and Push-Loaded Scraper Operations — Reducing Loading Time
- Scraper Versus Truck Haul Economics — Selecting by Distance and Material
- Grader Passes and Operating Speeds — Planning Fine Grading Output
- Ripper Selection and Shank Configuration — Raising Output in Hard Ground

Day 5: Haul Trucks and Haul Roads

- Rimpull and Retarder Charts — Predicting Loaded and Empty Speeds
- Rolling and Grade Resistance — Setting Haul Road Design Limits
- Rigid Versus Articulated Dump Trucks — Choosing for Terrain and Distance
- Haul Road Maintenance Regimes — Cutting Tyre Wear and Fuel Burn
- Haul Cycle Simulation — Testing Route Options Before Commitment

Day 6: Compaction and Placement

- Proctor Compaction Tests — Linking Density Targets to Moisture Control
- Compactor Types and Selection — Smooth Drum, Padfoot and Pneumatic Rollers
- Lift Thickness and Pass Counts — Planning Compaction Production
- Intelligent Compaction and Field Density Testing — Verifying Specification Compliance
- Water Bowser Planning — Supplying Moisture for Fill Placement

Day 7: Fleet Matching and Balancing

- Match Factor Calculation — Balancing Loader Capacity and Truck Numbers
- Queuing Analysis at Loading and Dumping Points — Reducing Waiting Time
- Bunching and Dispatch Rules — Keeping Trucks Evenly Spaced
- Spread Fleet Balancing — Aligning Dozers, Graders and Rollers With Delivery
- Fleet Sensitivity Testing — Responding to Haul Distance Changes

Day 8: Owning and Operating Cost

- Depreciation and Finance Cost Models — Building the Ownership Rate
- Fuel, Tyre and Wear Part Estimating — Building the Operating Rate
- Cost per Cubic Metre Comparisons — Ranking Fleet Alternatives
- Buy, Rent or Subcontract Decisions — Weighing Utilisation and Risk
- Replacement Timing Analysis — Deciding When to Retire a Machine

Day 9: Maintenance Planning and Availability

- Preventive Maintenance Schedules — Setting Service Intervals by Hours
- Condition Monitoring and Oil Analysis — Catching Component Failures Early
- Mean Time Between Failures Tracking — Measuring Fleet Reliability
- Mechanical Availability and Utilisation Indicators — Reporting Fleet Performance
- Field Service and Spare Parts Stocking — Reducing Downtime on Remote Sites

Day 10: Practising the Earthworks Fleet Selection and Productivity Plan

- Volume Conversion and Material Balance for a Case Project — Applying Soil Factors
- Production Estimate for the Selected Fleet — Applying Cycle Time Methods
- Fleet Matching and Cost Comparison — Applying Match Factor and Unit Cost
- Maintenance and Availability Assumptions — Applying Reliability Measures
- Earthworks Fleet Selection and Productivity Plan — Completing the Tender-Ready Document

Applying Earthmoving Equipment Selection and Productivity After the Course

- Recalculate the match factor and truck numbers on one live earthworks spread using measured cycle times and adjust the fleet for the next shift pattern.
- Build an owning and operating cost per cubic metre comparison for one planned machine purchase and present the buy, rent or subcontract choice to the plant manager.

Earthmoving Equipment Selection and Productivity Questions FAQ

What is earthmoving equipment selection and productivity and why does it matter now?

Earthmoving equipment selection and productivity is the practice of choosing, matching and costing machines so earthworks move the planned volumes at the lowest unit cost. It matters now because fuel, operator and component costs are rising while projects demand faster cut and fill.

Who gains most from earthmoving equipment selection and productivity training?

Plant managers, earthworks engineers and equipment planners gain most, alongside maintenance and site production leads. Each of them decides which machines work where, how many are needed and how long they will run.

How does earthmoving equipment selection and productivity training differ from a heavy equipment operator course?

Earthmoving equipment selection and productivity training covers planning, estimating and costing fleets rather than operating controls. An operator course builds safe machine handling skills, while this course trains productivity calculation, fleet matching, cost comparison and maintenance planning for managers and engineers.

What do you bring back from earthmoving equipment selection and productivity training?

You bring back an earthworks fleet selection and productivity plan for a real project, with volume conversions, production estimates, a matched fleet, unit cost comparison and maintenance assumptions your plant department can use in tenders.

Earthmoving Equipment Selection and Productivity: The Way Forward

The earthworks fleet selection and productivity plan first informs which machines and how many to mobilise for the next earthworks package. Plant managers, estimators and earthworks engineers use it as one agreed basis for output and cost. After its first use, compare planned and measured cycle times and unit costs, then refine soil factors and job efficiency for future tenders.