Controlled Blasting Techniques Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Controlled Blasting Techniques Training Course is a specialized, industry-focused program designed to build advanced competencies in safe blasting design, vibration control, rock fragmentation optimization, and precision excavation methods used in modern mining, tunneling, quarrying, and civil engineering projects. The course integrates engineering principles, explosive science fundamentals, geotechnical assessment, and environmental impact mitigation strategies to ensure efficient and safe rock breakage while minimizing overbreak, flyrock, ground vibration, and air overpressure.

In today’s fast-evolving infrastructure and mining sectors, the demand for sustainable blasting practices, digital blast design tools, drone-assisted monitoring, AI-based fragmentation analysis, and regulatory-compliant explosive handling is rapidly increasing. This training equips professionals with industry-relevant skills in blast optimization, risk assessment, safety compliance (OHS standards), and productivity enhancement techniques, ensuring alignment with global best practices in controlled rock excavation and environmental stewardship.

Programme Curriculum

Controlled Blasting Techniques Training Course

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Course Duration

5 Days

Course Objectives

1. Master controlled blasting design principles for mining and construction projects
2. Understand explosive energy control and rock fragmentation optimization
3. Apply vibration reduction techniques and ground stability control
4. Develop skills in blast pattern design and delay sequencing systems
5. Implement flyrock mitigation and safety zoning strategies
6. Use digital blast design software and simulation tools
7. Conduct geotechnical analysis for drilling and blasting operations
8. Ensure compliance with explosives regulations and OHS safety standards
9. Optimize cost-effective blasting and productivity enhancement models
10. Perform environmental impact reduction and noise control in blasting
11. Apply precision drilling techniques and hole deviation control
12. Integrate AI-driven blast analytics and fragmentation assessment tools
13. Develop expertise in risk assessment and emergency response planning in blasting zones

Target Audience

1. Mining Engineers and Mining Supervisors
2. Civil Engineers in Infrastructure and Tunneling Projects
3. Quarry Managers and Drill & Blast Supervisors
4. Blasting Engineers and Explosives Technicians
5. Construction Project Managers and Site Engineers
6. Geotechnical Engineers and Rock Mechanics Specialists
7. Safety Officers (HSE / OHS Professionals)
8. Government Regulators and Mining Inspectors

Course Modules

Module 1: Fundamentals of Controlled Blasting

- Basics of explosive energy transfer in rock
- Rock mechanics and fracture behavior
- Types of controlled blasting methods
- Blast geometry fundamentals
- Safety principles in blasting design
- **Case Study:** Controlled blasting in open-pit mining for reduced overbreak

Module 2: Drilling Techniques & Blast Hole Accuracy

- Drilling equipment selection and setup
- Hole deviation control techniques

- Bench drilling patterns
- Collar and toe accuracy management
- Drill data quality assurance
- **Case Study:** Tunnel excavation accuracy improvement in urban metro project

Module 3: Blast Design Engineering

- Burden and spacing calculation methods
- Delay timing and initiation systems
- Charge distribution techniques
- Fragmentation prediction models
- 3D blast design simulation tools
- **Case Study:** Optimized quarry production through redesigned blast patterns

Module 4: Vibration Control & Environmental Management

- Ground vibration monitoring systems
- Air overpressure control methods
- Flyrock containment strategies
- Environmental compliance frameworks
- Noise reduction in blasting zones
- **Case Study:** Urban construction blasting near residential infrastructure

Module 5: Explosives Technology & Initiation Systems

- Types of industrial explosives
- Electronic detonators and delay systems
- Energy control in explosive selection
- Safe handling and transport procedures
- Misfire prevention techniques
- **Case Study:** High-precision blasting in hard rock tunneling project

Module 6: Rock Fragmentation & Productivity Optimization

- Fragmentation size analysis techniques
- Stockpile and crusher feed optimization
- Swelling and swell factor control
- Blast performance evaluation metrics
- AI-based fragmentation prediction
- **Case Study:** Productivity improvement in aggregate quarry operations

Module 7: Safety, Risk Assessment & Compliance

- Hazard identification in blasting zones
- Risk assessment methodologies
- Emergency evacuation planning
- Legal compliance and documentation
- PPE and blast site safety protocols
- **Case Study:** Safety system overhaul in large-scale mining operation

Module 8: Advanced Digital Blasting & Smart Technologies

- Blast simulation software applications
- Drone-based blast monitoring systems
- AI and machine learning in blasting optimization
- Real-time data analytics in drilling operations
- Digital twin modeling for mine blasting
- **Case Study:** Smart blasting transformation in automated mining site

Training Methodology

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price

23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

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Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com