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# Blasting Principles For Open Pit Mining

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Environmental Issues of Blasting  
Introductory Mining Engineering  
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SME Mining Engineering Handbook, Third Edition  
Rock Blasting and Explosives Engineering  
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Open Pit Mine Planning and Design, Two Volume Set, Second Edition  
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Engineering Rock Blasting Operations  
Mining Engineering: Open Pit Techniques  
Mineral Property Evaluation  
Blasting Principles for Open Pit Mining  
Measurement and Analysis of Blast Fragmentation  
Explosives and Blasting Procedures Manual  
Blasting Principles for Open Pit Mining: General design concepts  
Mine Planning and Equipment Selection 2004  
Rock Fragmentation by Blasting  
The Chemistry and Technology of Magnesia

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## **DUDLEY GABRIELLE**

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### Extractive Metallurgy of Copper Taylor & Francis

Developments in Geographic Information Technology have raised the expectations of users. A static map is no longer enough; there is now demand for a dynamic representation. Time is of great importance when operating on real world geographical phenomena, especially when these are dynamic. Researchers in the field of Temporal Geographical Information Systems (TGIS) have been developing methods of incorporating time into geographical information systems. Spatio-temporal analysis embodies spatial modelling, spatio-temporal modelling and spatial reasoning and data mining. *Advances in Spatio-Temporal Analysis* contributes to the field of spatio-temporal analysis, presenting innovative ideas and examples that reflect current progress and achievements.

### Environmental Issues of Blasting CRC Press

Weak rocks encountered in open pit mines cover a wide variety of materials, with properties ranging between soil and rock. As such, they can provide a significant challenge for the slope designer. For these materials, the mass strength can be the primary control in the design of the pit slopes, although structures can also play an important role. Because of the typically weak nature of the materials, groundwater and surface water can also have a controlling influence on stability. *Guidelines for Open Pit Slope Design in Weak Rocks* is a companion to *Guidelines for Open Pit Slope Design*, which was published in 2009 and dealt primarily with strong rocks. Both books were commissioned under the Large Open Pit (LOP) project, which is sponsored by major mining companies. These books provide summaries of the current state of practice for the design, implementation and assessment of slopes in open pits, with a view to meeting the requirements of safety, as well as the recovery of anticipated ore reserves. This book, which follows the general cycle of the slope design process for open pits, contains 12 chapters. These chapters were compiled and written by industry experts and contain a large number of case histories. The initial chapters address field data collection, the critical aspects of determining the strength of weak rocks, the role of groundwater in weak rock slope stability and slope design considerations, which can differ somewhat from those applied to strong rock. The subsequent chapters address the principal weak rock types that are encountered in open pit mines, including cemented colluvial sediments, weak sedimentary mudstone rocks, soft coals and chalk, weak limestone, saprolite, soft iron ores and other leached rocks, and hydrothermally altered rocks. A final chapter deals with design implementation aspects, including mine planning, monitoring, surface water control and closure of weak rock slopes. As with the other books in this series, *Guidelines for Open Pit Slope Design in Weak Rocks* provides guidance to practitioners involved in the design and implementation of open pit slopes, particularly geotechnical engineers, mining engineers, geologists and other personnel working at operating mines.

*Introductory Mining Engineering* CRC Press

Spearheading the promotion of international technology transfer in the fields of mine planning, mining systems design, equipment selection and operation techniques, the International Symposium on Mine Planning and Equipment Selection is recognised by the mining society as a key annual event in highlighting developments within the field. Here in this volume, proceedings from the thirteenth annual symposium concentrate on the following major topics: \* open pit and underground mine planning, modelling and design \* geomechanics \* mining and processing methods \* design, monitoring and maintenance of mine equipment \* simulation, optimization and control of technological processes \* management, mine economics and financial analysis \* health, safety and environmental protection. Including 147 papers from leading experts and authorities, Mine Planning and Equipment Selection undoubtedly provides valuable information and insight for a range of engineers, scientists, researchers and consultants involved in the planning, design and operation of underground and surface mines.

### Principles and Practices of Rock Blasting CSIRO PUBLISHING

Fragmentation characteristics influence mucking productivity, crusher throughput and energy consumption, plant efficiency, yield and recovery, or the price itself of the end product in the case of industrial minerals and aggregates. Reliable, quantitative measurements of fragment sizes are instrumental in controlling and optimizing the blasting res

### Advances in Spatio-Temporal Analysis Society for Mining, Metallurgy & Exploration

Blasting practices in mines have undergone many changes in the recent past and continue to be honed and reconfigured to meet the demands of today's mining needs. This volume compiles papers of the workshop Blasting in Mines New Trends, hosted by the Fragblast 10 Symposium . The 17 papers provide a mix which highlight the evolving trends in blasti

### **Blasting in Mining - New Trends** Springer Nature

Although most mining companies utilise systems for slope monitoring, experience indicates that mining operations continue to be surprised by the occurrence of adverse geotechnical events. A comprehensive and robust performance monitoring system is an essential component of slope management in an open pit mining operation. The development of such a system requires considerable expertise to ensure the monitoring system is effective and reliable. Written by instrumentation experts and geotechnical practitioners, *Guidelines for Slope Performance Monitoring* is an initiative of the Large Open Pit (LOP) Project and the fifth book in the *Guidelines for Open Pit Slope Design* series. Its 10 chapters present the process of establishing and operating a slope monitoring system; the fundamentals of pit slope monitoring instrumentation and methods; monitoring system operation; data acquisition, management and analysis; and utilising and communicating monitoring results. The implications of increased automation of mining operations are also discussed, including the future requirements of performance monitoring. *Guidelines for Slope Performance Monitoring* summarises leading mine industry practice in monitoring system design, implementation, system management, data management and reporting, and provides guidance for engineers, geologists, technicians and others responsible for geotechnical risk

management.

*Rock Mechanics and Engineering Volume 3* CRC Press

This work provides detailed information about materials needed for carrying out blasting operations such as explosives and related accessories, understanding of the process of fragmentation, various techniques, design methods, and applications including environmental aspects.

*Electrical Measuring Instruments and Measurements* CRC Press

Rock Blasting and Explosives Engineering covers the practical engineering aspects of many different kinds of rock blasting. It includes a thorough analysis of the cost of the entire process of tunneling by drilling and blasting in comparison with full-face boring. Also covered are the fundamental sciences of rock mass and material strength, the thermal decomposition, burning, shock initiation, and detonation behavior of commercial and military explosives, and systems for charging explosives into drillholes. Functional descriptions of all current detonators and initiation systems are provided. The book includes chapters on flyrock, toxic fumes, the safety of explosives, and even explosives applied in metal working as a fine art. Fundamental in its approach, the text is based on the practical industrial experience of its authors. It is supported by an abundance of tables, diagrams, and figures. This combined textbook and handbook provides students, practitioners, and researchers in mining, mechanical, building construction, geological, and petroleum engineering with a source from which to gain a thorough understanding of the constructive use of explosives.

*Guidelines for Open Pit Slope Design in Weak Rocks* CRC Press

Rock Fracture and Blasting: Theory and Applications provides the latest on stress waves, shock waves, and rock fracture, all necessary components that must be critically analyzed to maximize results in rock blasting. The positioning of charges and their capacity and sequencing are covered in this book, and must be carefully modeled to minimize impact in the surrounding environment. Through an explanation of these topics, author Professor Zhang's experience in the field, and his theoretical knowledge, users will find a thorough guide that is not only up-to-date, but complete with a unique perspective on the field. Includes a rigorous exposition of Stress Waves and Shock Waves, as well as Rock Fracture and Fragmentation Provides both Empirical and Hybrid Stress Blasting Modeling tools and techniques for designing effective blast plans Offers advanced knowledge that enables users to choose better blast techniques Includes exercises for learning and training in each chapter

*Advanced Analytics in Mining Engineering* Butterworth-Heinemann

The papers in these two volumes were presented at the International Conference on "NexGen Technologies for Mining and Fuel Industries" [NxGnMiFu-2017] in New Delhi from February 15-17, 2017, organized by CSIR-Central Institute of Mining and Fuel Research, Dhanbad, India. The proceedings include the contributions from authors across the globe on the latest research on mining and fuel technologies. The major issues focused on are: Innovative Mining Technology, Rock Mechanics and Stability Analysis, Advances in Explosives and Blasting, Mine Safety and Risk Management, Computer Simulation and Mine Automation, Natural Resource Management for Sustainable Development, Environmental Impacts and Remediation, Paste Fill Technology and Waste Utilisation, Fly Ash Management, Clean Coal Initiatives, Mineral Processing and Coal Beneficiation, Quality Coal for Power Generation and Conventional and Non-conventional Fuels and Gases. This

collection of contemporary articles contains unique knowledge, case studies, ideas and insights, a must-have for researchers and engineers working in the areas of mining technologies and fuel sciences.

**Rock Fragmentation by Blasting** Taylor & Francis Group

Industrial Explosives and their Applications for Rock Excavation focuses on applications of industrial explosives in civil and mining engineering works. Explosives and their actions are explained in terms of basics, principles, and related chemistry. Explosives and initiation devices are described, including their characteristics, geometry, and timing aspects of the blast design. Designing blasts for rock excavation works is explained, including devices for obtaining large-sized blocks, construction of yards, and excavation of big foundations. Finally, criteria for the mitigation of the associated seismic disturbances are summarized. The book: provides an updated vision of industrial explosives, including the best technical advice for rock excavation; contains harmonized preliminary modules aimed at introducing basic concepts of chemistry and physics applied to the drilling and blasting technique; defines balanced mix of theory capable of providing skills to design an efficient blasting; covers excavation problems from different points of view and in different contexts; and addresses issues of drilling and loading blast-holes. Industrial Explosives and their Applications for Rock Excavation is aimed at graduate students, researchers, and professionals in mining engineering and explosives technology.

**Journal of the South African Institute of Mining and Metallurgy** CRC Press

An introductory text and reference on mining engineering highlighting the latest in mining technology Introductory Mining Engineering outlines the role of the mining engineer throughout the life of a mine, including prospecting for the deposit, determining the site's value, developing the mine, extracting the mineral values, and reclaiming the land afterward. This Second Edition is written with a focus on sustainability-managing land to meet the economic and environmental needs of the present while enhancing its ability to also meet the needs of future generations. Coverage includes aboveground and underground methods of mining for a wide range of substances, including metals, nonmetals, and fuels. Completely up to date, this book presents the latest information on such technologies as remote sensing, GPS, geophysical surveying, and mineral deposit evaluation, as well as continuous integrated mining operations and autonomous trucks. Also included is new information on landscape restoration, regional planning, wetlands protection, subsidence mitigation, and much more. New chapters include coverage of: \* Environmental responsibilities \* Regulations \* Health and safety issues Generously supplemented with more than 200 photographs, drawings, and tables, Introductory Mining Engineering, Second Edition is an indispensable book for mining engineering students and a comprehensive reference for professionals.

*Slope Stability 2007* Taylor & Francis Group

In large surface mining operations, drilling and blasting activities constitute more than 15% of the total costs. In order to optimize performance and minimize costs, a thorough knowledge of drill and blast operations is, therefore, extremely important. In this unique reference volume, rotary blasthole drilling and surface blasting, as applied in la

**Underground Mining Methods** CRC Press

This book gives a rigorous and up-to-date study of the various AI and machine learning algorithms

for resolving environmental challenges associated with blasting. Blasting is a critical activity in any mining or civil engineering project for breaking down hard rock masses. A small amount of explosive energy is only used during blasting to fracture rock in order to achieve the appropriate fragmentation, throw, and development of muck pile. The surplus energy is transformed into unfavourable environmental effects such as back-break, flyrock, air overpressure, and ground vibration. The advancement of artificial intelligence and machine learning techniques has increased the accuracy of predicting these environmental impacts of blasting. This book discusses the effective application of these strategies in forecasting, mitigating, and regulating the aforementioned blasting environmental hazards.

**Rock Blasting** CRC Press

Rock Fragmentation by Blasting contains the papers presented at the 10th International Symposium on Rock Fragmentation by Blasting (New Delhi, India, 26-29 November 2012), and represents the most advanced forum on blasting science and technology. The contributions cover all major recent advancements in blasting and fragmentation, from realistic tre

**Flyrock in Surface Mining** John Wiley & Sons

Collection of excellent articles presenting the latest developments in blast vibration measurements, modeling and mitigation techniques. Includes contributions on novel environmentally-induced vs blast-induced movements, non-conventional geophysical processing techniques, new modeling approaches, mitigation techniques using smarter blasting methods

**NexGen Technologies for Mining and Fuel Industries (Volume I and II)** CSIRO PUBLISHING

Divided into two volumes, this accessible work describes the principles involved in hard rock blasting as applied to open pit mines. A large number of examples illustrate the application of the principles. The first volume introduces basic engineering concepts and the building blocks that make up a blast design. The second volume goes into more depth to provide a better understanding of the fundamental concepts involved in rock blasting. Both volumes provide a basis for engineers to improve their blasting operations and their understanding of blasting papers that appear in technical literature.

*SME Mining Engineering Handbook, Third Edition* Elsevier

This multi-author new edition revises and updates the classic reference by William G. Davenport et al (winner of, among other awards, the 2003 AIME Mineral Industry Educator of the Year Award "for inspiring students in the pursuit of clarity"), providing fully updated coverage of the copper production process, encompassing topics as diverse as environmental technology for wind and solar energy transmission, treatment of waste by-products, and recycling of electronic scrap for potential alternative technology implementation. The authors examine industrially grounded treatments of process fundamentals and the beneficiation of raw materials, smelting and converting,

hydrometallurgical processes, and refining technology for a mine-to-market perspective - from primary and secondary raw materials extraction to shipping of rod or billet to customers. The modern coverage of the work includes bath smelting processes such as Ausmelt and Isasmelt, which have become state-of-the-art in sulfide concentrate smelting and converting. - Drawing on extensive international industrial consultancies within working plants, this work describes in depth the complete copper production process, starting from both primary and secondary raw materials and ending with rod or billet being shipped to customers - The work focuses particularly on currently-used industrial processes used to turn raw materials into refined copper metal rather than ideas working 'only on paper' - New areas of coverage include the environmentally appropriate uses of copper cables in power transmission for wind and solar energy sources; the recycling of electronic scrap as an important new feedstock to the copper industry, and state-of-the-art Ausmelt and Isasmelt bath smelting processes for sulfide concentrate smelting and converting

*Rock Blasting and Explosives Engineering* Springer Nature

This third edition of the SME Mining Engineering Handbook reaffirms its international reputation as "the handbook of choice" for today's practicing mining engineer. It distills the body of knowledge that characterizes mining engineering as a disciplinary field and has subsequently helped to inspire and inform generations of mining professionals. Virtually all of the information is original content, representing the latest information from more than 250 internationally recognized mining industry experts. Within the handbook's 115 thought-provoking chapters are current topics relevant to today's mining professional: Analyzing how the mining and minerals industry will develop over the medium and long term--why such changes are inevitable, what this will mean in terms of challenges, and how they could be managed Explaining the mechanics associated with the multifaceted world of mine and mineral economics, from the decisions associated with how best to finance a single piece of high-value equipment to the long-term cash-flow issues associated with mine planning at a mature operation Describing the recent and ongoing technical initiatives and engineering developments in relation to robotics, automation, acid rock drainage, block caving optimization, or process dewatering methods Examining in detail the methods and equipment available to achieve efficient, predictable, and safe rock breaking, whether employing a tunnel boring machine for development work, mineral extraction using a mobile miner, or cast blasting at a surface coal operation Identifying the salient points that dictate which is the safest, most efficient, and most versatile extraction method to employ, as well as describing in detail how each alternative is engineered Discussing the impacts that social and environmental issues have on mining from the pre-exploration phase to end-of-mine issues and beyond, and how to manage these two increasingly important factors to the benefit of both the mining companies and other stakeholders

*Industrial Explosives and their Applications for Rock Excavation* CRC Press

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