Ore Reserve Estimation and Strategic Mine Planning



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出版者:Springer-Verlag New York Inc.

出版时间:2009-1

装帧:HRD

isbn:9781402044120

The mining business faces continual risks in producing metals and raw materials under fluctuating market demand. At the same time, the greatest uncertainty driving the risk and profitability of mining investments is the geological variability of mineral deposits. This supply uncertainty affects the prediction of economic value from the initial valuation of a mining project through mine planning, design and production scheduling. This book is the first of its kind, presenting state-of-the-art stochastic simulation and optimization techniques and step-by-step case studies. Quantification of geological uncertainty through new efficient conditional simulation techniques for large deposits, integration of uncertainty to stochastic optimization formulations for design and production scheduling and the concurrent management of risk are shown to create flexibility, options and opportunities, increase asset value, cashflows and return on investment. The new approaches introduced include resource/reserve risk quantification, cost-effective drilling programs, pit design and long-term production scheduling optimization with simulated orebodies, ore reserve classification, geologic risk discounting, waste managing and demand driven scheduling, risk assessment in meeting project production schedules ahead of mining, risk based optimal slope

design, options valuation when mining. Applications include commodities such as gold, copper, nickel, iron ore, coal and diamonds.
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