Sensing and Monitoring Technologies for Mines and Hazardous Areas

Description:
Sensing and Monitoring Technologies for Mines and Hazardous Areas: Monitoring and Prediction Technologies presents the fundamentals of mining related geotechnical risk and how the latest advances in sensing and data communication can be used both to prevent accidents and provide early warnings.

Opencast mining operations involve huge quantities of overburden removal, dumping, and backfilling in excavated areas. Substantial increases in the rate of accumulation of waste dumps in recent years has resulted in greater height of dumps and also has given rise to the danger of dump failures as steeper open pit slopes are prone to failure. These failures lead to loss of valuable human lives and damage to mining machinery.

This book presents the most recent advances in gas sensors, methane detectors, and power cut-off systems. It also introduces monitoring of the gas strata and environment, and an overview of the use of Internet of Things and cloud computing for mining sensing and surveillance purposes. Targeted at geotechnical and mining engineers, this volume covers the latest findings and technology to prevent mining accidents and mitigate the inherent risk of the activity.

- Presents complete details of a real-time slope stability monitoring system using wireless sensor networking and prediction technique based on multivariate statistical analysis of various parameters and analytical hierarchy process methods
- Discusses innovative ideas and new concepts of sensing technologies, mine transport surveillance, digital mining, and cloud computing to improve safety and productivity in mining industry
- Includes slope stability prediction software, downloadable through a companion website, which can be used for monitoring, analyzing, and storing different sensors and providing audio-visual, SMS, and email alerts
- Covers the latest findings and technology to prevent mining accidents and mitigate the inherent risk

Contents:
Chapter 1. Mechanism of slope failure and its monitoring techniques
Chapter 2. Mine transport surveillance systems
Chapter 3. Gas sensors for underground mines and hazardous areas
Chapter 4. Local methane detector and power cut-off system
Chapter 5. Integrated gas, strata and environment monitoring system
Chapter 6. Digital mining technology using internet of things
Chapter 7. Cloud computing technology and its application in mines

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