9:45 AM

MineSAFE: Application and Extension of Serious Games for Mine Safety Education

L. Brown; Mining & Geological Engineering, University of Arizona, Tucson, AZ

In previous work, we developed a software platform to create 3D computer games for mine safety training. "Serious games" can promote critical thinking through authentic game environments that contextualize learning and enable persistent consequences for users actions. In this work, we discuss recent developments in our MineSAFE platform, including new interaction capabilities and extensions for multi-player gaming. We outline game scenarios based on MSHA and NIOSH-sanctioned training materials, with a brief demonstration and feedback from recent usability tests.

10:05 AM

Excellent Occupational Safety and Health Management in Southeast Asian Mining Industries by Know-How Transfer

J. Kretschmann[1] and N. Nguyen[2]; [1]TFH Georg Agricola University, Bochum, Germany and [2]Mining Management, Hanoi University of Mining and Geology, Hanoi, Viet Nam

Southeast Asian countries cannot maintain their economic growth rate without the development in their mining industries. Their sustainable development requires sound fundamentals to secure not only economic progress and environment protection but also improvements in occupational safety and health (OSH) for employees. Mining industries in South East Asia are still very labor intense. Tremendous achievements from world class mining operations in advanced mining countries can be used as role models to improve the status quo of the Southeast Asian countries in OSH management. Know-how transfer, therefore, is a key factor for major improvements. Effects of the transfer based on a multilevel approach will be discussed in the article based on a case study from the German hard coal mining industry. Crucial requisites for excellent achievements in OSH in Southeast Asian mining countries are also mentioned.

10:25 AM

Mechanized Ground Support Design Using Safety Factor Analysis at the Turquoise Ridge Joint Venture, Nevada

L. Sandbak; Engineering, Barrick Gold, Golconda, NV

The TRJV mine consists of altered low strength rocks that uses the underhand cut and fill mining method. TRJV is mechanizing top cuts to eliminate hazards associated with jackleg drilling such as heavy lifting, pinch points, closeness to rotating steel, noise, and exposure to ground fall hazards at the face. The previously maximum topcut drift dimensions were 10' High x 10' Wide. New bolter/jumbo units can safely operate in a 10'W x 12'H or larger sized openings and limit miner exposure to loose rock caused by jackleg vibration and/or blasting damage at or near the rock face. The basis for the safety factor analysis is the support of a conservative "dead weight" of rock held in place by bolts in which the depth of failure is approximated as a wedge whose height is one-half of the span (Pakalnis, 2008). Pull testing shows that the bolt bond strength is highly dependent on the rock mass rating or RMR (Bieniawski, 1976) Arched back profiles can double the calculated safety factor. A comparison of numbers of bolts and lengths needed to maintain a safety factor of at least 1.5 is examined to determine the minimum bolt support needed in the larger proposed drift sizes.

MINING & EXPLORATION:
Operations: Applications of Discrete System Simulation in Mining II

9:00 AM • Wednesday, February 26

Chair: **E. Tarshizi,** *University of Nevada, Reno, Reno, NV*

9:00 AM

Introductions

9:05 AM

Using a Discrete System Simulation and Animation Model of a Coal Mine to Increase Equipment Efficiency and Reduce Environmental Impact

E. Tarshizi[1], V. Ibarra[1], D. Taylor[1] and J. Sturgul[2]; [1]Mine Systems Optimization and Simulation Laboratory, Mining and Metallurgical Engineering Dept., University of Nevada, Reno, NV and [2]School of Civil, Environmental and Mining Engineering, The University of Adelaide, Adelaide, SA, Australia

This paper demonstrates the application of a mine system simulation and animation model in enhancing the efficiency of a truck-shovel operation and reducing the haulage environmental impact in an open-cut coal mine. In any mine, a key objective is to have enough equipment for production and not have excess to where it is counterproductive. Due to the advent of responsible mining, environmental regulations, and eco-friendly practices, these factors must also be considered in the analysis. The over-trucked situation at the mine excavators will be discussed, i.e. when the number of trucks exceeds the optimum number of trucks a mine should have for the most productive/profitable mining operation. When the system has an excess number of trucks, equipment utilization is reduced which impacts mine operating and capital costs and also the environment, through unnecessary truck purchase, energy use, air and noise pollution etc. A case study of a surface coal mine in Spain has been used for the simulation model.

9:25 AM

3D Modeling and Simulation of Operations in a Surface Mine System using Simio Simulation Software

J. Munoz Mata; Simu Network, Seville, Spain

Effective mine design and planning is the key for the success of any mining project and its operations. It is always vital to manage and control the risks of increasing operating costs during the different stages of mining operations. Rapid changes in metal markets, economical swings affecting manufacturers, global consumption, and the development of new technologies that can change the economical perception of value for specific materials will lead the need of improvements and processes optimization in mines. Modeling using simulation is well recognized as an important methodology for analyzing complex and expensive systems. Considering mining (operation & capital) costs, mine system simulation method is a great example of discrete-event system simulation applications. This paper discusses the use of Simio in a mining project as a case study. Simio is the most advanced of the latest generation of 3D, Object Oriented Modeling and Simulation software. This model helps engineers and executives to achieve the most effective possible mine design and planning, optimal assets allocation, as well as financial risk control in case of unexpected or critical events in the mine.

9:45 AM

Discrete Simulations Quantifying the Effects of Material Handling Conveyors in Series or Parallel Oreflow Streams

K. Shelswell; Labrecque Technologies Inc., Sudbury, ON, Canada

Comparison of oreflow efficiency on material handling conveyor systems.

10:05 AM

Shuttle Car Network Model for Roadway Development

E. Baafi[1], I. Porter[2] and D. Cai[3]; [1]University of Wollongong, Wollongong, NSW, Australia; [2]University of Wollongong, Wollongong, NSW, Australia and [3]University of Wollongong, Wollongong, NSW, Australia

In longwall mining at least two parallel roadways known as gateroads are mined to delineate the sides of the longwall block, with a longwall installation face then driven connecting them to enable the longwall mining equipment to be installed.

www.smenet.org

PRELIMINARY PROGRAM

NEWMONT®

Official 2014 Meeting Sponsor

SME
Society for Mining, Metallurgy & Exploration

SUPPLEMENT TO
Mining engineering