

## New Updates for NIOSH Coal Mine Ground Control Software

The NIOSH suite of coal mine ground control software addresses nearly every aspect of coal mine ground control planning, including geologic characterization, mine layout, pillar design, and support selection. Mine planners who use the software have access to the knowledge gained during years of NIOSH research—packaged in a simple, easy-to-use format. Several of these software packages have recently been updated and improved.

**Analysis of Roof Bolt Systems (ARBS)** (Figure 1) helps select the proper roof bolt system design from the immense variety of available bolt types and patterns. It was developed from statistical analysis of extensive bolt performance and roof fall data. New features in Version 2 include—

- The capability to analyze roof bolt systems that use two types of bolts; and
- A roof support cost module that estimates the total installed cost of different patterns, considering the costs of consumables, labor, maintenance, and other factors.

The **Support Technology Optimization Program (STOP)** (Figure 2) can be used to make judgments regarding which secondary support system will be the most effective in a particular mine condition and to evaluate the advantages or disadvantages of alternative support systems. Version 3.0 includes additional improvements:

- Supports with large load-shedding following yielding can be designed based on the peak loading capability as well as the residual loading capability;
- Seven new support systems have been added to the program; and
- Easier access to photo gallery has been provided.

The **Coal Mine Roof Rating (CMRR)** replaces complicated geologic information with a simple numerical rating that mine planners can use in many ground control applications. The CMRR can be readily integrated into a geologic exploration program, and the software package is capable of generating an AutoCAD CMRR "layer." Version 1.2 contains—

- The complete CMRR database with more than 250 ratings obtained from 70 different U.S. coal seams; and
- An all-new "Help" file that clearly explains all aspects of the program.

**Analysis of Horizontal Stress in Mining (AHSM)** can help find the optimum mine layouts for control of horizontal stress. It can be used to analyze both development and longwall retreat designs, and it shows how the stress condition varies as the entry, crosscut, and panel orientations are changed. Version 2 features—

- Improved graphics that enable the user to observe the effect of design changes without adjusting the display on the computer screen; and
- Resource files containing information on stress mapping, advance-and-relieve mining, stress measurements in U.S. coal mines, and other topics.



Figure 1.—The Analysis of Roof Bolt Systems (ARBS) helps select the proper roof bolt type and pattern.



Figure 2.—The Support Technology Optimization Program (STOP) can be used to compare alternative secondary support systems.

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To obtain free copies of ARBS, STOP, CMRR, and AHSM, along with other NIOSH ground control software, visit the NIOSH Ground Control topic page at: [www.cdc.gov/niosh/mining/topics/groundcontrol/groundcontrol.htm](http://www.cdc.gov/niosh/mining/topics/groundcontrol/groundcontrol.htm). You may also contact Kim Mitchell at 412-386-6552, e-mail: [KAMitchell@cdc.gov](mailto:KAMitchell@cdc.gov). Or you may complete the order form below, detach, and mail to: Kim Mitchell, NIOSH Pittsburgh Research Laboratory, Cochrans Mill Rd., P.O. Box 18070, Pittsburgh, PA 15236-0070, or fax to 412-386-6891.

To receive other information about occupational safety and health topics, call 1-800-35-NIOSH (1-800-356-4674), or visit the NIOSH Website at [www.cdc.gov/niosh](http://www.cdc.gov/niosh)

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Please send me free copies of ARBS, STOP, CMRR, and AHSM, along with other NIOSH ground control software.

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