What is human factors research?

• *A roof bolter reaches for a lever while guiding the drill with his other hand. Since he's watching the drill and many of the controls look and feel alike, he hits the wrong control and crushes his hand.*

• *Six hours into the night shift, an ore truck driver dozes off. The truck plows over the berm and down into the pit.*

• *Fleeing a fire, a face crew sees smoke in the intake entry. Assuming the fire is ahead, they cross over to another entry, but soon encounter even worse smoke.*

These very different accidents have at least one factor in common: the *human* factor. The actions, decisions, thoughts, or perceptions of one or more humans contributed to the accident. These are just a few examples of safety problems researched by the Human Factors Group of the Pittsburgh Research Center, U.S. Department of Energy.

Human Factors is a young science that emerged during the late 1950s and early 1960s. Its practitioners study human abilities and characteristics, and work to apply that information to the safe design and operation of equipment, systems, and jobs. By taking the strengths and limitations of human beings into consideration, Human Factors designers can make jobs safer, more productive, and more rewarding.

Human Factors research in mining started over 20 years ago. The Federal Coal Mine Health and Safety Act of 1969 spawned new studies of industrial safety problems in mining. These studies showed that 50% to 85% of all mining injuries are due, in large part, to human error. The evidence suggested that poorly designed equipment, work environments, and ineffective training are often the cause of these performance errors.

This led to the formation of a specialized Human Factors research program. Today, our group employs more than 20 experts in industrial engineering, social sciences, computers, biomechanics, education, training, and other related disciplines. These researchers work in teams to address safety problems and provide usable solutions to the mining community.

Some examples of useful products or information that we've developed include:

• How to lift without hurting your back. Or better yet, how to get the job done *without* dangerous lifting.

• An improved method for donning a self-rescuer in a mine fire (the "3+3 method").

• Software that lets you design a permissible illumination system for a mining machine while maximizing visibility.

• Training exercises that use three-dimensional slides to teach miners how to recognize hazardous roof.

• How to implement new technologies, such as automation: what works and what doesn't.

If you have suggestions for new research areas or want more information on what we've already done, please feel free to contact us.

Robert F. Randolph, Research Psychologist, (412) 892-4360