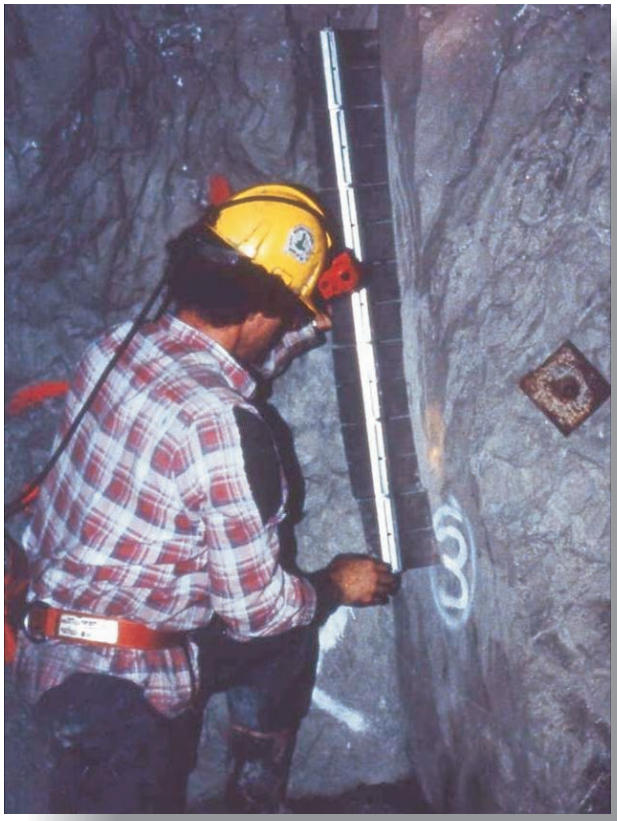
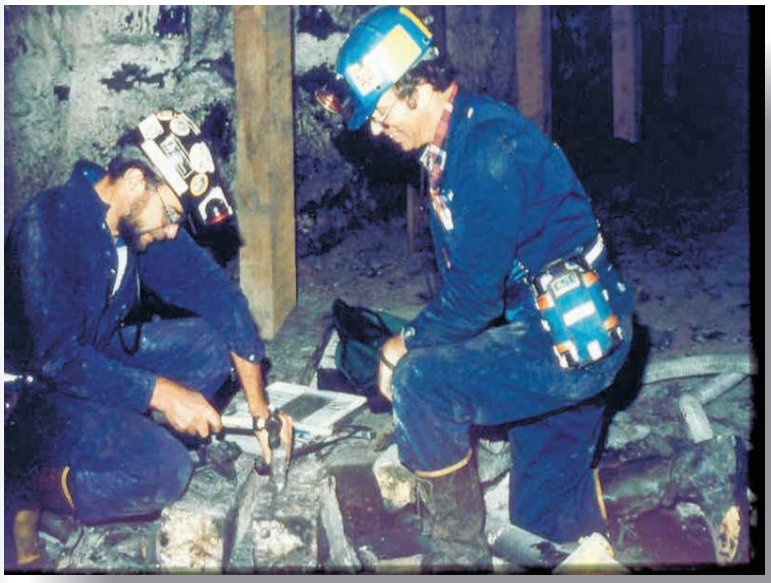
IC 9498
INFORMATION CIRCULAR/2007

Proceedings of the International Workshop on Rock Mass Classification in Underground Mining





Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

Information Circular 9498

Proceedings of the International Workshop on Rock Mass Classification in Underground Mining

Edited by Christopher Mark, Ph.D., P.E., Rimas Pakalnis, P.Eng., and Robert J. Tuchman

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health
Pittsburgh Research Laboratory
Pittsburgh, PA

May 2007

DISCLAIMER

Mention of any company or product does not constitute endorsement by the National Institute for Occupational Safety and Health (NIOSH). In addition, citations to Web sites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these Web sites.

The views expressed by non-NIOSH authors in these proceedings are not necessarily those of NIOSH.

ORDERING INFORMATION

To receive documents or other information about occupational safety and health topics, contact NIOSH at

NIOSH—Publications Dissemination
4676 Columbia Parkway
Cincinnati, OH 45226–1998

Telephone: **1–800–35–NIOSH** (1–800–356–4674)
Fax: 513–533–8573
e-mail: pubstaft@cdc.gov

or visit the NIOSH Web site at **www.cdc.gov/niosh**

DHHS (NIOSH) Publication No. 2007–128

May 2007

SAFER • HEALTHIER • PEOPLE™

CONTENTS

Page

UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

cm	centimeter	m^3	cubic meter
ft	foot	m/day	meter per day
g/cm^3	gram per cubic centimeter	m/s	meter per second
g/t	gram per ton	min	minute
GPa	gigapascal	mm	millimeter
hr	hour	MN/m	meganewton per meter
in	inch	MPa	megapascal
kg	kilogram	mt	metric ton
kJ/m^3	kilojoule per cubic meter	mt/m	metric ton per meter
km	kilometer	Mt	million tons
km^2	square kilometer	N/m	newton per meter
km/s	kilometer per second	N/m/m	newton per meter per meter
kN	kilonewton	N/mm^2	newton per square millimeter
kN/m	kilonewton per meter	psi	pound-force per square inch
kN/m^2	kilonewton per meter squared	rps	revolution per second
ksi	1,000 psi	t/m	ton per meter
L/min	liter per minute	t/m^2	ton per square meter
L/sec	liter per second	tnf	ton of force
lb	pound	tnf/m^2	ton of force per meter squared
m	meter	μsec/m	microsecond per meter
m^2	square meter		

PROCEEDINGS OF THE INTERNATIONAL WORKSHOP ON ROCK MASS CLASSIFICATION IN UNDERGROUND MINING

Edited by Christopher Mark, Ph.D., P.E.,[1] Rimas Pakalnis, P.Eng.,[2] and Robert J. Tuchman[3]

ABSTRACT

Rock mass classification is widely used throughout the underground mining industry—in both coal and hard-rock mines. It is used in all stages of the mining process, from site characterization to production operations. The goal of the International Workshop on Rock Mass Classification in Underground Mining was to provide a forum for leading practitioners of rock mass classification to come together and share their methods and experiences with the technique. The workshop was held in Vancouver, British Columbia, Canada, on May 31, 2007. It was co-chaired by Christopher Mark, Ph.D., P.E., National Institute for Occupational Safety and Health, Pittsburgh, PA, and Rimas Pakalnis, P.Eng., University of British Columbia, Vancouver, Canada.

The proceedings of the workshop contain 16 invited papers from 9 countries, reflecting the international depth and breadth of current practice. Applications in both hard-rock and coal mining are well represented. Some of the topics that were addressed at the workshop include:

- Major rock mass classification systems used in mining and their variants
- Collection of input data through observation, rock testing, and geophysics
- Design of mine layouts and rock support systems using classification
- Estimation of rock mass strength and other input parameters for numerical models from classification
- Applications in weak rock, raise boring, cavability assessment, and other special topics
- Risk assessment using rock mass classification

[1]Principal research mining engineer, Pittsburgh Research Laboratory, National Institute for Occupational Safety and Health, Pittsburgh, PA.

[2]Associate professor of mining engineering, University of British Columbia, Vancouver, British Columbia, Canada.

[3]Technical writer-editor, Writer-Editor Services Branch, Division of Creative Services, National Center for Health Marketing, Coordinating Center for Health Information and Service, Centers for Disease Control and Prevention, Pittsburgh, PA.