
MINE RESCUE

MASHA Products

Information for any of the following MASHA products may be obtained by contacting Jean Chadbourn at jeanchadbourn@masha.on.ca, or (705)474-7233 ext. 279.

Emergency Preparedness Guidelines

Non-Members: \$111.00
Members: \$37.00

“This manual is intended to be a reference guide to help Ontario mining companies prepare for emergency situations. The manual covers all aspects of emergency preparedness: the components of an emergency plan; training drills; and media communication.”

Mine Rescue Handbook

Non-Members: \$90.00
Members: \$30.00

“The purpose of the Handbook of Training in Mine Rescue and Recovery Operations is to provide a guide for the training of the members of mine rescue teams in the care and use of apparatus for protection in irrespirable atmospheres, in the detection of noxious gases, all specialized emergency response equipment, and in a general knowledge of accepted procedures for rescue and recovery operations during or after a mine fire. It is meant to serve as a reference guide for the members of mine rescue teams and to assist mine operators during mine rescues or other emergencies.”

Mine Rescue Refuge Stations Guidelines

Non-Members: \$111.00
Members: \$37.00

“This manual provides an overview of this vital subject, including: legislated requirements; suggestions regarding construction; equipment and supplies; emergency procedures; and inspections. The information will be useful to anyone contemplating changes to their facilities.”

Under Oxygen: 75 Years of Mine Rescue History in Ontario

Non-Members: \$35.00
Members: \$35.00

“The year 2004 mark[ed] the 75th anniversary of the Mine Rescue program in Ontario. MASHA ... prepared a history book to capture some of the events and individuals that have shaped mine rescue over the years. This 184-page, hard cover book is packed with pictures and first-hand stories.”

Online Resources

- Health and Safety Executive (UK)
 - Use of Self-Rescuers in Hot and Humid Mines (Research Report 180)
<http://www.hse.gov.uk/research/rrhtm/rr180.htm>

“The concept of self-rescue is premised on the assumption that underground mineworkers will have the physical and mental capacities required for self-rescue and in-seam rescue. There is a recognised research 'gap' concerning the practical limitations, and ultimately personal endurance limits, associated with the extended wearing of mining industry respiratory protective devices under high physiological stress conditions. This has implications for those who have responsibility for the design of emergency response strategies predicated on seeking to directly evacuate hot and humid mines.”
 - Mines Rescue Arrangements: Future Options (Contract Research Report 448/2002)
http://www.hse.gov.uk/research/crr_hm/2002/crr02448.htm

“For many years there have been requirements in UK Health and Safety law for the owners of mines to provide rescue arrangements to deal with fires, explosions and other emergency incidents which may occur within their mines. The current requirements are identified in the Coal Industry Act 1994 and in the Escape and Rescue from Mines Regulations 1995. One of the key requirements for coal mines is a capability to respond rapidly to emergency call outs to attend at incidents and to sustain recovery operations, particularly those requiring breathing apparatus, over extended periods with people trained to work safely in the special hazards of the mine environment.”
- Mines Rescue Services of South Africa
 - Main Page
<http://www.minesrescue.co.za/>

“The South African Mines Rescue Service who through the training of volunteer brigadesmen, provides resources and expertise for an emergency service primarily to the mining industry.”
- MineSafe (Australia)

“MINEsafe draws on the extensive OH&S knowledge, expertise and data of the ILO, CFMEU, ICEM, Queensland Department of Natural Resources and Mines, New South Wales Department of Mineral Resources, Coal Services Pty Ltd, and the National Occupational Health and Safety Commission as a part of its comprehensive approach to OH&S information distribution.”

 - Emergency Preparedness Guidelines
http://minesafe.com/papers/papers/EMERG_PREPARE.pdf

“These guidelines are meant to provide guidance to Incident Management Teams (IMT) and Mines Rescue Service (MRS) officers in regards to their responsibilities and conduct in an underground coal mining emergency....These guidelines have been developed through detailed risk assessments and consultation with industry and mines

rescue experts both within Australian and Overseas. Ongoing annual reviews will be conducted taking into account underground mine emergencies simulated emergencies and general application of the guidelines to ensure that they remain both functional and practical.”

- Emergency Response Planning
<http://www.minesafe.org/library/health/10884928959737.html>

“An emergency can be described as an abnormal, dangerous or life-threatening situation requiring urgent action to protect people, property and the work area. Workers must be trained in what to do in an emergency and they must be given the right tools to do the job.”

- MSHA (Mine Safety and Health Administration)

- Mine Rescue Home Page
<http://www.msha.gov/MineRescue/rescue.HTM>

Offers a directory of nationwide (U.S.) mine rescue teams; additionally, it provides links to mine rescue contests, associations, history, and the Mine Rescue Hall of Fame.

- National Mine Rescue Association

- Main Page: <http://www.miningorganizations.org/nmra.htm>

The NMRA is “dedicated to the advancement of the science and engineering practices related to the prevention and control of mine fires and explosion.”

- NIOSH

- Emergency Response and Rescue in Mining
<http://www.cdc.gov/niosh/mining/topics/emergresp/default.htm>

“The goal of the NIOSH Emergency Response and Rescue Program is to enhance the safety and effectiveness of mine rescue teams and evacuating miners by implementing realistic training simulations and improving the technology used for rescue, exploration, recovery, firefighting, and evacuation operations in mines.”

- Emergency Response and Rescue Tips and Information
<http://www.cdc.gov/niosh/mining/topics/emergresp/alltips.htm>

- Historical Mine Disasters
<http://www.cdc.gov/niosh/mining/topics/data/disasters.html>

- Mine Rescue and Response
<http://www.cdc.gov/niosh/mining/pubs/pdfs/mrar.pdf>

“This paper describes technology and training that has been identified for underground emergency responders.”

- Mine Rescue Training Simulations and Technology
<http://www.cdc.gov/niosh/mining/pubs/pdfs/mrts.pdf>

“Mine operators often rely on mine rescue teams to save lives during an underground emergency such as an underground fire, explosion or roof

fall. It is extremely important that team members are provided with adequate exploration equipment and that training simulations are conducted in a realistic manner. A series of mine rescue training exercises was developed, conducted and evaluated by the National Institute for Occupational Safety and Health (NIOSH) in cooperation with the Pennsylvania Department of Environmental Protection, Bureau of Deep Mine Safety. The exercises were conducted at NIOSH's Lake Lynn Laboratory during 1995 to 1998 and resulted in improved technology and training for mine rescue teams."

- MERITS: Mine Emergency Response Interactive Training
<http://www.cdc.gov/niosh/mining/topics/educationandtraining/merits.html>

"The Mine Emergency Response Interactive Training Simulation (MERITS) provides trainees an opportunity to gain command center experience during a simulated underground coal mine emergency. This computer-based training allows trainees to practice information gathering, situation assessment, decision-making, and coordination skills without risk to personnel or property."

- Saskatchewan Mine Emergency Response Program
 - Mine Rescue Manual
<http://www.labour.gov.sk.ca/safety/mine-rescue-manual/index.htm>
- SIMRAC (Safety in Mines Research Advisory Committee—South Africa)
 - Analysis of Emergency Care Provided for Injured Miners in SA Mines (Report HEALTH 801)
<http://www.simrac.co.za/report/Reports/Health/health801/health801.html>

"A literature review of emergency medical and trauma care services identifies time as the most critical factor affecting the outcome of severely injured patients. In the mining industry, delays in access to definitive care are often unavoidable due to the remoteness of many mining operations and working places. In geographically isolated areas, the quality of pre-hospital care and the management of the emergency care system are equally important. The primary aim of this project was to assess and make recommendations on the provision of a comprehensive emergency medical service in the South African mining industry to ensure that all the required systems are in place to deliver a skilled emergency response to all incidents. In turn, this will increase the number of survivors and miners who return to work."

- Develop a Trapped Miner Location System and Rescue Technology (Report GEN 502)
<http://www.simrac.co.za/report/Reports/thrust9/gen502/gen502.htm>

"There is no commercially available system for trapped miner location which fully complies with South African mining industry requirements and the S.A. mining industry has not adopted any of these because of specific local mine conditions, requirements, and lack of design adaptation for these conditions.... In order to reduce the cost of safety measures for the mining industry a new integrated multi-functional approach to the development of the trapped miner location system is adopted which resulted in the development of the Integrated Miner

Safety Device which also provides for the identification of clock-in-out purposes, access control and wireless alarm.”

- Manual of Best Practice for Emergency Response Procedures (Report COL605)

<http://www.simrac.co.za/report/Reports/thrust9/col605/col605.htm>

“The primary objective of this project was to provide coal mines with a comprehensive documented strategy to deal with emergencies arising from intrushes, fires and explosions.”

- Practices and Procedures to Overcome the Problems Associated with Disorientation and Low Visibility in the Aftermath of Mine Explosions or Fires (Report GEN 101)

<http://www.simrac.co.za/report/Reports/thrust4/gen101/gen101.htm>

“The purpose of the SIMGEN 101 project was to find workable solutions to the problems associated with escapes under conditions of poor visibility, with specific reference to South African coal, gold and platinum mines.”

- United States Mine Rescue Association

- Main Page

<http://www.usmra.com/>

The USMRA allows its members to share information about mine rescue and emergency response.

- Western Australia, Department of Industry and Resources

- Refuge Chambers in Underground Metalliferous Mines

http://www.doir.wa.gov.au/documents/safetyhealthandenvironment/SHD_MS_Guide_RefugeChamber.pdf

“The purpose of this guideline is to provide guidance on the safe use of appropriate refuge chamber facilities as a part of the response to hazards posed by irrespirable atmospheres underground.”

- Fitness for Mine Rescue Personnel

http://www.doir.wa.gov.au/documents/safetyhealthandenvironment/shed_safety_guide_fitnessrescue.pdf

“This Department of Industry and Resources guideline offers a practical approach for mine managers and supervisors to assist in ensuring that mine rescue personnel are appropriately medically and physically fit, so reducing the risk of injury, or sudden incapacity during a mine rescue event or training.”

Journals

Aziz, N.I., and Y. Sun. 2000.. “Self-contained self-rescuers: new strategies for mine escape in Australia.” *International Mining and Minerals* 3 (25): 19-25.

The duration of the oxygen supply provided by self-contained self-rescuers was tested by volunteers in laboratory treadmill trials.

Brake, D.J., and G.P. Bates. 1999. "Criteria for the design of emergency refuge stations for an underground metal mine." *Proceedings of the Australasian Institute of Mining and Metallurgy* 304 (2): 1-8.

Kampmann, B., and G. Bresser. 1997. "Stress and strain of mine rescue teams during a standard training procedure." *Applied Occupational and Environmental Hygiene* 12 (12): 952-956.

Describes the findings and recommendations that were obtained from measuring the heart rate, body core temperature and sweat loss of the rescue teams in the Ruhrkohle mining district.

Kampmann, B., and G. Bresser. 1999. "Heat stress and flame protective clothing in mine rescue brigadesmen: inter- and intraindividual variation of strain." *Annals of Occupational Hygiene* 43 (5): 357-365

"A climatic exposure was conducted for the 52 rescue brigadesmen of a mine while they wore flame protective clothing. We looked for individual parameters allowing prediction of tolerated exposure times in the climate tested. Of all individual parameters, only body temperature at the end of the Stoklossa heat tolerance test and physical fitness showed significant influence on the tolerated exposure time, although not very strongly. Age, body mass, and Body Mass Index showed no significant influence on the tolerated exposure time."

Kierk, C. de. 2003. "Mine rescue services South Africa. An overview." *Journal of the Mine Ventilation Society of South Africa* 56 (3): 113-118.

"Discusses the structure, training and equipment of Mines Rescue Services (MRS), the private sector organisation responsible for rescue and recovery services for the South African mining industry. Also presents fire statistics."

Thorne, R. 1996. "Reducing rock falls during mine rescue." *Mining Engineering* 48 (12): 15-18.

Discusses the technique of rope rescue, particularly as it applies to open-pit mines rescue operations.

Other

British Columbia, Ministry of Employment and Investment, Health and Safety Branch. 1996. *British Columbia Mine Rescue Manual*. Victoria: Ministry of Employment and Investment.

A guide to mine rescue in British Columbia.

New South Wales, Mines Rescue Board. 1999. *Emergency Preparedness and Mines Rescue*. Sydney: New South Wales Mines Rescue Board.

"This book encompasses the theories and the facts and figures pertaining to emergency preparedness, mines rescue emergencies and related topics."

Great Britain, Health and Safety Commission. 2001. *Guidance and Information on Escape From Mines*. Sudbury, UK: HSE Books.

This publication is aimed primarily at mine managers and mine owners; it contains guidance on escape from mines in an emergency, and explains how to develop emergency plans.

Stevenson, Trevor. 1986. *Improving Ground Stability and Mine Rescue: The Report of the Provincial Inquiry into Ground Control and Emergency Preparedness in Ontario Mines*. Toronto: Provincial Inquiry into Ground Control and Emergency Preparedness in Ontario Mines.

“At 10:12 a.m. on Wednesday, June 20, 1984, a shock wave generated by a rockburst shook the Falconbridge Mine near Sudbury, Ontario, causing a backfilled stope to collapse. Four men were buried in the rubble of timber and cemented mill tailings. Rescue efforts were hampered by a series of subsequent tremors; in fact the microseismic monitor installed at the mine recorded 10 significant events in the following 24 hours ... The accident [also] provided a focus for many of the issues troubling mine workers in Ontario ... Together with the insistence of the United Steelworkers of America and the Sudbury Mine, Mill and Smelter Workers union, this led to the establishment of the Ground Control and Emergency Preparedness Committee.”