The 29th International Conference on Ground Control in Mining

Analysis of Ground Control Codes in the International Codes of the International Labour Organisation

Kazem Oraee, PhD
Professor, Stirling University, Stirling, UK, E-mail: sko1@stir.ac.uk

Nikzad Oraee, LL.B.
Postgraduate Student, Imperial College Business School, London, UK, Email: Nikzad.Oraee-Mirzamani09@imperial.ac.uk

Arash Goodarzi, MSc
Research Fellow, Ministry of Labour and Social Affairs, Tehran, Iran, E-mail: arash_good@yahoo.com

ABSTRACT

Unexpected movement of ground can potentially endanger lives, damage equipment or destroy property. Occupational accidents frequently occur with fatal consequences in developing countries with significant economic dependence on industries such as mining. There is therefore increasing need for miners' protection against such hazards. Slope stability and roof support accidents are two of the major causes of fatalities at surface and underground mining operations respectively. According to National Codes employers are obligated to protect workers against accidents; however these rules fall foul of the standards in developed countries. National safety regulations should clearly specify support systems. The International Labour Organization (ILO) prepared two Codes of practice, aiming to guide those responsible for improving standards of safety and to provide guidelines for the drafting of safety regulations for the coal mine industry and quarry open cast mines. The practical recommendations of these Codes in the ground control section have been analysed and the advantages and disadvantages of ILO Codes concerning ground control summarized

Key Words: ILO, Codes, Ground Control, Safety

INTRODUCTION

Two million people die every year from work-related accidents and diseases. An estimated 160 million people suffer from work-related diseases, and there are an estimated 270 million fatal and non-fatal work-related accidents per year. In economic terms, the ILO has estimated that 4% of the world's annual GDP is lost as a consequence of occupational diseases and accidents (1).

Mining has always been dangerous due to many potential risks such as those associated with using machinery in enclosed spaces, rock falls, blasting operations and explosion of flammable gases, which endanger miners' safety and health. It is however suggested that implementing new laws along with strict adherence therewith would reduce such risks in the workplace.

The severity and frequency of accidents are trending downward in developed countries where focus is on large private companies who invest heavily in mechanization and developing economies of scale, but in many parts of the world, particularly in developing countries, minerals are extracted by people working with simple tools and equipment; they work on a smaller scale, are more flexible, and can exploit irregular ore bodies and steep, dipping seams.

THE SMALL-SCALE MINES

The exploitation of the small-scale mines is typically conducted in remote and poor societies where relying on farming and other such occupations do not provide for an adequate living. Nearly 13 million people worldwide work in small-scale mining and an estimated 100 million depend on them for their livelihood. Women provide up to 50% of the small scale mining workforce. According to the ILO, in recent years small-scale mining accounted for 15-20% of the world's non-fuel mineral production. Small-scale mining operations often operate illegally and without any supervision of government authorities (2).

Miners often operate in hazardous working conditions in small-scale mines where many accidents occur. According to the ILO, rock falls, lack of ventilation, misuse of explosives, lack of knowledge and training, and obsolete and poorly maintained equipment are the five main causes of accidents.

China's small-scale coal mines, which employ roughly 2.5 million people, are among the world's most dangerous. Official statistics suggest that around 6000 people die each year, though there are probably thousands more unreported deaths in illegal and tacit operations. In Hunan Province in central China, for example, the government has closed some mines as many 20 times.

THE LEGISLATION OF GOOD LAWS

Labour-intensive and extremely hazardous occupations are almost always governed by standardised work conditions. Proper legal and social support with committed cooperation by governments, employers and workers organizations can turn unsafe work conditions into safe work. Safety and health in America's mining industry has improved since 1978 when the Mine Safety and Health Administration (MSHA) began operating and implementing the provisions of the new Mine Safety and Health Act of 1977. The law's requirements have already been imposed on mine operators by inspectors since the law was enacted. The number of USA mining fatalities dropped sharply under the new Act from 242 in 1977 to 53 in 2008 as a result of legislation of appropriate technical laws. The Agency is responsible for the

reduction of accidents in the mining industry by inspection and other ways. The Act amended and consolidated all previous legislation embodying federal safety and health regulations for the mining industry. It strengthened and expanded the rights of miners and enhanced the protection of miners from retaliation for exercising such rights. Generally, occupational safety and health in the United States' mining industry continues to improve.

THE CONVENTION, RECOMMENDATION AND CODES OF PRACTICE OF THE ILO

The International Labour Organization (ILO) is a specialised agency of the United Nations responsible for dealing with labour-related issues. It was founded in order to advance opportunities for workers to obtain decent employment and promotion rights at work.

International labour standards refer to Conventions and Recommendations adopted by the ILO. Conventions are international treaties that are legally binding on member states that have ratified them. Recommendations are advisory only. In many cases, a Convention lays down the basic principles to be implemented by ratifying countries, while a related Recommendation supplements the Convention by providing more detailed guidelines on how it could be applied.

There are 188 Conventions and 199 Recommendations as yet (2010). They cover a wide range of labour issues, from basic human rights to specific safety and health standards for various industries. International labour standards are adopted by the annual International Labour Conference. The Conference is made up of member States, of which there are 175. The ILO has been actively involved in labour and social aspects of mining for over 70 years. The ILO's Safety and Health in Mines Convention (No. 176) and its accompanying Recommendation (No. 183) were reached in June 1995 and twenty-four countries have ratified the Convention hitherto (Table 1).

Table 1. The countries that ratified Convention No.176

	Country	Ratification date
1	Botswana	1997
2	Finland	1997
3	Spain	1997
4	Sweden	1997
5	Germany	1998
6	Ireland	1998
7	Philippines	1998
8	Slovakia	1998
9	Armenia	1999
10	Austria	1999
11	Norway	1999
12	Zambia	1999
13	Czech Republic	2000
14	Lebanon	2000
15	South Africa	2000
16	Poland	2001
17	United States	2001
18	Portugal	2002
19	Albania	2003
20	Zimbabwe	2003
21	Brazil	2006
22	Luxembourg	2008
23	Peru	2008
24	Bosnia and Herzegovina	2010

The Convention has set the principle for national action concerning the improvement of working conditions in the mining industry. The Convention seeks to describe in general terms the frame of laws and regulations that governments should incorporate to ensure the safety and health of miners. It also describes the rights and responsibilities of employers and employees. The Convention is the only internationally agreed standard for safety and health in mines as workplaces. Major mining States such as the United States, South Africa, Sweden and Germany, in which laws and practices always exceed these basic standards, have ratified the Convention while many other countries implement earlier ILO standards on occupational safety and health and impose legislation which fail to deal with the specific needs of mining.

Application of the Convention has to be prescribed by national laws and regulations, and supplemented by Codes of practices where appropriate. The Codes of Practice are based on principles established in international instruments relevant to the protection of workers' safety and health. They are primarily designed as a basis for prevention (protective measures) and are considered as ILO technical standards in occupational safety and health. They contain general principles and specific guidance which concern, in particular, the surveillance of the working environment.
The ILO has adopted more than 40 standards specifically dealing with occupational safety and health, as well as over 40 Codes of Practice.

Historically, mining has been one of the occupations with the highest levels of risk involved. The ILO prepared two Codes of Practice aiming to guide those responsible for improving standards of safety and to provide guidelines for the drafting of safety regulations for the coal mine industry and quarry open cast mines.

GROUND CONTROL IN ILO SAFETY DOCUMENTS

In order to maintain the stability of the ground in accordance with Article 7(c) of the Convention (No. 176), "*employers shall take all necessary measures to eliminate or minimize the risks to safety and health in mines under their control, and in particular: take steps to maintain the stability of the ground in areas to which persons have access in the context of their work*".
Furthermore in accordance with Paragraph 13 of the Recommendation (No. 183), "*the employer should take all appropriate measures to:*
(a) Monitor and control the movement of strata;
(b) As may be necessary, provide effective support of the roof, sides and floor of the mine workings, except for those areas where the mining methods selected allow for the controlled collapse of the ground;
(c) Monitor and control the sides of surface mines to prevent material from falling or sliding into the pit and endangering workers; and
(d) Ensure that dams, lagoons, tailings and other such impoundments are adequately designed, constructed and controlled to prevent dangers from sliding material or collapse."

In accordance with Paragraph 16 of the Recommendation (No. 183), "*the particular hazards referred to in Article 7(g) of the Convention requiring an operating plan and procedures might include: …rock falls; susceptibility of areas to seismic movements; hazards related to work carried out near dangerous openings or under particularly difficult geological circumstances…*"

The Convention and Recommendations generalize about ground control in mines. They do not contain any technical recommendation for improving national law and regulation.
Therefore the ILO has merely proposed the Codes of Practice to improve safety standards.

A generalized procedure is replicated in the Codes of Practice for mining which are prepared by ILO for open cast mines and coal mines. The Codes of Practice shall be developed to encourage the use of existing laws such as the Convention (No. 176) and Recommendation (No. 183).

ILO states that the "*codes of practice are not intended to replace national laws or regulations or accepted standards…*" but where national standards do not exist or are not competent, the employers and employees should give consideration to international standards. Drawing up national legislation, regulations and safety standards on ground control requires plenty of expert knowledge, experience , and skills which exist with a lower standard in many developing countries.

The application of legal procedures is the best method to protect against the accidents and encourage the improvement of safety and health in mining. But the legislation of good laws calls for the several skills that these countries do not possess.

The International safety standards shall contain technical information based on the fundamental rules of mining engineering that should be directly usable in developing countries. The developing countries must actively seek to adopt efficient regulatory arrangements, which should lead to reductions in occupational accidents.

The Codes of Practice only contain the main requirement of the mining safety in national regulations relating to ground control and mine stability or other matters under the existing conditions.
These Codes are not intended to provide detailed instruction on how to develop a ground control plan but are intended to provide direction on matters that should be considered in planning ground control. In a ground control plan in developed countries, it is sufficient for an employer to commit to following these guidelines and national laws and regulations, whereas in developing countries where laws do not possess sufficient regulatory powers, such mere Codes are inadequate and do not oversee the effectiveness of the subject country's regulations. For those countries, each article in the Codes of Practice should be explained in detail by national safety regulators.

Technical cooperation by developed countries to develop the framework of international organizations such as the ILO could help promote good legislation in the developing countries and help their progress through the reduction of occupational accidents.

The technical assistance should include instructions about designing, installing, monitoring and withdrawing of supporting systems in mines (rock bolts, frames, arcs and etc.). Furthermore, developed countries should help promote exchanges of technical and practical experiences between all nations in order to increase awareness for reducing human and economic costs of accidents and diseases at work. Thus a set of detailed instructions on ground control and stability in mines, at an International level, is deemed crucial and constructive for developing countries.

A simple suggestion could be a ranking system whereby each country would be regulated according to the adequacy of their domestic safety regulations and the dominant technology utilised in mining. Thus countries would be placed in groups and a single comprehensive Convention for each group would ensure their gradual improvements and indeed their adherence to the legislations.

Developing mining safety regulations for each country individually on an international scale is not possible. The differences between the safety standards of a developed country and that of a developing country are numerous; thus the standards between the two countries could be incomparable, despite being both signatories to the same convention. Such arbitrary measures are deemed ineffective and are bound to fail. The safety standards for developing countries must be proportional to their mining technology and their outlook toward prioritising the safety of their mining operation. For example, while powered supports are only used in mechanised underground mining and are not common in developing countries, the chapter on roof and walls support in the Code of Practice on Safety and Health in Underground Coal Mines focuses for the most part on powered support safety regulations.
The Codes of Practice have no special regard for ground control and stability of mines. The whole chapter relating to roof and walls support only comprises 6 out of 199 pages in the Code of Practice on Safety and Health in Underground Coal mines.
International safety standards must also be up to date with global changes in technology. Although the Code of Practice on Safety and Health in Underground Coal Mines was updated after over 20 years in 2006, the Code of Practice in Safety and Health in Opencast Mines has not been updated since 1991, and there are no signs indicating an updated development to this Code of Practice.

CONCLUSIONS

The enforcement of safety regulations in mines is a key step on the road to sustainability. The process of enacting regulations and laws, the reporting system for occupational safety and work-related accidents in many developing countries are poor and in some cases are deteriorating. For example, India reports 222 fatal accidents while the Czech Republic, which has a working population of about 1 per cent of India, reports 231; estimates state the true number of such accidents in India is 40,000 (3). A proper understanding of occupational safety and health does not exist in many developing countries. The ILO must provide more technical assistance to member States to strengthen their response to safety at and throughout the workplace. Expectations are significantly higher from an international organization with an annual budget of more than 200 million U.S. dollars (4).

Stability of mines is one of the major geotechnical tasks in mine design and operation. Governments in developed countries and large firms have conducted numerous research projects on ground control, which, if made available to all developing countries would perhaps provide them with sufficient technical knowledge and create a sense of urgency. The ILO should prescribe overarching descriptions and principles of the main features of the new generation of mine safety legislation globally. During this process the ILO should ensure cooperation with technologically advanced countries in order to create set of standardised regulations while adhering to the current state of technology.

REFERENCES

1- INTERNATIONAL LABOUR ORGANIZATION, XVIIth World Congress on Occupational Safety and Health Decent work is safe work, International Labour Office, Geneva, Switzerland, 2009
2- INTERNATIONAL LABOUR ORGANIZATION, Facts on Small-scale Mining, International Labour Office, Geneva, Switzerland, 2003
3- INTERNATIONAL LABOUR ORGANIZATION, Decent work / safe work, International Labour Office, Geneva, Switzerland, 2005.
4- INTERNATIONAL LABOUR ORGANIZATION, Programme and Budget for 2008–09, International Labour Office, Geneva, Switzerland, 2008.
5- INTERNATIONAL LABOUR ORGANIZATION, Code of practice on safety and health in underground coal mines, International Labour Office, Geneva, Switzerland, 2006.
6- INTERNATIONAL LABOUR ORGANIZATION, Code of practice on Safety and health in opencast mines, International Labour Office, Geneva, Switzerland, 1991.
7- INTERNATIONAL LABOUR ORGANIZATION, Code of practice on Recording and notification of occupational accidents and diseases, International Labour Office, Geneva, Switzerland, 1996.