RISK ASSESSMENT AS A TOOL OF MINES' SAFETY IN INDIA

The coal mining industry in India which is spread mainly in eastern and central India engages about 5.6 lakh workers on a daily basis. There can be no doubt that the safety of these workers, who work under difficult ground conditions, is extremely important. Our main contention is that it is possible to introduce an approach of risk assessment as an important component of safety and risk management. In doing so it would also not be advisable to discontinue the existing prescriptive safety approach given in the statutes and the various mine regulations that have been evolved over a period of time. Risk assessment would, therefore, be an additional layer of mines' safety and the complete transition to this approach will have to be planned carefully.

The global literature seems to conclude that both risk management through risk assessment and rule compliance through prescription are mutually complementary and the main issue here is to get the balance right. This is part of a global approach to make rule compliance within an overall risk management framework. The entire syndrome has been best described as a rule management strategy which requires management of undertakings to recognize that the regime of rules is always a work in progress and an active risk assessment process, identifies and assesses the risk. In this manner, both rule compliance and risk assessment go hand- in- hand with no conflict in the two approaches.

A risk based safety culture has been described in the literature as a culture which has two distinguished components, namely, risk assessment and risk management. In essence, such a culture implies that the hazards associated with processes and their associated tasks are identified, the likelihood of the hazard being realised has been assessed and the potential harm which the hazard can cause to people and property and the environment in general has been evaluated. It also means that the risk mitigation measures have been put in place after a risk assessment of individual risks has been undertaken.

A.R Hale and P.Swuste , two leading Occupational Safety and Health (OSH) experts, have described risk assessment as rules which define goals and objectives to be achieved by employers, for example, duty of care requirements and the ways to arrive at decisions about a particular course of action. Risk controls to be adopted by the system, according to them, are nothing but rules defining concrete actions to be taken as required by the system.

It has also been contended in the literature that prescriptive standards and regulations provide instructions on how to resolve specific engineering problems on the basis of past experience or by applying safety norms and factors. Performance based approaches have been encouraged over the last few decades as they promote and encourage innovative solutions to risk management which is at the core of the European Commission's framework for creating the EU's single market known as the New Approach .

In some countries, for example, the United Kingdom, a person or an organisation that creates risk is also given the obligation to manage and control the risk so to make it reasonably practicable. The concept of As Soon As Reasonably Possible (ASARP) bestows upon the person or the organisation the duty to demonstrate that they have taken action to ensure that all risk is reduced to the extent that it is practicable to do so. For doing so, they must adduce documentary evidence for example, a risk assessment or a safety case to show that they manage the risks caused by their activities. A safety case is a commitment made to the regulator by the companies to demonstrate the process that has been gone through to identify the hazard, the methodology that has been used to assess risks and the justification that the company has chosen as a particular risk mitigation measure. The regulator under the safety case approach must reject or accept the case submitted by

the company. The safety case approach does not involve rejection of the prescriptive approach and requires that technical standards be specified and regulations could then enforce the standards.

Another approach to safety has been the cost-benefit analysis, which many experts feel is some kind of an impediment to the safety case legislation. The main problem here is that it is virtually impossible to quantify the benefits of preventing catastrophic events which are rare in nature. The cost-benefit approach , therefore , has not been very popular as compared to the safety case approach , where value-based arguments could be made such as the polluter pays principle .

The five elements that go into the safety- case method or for that matter the risk assessment method involve: (a)a risk or hazard management framework,(b)a requirement to make the case to the regulator,(c)a confident and independent regulator,(d)involvement of the workforce in the safety regime,(e) a general duty of care imposed on the regulator.

In the UK, the UK Health and Safety Act 1974, regulates workers' safety in all industries. It imposes a general duty on employers to provide safety and health at workplaces. This Act takes a risk based approach to health and safety. The background to the Act has been the Report under Lord Robens set up in 1970 which changed the approach that was laid down in the country for about 150 years ago. The Committee recommended the unification of laws for separate industries to be replaced by a single comprehensive legal framework of the major statutes on safety and health at workplace and the establishment of a national safety and health authority. Besides the 1974 Act, a Health and Safety Executive (HSE), was also created. His major requirement was to carry out a risk assessment of hazards in organisations engaging five or more employees and need to record the significant findings of the risk assessment. It also places responsibility on designers, manufacturers and suppliers to ensure that the articles which they produce are safe for use as it is reasonably practicable. At the same time, it also placed on every employee while at work to take reasonable care of their fellow workers who may be affected by their action. It also laid down the principle that an organisation that creates risk must also have the clear responsibility of assessing the risk and ensure that it is mitigated to a large extent through design management and procedural measures.

Australia has adopted a more risk management oriented approach away from the prescriptive approach. The entire process is carried forward through a tripartite social dialogue mechanism in a culture of cooperation and a parliamentary political system. The United States follows a more prescriptive approach, although the US Process Safety Management(PSM) standards also require that employees be consulted in the process hazard analysis.

In India, the National Safety Council of India (NSC), with its headquarters in Mumbai, has done Hazard Identification and Risk Assessment (HIRA)studies in certain industries. The HIRA has the basic objective to assess the existing risk in any operation in conjugation with safety precautions and suggest measures to improve / addition interlock machines guarding fire, electricity protection system and personal protection equipment to reduce risk. NSC conducts these studies in accordance to IS.18001 (Occupational Health Safety Management System-Requirement with guidance for use) taking into consideration the plant specific statutory requirements and standards. The NSC also does Quantitative Risk Assessment (QRA) to make a quantitative estimate of the risks involved from operations in chemical industries and processes. The evaluation is a four-step process with hazard identification, consequence analysis, frequency estimation and risk analysis.

In India, the new labour code on occupational safety, health and working conditions proposed by the Central government in India , is under the consideration of Parliament and shows that it is possible to incorporate features of risk assessment apart from the prescriptive provisions .

An important new feature of the code is the creation of an advisory body which is expected to bring about a change in the safety paradigm of the country and pave the way forward from a prescriptive to more advisory oriented approach which would set safety standards.

The creation of the National Occupational Safety and Health Advisory Board is expected to bring about this change. It would be the apex body to advise Central Government on the matters relating to: (a) standards,

rules and regulations to be declared or framed under this Code; (b) implementation of the provisions of this Code and the standards, rules and regulations relating thereto; (c) the issues of policy and programme relating to occupational safety and health referred to it, from time to time, by the Central Government; and (d) any other matter in respect of this Code referred to it, from time to time, by the Central Government.

What are the possibilities of introducing risk assessment in the Indian coal mining sector, which is a potentially hazardous sector calling for a dynamic safety regime with the active participation of all the three social partners? From the Australian mining experience, which depends to a large extent on the risk- based assessment of occupational safety, we have a concept called the Trigger Action Response Plan (TARP). TARP attempts to identify warning signs or risk factors (triggers) of growing and a corresponding set of measures that needs to be taken when the triggers are present. The concerns are labelled as green, yellow, orange and red depending on the intensity and seriousness of causing disasters. These triggers are specified for each section of the mines along with the action required by the mine management, workers and the government. In this manner, a complex risk management exercise could be converted into a set of implementable rules and regulations for all the social partners to understand and implement on the ground .

The Indian coal industry consisting of coal mines could be segregated according to the risks and categorized into the above mentioned coloured zones for risk assessment and prescriptive rules.

There have been voices in the coal industry in India which have argued for risk based system of safety and called for an effective risk assessment based safety management plan. There is the possibility of fewer accidents if a proper risk assessment based safety management plan is put in place and their periodic reviews have also been discussed. The industry has also argued for a principal hazard management plan which focuses on full identification and management of low frequency high consequence events, such as spontaneous combustion gas, strata control in mines, to mention a few aspects. The need for a hierarchy of controls was also felt which includes recognised standards, risk assessment, Troubled Asset Relief Program (TARP), workplace inspections, control effectiveness, check sheets and regular monitoring of safety measures.

The issue of risk based safety in underground mines in India has also been discussed in academic circles. About 172 hazard events have been identified and put into six broad categories of hazard groups which include geomechanical (ground movement), mechanical (rope haulage, belt conveyor), chemical (blasting), electrical , geochemical (dust, gas and other combustible material) and environmental. These hazards have been further classified into as human, machine/tool, work methods/procedures, work environment/managerial.

It is important that India adopts risk assessment as an additional safety measure for mine workers. During the year 2018, there were fatal accidents involving workers in coal, metal and oil mines. The number of fatal accidents in the US for all mines in 2018 was 27 .

The number of mines reporting about their activities to the Directorate General Mines Safety(DGMS), under the Central Ministry of Labour & Employment in 2015 were 590 (coal) 2398 (metal) and 112 (oil). The DGMS has facilitated Risk Assessment Study &Preparation of Safety Management in only 110 mines and the process would need to be speed up.

While the number of inspections by the Directorate General Of Mines Safety, (DGMS) over the years has come down from 6047 to 3263 for coal mines between 2015 and 2018, for metal mines from 5889 to 4258 and for oil mines from 786 to 606 during the same period as mentioned for coal, it becomes all the more necessary that the risk-based assessment approach to safety is given a serious thought as an additional safety layer with the involvement of all the stakeholders. ■

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