



भारत सरकार / Government of India  
श्रम एवं रोजगार मंत्रालय / Ministry of Labour & Employment  
खान सुरक्षा महानिदेशालय / Directorate General of Mines Safety



DGMS(Tech.) Circular No. 02 of 2020

Dhanbad, dated 09/01/2020

To

All Owners, Agents and Managers of Coal and Metalliferous Mines

**Subject: Guidelines for Systematic Monitoring of Slopes in Opencast Coal and Metalliferous Mines**

Sir,

In pursuance of Regulation 106(2) of the Coal Mines Regulations, 2017, before starting a mechanized opencast working, the owner and agent of the mine have to ensure that the mine, including its method of working, ultimate pit slope, dump slope and monitoring of slope stability, has been planned, designed and worked as determined by a scientific study and a copy of the report of such study has been kept available in the office of the mine. Insertion of a similar provision is in pipeline by making amendment in the Metalliferous Mines Regulations, 1961. Further as per No. DGMS (Technical) Circular/08, dated 23.09.2013, the mine management has to deploy a suitable slope monitoring system in mines customized to the local needs for ensuring timely withdrawal of men and machinery from any area in a mine likely to be affected by an impending slope failure.

However, still there is a lot of diversity amongst different mines in understanding and practices of slope monitoring. Therefore, it was felt necessary to evolve a broad standardization for systematic monitoring of slopes in opencast mines.

In view of the above, a workshop on the subject "scientific study and slope monitoring in opencast mines and way forward" was organized by DGMS on 06.12.2019 at DGMS Western Zone, Nagpur, to deliberate and review, among others, the present status of slope monitoring and finalize a protocol for systematic monitoring of slopes in opencast mines. The workshop was attended by about 79 officials and experts from regulator, various mining industry and research/academic institutions, like DGMS, CMPDI, CSIR-CIMFR, IIT Kharagpur, VNIT Nagpur, SECL, MCL, NCL, WCL, ECL, SCCL, NLC, NMDC, SAIL, MOIL, HCL, UCIL, NALCO, Ultratech Cement Ltd., Maihar Cement, etc., in which 12 technical presentations were made by different experts giving valuable inputs on the subject matter.

Based on various inputs drawn from the detailed deliberations and discussions made in the workshop, the following guidelines are being made for systematic monitoring of slope in opencast coal and metalliferous mines:

**1.0 Monitoring methodology:**

- 1.1 The owner, agent or manager of every opencast mine shall deploy a suitable slope monitoring system customized to the local needs in his mine for ensuring timely withdrawal of men and machinery from any area in the mine likely to be affected by an impending slope failure, as required under DGMS (Technical) Circular/08, dated 23.09.2013.

1.2 Selection of methodology of slope monitoring, including the nature & frequency of inspections, type of instrumentations, periodicity of capturing data & analysis thereof, etc., as will be suitable to forecast and address the potential level of impending danger in a mine shall be decided based on a scientific study.

1.3 The scientific study report shall, among others, also specify different trigger points of observed values, like Warning Level, Withdrawal Level, etc., based on which a trigger action response plan (TARP) shall be formulated & kept operative in the mine.

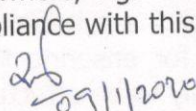
## **2.0 Recording and analysis of observational data:**

All observations taken for monitoring of slope in a mine shall be recorded and duly signed in a bound-paged register or in tamper-proof electronic form by the competent person responsible for taking the observations. The observational data shall be analyzed by the slope monitoring officer using the analysis technique recommended in the scientific report. Wherever warranted, help of any scientific agency expert in the subject may be taken for the purpose.

## **3.0 Organization for slope monitoring:**

- 3.1 a) The manager of every opencast mine shall have a structured team of trained competent persons for slope monitoring headed by a slope monitoring officer with clearly defined duties and responsibilities. In mine(s) where a strata control officer is already appointed, it may be adequate if the same person is authorized to work as slope monitoring officer.
- b) In respect of a group of mines in operation, the Owner/Agent shall create a dedicated "Geo-Technical Cell" with appropriate organization and infrastructure for the purpose of
- keeping a close liaison with the slope monitoring activities being undertaken in various mines,
  - reviewing the technique used, instrumentation deployed, frequency for slope monitoring, recording of measurements and analysis, etc.,
  - conduct of mock rehearsals and
  - training and up-skilling of the engaged organization on slope monitoring in mines
- 3.2 The manager shall also define duties and responsibilities of different managerial and supervisory personnel in the mine with regard to dissemination of information and action to be taken to make the TARP operative.
- 3.3 There shall be provided an effective means of communication system in the mine for prompt dissemination of the information amongst concerned officials for timely action.

All Owners, Agents and Managers of coal and metalliferous mines are advised to ensure compliance with this circular.

  
(R. Subramanian)  
Director General of Mines Safety