

<p><b>Project Title:</b></p> <p><b>ADVICE ON PREPARATION OF STRATA CONTROL AND MONITORING PLAN FOR ‘V’ SEAM (23/8 INCLINE) OF BHOWRA (N) UG MINE, E.J. AREA, BCCL</b></p> <p><b>Project No.:</b> <b>CNP/4919/2019-20</b></p>	<p><b>Executive Summary</b></p> <p>Bhowra (N) underground coal mine is in E.J. Area of BCCL and is located in the eastern part of the Jharia coalfield of Dhanbad district, Jharkhand. In Bhowra (N) mine, Seam-V, a prime coking coal, is being developed by bord and pillar method of working using conventional solid blasting technique. The dimension of the gallery is 4.8m wide and 3.0m high along with the coal pillar size of 35 m x 35 m (centre-to-centre). The average depth of cover of working district is 185 m. In spite of moderate depth of cover and high compressive strength of sandstone (111.48 MPa) roof strata, the phenomenon of coal pillars spall is widening the galleries. The wider roof span deteriorates with time and advancement of galleries and therefore required to support for longer durability. With this background, the preparation of strata control and monitoring plan (SCAMP) of 27L Development district as per Reg. 123 of CMR-2017 was assigned to CSIR-CIMFR. Accordingly, towards the SCAMP preparation, scientific study for rock characterisation by empirical approach namely “CMRI-RMR” was commenced. In this, geotechnical study and rock samples collection in underground were done. After laboratory test at CSIR-CIMFR, the parametric study by appropriate indexing and rating was done. The other relevant information for the selection of geo-technical instruments and planning of monitoring strategy of roof rock was also collected at the mine site. From the field and laboratory investigation following conclusions and recommendations are made.</p> <ul style="list-style-type: none"> <li>❖ Estimated CMRI-RMR value is 63, and after solid blasting adjustment final CMRI-RMR value is 56.7, which indicates that the immediate roof is in Class IIIB, fair roof category. The corresponding load values for galleries and junctions are 3.18t/m<sup>2</sup> and 4.05t/m<sup>2</sup> respectively.</li> <li>❖ The support system for 4.8m wide gallery is four TMT rock bolts, grouted with full columns resin capsules. The bolt spacing and the row spacing should be 1.2 m and 1.4 m respectively. All bolts should be installed vertical for optimum beam formation. The support resistances and the design safety factor in development galleries are 5.95t/m<sup>2</sup> and 1.87 respectively.</li> <li>❖ The four way junctions (4.8m X 4.8m) would be supported with twenty numbers of resin grouted full column TMT rock bolts. The bolt spacing and the row spacing should be 1.2m X 1.2m (grid pattern). The support resistances and the designed safety factor of the support system in the junctions are 8.68t/m<sup>2</sup> and 2.14 respectively.</li> </ul>
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|  | <ul style="list-style-type: none"><li>❖ In case of spalling in coal pillars and increase in roof span cross-sectional area in junctions, cogs/extra roof bolts should be installed. The resistance offered by cog/extra roof bolts is not considered in the advised support system.</li><li>❖ The rock bolt should be 1.65 m long and of 20 - 22 mm diameter TMT ribbed steel bar. Performance of resin grouted roof bolts in rock mass must be evaluated using SEPT (Short Encapsulation Pull Test) at specific intervals at varied horizon of the immediate roof. All rock bolts shall be threaded (not less than 15cm at the out-by-end) for fixing of the compatible bearing plate. The quality of the rock bolts &amp; its fixtures and the resin capsules are to be followed as per the DGMS prescribed standard specifications in “DGMS/S&amp;T/Tech. Cir. (Approval) No. 3, June 2010” and “DGMS/S&amp;T/Tech. Cir. (Approval) No. 10, 13th July 2009” respectively.</li><li>❖ Geotechnical instruments like telescopic convergence indicator, load-cell and dual height tell-tale should be installed for the respective observation of roof convergence/closure, rock load and strata dilation/separation height and based on their reading the evaluation of optimum roof support should be done.</li><li>❖ Apart from the strata monitoring station at the junctions, the locations where prominent geological weaknesses in galleries should be also monitored with increase frequency of observation. When high rate convergence (&gt;2 mm/day) complimented with increase rate of roof rock load reading (&gt;2 ton/day) is found, the support density should be increased immediately, so that dilation of strata can be minimised.</li><li>❖ If case of any notable change in geo-mining conditions, CMRI-RMR of roof rock mass and design of support system should be reassessed.</li></ul> |
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