

<p>Project Title: Advice on slope stability condition of X-Quarry at Sukinda Chromite Mine, Odisha, Tata Steel Project No.: CNP/4809/2019-20</p>	<p>Executive Summary:</p> <p>Successful completion of an opencast coal mine to its ultimate pit stage depends not only on its optimum design but also on periodic review of the design based on periodic monitoring of ground movement, if any, and incorporation of updated geo-technical data generated based on new geological features revealed with deepening of the mine. CSIR-CIMFR has been providing the technical services and advice on periodic design modification and monitoring quarterly of Sukinda Chromite mine, Tata Steel, for more than twenty years.</p> <p>Based on the expertise available and also on the track record of CIMFR, M/s TATA STEEL earlier entrusted a project to CSIR-CIMFR to assess and advice on slope stability condition OB X quarry of Sukinda Chromite mine during 2019-20. As the lease of the mine with M/s Tata Steel was expiring by March 31, 2020, mine management had to reach the planned ultimate stage of the pit by that date, hence on mine management's request CSIR-CIMFR carried out periodic monitoring of the mine using total station and dumpy level for change in horizontal distance and reduced level respectively. Visual inspection of conditions of toe, crest & slopes of highwall and dump condition was also to be carried out. The purpose was to detect any instability condition developing in any part of mine as a function of time. This would help the mine management in taking timely and appropriate remedial measures for safety of pit slopes, dumps and mining machineries.</p> <p>The quarterly monitoring observations by CSIR-CIMFR show moderate changes. Among the monitoring stations made available for monitoring, the maximum observed cumulative change was 1.3 cm (till October 2018) in OB-X quarry. The large-scale instability is unlikely with effective drainage.</p> <p>Mine management was advised to install additional monitoring stations to cover the entire footwall and hangwall, especially towards south side of the OB-X quarry and relocate the recently broken /inaccessible monitoring stations. It was pointed that a small portion of benches towards eastern transit zone of OB-X quarry are steeper due to merging of benches. Any steepening towards any side of the barrier would cause failure in the barrier. Benches should be properly formed in this barrier. It would be better if this barrier is completely mined out. Although, the monitoring results do not reveal significant displacement on the observed stations made available for the slope monitoring study but it does not mean that more movement will not occur in near future.</p> <p>Continuous association of CSIR-CIMFR with mine management of OB-X Quarry, Sukinda Chromite Mine, Tata Steel for more than 20 years in optimum design of its pit various stages and periodic monitoring helped the mine management to reach the ultimate stage of pit successfully.</p> <p>If M/s Tata Steel regains the lease after March 2020, it is recommended to continue the long-term association between CIMFR and TATA STEEL for regular evaluation of the geo - mining condition, which will help for safe and economical mining at OB-X Quarry, Sukinda Chromite Mine in future also.</p>
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