

Project Title: Advice on pit slope stability of Kerandari 'A' coal block

Project No.:
CNP/4905/2019-20

Executive Summary:

Kerandari Coal Mining Project of M/s NTPC Limited has been planned for extraction of coal using opencast method in its A-block upto ultimate pit depth of maximum 395m which may become one of the deepest opencast coal mine. It has been planned for 6MTPA using shovel dumper combination and has not yet been started. M/s NTPC Ltd. entrusted CSIR-CIMFR, Dhanbad, for optimum design of pit at A-block of Kerandari Coal Mining Project.

Kerandari Coal Mining Project of M/s NTPC Limited is located in the western part of North Karanpura Coalfield in Hazaribagh district of Jharkhand state. PakriBarwadih coal block comprises of Talchir, Karharbari, Barakar, Barren Measures and Raniganj formations. There are four persistent coal seams in Barakar formation of Kerandari 'A' Coal Block, viz Seam – I, II, III & IV in ascending order. The waste rock is primarily fine to coarse grained sandstone, shale and thin uneconomic coal seams.

Based on the geo-technical study and slope stability analysis various possible combinations of bench height, width, overall angle etc. were worked out to find out the optimum combination as follows:

Geo-mining conditions	Bench Parameters		
	Bench height (m)	Exposed width (m)	Angle (deg.)
Top Soil / Sub Soil	6	9	70
Pit Benches in coal and overburden	10	15	70
	or		
	15	23	70

The large-scale instability is unlikely with successful production & controlled blasts and effective drainage. The operating bench width of pit should never be less than that specified in Regulation 106(5) of CMR 2017. The operating slope angle of pit would be flatter than the final/ ultimate pit slope. The unavoidable small-scale bench failures could be arrested on these wide benches and large-scale slope failure can be avoided. These recommendations are valid with well-developed drainage system in and around the mine as well as controlled blasting for ultimate pit slopes. If any deviation is observed then these slope angles will have to be corrected accordingly.

An effective and minimum gap of 100m between the toe of the lowermost level of internal dump and the toe of active highwall slope of mine should be maintained at each stage of operation in the mine.

Optimum design provided in the report will help the mine management in better mineral conservation and less dumping space requirement for waste.