

CASE ORIENTED RULES

- 1). *The topics of the case study will be provided 10 days prior to the event.*
- 2). *Each team comprises 2-3 members, with one designated as the leader.*
- 3). *Each team will be allotted 6-8 minutes for their presentation and 5 minutes for questioning by the jury.*
- 4). *Extending beyond time will fetch some negative score.*
- 5). *The result will be declared based on the score awarded by the jury.*

Any event will be cancelled if we will be having less than 6 participants in group or individuals as mentioned in the particular event.

Choose one problem statement from the below mentioned problem statements. Submit your strategy and idea to solve the given problem before 4 april 2024 (Important) through google form given below.

<https://forms.gle/qYVBWuY77RtNoAPB7>

Problem Statement

An ABC Opencast Project is in operation since 2016. The Opencast Project is a conversion of underground mine (standing on developed pillars) in to an Opencast Mine. The mine boundaries of the project are as follows:

Northeast: Koel River

Southwest: Common boundaries with underground mine.

Northwest: Quarry floor aligns with 200m-depth line of Seam-I

Southeast: Quarry floor aligns with in crop position of Seam-I



The major structures around the mine are bund, 220 KV and 400 KV overhead transmission lines (do not belong to mine owner), agriculture land with commercial crops (do not belong to mine owner).

The bund was constructed in the lease boundary of the mine from west to east side of the mine as a safety measure against inundation. The bottom width of the bund is 70m, top width of the bund is 12m and height is 15m. The 220 KV and 400 KV overhead transmission lines are passing behind the bund. The agriculture lands are located on the west side of the mine.

The minimum distance between the present working area to the bund, overhead transmission lines and agriculture lands are 50m, 135m and 100m respectively.

In January 2024, cracks were observed on the bund surface, and overhead transmission lines foundation. In the same month, SPCB imposed a penalty of 10 crore for damaging 80 hectares of agriculture land due to dust generated from blasting.

Develop a plan for conducting blasting operations in the mine satisfying the below conditions

1. Minimum blast induced ground vibration
2. Air over pressure less than (115 dB)
3. Safe blast above developed pillars
4. Preventing dust pollution

Problem Statement

Underground mining is a way forward towards clean coal production technology and sustainable development. Mining industry is planning to increase number of continuous miner-based mass production technology in Indian coalfields within five years on urgent basis to enhance production from underground coal mine. Considerable amount of coal is locked-up in developed pillars (along roof) in thick seam at higher depth of cover in mines of ABC. The developed thick coal seam is above the stowed goaf and below the goaved-out longwall panel. Geo-mining and other conditions of the panel is given in **Table 1** and **Figs. 1-2**. Design the manner of pillar extraction, fender and rib/snook for Continuous miner-based mass production technology including applied support system.

Table 1. Geo-mining conditions including other parameters

Parameter	Description
Incubation period	10 Month
Seam thickness	9.93 m
Status of overlying seam	The parting between the goaf of the overlying seam and the working seam is around 80 m.
Status of underlying coal seam	Stowed goaf below 8 m parting thickness
Size of pillar (center to center)	40 m x 40 m
Number of Pillar	45
Gallery Size (width x height)	5.5 m x 3.0 m
Gallery height	3 m
Proposed depillaring height	6.0 m
Thickness of coal to be left in goaf	4.0 m
Depth cover	360 m
RMR of seam	41
Rock load height (m)	
• Gallery	2.10 m
• Junction	3.25 m
Density of immediate roof	2.35 Ton/m ³
Immediate roof	Thick and massive fine to coarse-grained sandstone with presence of slickenside (weak planes) near the sealing of the roof. Found to be weak due to underlying stowed goaf.
Anchorage capacity of roof bolts	20 t
Anchorage capacity flexi bolts of 5 m length	50 t
Production	1500 t/day

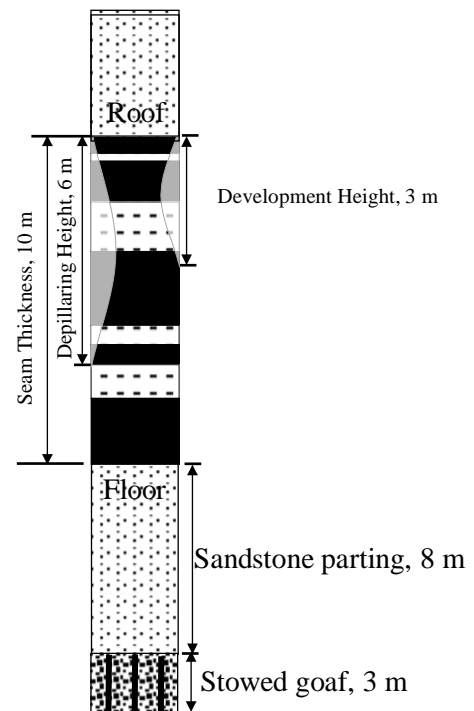


Fig. 1. Section of working seam with status of underlying seam

Barrier pillar of
overlying goaf

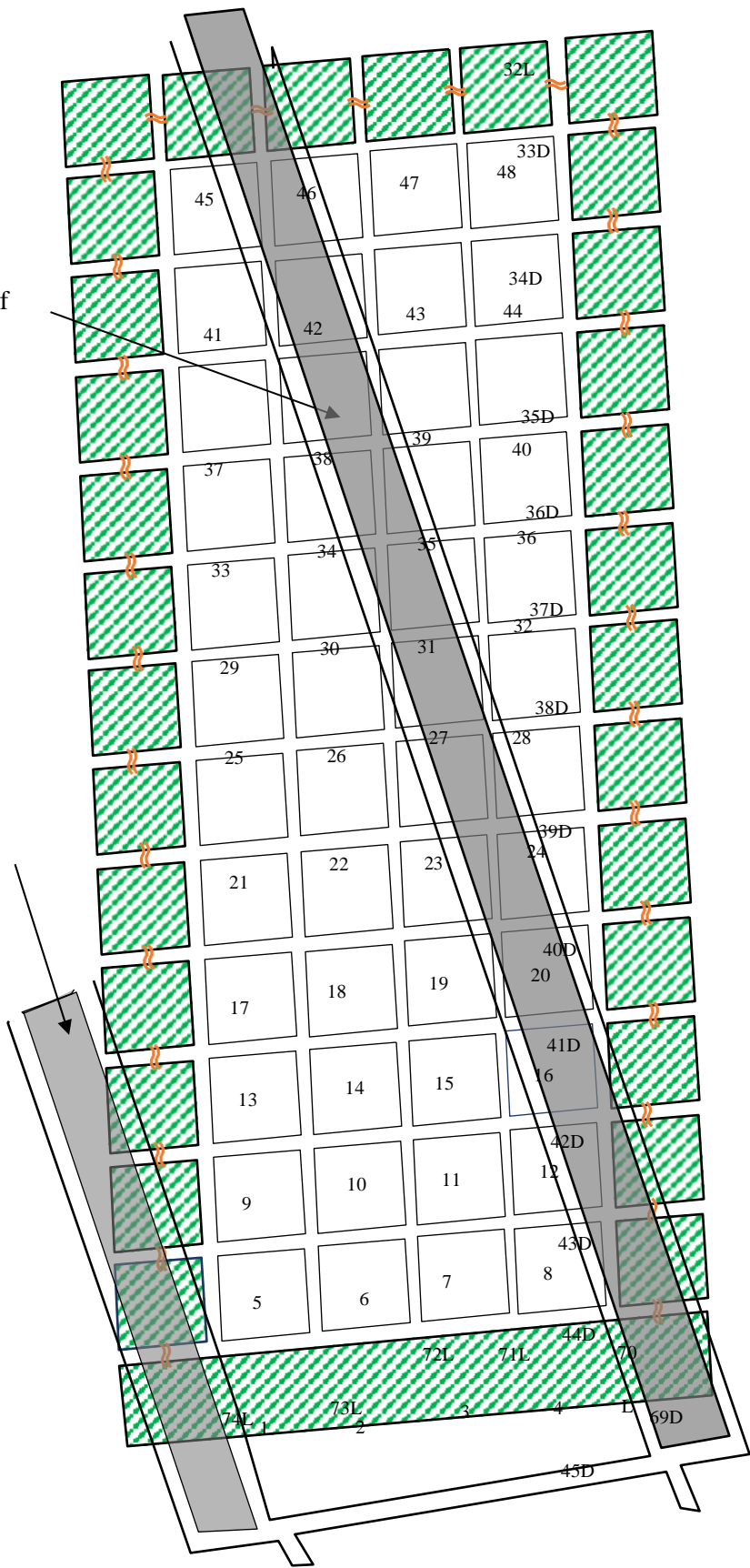


Fig. 2. Proposed panel to be depillared using continuous miner.