

## **SOP FOR DETERMINATION OF POWDER FACTOR IN COAL MINES**

Powder Factor: The quantity of explosive required to break one cubic meter of rock is known as powder factor.

$$\text{Powder Factor (OB)} = \frac{\text{Volume of Block geometry (m}^3\text{)}}{\text{Quantity of Explosive used (Kg)}}$$

$$\text{Powder Factor (Coal) (Tt/Kg)} = \frac{\text{Volume of Block geometry (m}^3\text{)} \times \text{Specific gravity (Coal)}}{\text{Quantity of Explosive used (Kg)}}$$

### **Calculation of Volume of Block Geometry:**

#### **Requirements:**

Surveyor, Measuring tape, Lime powder (Chuna,)

1. Collect the geological information of the patch where powder factor has to be determined.
2. Visit the patch alongwith Committee formed for determining powder factor.
3. Analyse the blast geometry parameter at the blasting site.
4. Get the measurement of depth, spacing and burden of each hole at the blast site with the help of surveyor and note it down on a record book.
5. After calculating the depth of each hole take the average of all the hole depth. This average of hole depth represent the height of the block geometry.
6. The length of the block is determined by measuring the distance from the centre of first hole to the centre of the last hole towards the longer side in straight line at three different points. Then take the average of the three readings. Add one spacing to the average value of length. This value represent the in-situ length of block to be blasted.

7. The width of block is determined by measuring the distance from the centre of first hole to the centre of the last hole towards the shorter side in straight line at three different points. Then take the average of the three readings. Add one burden to the average value of width. This value represent the in-situ width of block to be blasted.
8. To ensure the impact on length and width of block geometry after blasting a line with calcium carbonate shall be drawn around the block geometry.
9. Put the values of height, length and width in the following formulae:  
In-situ Volume of block geometry ( $m^3$ ) = Avg. Length x Avg. Width x Avg. Height

#### **Calculation of Quantity of Explosive:**

10. During charging of the holes in the block geometry the quantity of explosive loaded in each hole must be noted down in record book.
11. Sum of the explosive loaded in all the holes will give us the quantity of explosive used in blasting the block geometry.
12. Put the values of volume of block geometry and quantity of explosive used in the formulae used to calculate the powder factor of the each block.

#### **DETERMINATION OF POWDER FACTOR FOR MINE**

$$PF (m^3/Kg) = \frac{\text{Sum of Total volume of overburden of five readings taken in OB}}{\text{Sum of total quantity of expl. used in five readings taken in OB Blast}}$$

$$PF (Te/Kg) = \frac{\text{Sum of Total tonne of coal of five readings taken in coal}}{\text{Sum of total quantity of expl. used in five readings taken in OB Blast}}$$

#### **IMPORTANT INSTRUCTIONS**

1. The number of reading to be taken to determine the powder factor of overburden for a mine should not be less than five in number.

2. In order to determine the powder factor of coal minimum number of five readings shall be taken in different coal benches.
3. The reading for determining powder factor must be taken at different benches of the mine so that the variation of geology at different benches must be incorporated.
4. Record must be countersigned by the committee formed for above purpose.