



NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR



DEPARTMENT OF MINING ENGINEERING

VIGYAAN PROBLEM STATEMENTS

1. Mine Ventilation

Consider a underground coal mine which is developed by Bord and Pillar mining system under a depth of 250m at an inclination of 1 in 10, the coal is found to be of Degree-3 type. During its extraction process and further development it was found that there is possible of opening of a new block. Now the air quantity that could be supplied to the mine is limited as the fans are running at their best possible efficiency. Now the task of a mining engineering is to design such a permanent ventilation system that could bring enough air to the new ventilation district without installation of new mine fan.

Problem: Design an appropriate mine ventilation plan where the location of each ventilation devices should be shown and their physical significance should be mentioned.

[Note: Assume necessary data.]

2. An opencast coal mine is located close to thermal power plant, suggest an innovative method for disposing fly ash generated by power plant in coal mines.

3. There is a coal stock to the extent of 8 lakh tones, Signs and symptoms of spontaneous heating and fire are being observed at places in the stockyard which is being done by quenching with water and using dozer for compacting the coal stock and making it in dome shape.

it is proposed to carry out scientific study and derive suitable methodology for the above coal stock.

- To combat existing fire.
- To control the further spontaneous heating and arrest the further outbreak of fire.

4. For mining environment, both the opencast and underground mining needs seriously application of robotics. In deep mining, the room and pillar or bord and pillar method progresses along the seam, while pillars and timber are left standing to support the mine roof and highly equipped machineries used To maintain safety and reduced the human activity, it is very much essential to adopt robotic technology in underground mines.

Design a robot that will be do jobs like laying explosives, going underground after blasting to stabilize a mine roof or mining in areas where it is impossible for humans to work or even survive.

5. Noise-induced hearing loss (NIHL) is the most common occupational illness. Because of the insidious nature of NIHL, it can go unnoticed until a considerable loss of hearing has occurred. In some cases, diagnosis is delayed because an exposed individual claims to have become accustomed to the noise. In reality, that person may have already suffered irreversible hearing loss.

Design of effective enclosure or noise isolation system for under ground working.

6. In India, a number of opencast mines are working on left over coal pillars earlier developed by bord and pillar method of mining. In these cases, fires have occurred in such opencast mines working over underground pillars causing loss of coal reserve, production, productivity and also hampering the safety.

A trend is gaining momentum in recent past of extracting out such developed coal pillars by quarrying. In these cases presence of air and the inherent susceptibility of coal make it to a fiery situation .

Develop a safe extraction method of extracting locked coal pillars based on field observations.

7. It is responsibility of man to live in harmony with nature and all its living creatures while tapping the earth's vast mineral resources so as to maintain and improve our essential needs. It may encure an end cost. polluting our environment however also carries a huge burden of responsibility on all of us in order to maintain the future of our entire eco system and the natural beauty of earth.

In bulk handling industry such as coal, iron ore, quarry aggregate etc, the control of dust is of prime importance and should be regarded as part of the process. Suggest some methods to control mining and industrial dust , air pollution and related occupational diseases.