

PMN6J001 MINE CLIMATE AND VENTILATION

Module-I:

Mine Gases: Properties, physiological effects, occurrence, detection and monitoring, sampling and analysis of mine air; Methane: Methane content of coal seams, methane emission, methane layering, methane drainage, radon gas and its daughter products

Heat and Humidity: Sources of heat and humidity in mines, physiological effects of heat and humidity, heat stresses, Psychrometry, air cooling power, air cooling systems

Module-II:

Distribution and control of air flow through mine openings: Laws of fluid flow, resistance of mine airways, equivalent orifice, losses in airways, distribution of air, economic design of airways, flow control devices, standards of ventilation, regulation regarding air velocities in underground mines

Module-III:

Natural Ventilation: Causes of natural ventilation, methods of calculation of NVP

Mechanical Ventilation: Mine fans, types of fans, theory, characteristics and selection of fans, reversal of flows, fan laws, installation of fans, series and parallel combination of fans, fan drift, diffuser and evasee, booster fan, auxiliary ventilation

Module-IV:

Ventilation Surveys and Ventilation Planning: Pressure and quality surveys, survey instruments, planning of ventilation systems, estimation of air quality requirement for mines, principle of ventilation network analysis

MINE CLIMATE AND VENTILATION LAB

1. Determination of relative humidity of mine air using hygrometer
2. Determination of relative humidity of air using Assman Psychrometer
3. Determination of cooling power of mine air using Kata Thermometer
4. Measurement of air velocity by (i) Vane Anemometer (ii) Electric Analog Velometer
5. Study of Pitot Static Tube & measuring of Air Velocity in a ventilation duct in combination with an Inclined Manometer
6. Measurement of dust concentration by (i) Gravimetric Dust Sampler, (II). Personal Dust Sampler
7. Measurement of fan pressure
8. Plotting of fan characteristic curve
9. Plotting of dust characteristic curve
10. Model study of centrifugal fan with reversal arrangement, Axial flow fan