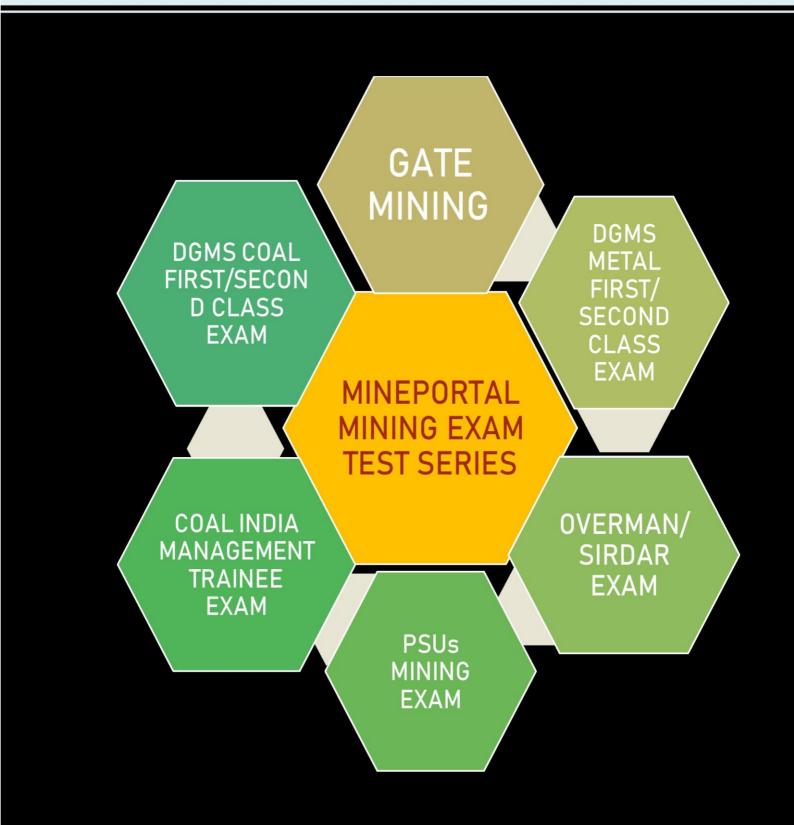
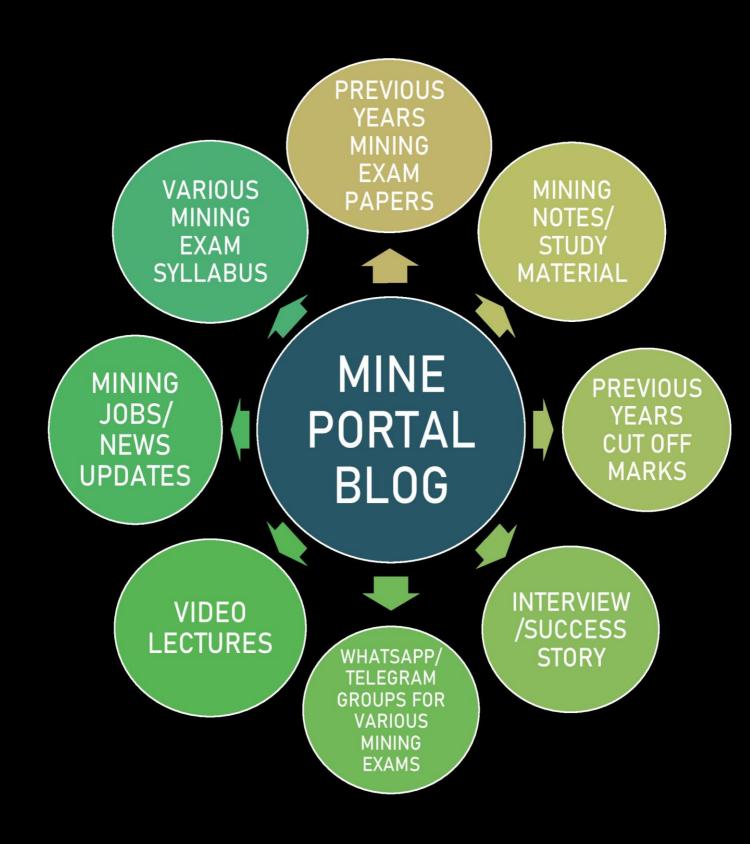
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CMR (Ventilation) Quick Revision

The problem with the Coal Mines Regulations is that they are very exhausting and complicated to read which makes it difficult to memorize them. The best way to memorize the regulations is to understand the science and logic behind them and simplify their language to keep them in your mind. It is difficult for our brain to retain long complicated sentences. In this article, an attempt is made to summarise some important regulations of the Ventilation chapter(Chapter XII) of CMR, 2017 in an easy to read and understand language so that one can do a quick revision(Although it is advised for anyone to gave gone through the regulations in their original form before reading the summary):-

153. Standard of ventilation-

- (1) The owner, agent, and manager shall ensure that-
- (a) Air quantity ≥ 6 m³/min per person employed in the district on the largest shift or Air quantity ≥ 2.5 m³/min per tonne of daily output,
 whichever is larger, passes along the last ventilation connection in the district.
- (b) Oxygen percentage in air ≥ 19%Carbon Dioxide percentage in air ≤ 0.5%or any noxious gas in quantity likely to affect the health of any person
- (c) Inflammable gas(mainly CH4) percentage ≤ 0.75% in the general body of the return air and Inflammable gas(mainly CH4) percentage ≤ 1.25% in any place in the mine
- (d) Wet Bulb Temperature(WBT) ≤ 33.5° centigrade, and if WBT is > 30.5° centigrade, then airspeed ≥ 1m/sec
- (e) Air samples and temperature readings shall be taken at least once every 30 days and the results shall be recorded to ensure compliance with clauses (b), (c), and (d).

But where special conditions exist, the **Chief Inspector** may approve a **ventilation scheme which may differ from the above provisions** by an order in writing, subject to such conditions as he may specify therein.

- (2) Mechanical ventilator is compulsory for every belowground mine.
- (3) If according to the Regional Inspector the ventilation is not adequate, he may require the installation and maintenance of such a mechanical ventilator as is capable of producing adequate ventilation in the mine or part.

154. Main mechanical ventilator(MMV), its drive, and fittings.-

- (1) Every main mechanical ventilator's distance from the opening of the shaft or incline at any point ≥10 meters.
- (2) Electricity supplied to the MMV will be through a separate circuit than that of the mine.
- (3) Two different sources of power to be provided for the MMV.
- (4) Pressure recording instrument near the MMV.
- (5) Reversal of air has to be possible.
- (6) Air Lock to be constructed at shaft or incline where person or material are transported.

155. Restriction on installation of mechanical ventilator belowground.-

- (1) No booster fan in fiery seam or II and III degree gassiness seam, unless manager is satisfied that it is necessary after ventilation survey in parts likely to be affected.
- (2) And **7 days** prior notice is to be given to Regional Inspector before such installation.

156. Installation and maintenance of mechanical ventilator.-

- (1) Mechanical ventilator and booster fan shall be examined every 7 days
- (2) Quantity of air shall be measured every **14 days** at every main intake and return, split, and ventilation district.
 - But in case of non-fiery seam or degree I gassy seam, the quantity can be measured every 30 days.

157. Standing orders.-

- (1) For every ventilator belowground except auxiliary fan, the manager shall submit standing orders specifying the action that shall be taken with respect to the withdrawal of persons from the mine or part thereof within a period of **30 days** of the installation to the Regional Inspector,
- (2) The Regional Inspector may approve or require some alterations.
- (3) A copy of the standing orders in suitable language shall be displayed at conspicuous places in the mine, both above and below ground.

158. Splits and airways.-

- (1) Mine shall be divided into districts to ensure separate and independent current of fresh air.
- (2) The intake shall be so arranged as to travel away from stagnant water.
- (3) Districts shall have two independent intake airways, one of which shall be for traveling.

 However, Regional Inspector may exempt from this requirement in special conditions.
- (4) At least two doors shall be provided between the main intake and main return airway connection if it is not sealed.

159. Brattices, doors, stoppings, and air-crossings.-

- (1) Any doubt about the adequacy of these ventilation devices shall be settled by Chief Inspector.
- (2) The space between the frame of every ventilation door and the roof and sides of the roadway shall be built up with masonry or concrete, not less than 25 centimeters in thickness.
- (3) Ventilation doors shall be self-closing.
- (4) If passage through doors is frequent, there shall be a door attendant.
- (5) Ventilation stopping thickness:
 - a) If not reinforced:- not less than 25cm
 - b) If reinforced:- not less than 15cm
- (6) In case of a mine having problems of fires or spontaneous heating along with the working of coal seams of degree 2 or degree 3 gassiness, the Chief Inspector may require the construction of explosion-proof ventilation stoppings at such places as may be specified by him.
- (7) The thickness of partitions and walls of air-crossings
 - a) If not reinforced:- not less than 25cm
 - b) If reinforced:- not less than 15cm
- (8) Examination of every airway, air crossing, and door shall be done once at least 14 days

160. Velocity of air current-

Degree of gassiness	Place where velocity of air is to be measured	Velocity of air (m/min)
First, second or third degree	Immediate outbye ventilation connection from the face.	30
First or second degree	(i) 4.5 meters from any face whether working or discontinued on the intake side of the brattice or	30

	partition. (ii) 7.5 meters outbye of the discharge end of an air pipe. (iii) At the maximum span of a longwall face.	15 60
Third degree	 (i) 4.5 meters from any face whether working or discontinued on the intake side of the brattice or partition. (ii) 7.5 meters outbye of the discharge end of an air pipe. (iii) At the maximum span of a longwall face: 	45 25 75

161. Auxiliary fans.-

- (1) Should supply adequate quantity of air within 3 meters of the face or blind end.
- (2) Conditions for installation of two or more auxiliary fans in the same ventilation district shall be specified by the Chief Inspector.

162. Precautions against fire in ventilation appliances.-

- (1) Fireproof housing for the mechanical ventilator.
- (2) In the case of every fan other than an auxiliary fan, the coal or other carbonaceous material exposed in the sides, roof, and floor shall be covered with masonry or other fire-resistant sealant as protection against fire, for a distance of not less than 5 meters in every direction from the fan

163. Ventilation plans to be brought up-to-date.-

(1) When any major alteration in ventilation system (like erection of stopping etc), the ventilation plans have to be brought up to date

164. Obstructions, interruptions, and alterations.

- (1) No material or debris shall be allowed to accumulate in any level, drive, crosscut, roadway, or any other part of the workings below ground so as to impede the ventilation.
- (2) Every roadway and working belowground which is not adequately ventilated shall be fenced or barricaded so as to effectively prevent persons entering the same.

165. Precautions against gas during de-watering and re-opening.-

- (1) Dewatering or reopening operations shall take place under the supervision of a competent person.
- (2) During such operations, Safety lamps shall be used.

166. Precautions against inflammable and noxious gases.-

(1) For the purpose of this regulation, inflammable gas shall be deemed to have been found or detected when it is indicated:-

Degree 1 gassiness:- 0.1% of CH4
Degree 2 gassiness:- 0.5% of CH4
Degree 3 gassiness:- 1.25% of CH4

(2) If gas is detected in any part of mine persons are to be withdrawn and the place shall be fenced immediately.

167. Inspection of unused working for gas.-

(1) Unused workings shall be inspected every **7 days** in 2,3 degree gassiness or fiery seam and results of such inspections shall be recorded

168. Safety lamps to be used in belowground mines.-

(1) Only approved lamps or lights shall be used or permitted to be used belowground in any mine.

Provided that the Chief Inspector may exempt any mine or part thereof from the operation of this regulation under special conditions.

169. Determination of percentage of inflammable gas and of environmental conditions.-

- (1) Approved apparatus to be used for the determination of inflammable gas percentage.
- (2) Gas samples to be analyzed within 3 days of taking them.
- (3) Determination of CH4 percentage shall be made once every 7 days:
 - a) If determination shows CH4 > 0.8%, determination shall be made every 24 hrs
 - b) If determination shows CH4 < 0.6%, determination shall be made every 30 days
- (4) After any alteration in the ventilation system is done, the determination of CH4 percentage shall be made within **24 hrs**
- (5) Power supply to be cut if CH4 > 1.25%

170. Monitoring devices.-

- (1) The Chief Inspector may require approved **environmental monitoring devices to continuously record information regarding environmental conditions** to be installed belowground.
- (2) The chief inspector may also require analysis of mine air samples by **gas chromatography** or other equivalent technique.

171. General precautions in gassy mines.-

- (1) Extension of gallery **not more than 3m** from ventilation connection, unless current of air is coursed up to a point **within 3m** of the face by means of brattice, tubes, etc.
- (2) No narrow main or advance gallery shall be driven more than three meters ahead of the widened gallery.
- (3) Every stopping shall be **substantially built** and every air crossing should be able to withstand an explosion.
- (4) Air current which ventilates goaved or disused area, shall not ventilate working face.
- (5) **No major alteration** in the ventilation system shall be made without permission of the Regional Inspector

172. Contrabands.—(It means items which are illegally imported)

- (1) In belowground mines, No person shall have any cigar, cigarette, biri, or other smoking apparatus, or any match or mobile phone or other unapproved apparatus of any kind capable of producing a light, flame, or spark in his possession.
- (2) A competent person shall be authorized to check every person going in mine for contrabands.

173. Underground relighting stations.-

(1) In every mine, **lamp stations for relighting safety lamps** may be fixed by the manager at suitable places belowground and every such station shall be marked **RELIGHTING STATION**, which shall be situated in a main intake airway, and shall be placed in charge of a competent person.