

CHAPTER

11



# **SAFETY IN COAL MINES**

**ANNUAL REPORT 2019-20**



# SAFETY IN COAL MINES

Coal mining poses several inherent, operational and occupational hazards and associated risks to the work persons. Hence, safety is always an utmost priority for Coal Companies and is one of the main ingredients of their mission statements. Coal companies have adopted a well-defined safety policy, which is the core of all safety initiatives. There are well designed Safety Management Plans in place for all mines to ensure safety with an aim to achieve “Zero Harm Potential (ZHP)”.

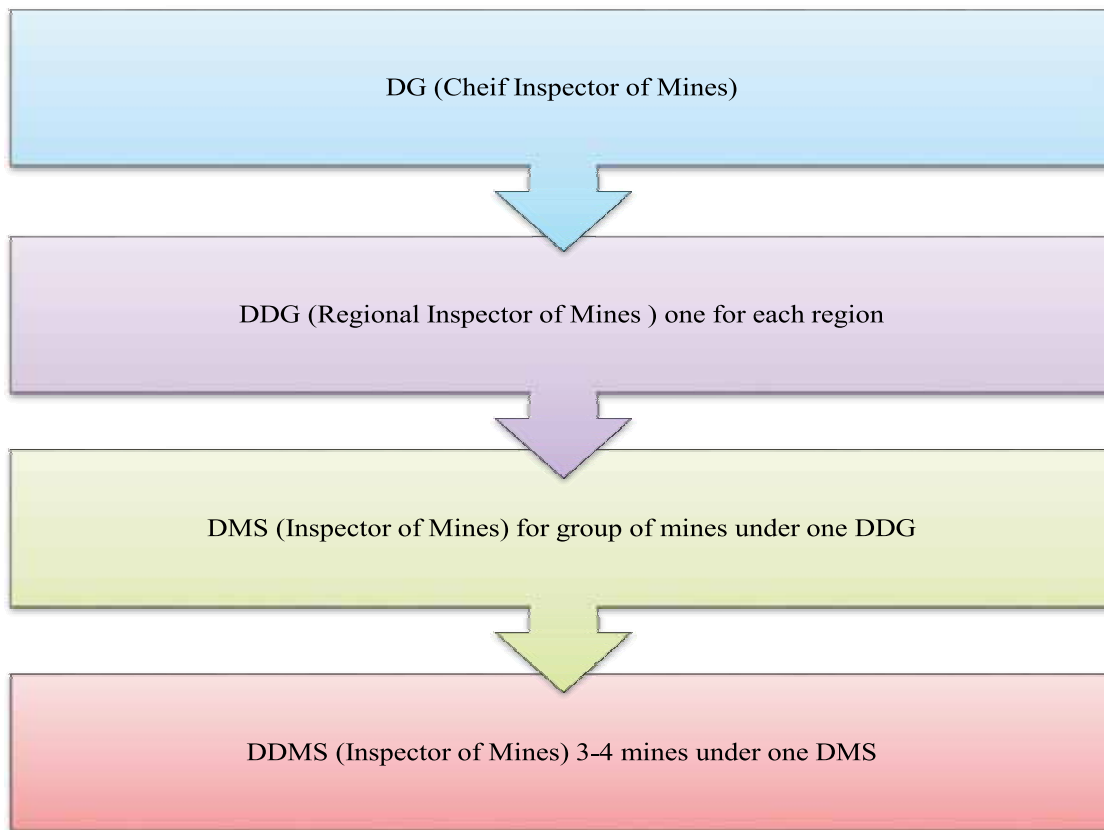
### Statutory Frame Work for Coal Mine Safety:

Coal mining, world over, is highly regulated industry due to presence of many inherent, operational and Occupational Hazards. Coal Mine Safety Legislation in India is one of the most comprehensive and extensive statutory framework for ensuring Occupational Health and Safety (OHS). Compliance of these safety statutes is mandatory. The operations in coal mines are regulated by the Mines Act, 1952, the Mine Rules, 1955, the Coal Mine Regulation, 2017 and several other statutes framed thereunder. Some of the important statutes related to coal mine safety are as follows:

Sl. No.	Statute
1	The Mines Act, 1952
2	The Mines Rules, 1955

Sl. No.	Statute
3	The Coal Mines Regulations, 2017
4	The Mines Rescue Rules, 1985
5	The Electricity Act, 2003
6	The Central Electricity Authority (measures related to safety & supply) Regulations, 2010
7	The Mines Vocational Training Rules, 1966
8	The Mines Crèche Rules, 1966
9	The Indian Explosive Act, 1884
10	The Explosive Rules, 2008
11	The Indian Boiler Act, 1923
12	The Mines Maternity Benefit Act & Rules, 1963
13	The Workmen Compensation Act, 2010
14	The Factories Act, 1948, Chapter -III & IV

**Safety Monitoring by Statutory Regulator:** The Directorate General of Mine Safety (DGMS) is vested with the responsibility to ensure compliance of provisions under the Mines Act, 1952 and Rules & Regulations made there under for improvement in standard of safety in mines. The structure of DGMS is as follows:



### Safety in mines of Coal India Limited

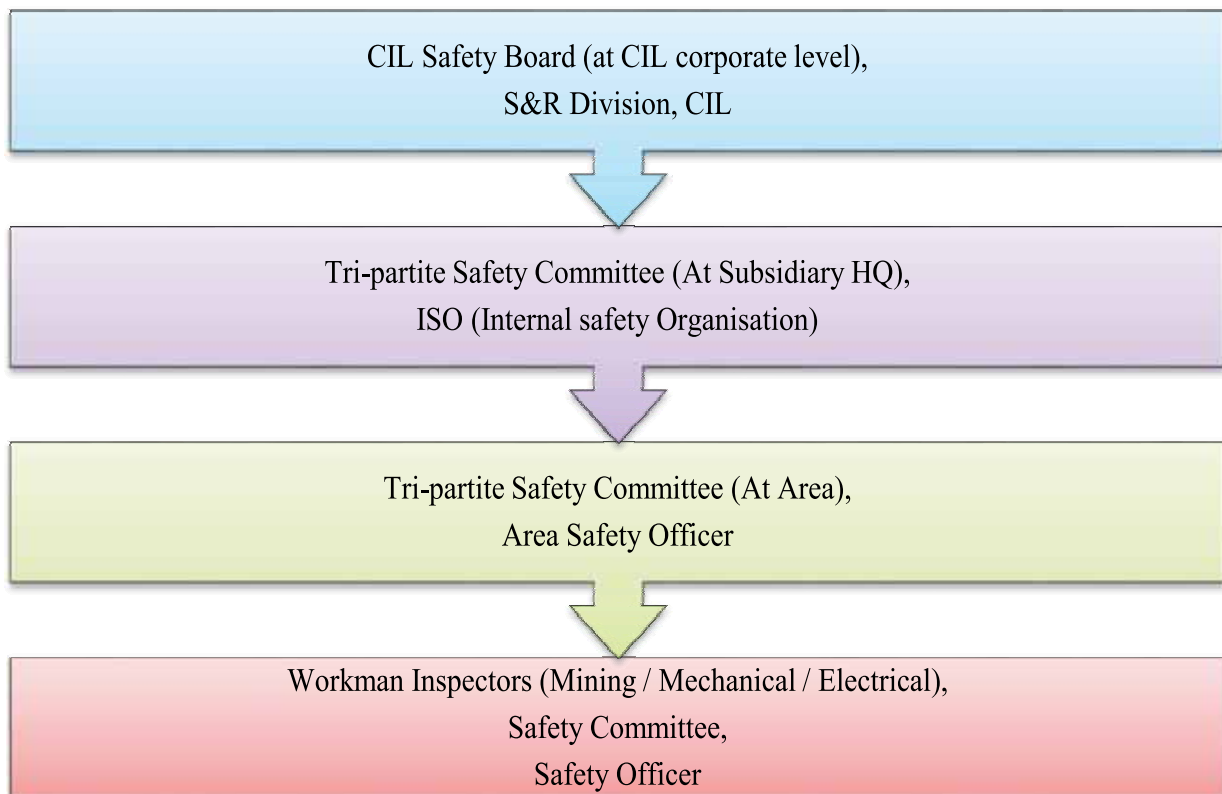
Safety is ingrained in mission statement of CIL and is one of the most important components in overall business strategy. CIL has framed a well-defined safety policy to ensure safety in all mines and establishments. CIL has already established a multi-disciplinary Internal Safety Organization (ISO) in all subsidiaries for the implementation of CIL Safety Policy. All operations, systems and processes of CIL are meticulously planned and designed with due regard to safety, conservation, sustainable development and clean environment. Work place hazards and associated risks of mining operations are identified and Safety Management Plan is prepared for each mine. CIL always encourages employees' participations in safety management so as to promote a proactive safety culture and improve safety awareness amongst all concerned. Various initiatives are being taken to achieve "Zero Harm Potential (ZHP)" in mines.

**Safety Policy of CIL:** Safety is always given prime importance in the operations of CIL as embodied in the mission. CIL has formulated a Safety Policy for ensuring safety in mines and

implementation of which is closely monitored at several levels. Details of Safety Policy of CIL are as under:

- Operations and systems will be planned and designed to eliminate or materially reduce mining hazards;
- Implement Statutory Rules and Regulations and strenuous efforts made for achieving superior standards of safety;
- To bring about improvement in working conditions by suitable changes in technology;
- Provide material and monetary resources needed for the smooth and efficient execution of Safety Plans;
- Deploy safety personnel wholly for accidents for accident prevention work;
- Organize appropriate forums with employees' representatives for Joint consultations on safety matters and secure their motivation and commitment in Safety Management;

- Prepare annual Safety Plan and long term Safety Plan at beginning of every calendar year, unit-wise and for the company, to effect improved safety in operations as per respective geo-mining needs to prepare the units for onset of monsoon, to fulfill implementation of decisions by Committee on Safety in Mines and Safety Conferences and to take measures for overcoming accident proneness as may be reflected through study of accident analysis, keeping priority in sensitive areas of roof-falls, haulage, explosives, machinery etc.
  - Set up a frame work for execution of the Safety Policy and Plans through the General Managers of Areas, Agents, Managers and other safety personnel of the Mines;
  - Multi-level monitoring of the implementation of the Safety Plans through Internal Safety Organization at the company headquarters and Area Safety Officers at area level;
  - All senior executives at all levels of management, will continue to inculcate a safety consciousness and develop involvement in practicing safety towards accident prevention in their functioning;
  - Institute continuous education, training and retraining all employees with the accent placed on development of safety oriented skills;
  - Continue efforts to better the living conditions and help of all the employees both in and outside the mines.
- Safety Monitoring in CIL:** Besides monitoring by statutory regulators, safety in CIL mines is being monitored at various levels:



**Safety Implementation in CIL:** Organizational hierarchy for implementation of Safety Policy in mines of CIL is as under:



### Analysis of Accident Statistics in CIL

Accidents statistics is the relative indicator for safety status in mines. Over the years the safety performance of CIL has improved significantly.

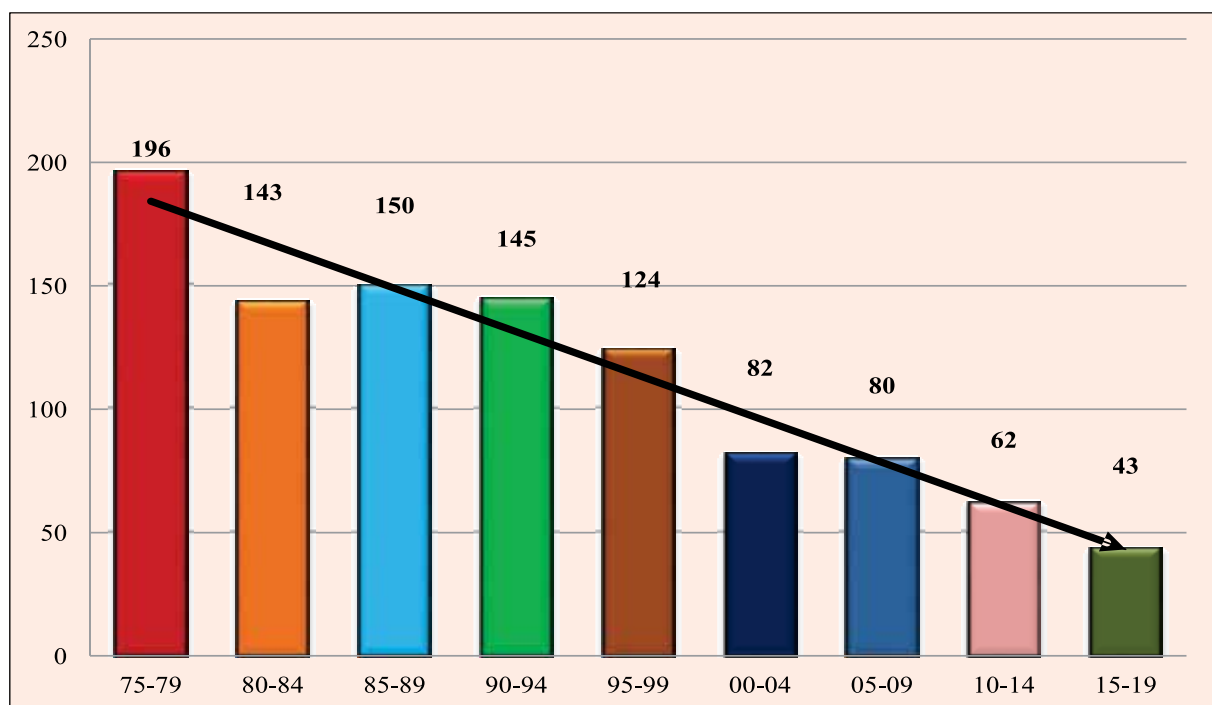
This improvement in safety is attributed to the following factors:

- Collective commitment and synergetic collaboration of the management and employees.
- Use of state-of-the-art technology in the field of mining methods, machineries and safety monitoring mechanism.
- Constant vigil, round the clock supervision and assistances from all concerned quarters.
- Continuous improvement in knowledge, skill and awareness of workforce through imparting quality training and relentless safety awareness drives.

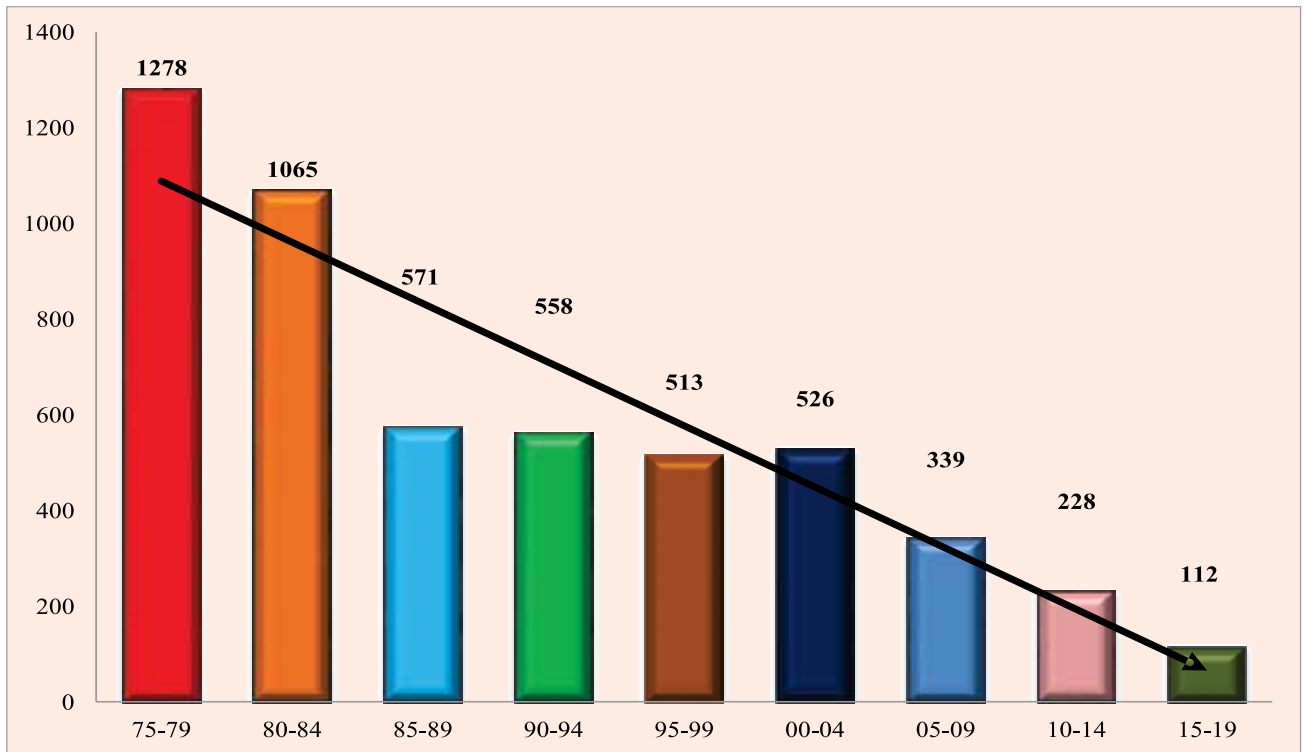
**Salient features of continuous and sustained improvement in CIL's safety performance:****Table: 1 - Comparative Accidents Statistics of CIL (5 Yearly Average) since 1975**

Time frame	Av. Fatal Accidents		Av. Serious Accidents		Av. Fatality Rate		Av. Serious Injury Rate	
	Accident	Fatalities	Accident	Injuries	Per Mill. Te	Per 3 Lac Manshifts	Per Mill. Te	Per 3 Lac Manshifts
1975-79	157	196	1224	1278	2.18	0.44	14.24	2.89
1980-84	122	143	1018	1065	1.29	0.30	9.75	2.26
1985-89	133	150	550	571	0.98	0.30	3.70	1.15
1990-94	120	145	525	558	0.694	0.30	2.70	1.19
1995-99	98	124	481	513	0.50	0.29	2.06	1.14
2000-04	68	82	499	526	0.28	0.22	1.80	1.47
2005-09	60	80	328	339	0.22	0.25	0.92	1.04
2010-14	56	62	219	228	0.138	0.23	0.49	0.80
2015-19	33	43	107	112	0.08	0.18	0.19	0.47

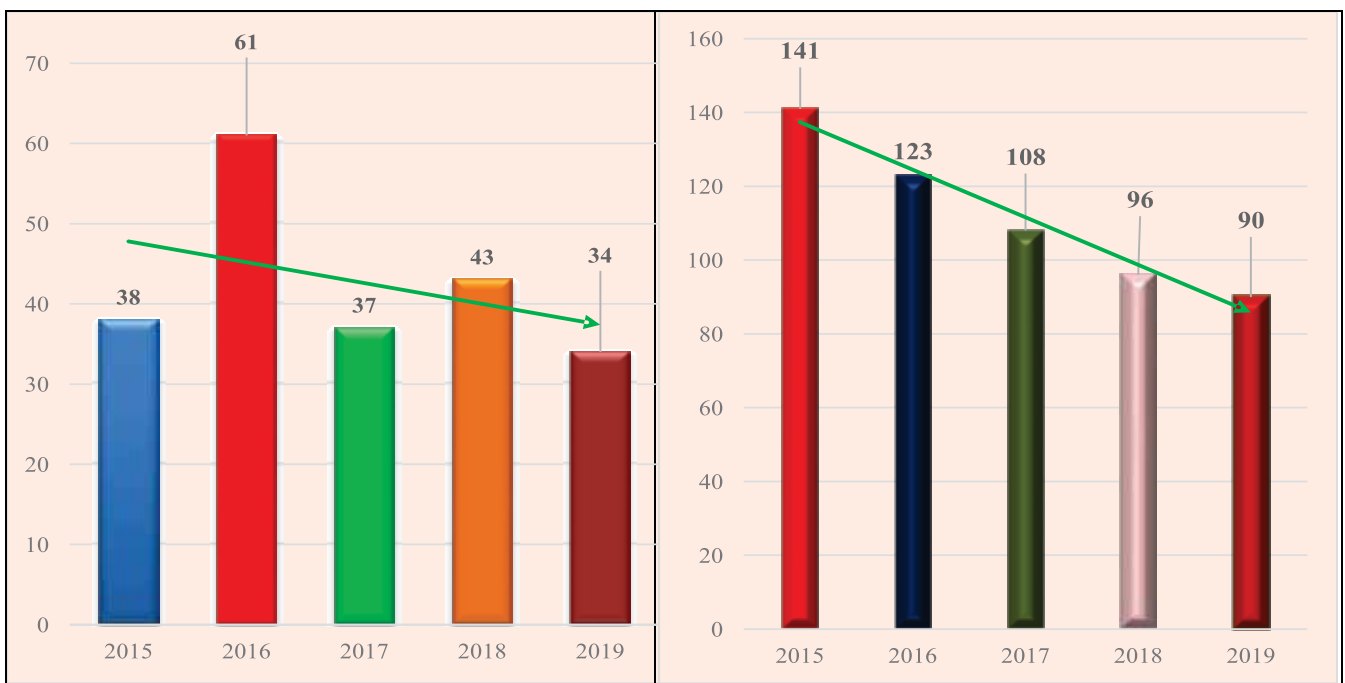
Note: Subject to reconciliation with DGMS & Accident Statistics are maintained calendar year-wise in conformity with DGMS practice

**Graph - 1 – Trend of 5 Yearly Average Fatalities in CIL since 1975**

**Graph: 2 – Trend of 5 Yearly Average of Serious Injuries since 1975**



**Graph-3: Trend of Fatalities& Serious Injuries for last 5 years in CIL**





**Table – 2: Overall Accident Statistics in 2019 vis-a-vis 2018 in CIL**

Sl. No.	Parameters	2018	2019	Reduction in absolute nos.	% of Reduction
1	Number of fatal accidents	33	30	3	9.09
2	Number of fatalities	43	34	9	20.93
3	Number of serious Accidents	87	86	1	1.15
4	Number of serious injuries	96	90	6	6.25
5	Fatality Rate per Mte. of coal production	0.07	0.06	0.01	14.29
6	Fatality Rate per 3 lakhs manshift deployed	0.18	0.15	0.03	16.67
7	Serious injury Rate per Mte.of coal production	0.16	0.15	0.01	6.25
8	Serious injury Rate per 3 lakhs man-shift deployed	0.41	0.40	0.01	2.44

Note: Accident Statistics are maintained calendar year wise in conformity with DGMS practice & figures subject to reconciliation with DGMS

**Table -3: Company-wise Accident Statistics of CIL for the year 2019**

Company	Fatal Accidents	Fatalities	Serious Accidents	Serious Injuries	Fatality Rate		Serious Injury Rate	
					Per Mill. Te	Per 3 lac manshifts	Per Mill. Te	Per 3 lac manshifts
ECL	7	7	18	18	0.14	0.16	0.35	0.40
BCCL	6	6	10	12	0.21	0.20	0.43	0.41
CCL	2	2	4	4	0.03	0.08	0.06	0.15
NCL	2	2	12	12	0.02	0.18	0.11	1.09
WCL	2	2	16	17	0.04	0.04	0.31	0.31
SECL	6	7	22	23	0.05	0.17	0.16	0.56
MCL	5	8	4	4	0.06	0.49	0.03	0.25
NEC	0	0	0	0	0.00	0.00	0.00	0.00
<b>CIL</b>	<b>30</b>	<b>34</b>	<b>86</b>	<b>90</b>	<b>0.06</b>	0.15	0.15	0.40

Note: Accident Statistics are maintained calendar year wise in conformity with DGMS practice & figures subject to reconciliation with DGMS

**Table - 4: Company-wise Accident Statistics during the period 2017 to 2019**

Company	Fatal Accidents			Fatalities			Serious Accidents			Serious injuries		
	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
ECL	9	1	7	9	2	7	20	24	18	20	25	18
BCCL	2	2	6	2	2	6	13	7	10	13	7	12
CCL	5	5	2	6	8	2	5	9	4	5	16	4
NCL	3	3	2	3	3	2	10	8	12	10	8	12
WCL	3	2	2	3	5	2	18	17	16	18	17	17
SECL	7	12	6	9	15	7	36	18	22	36	19	23
MCL	5	8	5	5	8	8	6	4	4	6	4	4
NEC	0	0	0	0	0	0	0	0	0	0	0	0
CIL	34	33	30	37	43	34	108	87	86	108	96	90

**Table – 5: Company-wise Fatality & Serious Injury Rate during the period 2017 to 2019**

Company	Fatality Rate Per MT of coal production			Fatality Rate Per 3 lac manshifts			Serious Injury Rate Per MT of coal production			Serious Injury per Rate 3 lac manshifts		
	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
ECL	0.22	0.04	0.14	0.18	0.04	0.16	0.50	0.52	0.35	0.41	0.53	0.40
BCCL	0.06	0.06	0.21	0.06	0.06	0.20	0.39	0.22	0.43	0.39	0.22	0.41
CCL	0.09	0.12	0.03	0.20	0.29	0.08	0.08	0.24	0.06	0.17	0.58	0.15
NCL	0.03	0.03	0.02	0.24	0.26	0.18	0.11	0.08	0.11	0.81	0.69	1.09
WCL	0.06	0.10	0.04	0.06	0.09	0.04	0.39	0.34	0.31	0.36	0.30	0.31
SECL	0.06	0.10	0.05	0.20	0.34	0.17	0.25	0.12	0.16	0.80	0.43	0.56
MCL	0.04	0.06	0.06	0.32	0.50	0.49	0.04	0.03	0.03	0.38	0.25	0.25
NEC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CIL	0.07	0.07	0.06	0.16	0.18	0.15	0.19	0.16	0.15	0.46	0.41	0.40

### Major Activities for Safety & Rescue Division of CIL

- Inspection of mines to review safety status of mine & follow up action thereof to improve safety status of mine.
- Fact finding into fatal accidents and major incidences.
- Imparting specialized training by SIMTARS accredited trainers to unit level and Area level executives, mine officials and members of Safety Committee.
- Framing of internal Technical Circulars / Management Guidelines / Advisory related to safety issues and monitoring implementation thereof.
- Maintenance of accidents / major incidents database.
- Analysis of mine accident statistics.
- Monitoring safety related R&D activities in CIL.
- Organizing meeting of CIL Safety Board and monitoring recommendations / suggestions made during meeting.
- Monitoring mine rescue preparedness at different mine rescue establishments.
- Publication of Safety Bulletin for disseminating and sharing of knowledge in order to promote safety awareness and inculcate better safety culture.
- Actively participated in organizing the meeting of Standing Committee on safety in coal mines and monitoring recommendations / suggestions made during meeting.
- Liaisoning with various agencies on the matter of mine safety and ISOs of various subsidiaries.
- Monitoring of CIL Safety Information System (CSIS) database and ensuring updation.
- Response to parliamentary questions related to mine safety including queries raised by different standing committees such as standing committee on Steel & Coal, standing committee on labour, as well as questions raised by COPU, MOC, CA&G and VIPs and information sought under the Right to Information (RTI)- 2005.

### Measures taken for improvement of safety in 2019

Apart from compliance of statutory requirements and on-going safety related initiatives, CIL and its Subsidiaries have pursued several measures in the year 2019 for enhancing safety standard in mines, which are given below:

- i. **Conducting Safety Audit:** Safety Audit of producing mines of CIL has been conducted through multi-disciplinary Inter-Area Safety Audit teams of respective subsidiaries in 2019 for assessing safety status of mines and deficiencies pointed out during the said safety audits are being rectified.
- ii. **Safety Management Plans (SMPs)** – Site-specific risk assessment based SMPs have been prepared for each mine of CIL by involving mine officials and workmen and the same are being reviewed on regular basis. Implementation of SMPs is being monitored through Internal Safety Organization (ISO) of each subsidiary. The process of Safety Management in mines is continuous and on-going for improving safety standards of mines.
- iii. **Principal Hazards Management Plans (PHMPs):** Principal Hazards Management Plans (PHMP) are formulated as a part of Safety Management Plan (SMP) to avert any mine disaster or major mine accident. Trigger Action Response Plan (TARP) are prepared to deal with emergency situations effectively.
- iv. **Standard Operating Procedures (SOPs):** Site-specific, Risk Assessment based Standard Operating Procedures (SOPs) for all Mining and Allied operations are framed and implemented. The SOPs are being updated on regular basis to cater to the changing mine conditions.
- v. **Special Safety Drives on different Safety Issues:** Special Safety drives on various safety issues were organized to improve standard of mines safety and enhance safety awareness amongst employees.
- vi. **Safety Training Programme in China:** 2<sup>nd</sup> educational training program on “Coal Mine Safety Management for CIL Executives and Exposure to Best Practices in China ” from 01.11.2019 to 11.11.2019 was organized at School of Safety Science and Technology, Henan Polytechnic University (HPU), Jiaozuo, Henan, China with collaboration of IIT , which was attended by 10 executives.



- vii. **Regular co-ordination with ISOs:** Several meetings were held under the Chairmanship of the Director (Technical), CIL for assessing the safety status of mines and other establishments for enhancing safety.
  - viii. **56<sup>th</sup> Meeting of CIL Safety Board:** 56<sup>th</sup> meeting of apex level tripartite CIL Safety Board was held on 24<sup>th</sup> June, 2019 in Kolkata under the Chairmanship of Chairman, CIL for assessing the mine safety status and implementation of recommendations of previous meeting.
  - ix. **National Dust Prevention Committee meeting:** The 18<sup>th</sup> meeting of the National Dust Prevention Committee (NDPC) was held on 20<sup>th</sup> September, 2019 in Kolkata under the Chairmanship of the Director (Technical), CIL for assessing the status of dust suppression arrangement and measures taken to reduce adverse effects of dust related problem in mines of CIL and other coal producing companies.
  - x. **Observation of "ILO's World Day for Safety and Health at Work"** in CIL (HQ) as well as all subsidiary HQs, Areas and mines on 28<sup>th</sup> April, 2019 to promote the preventive Safety culture.
- Apart from the above specific actions, the following measures are continued for improving safety standards:
- xi. **Emphasis on adoption of the state-of-the art technology in suitable geo-mining locales.**
    - a. Adoption of Mass Production Technology (MPT) in more number of UG mines.
    - b. Deployment of more nos. of Surface Miners to eliminate blasting operation in OCPs.
    - c. Deployment of relatively higher capacity HEMM in more number of OCPs.
    - d. Mechanization of UG drilling operation for roof bolting.
  - xii. **Adoption of the state-of-the art mechanism for Strata Management**
    - a. Scientifically determined Rock Mass Rating (RMR) based Strata Support System.
    - b. Mechanized Drilling for Roof bolting.
    - c. Use of Resin Capsules in place of Cement capsules.
    - d. Use of modern Strata Monitoring Instruments.
    - e. Strata Control Cell for monitoring efficacy of strata support system. An in-house Rock Testing Laboratory established in Nagpur, WCL for

determination of Rock Mass Rating (RMR) of strata was accredited with NABL certificate.

- f. Imparting quality training to support crews & front-line mine officials, supervisors & grass root level workmen.

**xiii. Mechanism for monitoring of mine environment:**

- a. Detection of mine gases by Multigas detector, Methanometer, CO-detector etc.
- b. Continuous monitoring of mine environment by installing Environmental Tele Monitoring System (ETMS) & Local Methane Detectors (LMD) etc.
- c. Regular Mine Air Sampling and Analysis by using Gas Chromatograph.
- d. Personal Dust Sampler (PDS) for detecting dust concentration.
- e. Use of Continuous Ambient Air Quality Monitoring System (CAAQMS) in large OCPs to assess the ambient dust concentration.

**xiv. Strengthening Water Danger Management:**

- a. Conducting Check Survey & Joint Survey to eliminate errors in mine survey.
- b. Preparation and maintenance of seam-wise Water Danger Plan.
- c. Preparation and implementation of Monsoon Action Plan.
- d. Adequate Pumping Facilities with adequate capacity of Sumps.
- e. Liaison with the State Meteorological Dept. & Dam Authorities.

- f. Construction of Embankments against water bodies.

- g. Inter-mine joint survey between adjoining mines to prove inter-mine barriers.

**xv. Training on Mine Safety:**

- a. Initial and Refresher training & On-the-Job Training as per statute.
- b. Training on Simulators to HEMM operators.
- c. Skill up-gradation of frontline mine officials on continual basis on various topics.
- d. Sensitization of all employees including Members of Safety Committees and contractual workmen on regular basis.
- e. Various training programme for enhancement of knowledge of mine executives.

**xvi. Mine Safety Inspection:**

- a. Round-the-clock Supervision of all mining operations by adequate number of competent & statutory Supervisors and mine Officials.
- b. Regular Inspection by Workmen Inspectors appointed in each mine.
- c. Surprise back shift mine Inspections by mine and area level officials.
- d. Regular mine Inspection by officials of Internal Safety Organization of respective subsidiary and CIL.
- e. Periodic mine Inspections by senior officials of CIL & Subsidiaries, Trade union representatives and officials of MOC.



Chairman Coal India briefing West Side Coal Minister at Bhaquerwadi OCP, Talcher



CMD, SECL briefing West Side Coal Minister at Bhaquerwadi OCP, Talcher



SECL @secl\_08 - Nov 28  
Shri. Anil Kumar Jain, Secretary, Ministry of Coal was on visit to SECL on 27 & 28 Nov, 2019. He visited Gevra, Dipka and Kamsmunda Mines and chaired SECL review meeting.  
@CoalIndiaHQ @CoalMinistry



#### Steps for prevention accidents in OCPs:

- a. Formulation and Implementation of Mine-specific Traffic Rules.
- b. Code of Practice for HEMM Operators, Maintenance staff & others.
- c. Sensitization training of Contractor's Workmen involved in contractual jobs.
- d. Installed a '**Universal Equipment Simulator**' at Central Excavation Training Institute (CETI) in NCL, Singrauli to impart simulation training to Dragline, Shovel and Dozer Operators. Simulator allows operator to hone their skills.



- e. Lighting arrangement by using high mast towers are provided for enhancement of standard of illumination.
- f. Eco-friendly Surface Miners for blast free mining and avoidance of associated risks.



- g. Dumpers fitted with Proximity Warning Devices, Rear view mirrors and camera, Audio-Visual Alarm (AVA), Automatic Fire Detection & Suppression System (AFDSS) etc.
- h. Ergonomically designed seats & AC Cabins for operators' comfort.
- i. Indigenous built solar powered based real time dump monitoring device has been installed in OC mine of WCL. This device is designed for giving early warning in case of movement in OB dump.





- j. Automatic pressure water spraying system for cleaning vehicle introduced in WCL.



- k. Apart from system of wet drilling and water Sprinklers for dust suppression, mist type fixed as well as trucks mounted water cannons have been introduced in OC mines.



- l. GPS based Operator Independent Truck Dispatch System (OITDS) in large OCPs for tracking movement of HEMMs inside OC mine. E-surveillance unit has been installed in mines for monitoring operations 24X7 in real time by using GPS/GPRS-based vehicle tracking, and geo-fencing system.



**Mine Emergency Response System:**

- Emergency Action Plans prepared as per statute for each mine.
- Mock Rehearsals for examining the efficacy of Emergency Action Plan.
- Demarcating Emergency Escape Routes in below ground.
- Check list prepared for dealing with an emergency in mine.
- Flow Chart prepared for transmission of information regarding crisis / disaster in mines from site of accident to the Ministry of Coal, New Delhi.

**Rescue Services for Emergency Response System in CIL:**

- CIL is maintaining a well establishment Rescue Organization comprising of 6 Mine Rescue Stations (MRS), 13 Rescue Rooms-with-Refresher Training facilities (RRRT) and 17 Rescue Rooms (RR).
- All Rescue Stations / Rescue Rooms are fully equipped with adequate numbers of rescue apparatus as per the Mine Rescue Rules (MRR), 1985.
- This Rescue Organization is staffed by adequate numbers of Rescue Trained Personnel (RTP) as per the MRR, 1985.



- All RTP are being periodically re-trained to conduct rescue operations in hot, humid and irrespirable atmospheres in modern training galleries as well as in mines.



- CIL employs Permanent Brigade Members and RTPs who are available on call 24x7.

The Mine Rescue Station and Rescue Rooms are established at strategic locations spreading across different Subsidiaries to cater to the emergencies in their command area.

The details are as under:

Company	Rescue establishment presently operating		
	Mine Rescue Station (MRS)	Rescue room with Refreshers Training (RRRT)	Rescue Room (RR)
ECL	Sitarampur	Kenda	Jhanjra ,Kalidaspur,Mugma
BCCL	Dhansar		Moonidih, Madhuband, Sudamdih
CCL	Ramgarh	Kathara&Churi	Dhori, Kedla&Urimari
SECL	Manindragarh	Sohagpur, Ksumunda, Johilla, Bistrampur, Baikunthpur	Chirimiri, Raigarh, Bhatgaon, Jamuna & Kotma, Korba
WCL	Nagpur	Parasia, Pathakhera, Tadali	Damua , New Majri&Sasti
MCL	Brajraj Nagar	Talcher,	-
NEC	-	Tipong	-
Total	6	13	17

### Neyveli Lignite Corporation India Ltd

#### Accident Statistics of NLCIL - (for last five years):

Year	Fatalities	Serious Injuries
2014-15	1	1
2015-16	3	2
2016-17	Nil	1
2017-18	2	0
2018-19	1	Nil
2019-20 (Apr- Nov)	2	Nil

1. Neyveli Mines are being operated with State of The Art Technology i.e. Specialized Mining Equipment's Bucket Wheel Excavators having inbuilt safety features.
2. Safety and Health policy is being implemented in its true spirit.
3. Mines are having organizational set up of various divisions and equipped with sufficient number of statutory officials and other required engineers, supervisors, technicians etc.

4. NLCIL has well established Group Vestibule Training Centre, Unit Level Training centres and Learning and Development Centre to impart training and retraining.
5. Risk assessment based Safety Management Plans have been prepared for all the divisions and are under implementation.
6. Standard operating procedures have been established for all the activities of the mines and are strictly implemented.
7. Internal Safety Organization is functioning, headed by Chief General Manager / Mining.
8. Illumination, dust, noise and vibration studies are conducted once in six months and all the parameters are maintained as the norms.
9. All accidents and near miss incidents are thoroughly analyzed and investigated for corrective measures.

#### Safety Audits

1. Mines are inspected everyday by Unit Statutory officials and ISO officials.
2. Workmen Inspectors are inspect various parts of the Mines twice in a week and maintain the records as per statute.

3. Pit Safety Committee (PSC) Members inspect the Mines once in a month and observations are deliberated in the monthly PSC meeting.
4. Inter-Unit Safety Assessment (IUSA) team members inspect the mines once in three months.
5. Central Safety Council Members inspect the mines once in six months.
6. Division –wise Safety Audits are conducted with the co-ordination of ISO officials.

The audit recommendations are implemented and compliance reports are furnished regularly.

### Accident Statistics

Sl. No	Particulars	2019-20 April' 19 to November '19 Mines
1	Numbers of Fatal Accidents	2
2	Numbers of Fatalities	2
3	Numbers of Serious Accidents	-
4	Numbers of Serious injuries	-
5	Numbers of Reportable Accidents	-
6	Total man days worked	-
7	Total Production in Million Tonnes	-
8	Fatality rate per Million Tonnes of Lignite Production	-
9	Fatality rate per 3 lakh man shifts deployed	-
10	Serious injury rate per Million Tonnes of Lignite production	-
11	Serious injury rate per 3 lakh manshifts deployed	-

### Safety Budget & Actual Expenditure

Year	Safety Budget	
	Allocated	Actual 2019-20 upto Nov
2018-19	₹ 230.00 Lakhs	About ₹ <b>97.13</b> Lakhs

### Safety Trainings

#### Training given at GVTC April 2019 to Nov 2019

Basic training		Refresher training		Specific job training		Orientation training to executives	Total no. Of persons trained
Employees	Contract workers	Employees	Contract workers	Employees	Contract workers		
28	725	650	1189	693	905	132	4322

#### First aid training given April 2019 to Nov 2019

YEAR	MINE-I	MINEIA	MINE-II	Barsingar Mine	NLCIL MINES
2019-20 upto Nov	125	69	107	53	354

### Safety Workshops

- Safety workshop of Mine-1A conducted on 16.02.2019.
- Safety workshop of Mine-II conducted in February 2019.

### Details of Safety initiatives/activities carried out during the year 2019-20

1. Refilling of fire extinguisher is under process.
2. Monthly safety committee meeting conducted as per schedule.
3. Mock drill conducted as per schedule.
4. Organized special training by Volvo Engineer for Dumper Operator.
5. Bipartite safety meeting conducted on 9<sup>th</sup> August 2019.
6. Illumination survey as per schedule.
7. Initial/ basic training, refresher training, special training given as per schedule
8. Special awareness drive on SOP & safe working organized for operators & workmen
9. SOP for water tanker operation distributed to all the operators
10. Launch of a massive Safety Awareness campaign
11. Renovation of old safety board/ poster during Mine Safety Week-2019
12. Safety Management plan-2020 prepared and implemented
13. Pocket dairy of SOP/COP in Hindi languages-2020 prepared and distributed to all BLM workmen (contractual & Dept.) during Mine Safety Week-2019.
14. Renovation of Haul road, LMV mine road, benches, view point and mine buildings

15. Conduction of safety talks
16. LOCK OUT TAG OUT arrangement, various SOP/COP, flag poles are done/developed/streamlined as per DGMS standard.
17. Special one day First Aid class was arranged for 53 persons and theoretical training.

### Occupational Health services

- All mines have been equipped with sufficient number of first aid rooms and stations to ensure timely rendering of First Aid Services to the injured.
- A 340 bedded Hospital with state of art infrastructure as well as sufficient number of medical and para-medical staff is maintained in the vicinity of Mines.
- IME/PME Details from 01.04.2019 to 30.11.2019

Type of Medical Examination	Number of persons	
	Target	Actual
Initial Medical Examination (IME)	479	618
Periodical Medical Examination (PME)	3881	4086

### Singareni Collieries Company Limited (SCCL):

SCCL has a planned and systematic approach to implement the safety policy of the organisation through an effective safety management system. SCCL is strictly implementing all statutory provisions related to mining operations. Safety measures are being monitored at mine level, Area level, Company level and National level. The deficiencies observed are being entered into web site and their rectifications are being monitored from time to time. SCCL aims to minimize risks in mine, bring safety awareness amongst its employees and thereby aims for achieving zero accident potential in the mines. SCCL uses Risk Assessment methods to determine priorities and set objectives for eliminating hazards and reducing risks.

## Accident Statistics of SCCL

i. Details of fatal and serious accidents and rate of fatality and serious injury during 2014-15 to 2019-20 (up to Dec, 2019) is given in the table below.

Year	Fatal Accidents	Fatalities	Serious Accidents	Serious Injuries	Fatality Rate		Serious Injury Rate	
					Per MT	Per 3 lakh man-shifts	Per MT	Per 3 lakh man-shifts
2014-15	7	7	271	271	0.13	0.15	5.16	5.64
2015-16	7	7	225	225	0.12	0.14	3.73	4.51
2016-17	10	12	220	224	0.20	0.25	3.65	4.66
2017-18	11	12	210	215	0.19	0.24	3.47	4.32
2018-19	7	7	187	187	0.11	0.16	2.90	4.17
2019-20 (up to Dec, 2019)	6	6	95	95	0.13	0.20	2.05	3.14

ii. Details of fatal and serious accidents and rate of fatality and serious injury during 2014 to 2019 is given in the table below.

Year	Fatal Accidents	Fatalities	Serious Accidents	Serious Injuries	Fatality Rate		Serious Injury Rate	
					Per MT	Per 3 lakh man-shifts	Per MT	Per 3 lakh man-shifts
2014	8	9	270	271	0.17	0.18	5.25	5.52
2015	7	7	245	245	0.12	0.14	4.05	4.98
2016	10	12	216	218	0.20	0.25	3.66	4.54
2017	11	12	213	219	0.20	0.24	3.60	4.39
2018	7	7	190	191	0.11	0.15	2.91	4.10
2019	8	8	138	138	0.12	0.20	2.10	3.38

### Safety Measures in SCCL:

- Phased out conventional mining in UG mines by introducing semi-mechanisation, Continuous Miners and long wall.
- Roof/Sides support is being done based on geo-tech studies by Resin capsules with roof bolters.
- Quad bolters and jumbo drills were provided in continuous miner panels to meet demand of support as per extraction requirement.
- Strata monitoring with TEL- TALES, Roof Extensometers, Load cells and Stress capsules are in use for monitoring strata behavior.
- Services of Scientific Institutions like NIRM, CIMFR & NGRI are being taken up for scientific investigation and studies in different mines on strata management.
- To monitor strata control & mine environment activities, each region is provided with strata monitoring cells. LIDAR (Light detection and scanning terrestrial scanner) has been procured recently and installed for monitoring the dump slope and pit slope on real time basis.
- Men transport systems have been introduced in all underground mines.
- Replaced haulages with belt conveyors for coal evacuation, wherever possible.
- Monitoring of High wall benches (slopes) and dump slopes for early detection of slope failures.

- Use of Rear-view Cameras and proximity-warning devices in Dumpers in Open cast mines.
- Guidelines on precautions to be taken during summer are circulated every year.
- Pre-Monsoon audit of the precautionary measures taken/ to be taken against danger of inundation is carried out every year.
- Provided Nitrogen Injection Fire Prevention and extinguishing system at transformers in all 132 KV sub-stations.
- SCCL has utilised the expertise of the Australian mining industry for development, implementation and monitoring of SMP in SCCL mines by Training a team of 10 executives at SIMTARS, Australia on Risk assessment based Safety Management System, under the program "Train the Trainers".
- Safety Management Plans of all operating mines are prepared and submitted.
- Training on development and implementation of SMP is being imparted to the Safety Management Team of the concerned mines by the SIMTAR accredited trainers. Presently, training in 16 mines is completed.

### Rescue Services in SCCL:

- A Central monitoring mechanism with Department of Rescue headed by a General Manager has been established at Ramagundam. In addition to this, three Rescue Room for Refresher Training (RRRT) centers were established at Kothagudem, Mandamari and Bhoopalapalli Areas.
- Rescue services in SCCL were modernized in the year 2002 to be the best in India and on par with those in developed countries meeting International Standards.
- Apart from the basic rescue equipment required as per the statute, SCCL has procured state of the art Hydraulic Rescue Tools consisting of Hydraulic Cutters, Spreaders, Combi-Tools, Rescue Rams and Lifting Jacks. Pneumatic High Pressure Lifting bags, Concrete Cutters and Wood Cutters to deal with various types of disasters.
- SCCL Rescue Team led by Directors and GMs attended International Mines Rescue Conference thrice and

participated five times in International Mines Rescue Competitions conducted once in two years.

- The Rescue services of SCCL are extended to civil calamities also such as road/train accidents, vehicle collisions, drowning, fire incidents in villages, and fire accidents in thermal power plants.

### Mine Safety Inspections:

- Every Mine has been provided with statutory man power to supervise/inspect the mining activities for safe operations.
- Area level senior officers will made inspections/surprise inspections to ensure implementation of SOPs, provisions of act, regulations.
- Regular and surprise inspections of the mines and departments by GM (S) of the region and corporate ISO officers to ensure safe operations and implementation of SOPs, provisions of Act, Regulations.
- Periodical inspections of Workmen inspectors.
- Monthly inspections/follow-up inspections by Pit Safety Committee members at Mine level.
- Special drive for accident prevention in OCPs:
- Conducting special awareness classes to all the employees including contract workmen.
- Conducting Safety audits to ensure implementation of all statutory provisions.
- Conducting Safety audit on HEMM and their movement.

### Emergency response system:

- Emergency response plan prepared and submitted to the Directorate of Mines Safety.
- Mock rehearsals are being conducted at all mines to examine the efficacy of the emergency response system.
- Displayed emergency response flow chart at conspicuous places at the mines.
- Escape routes are prepared and being inspected and maintained for availability in emergencies.



### Safety and R&D Initiatives:

- **Introduction of LiDAR equipment for slope monitoring in OC mines:**

LiDAR is introduced recently in SCCL for Slope Stability Monitoring. The equipment continuously measure (24x7) mine wall movements with sub-millimetric accuracy at long distance (up to 2.0 km) and provide reliable early warning for progressive slope movements potentially leading to failures. Scientific studies are conducted for Pit slope and dump slope stabilities in all Opencast mines as per statute by IIT (BHU), NITK, CIMFR etc. Strata Control and Management Plan studies are being conducted for all Underground Mines by NIT, CIMFR, SIMTARS etc., Wi-fi communication for Underground communication system is in process of procurement.



- **Tube Bundle Gas Monitoring System (TBGMS)**

TBGMS was procured from M/s. SIMTARS, Australia and installed at Adriyala Longwall Project during 2017 for the first time in SCCL mines. It is capable of monitoring 20 locations continuously. Tube Bundle Gas Monitoring Systems are used to monitor the atmosphere at relevant locations in underground. They sample from return airways to detect the onset of spontaneous combustion and to determine gas generation rates, as well as from sealed and active goafs to determine explosibility, air ingress and potential spontaneous combustion activity.

System consists of supervisory, control and data acquisition (SCADA) software and hardware developed specifically

for continuous automated mine gas monitoring, interpretation and decision support system. The system will measure very accurately Carbon Monoxide, Methane, Carbon dioxide and Oxygen components of the coal mine atmosphere and give the user essential information on the status of the underground atmosphere.



Tube Bundle System in operation at Adriyala Longwall Project

### Occupational Health Services and Initial Medical Examinations:

- In SCCL, all Periodical Medical Examination (PME) Centers have been equipped with required medical appliances and personnel.
- 23 Doctors were trained in Occupational health services training centre to serve in all 11 IME/PME centers.
- Due importance is being given for detection of occupational diseases at early stages and all the workers are undergoing PME.
- Notified occupational diseases, if any, are being reported scrupulously.
- Occupational Diseases Board was constituted, regular meetings are being held and its recommendations are followed/ implemented.
- IME is being done to all departmental and contract workmen before deploying them for duty, PME is being done to the employees below 45 years of age once in every 5 years and once in 2 <sup>1/2</sup> years to all those employees above 45 years of age.

