



SAFETY IN COAL MINES

ANNUAL REPORT 2017-18

SAFETY IN COAL MINES

Coal India Limited:

Safety is always of utmost priority of CIL. Safety is ingrained in mission statement of CIL and is one of the most important components in our 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 stated 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. CIL has identified work place hazards and associated risks in each mining operation and prepared a Risk Assessment based Safety Management Plan for every mine. CIL always encourages employees' participations at all levels so as to promote a proactive safety culture and improve safety awareness up to grass root level employees. Various initiatives are taken on continual basis at all levels to translate the vision of "Zero Harm Potential (ZHP)" into a reality.

Salient features of continuous and sustained improvement in CIL's safety performance:

Comparative Accidents Statistics of CIL of 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
2015-17#	36	45	112	116	0.08	0.19	0.22	0.49

Average of last three years i.e. 2015, 2016 & 2017 (up to November) & figures are subject to reconciliation with DGMS

Safety performance of CIL:

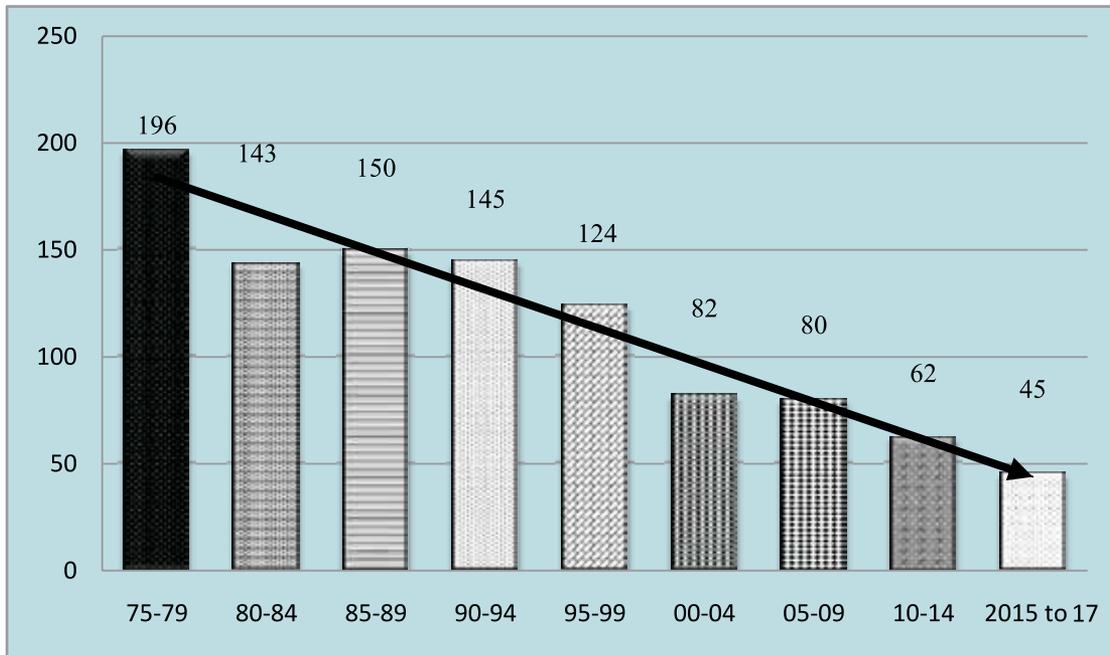
Accidents statistics is the relative indicator for safety status in mines. Over the years the safety performance of CIL in terms of accident has improved significantly.

Analysis of Accident Statistics in CIL:

This improvement in safety is attributed to the following factors:

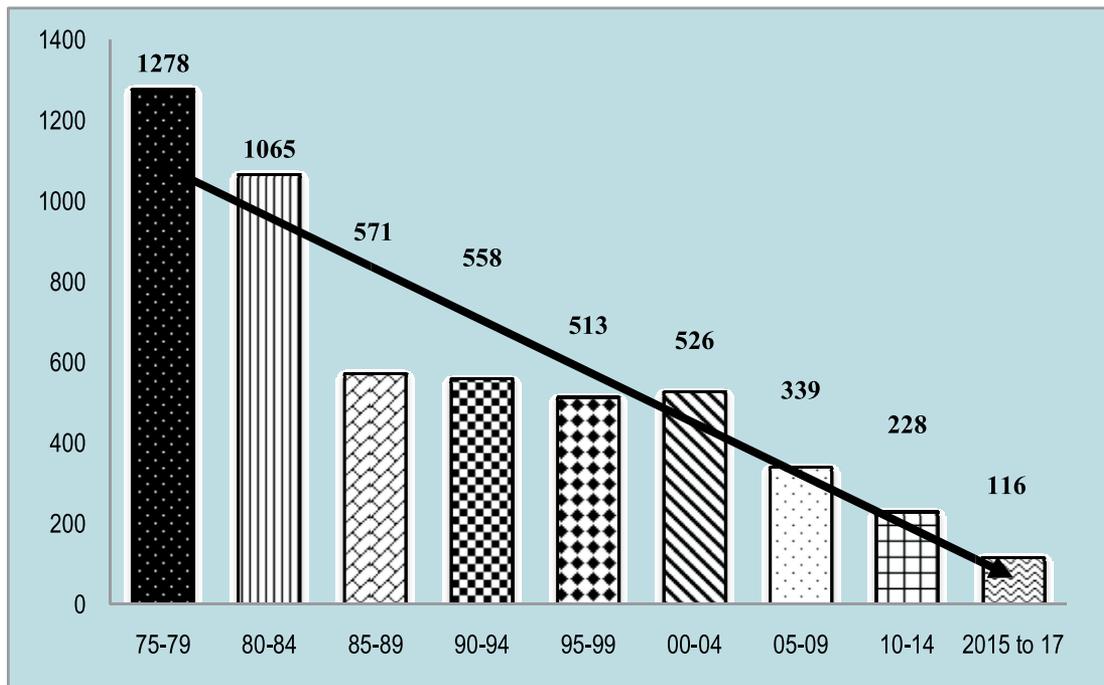
- Collective commitment and synergetic collaboration of the management and employees.
- Use of state-of-the-art technology in the field of mining methods, machineries and safety monitoring mechanism.
- Continuous improvement in knowledge, skill and awareness of workforce through imparting quality training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

Trend of 5 Yearly Average Fatalities in CIL since 1975



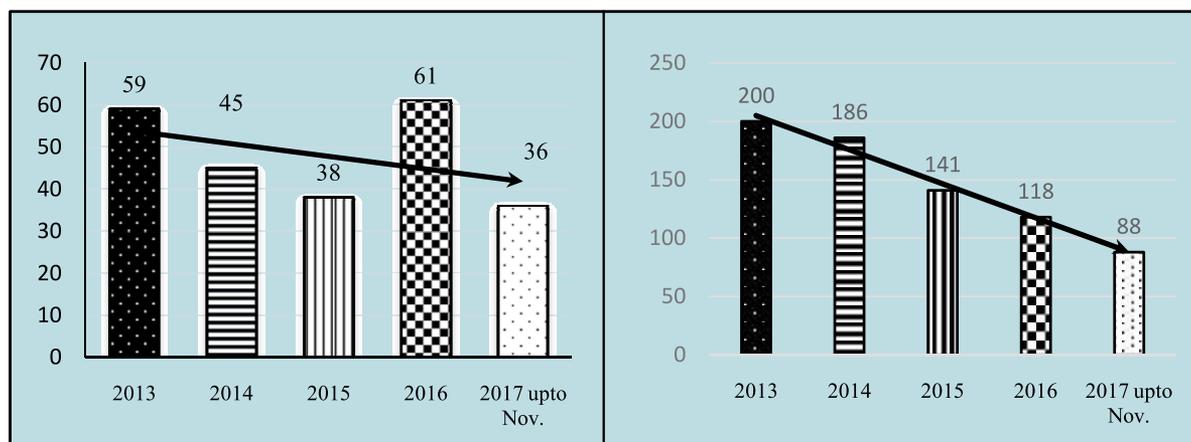
Average of last three years i.e. 2015, 2016 & 2017 (up to November) & figures are subject to reconciliation with DGMS

Trend of 5 Yearly Average of Serious Injuries since 1975



Average of last three years i.e. 2015, 2016 & 2017 (up to November) & figures are subject to reconciliation with DGMS

Trend of fatalities & serious injuries in CIL for last 5 years



Note: Accident Statistics are maintained calendar year wise in conformity with DGMS practice & figures since 2016 are subject to reconciliation with DGMS

Overall in CIL - All parameters have shown improvement in 2017 up to November vis-a-vis 2016

Sl. No.	Parameters	2017	2016	Change in absolute nos.	% of Change
1	Number of fatal accidents	33	38	- 5	-13.16 %
2	Number of fatalities	36	61	-25	-41.98 %
3	Number of serious Accidents	88	113	-25	-22.12 %
4	Number of serious injuries	88	118	-30	-25.42 %
5	Fatality Rate per Mte. of coal production	0.07	0.11	-0.04	-36.36 %
6	Fatality Rate per 3 lakhs manshift deployed	0.17	0.25	-0.08	-32.00 %
7	Serious injury Rate per Mte. of coal production	0.17	0.22	-0.05	-22.73 %
8	Serious injury Rate per 3 lakhs man-shift deployed	0.41	0.49	-0.08	-16.33%

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

Company-wise Accident Statistics of CIL for the year 2017

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	9	9	18	18	0.25	0.20	0.51	0.40
BCCL	2	2	13	13	0.07	0.06	0.43	0.42
CCL	5	6	03	03	0.10	0.22	0.05	0.11
NCL	3	3	09	09	0.04	0.27	0.11	0.80
WCL	3	3	11	11	0.07	0.07	0.26	0.24
SECL	7	9	29	29	0.07	0.22	0.22	0.70
MCL	4	4	05	05	0.03	0.28	0.04	0.35
NEC	0	0	00	00	0.00	0.00	0.00	0.00
CIL	33	36	88	88	0.07	0.17	0.17	0.41

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

Company-wise Accident Statistics during the period 2015 to 2017

Company	Fatal Accidents			Fatalities			Serious Accidents			Serious Accidents		
	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017
ECL	07	09	09	07	31	09	39	42	18	40	44	18
BCCL	07	06	02	07	06	02	09	05	13	09	05	13
CCL	02	04	05	02	04	06	05	07	03	05	08	03
NCL	01	04	03	01	04	03	18	13	09	20	13	09
WCL	08	05	03	08	05	03	24	14	11	27	14	11
SECL	10	08	07	10	09	09	33	25	29	35	27	29
MCL	03	02	04	03	02	04	04	07	05	04	07	05
NEC	00	00	00	00	00	00	00	00	00	00	00	00
CIL	38	38	33	38	61	36	132	113	88	140	118	88
	Fatality Rate Per MT of coal production			Fatality Rate Per 3 lac manshifts			Serious Injuries Rate Per MT of coal production			Serious Injuries Rate 3 lac manshifts		
CIL	0.07	0.11	0.07	0.15	0.25	0.17	0.27	0.22	0.17	0.56	0.49	0.41

Major Activities of Safety & Rescue Division of CIL:

- Inspection of mines to review safety status of mine & follow up action thereof.
- Prima-facie fact finding enquiry into fatal accidents and major incidences such as Mine fire, subsidence, in-rush of water, slope failure, etc.
- Imparting specialized training by SIMTARS accredited executive trainers to Unit level and Area level executives, mine officials and members of Safety Committee, who are directly engaged in ensuring safety in mine.
- Framing of internal technical circulars / management guidelines related to safety issues and monitoring implementation thereof.
- Maintenance of database of accidents / major incidents.
- Publication of Safety Bulletin for disseminating and sharing of knowledge in order to promote safety awareness and inculcate better safety culture.
- Framing reply of different coal mine safety related Parliamentary Questions including queries raised by different Standing Committees such as Standing

Committee on Steel & Coal, Standing Committee on Labour, Standing Committee on Subordinate Legislation as well as questions raised by COPU, MOC, CAG and VIPs.

- Monitoring safety related R&D activities in CIL.
- Organizing meeting of CIL Safety Board and monitoring recommendations / suggestions made during these meetings.
- Assisting in organizing the Standing Committee on Safety in coal mines and monitoring recommendations / suggestions made during meeting.

Measures taken for improvement of safety in 2017:

CIL has vigorously pursued several measures in the year 2017, along with, the on-going safety related initiatives, apart from compliance of statutory requirements for enhancing safety standard in mines of CIL and its Subsidiaries, which are given below:

- **Conducting Safety Audit:** Safety Audit of all operating mines of CIL has been conducted through multi-disciplinary Inter-Company Safety Audit teams in 2017 for

assessing safety status of mines and violations pointed out during the said safety audits are being rectified as per the stipulated timeline.

- **Online Safety Monitoring System:** Online Centralized Safety Monitoring System "CIL Safety Information System (CSIS)" has been developed and uploaded in CIL website. Relevant safety related information from each mine is being uploaded in the same system on continual basis for better safety management.
- **Imparting Special Training by SIMTARS, Australia accredited Trainers:** Executives who had undergone specialized training on Risk Assessment through SIMTARS, Australia are engaged in imparting training and upgrading the knowledge of Mine level executives as well as Members of Safety Committees of individual mines to identify the hazards and evaluate the associated Risks in the mines so as to prepare Risk assessment based Safety Management Plans (SMPs), Principal Hazards Management Plans (PHMPs) and Standard Operating Procedures (SOPs).
- **Establishment of Geo-Technical Cell in all subsidiaries -** Geo-Technical cells have been established in all subsidiary HQ headed by a senior level officer of Mining Discipline and assisted by adequate number of Multi - Disciplinary technical experts including Geologist.
- **Safety Management Plans (SMPs) –** Site-specific risk assessment based SMPs has been prepared for each mine of CIL by involving mine officials and workmen and the same are being updated on continual basis. The process of Risk Assessment in mines is continuous and on-going for improving Safety Standards of Mines on real time basis. All SMPs are being monitored through ISO of each subsidiary.
- **Principal Hazards Management Plans (PHMPs):** Principal Hazards Management Plans (PHMP) are also being formulated as a part of Safety Management Plan(SMP) to avert any mine disaster or major mine accident. Recommended control measures thereof in form of Trigger Action Response Plan (TARP) are being implemented to safety deal with emergency, if any.
- **Standard Operating Procedures (SOPs):** Site-specific, Risk Assessment based Standard Operating

Procedures (SOPs) for all Mining and Allied operations are framed and implemented. The same are being updated on continual basis to cater to the changing mine dynamics.

- **Conducting Special Safety Drives on different Safety Issues:** Special Safety drives on different safety matters are being organized to improve safety standard of mines and enhance safety awareness amongst employees. In this regard, a special drive "Meri Company Mera Gourav" was conducted from 15th Oct., 2017 to 15th Nov., 2017 in all mines spread over different subsidiaries of CIL to intensively make aware on state-of-the-art safe practices grass-root level workmen including their family members and other stakeholders related to mine safety.

• *Safety Campaign of CIL*

• सुरक्षा मेरी जिम्मेदारी है

• हमेशा सुरक्षा नियमों का पालन करें

- **OB dump Stability Study:** Assessment of OB Dumps and Benches have been conducted thoroughly by using expertise of CMPDIL and multi-disciplinary ISO teams in most of the opencast mines. Corrective actions are being taken based on the findings of aforesaid assessment.
- **Guidelines on corrective measures:** Several directives / guidelines on corrective measures for prevention of recurrence of similar type of accidents/incidences in future are being issued by the Safety & Rescue Division of CIL, after analysis of fatal accidents.
 - o part from the above specific actions, the following are on-going measures for improving safety standards:
 - o part from the above specific actions, the following are on-going measures for improving safety standards:
- **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 in UG mines.

- b. Deployment of more number 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.



- e. Phasing out manual loading in UG mines.

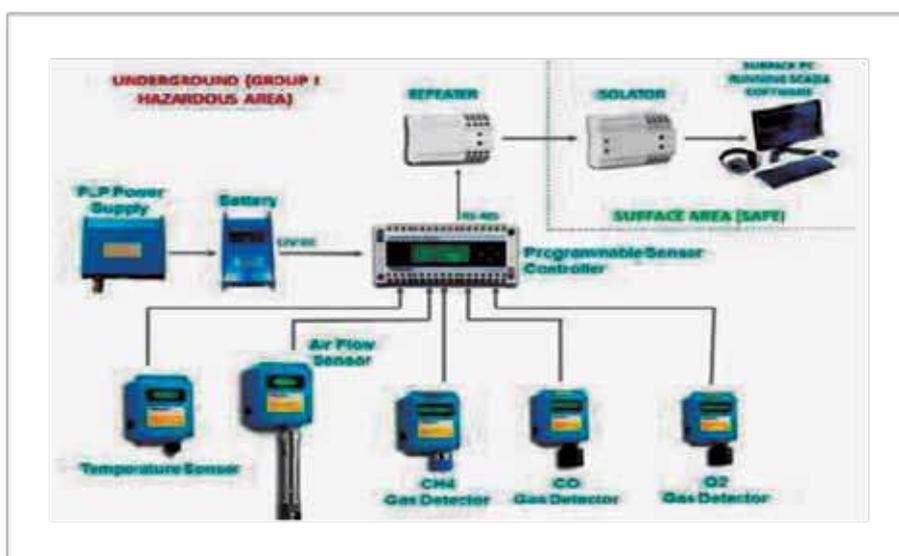
• **Adoption of the state-of-the art mechanism for Strata Management:**

- o Scientifically determined Rock Mass Rating (RMR) based Strata Support System.
- o Strata Control Cell for monitoring efficacy of strata support system.
- o Mechanized Drilling for Roof bolting.
- o Use of Resin Capsules in place of Cement capsules.
- o Use of modern Strata Monitoring Instruments.

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

• **Mechanism for monitoring of mine environment:**

- o Detection of mine gases by using Methanometer, CO-detector, Multi-gas detector etc.
- o Continuous monitoring of mine environment by installing Environmental Tele Monitoring System (ETMS) & Local Methane Detectors (LMD) etc.



- o Regular Mine Air Sampling and Analysis by Gas Chromatograph.
- o Personal Dust Sampler (PDS).
- o Use of Continuous Ambient Air Quality Monitoring System (CAAQMS) in large OCPs to assess the ambient dust concentration and take suitable mitigative measures.

Mine Safety Inspection:

- o Round-the-clock Supervision of all mining operations by adequate number of competent & statutory Supervisors and mine Officials.
- o Periodic mine Inspections by Head Quarter and Area level senior officials.
- o Surprise back shift mine Inspections by mine and area level officials.
- o Regular Inspection by Workmen Inspectors appointed in each mine.
- o Regular mine Inspection by officials of Internal Safety Organization of respective subsidiary and CIL.

Steps for prevention accidents in OCPs:

- a. Formulation and Implementation of Mine-specific Traffic Rules.
- b. Code of Practices for HEMM Operators, Maintenance staff & others.
- c. Sensitization training of Contractor's Workmen involved in contractual jobs.
- d. Training imparted to dumper operators on Simulators.
- e. Lighting arrangement using high mast towers for enhancement of illumination as per stipulated guidelines.
- 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. Wet Drilling & water Sprinklers for dust suppression.
- j. Use of Shock Tubes & Electronic Detonators for control of ground vibration & fly rocks.
- k. GPS based Operator Independent Truck Dispatch System (OITDS) in large OCPs for tracking movement of HEMMs inside OC mine.
- l. New Initiatives taken up by CIL in the year 2017:

An MoU is in the process of finalization between CIL and SIMTARS, Australia for

- a. Enhancing skill level of employees of CIL by imparting advanced level training.
- b. Establishing Mine Virtual Realty Training Centre at IIT (ISM), Dhanbad with the state-of-art-technology.
- c. Technical solutions in UG sector in challenging Geo-Mining locales.
- d. Detection and mitigation of fire and associated hazards in Jharia and Raniganj Coalfields.
- Development of suitable Training modules based on the concept of Risk Management for all mining and allied operations and revamping of existing "The Mines Vocational Training Rule", 1966 in association with DGMS to cater to the present needs.
- Adoption of concept of "Take Responsibility for Accident Prevention" (TRAP) for tangible reduction in operation related incidences.
- Formulation and implementation of Disaster Prevention Strategy to avert occurrence of any disaster in future.
- Taking up of different R&D Projects in collaboration with Scientific & Technical Institutes in the thrust areas of Safety & Conservation.

Mine Emergency Response System:

- o Emergency Action Plans has been prepared as per statute for each mine.
- o Mock Rehearsals for examining the efficacy of Emergency Action Plan.

- o Demarcating Emergency Escape Routes in belowground.
- o Check list prepared for dealing with an emergency in mine.
- o Flow Chart prepared for transmission of information regarding crisis / disaster in mines from site of accident to the Ministry of Coal, New Delhi.
- o 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 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, Kasmunda, 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

Safety Monitoring of CIL:

Apart from statutory monitoring by DGMS, the status of safety in mines of CIL is being monitored at various levels by the following agencies:

Level	Monitored By
Mine level	<ul style="list-style-type: none"> Workman inspectors: as per the Mines Rule-1955 Safety Committee: constituted as per the Mines Rule-1955
Area level	<ul style="list-style-type: none"> Tri-partite Safety Committee Area Safety Officer
Subsidiary HQ level	<ul style="list-style-type: none"> Tri-partite Safety Committee Internal Safety Organization (ISO)
CIL HQ: Corporate Level	<ul style="list-style-type: none"> CIL Board CIL Safety Board CMDs Meet. Corporate level ISO.
At National level	<ul style="list-style-type: none"> Standing Committee on Safety in Coal Mines National Conference on Safety in Mines. Various Parliamentary Standing Committees

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
3	The Coal Mine Regulation -2017 (Notified recently on 27.11.2017)
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 Policy of CIL:

Safety is given prime importance in the operations of CIL as embodied in the mission of Coal India Ltd. CIL has formulated a Safety Policy for ensuring safety in mines and implementation of which is closely monitored at several levels.

- 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 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.

- 8) 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 units;
- 9) 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;
- 10) 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;
- 11) Institute continuous education, training and retraining all employees with the accent placed on development of safety oriented skills;
- 12) Continue efforts to better the living conditions and health of all the employees both in and outside the mines.

B. Neyveli Lignite Corporation India Ltd.

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

Year	Fatalities	Serious Injuries
2013-14	1	4
2014-15	1	1
2015-16	3	2
2016-17	Nil	1
2017-18 (up to November 2017)	1	0

Safety Trainings:

Trainings given at GVTC upto November 2017:

BASIC TRAINING		REFRESHER TRAINING		SPECIAL TRAINING	OTHER TRAINING	TOTAL NOS. OF PERSONS TRAINED
EMPLOYEES	CONTRACT WORKERS	EMPLOYEES	CONTRACT WORKERS			
64	1488	1188	1783	1435	325	6516

Accident Statistics (for 2017-18):

Sl. No	Particulars	2017 – 18 Apr 17 to Nov 17 Mines
1	Numbers of Fatal Accidents	1
2	Numbers of Fatalities	1
3	Numbers of Serious Accidents	-
4	Numbers of Serious injuries	-
5	Numbers of Reportable Accidents	-
6	Total man days worked	2299518
7	Total Production in Million Tonnes	11.95
8	Fatality rate per Million Tonnes of Lignite Production	0.08
9	Fatality rate per 3 lakh man shifts deployed	0.13
10	Serious injury rate per Million Tonnes of Lignite production	-
11	Serious injury rate per 3 lakh manshifts deployed	-

Safety Budget & Actual:

Year	Safety Budget	
	Allocated	Actual upto November 2017
2017-18	₹552.00 Lakhs	About ₹122.00 Lakhs

Safety Trainings given at (L&DC) 2017-18:

YEAR	NO OF PRGMS.	EXE.	NON EXE.	TOTAL
2017-2018 Upto Nov. 2017	24	151	1389	1540

First Aid Training given in NLCIL Mines 2017-18' upto November 2017:

YEAR	MINE-I	MINEIA	MINE-II	BARSINGSARMINE	NLCIL MINES
2017-18	60	52	79	4	195

Safety Measures:

- In respect of the above, a working document 'Safety Management Plan' had been brought out and distributed to the operation/ Maintenance areas of NLC India Limited Mines and recommendations are implemented.
- A well laid Emergency Preparedness Plan/ Pre Monsoon Action Plan is being prepared for every Mine every year to take care of any emergency situation.
- The Risk Assessment, Occupational Health and Safety Audit for NLC India Limited Mines were carried out in the year 2003, 2007 and 2012 by accredited External Agency. Risk Assessment for NLC India Limited Mines was carried out by ISM, Dhanbad in the year 2016.
- NLC India Limited has obtained certification for all the Mines as under and the stipulated norms in the certifications and are being maintained.
 - Quality Management System ISO 9001.
 - Environment Management System ISO 14001.
 - Occupational Health and Safety Assessment Series – OSHAS 18001.
- Area wise responsibility with priority to Safety is being enforced at all Mine Operational/ Maintenance Activities for ensuring specific site supervision.
- Neyveli Mines: An Internal Safety Organization (ISO) is headed by CGM/Safety and Multidisciplinary team for each mine consisting of Engineers from Mining, Mechanical & Electrical discipline. These teams inspect the Mines on daily basis. The suggestions given by the team are implemented then and there. Monthly ISO Safety meeting with all the Safety Officers of respective Mines are held and suggestions given and the implementation are reviewed.
- Safe Work Practices, for all the important operation/ maintenance of the 'Specialized Mining Equipments' have been formulated/ modelled/ Codified and approved by DGMS and the same is being followed in all spheres of activities.
- Daily/ Regular/ Periodical Maintenance check lists for the "Specialized Mining Equipments" had been prepared and enforced for strict compliance.
- Inter Unit Safety Assessments are being carried out for every quarter to assess safety standards maintained as per statute.
- Systematic in-depth Accident Analysis is being done and counselling of near miss/ Serious Accident Victims is being done for accident prevention/ to avert recurrence of accidents.
- Commitment on inculcating Safety Awareness by way of imparting adequate/ need based training with new training modules to all employees and the Compulsory Training for all categories of employees, including the contract employees before their deployment in Shop Floor and in their assigned working areas. In addition to the above, work related specific job training / refresher training are also being imparted to all categories of employees.
- Safety Status/ Safety Performance of every activity is being monitored / reviewed under the statutory framework and once in a quarter, Safety performance is reviewed and discussed in the Board.
- Continuous monitoring of behavioural sense/ attitude/ commitment of employees towards Safety is being done.

14. Continual improvement on safety awareness in mines through Public Address System, LED display board (JUMBO SIZE), Display of Safety Boards, etc.
15. Week long Safety Week Celebrations are conducted every year to enhance the safety awareness among employees and their families.
16. All efforts are taken at NLC India Limited Mines to impart the best practices to be followed in Mines. NLC India Limited follows the dictum that a "Safe Mine is a Productive Mine". The safe worker/ employee are honoured suitably at Safety Week Celebration function conducted every year grandly by NLC India Limited Mines. Workmen/ Employees working in mines are also sent on safety tours to study the working condition/safety methodology followed in other mines. Officers are also sent to Seminars.
17. Surveillance camera being installed in Specialized Mining Equipments.

Safety & R&D initiatives:

- a. CCTV Surveillance at Specialised Mining Equipment(SME): SMEs are equipped with CCTV Surveillance systems to monitor and avert inadvertent entry of workforce into accident prone areas. Phase-I completed; for phase-II ordering is under process.
- b. Slope Stability Monitoring Radars: Procurement of Slope Stability Monitoring Radars for pre-warning of slope/rock mass movement is in progress.
- c. Simulator: Procurement of Simulator for imparting training on real-time basis to SME operators and CME operators is in progress.
- d. Safety related R&D initiatives are being carried out by Center for Applied Research and Development, Neyveli.

Emergency response system:

Emergency preparedness and response system for Fire, Inundation prepared for all mines and mock rehearsals are conducted at regular intervals

Occupational Health services:

- a. 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.

- b. Neyveli Mines has got well equipped 359 bed hospital with state of art infrastructure as well as sufficient number of medical and para-medical staff.
- c. An Occupational Health Dispensary is being operated under charge of qualified medical practitioner in Lignite Shaktinager, Barsingsar Township.

Initial Medical Examination:

Regular health check-up (IME/PME) is being conducted as per mining legislation.

IME (Initial Medical Examination) /PME (Periodical Medical Examination) conducted during 2017-18 up to November, 2017 is given below:

SI.No	Type of Medical Examination	Number of persons
01	Initial Medical Examination	1042
02	Periodical Medical Examination	
	Executives	143
	Non-Executives	622
	Contract	1228
	Total	3035

Singareni Collieries Company Limited:

1. Accident Statistics of SCCL – (for the last five years):

Year	Fatalities	Serious Injuries
2012-13	9	375
2013-14	12	321
2014-15	7	271
2015-16	7	225
2016-17	12	224
2017-18 (up to Dec)	10	166

2. Safety Statistics of Coal PSU (SCCL) during the year 2017 is given below.

Company	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
SCCL: 2017*	11	12	210	216	0.20	0.26	3.57	4.77

* Figures are up to Dec.

Note: Figures are subject to reconciliation with DGMS.

3. The company wise accident statistics during 2013 to 2017 is given below.

Fatal Accidents					Fatalities					Serious Accidents					Serious Injuries				
2013	2014	2015	2016	2017	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
11	8	7	10	11	12	9	7	12	12	364	270	245	216	210	369	271	245	218	216

Note: Figures for the year 2017 are up to Dec.

4. The rate of fatality and serious injury during 2013 to 2017 is given in the table below.

Fatality rate per MT.					Fatality rate per 3 lakh manshifts					Serious injuries per MT.					Serious Injuries per 3 lakh manshifts				
2013	2014	2015	2016	2017	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
0.24	0.17	0.12	0.20	0.20	0.24	0.18	0.14	0.25	0.26	7.36	5.25	4.05	3.66	3.57	7.33	5.52	4.98	4.54	4.77

Note: Figures for the year 2017 are up to Dec.

Safety Measures in SCCL:

I. Meetings conducted

- Corporate Safety Department has been conducting **Special Safety Review meetings** at three regions of SCCL with all Area GMs, Regional Safety GMs, ASOs, Mine Safety Officers, Agents, Area E&M Engineers, Group Engineers and Pit Engineers with focused agenda for reduction of accidents. Suggestions received and difficulties expressed by the participants at unit level are being addressed on top priority.
- Corporate Safety Review meeting** is being held

with Directors, Corporate HoDs and Regional Safety GMs for addressing the safety issues that were raised during the Area Safety Audits, recommendations made by ISO & DGMS authorities and also to review the accidents.

- All accidents are discussed in the review meetings** and the steps to be taken to avoid recurrence of such accidents are being discussed. Visuals of spot of accidents are shown in the meetings.
- Conducted special meetings to review **“Electrical Safety”** to reduce/eliminate electrical accidents in future.

- Meetings are conducted with OB removal contractors along with Directors to **review the safety status in off-loading areas.**
- Implementation of **Risk Assessment based Safety Management Plans.**

II. Training Imparted

- As part of compliance to the recommendations of 9th & 10th Conferences, SCCL has imparted training to 10 Executives at SIMTARS, Australia on SAFETY MANAGEMENT SYSTEM for providing further training to the trainers at operational level. Steps being initiated to establish "Safety Management Training Centres" each at Ramagundam and Mandamarri areas for imparting training to the Risk Management Teams of mines by SIMTARS Accredited Trainers (SATs).
- First aid refresher training on "Medical First Responder" was imparted to Mining supervisors by MicroNet TechNicks (I) Pvt Ltd., Hyderabad. About 1200 employees were extended this training.
- Training on Electrical Safety in Electrical Installations in Hazardous atmosphere & and testing and Assessment of Refurbished Motors for use in explosive Atmosphere was conducted in all the Regions of SCCL.
- Safety Awareness Programmes are being conducted for the Contract Workmen by involving the Workmen Inspectors and Pit Safety Committee members to reduce the accidents in underground mines and opencast projects.
- Advised to impart First Aid training to all Front line supervisors, Mech. & Ele. Supervisors, tradesmen and other category of employees to make available more number of persons to render first aid in needy occasions as per the rule 45 of Mines rules-1955.
- Workmen Inspectors were imparted Specialised Training programme at the office of Dy.DGMS, SCZ, Hyderabad.

III. Guidelines issued

- Stability of high wall benches/dump yards is being monitored on weekly basis and the same is being submitted to DGMS authorities. A workshop was conducted by CSIRO, Australia on stability analysis and

design optimization of OB dumps in deep opencast mines.

- Advised all Project Officers/Managers of opencast projects to go through the CSIRO, Australia recommendations for stability of high wall/low wall slopes in the Opencast mines for implementation wherever such type of conditions are existing.
- DGMS (Tech) circular nos. 02/1999 and 01/2013 on guidelines relating to safety of the steel bunkers were circulated to all Areas and advised to take all necessary safety measures as mentioned in the circulars.
- All area GMs were advised to instruct the concerned to ensure strict compliance on use of resin and cement capsules as grouting material for support purpose in all the underground mines as per DGMS Circulars no. 04 & 05 of 2013, dt.19.07.2013.
- Advised Mine Managers on immediate medical care at mine surface in emergency to extend necessary medical help with the help of first aid trained personnel or medical personnel before transporting the patient to hospital for further medical aid.
- Advised regional safety GMs to make haulage inspections in mines for adequacy of all safety provisions and systems including condition of track, man holes, lever operated tongue rails, lighting and guiding of tubs etc.
- Advised all Area GMs to obtain safety clearance certificate before commencing the mining operations or commissioning of equipments in their jurisdiction.
- All Mine Managers were advised to see that safety features of equipment/machinery shall be protected and not to allow any alteration except taking help from OEM in order to protect safety of equipment and the personnel operating the equipment.
- All Managers/HoDs of Mines and safety departments were advised to take up special drive on electrical safety and submit compliance report.
- Standard Operating Procedures (SOPs) were prepared for dumpers in OC mines and suggested to avoid movement of dumpers in down gradient with gear in neutral position.
- Steps to prevent violations with respect to usage of drill control panels and gate end boxes of SDLs were advised.

- Guidelines were circulated on shut down procedures during the maintenance/repair on electrical equipment.
- Guide lines were circulated to educate the workmen suffering from Hypertension and Diabetes for regular usage of medicines to reduce natural deaths at work places.
- Guidelines were circulated for inspection and operation on safe working of personal carrier vehicles.
- Guidelines on summer precautions are being circulated every year.
- Guidelines were issued for systematic extraction, maintaining diagonal of extraction to prevent over riding of falls and dangerous situations in depillaring panels.
- All Managers were advised to conduct mock rehearsals as per statute.
- Advised all the mine engineers to maintain records as per CEAR-2010 & CMR 1957 (Now CMR 2017).
- All Executives & Supervisors were sensitized to cause focused, qualitative and meaningful inspections and strive for utmost safety. All the accidents/incidents are being critically analyzed and advised all the Managers, Agents and concerned Officers to take specific preventive measures in eliminating similar accidents/incidents in future.
- Area E&M Engineers, Group E&M Engineers, and Pit Engineers were advised to take steps to ensure safe working of all electrical equipment.

IV. Inspections & Safety audits

- Area level committees were constituted with Area Safety Officer, Area Survey Officer and Area Civil Engineer on pre-monsoon audit inspections and observations relating to dangers due to inundation and preventive steps required for rectification of the deviations, if any were circulated to Mine Managers.
- Mock rehearsals are being conducted at appropriate time to check the emergency preparedness and timely reports are being sent to the DGMS authorities.
- Haulage Safety Audit was conducted by constituting a committee with Area Safety Officer, Area Engineer, Mine Safety Officer, WMI (Mining)/Overman and WMI (Mech).

- Inspections were carried out around all the OC Mines including dump yards to ensure adequate fence is provided in the form of trench and biological fence with babul plantation to prevent any inadvertent entry of the persons.
- A suitable monitoring system has been kept in place to evaluate mine inspection reports by higher authorities at every level and the compliance of the violations pointed out are being entered into web application which are monitored regularly.
- The deficiencies observed by the DGMS officers and ISO are being entered into web site and their rectifications are being monitored from time to time.
- All Area Safety Officers were advised to arrange to complete the enquiries into serious accidents and upload reports into SCCL WEB (within 15 days as per statute) to take corrective steps to avoid occurrence of similar type of accidents by sharing the information. Circulars are being issued on Fatal and Serious accidents with details of preliminary enquiry and findings thereof and the recommendations/precautions to prevent similar occurrences.

V. Other safety related measures:

- Safety Management Plans during the financial year 2015-16 were prepared for all the mines and sent to DGMS based on Risk Assessment Study considering the principle hazards like fire, explosion, inundation and strata failures.
- Accident enquiries into fatal and serious incidents are being conducted by the GM (S) of the region and guidelines are being circulated to prevent similar accidents/dangerous occurrences etc.,
- ISO is actively participating in monitoring of contractual works, vendors meet, preparation of NIT to address the safety issues.
- ISO has been discussing Safety issues before implementation of major mining projects.
- Rear view cameras have been introduced in dumper in open cast mines.

- Introduction of Automatic Fire Detection and Suppression Systems (AFD & SS) in all HEMM.
- As directed by Hon'ble Minister for Coal and Power in the 39th Standing Committee on safety, a Committee was formed to study the procurement of miners shoes and based on their recommendations, procurement process is preferred by open tender with rate contract on two sources as per IS: 3976 -2003 and IS: 15298 (pt-1) - 2002 standards to ensure quality and durability.
- Organising Safety Week, First-aid and Rescue Competitions at Company level.
- Follow up action and preparation of compliance reports in respect of the following:-
- Recommendations of Safety Conferences.
- Recommendations of Standing Committee on Safety in Coal Mines.
- Bipartite/Tripartite Safety Review Meetings at Company level.
- Identification of hazards in all mining operations and associated risks thereof.
- Adoption of the Roof Support System based on geo-technical studies.
- Phasing out of conventional mining methods.
- Continuous Miner and Long wall Technologies are being introduced in feasible areas to enhance the safety of workings.
- Introduction of roof-Bolters for Resin-Capsules bolting.
- Use of Rear-view Cameras and proximity-warning devices in Dumpers in Open cast mines.
- Men transport systems have been introduced in all underground mines.
Chair Lift – 41, Mine Cars – 11, Winding – 4 and Mine Cruisers - 1
- Tele Monitoring system for real time monitoring of CH₄ and CO gases in UG mines.
- Analysis of mine Air samples by Gas-Chromatographs.
- Introduction Automatic fire detection and suppression systems (AFD & SS) in all HEMM.
- Safety Audits are being conducted on regular basis by constituting committees.
- To monitor strata control mine environment activities, each region is provided with strata monitoring cells. The services of scientific institutions like, CIMFR, NIRM etc., are being utilized for designing panels for effective strata management and environmental issues.
- SCCL is contemplating to monitor slope stability by using the latest technology i.e Radar at two opencast mines. Based on the usefulness of this new technology, this monitoring mechanism will be extended to other opencast mines in future.