



SAFETY IN COAL MINES

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Safety in Coal mines

Safety is always the utmost priority of CIL. Safety is ingrained in the 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 its 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 designed and planned with due regard to safety, conservation, sustainable development and clean environment. Workplace hazards and associated risks of mining operations are identified and a Safety Management Plan is prepared for each mine. CIL always encourages employees' participation in safety management so as to promote a proactive safety culture and improve safety awareness amongst all employees. Several initiatives are being taken to achieve "Zero Harm Potential (ZHP)" in mines.

1. Coal India Limited

Analysis of Accident Statistics in CIL

Mine Accidents Statistics is the relative indicator for safety status in mines. Over the years the Safety Standard and over performance on safety matters has improved significantly. The same has been reflected in figures of CIL's Accident Statistics.

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 mechanisms.
- ◆ Constant vigil, round the clock supervision and assistance from all concerned quarters.
- ◆ Continuous improvement in knowledge, skill and awareness of the 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 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

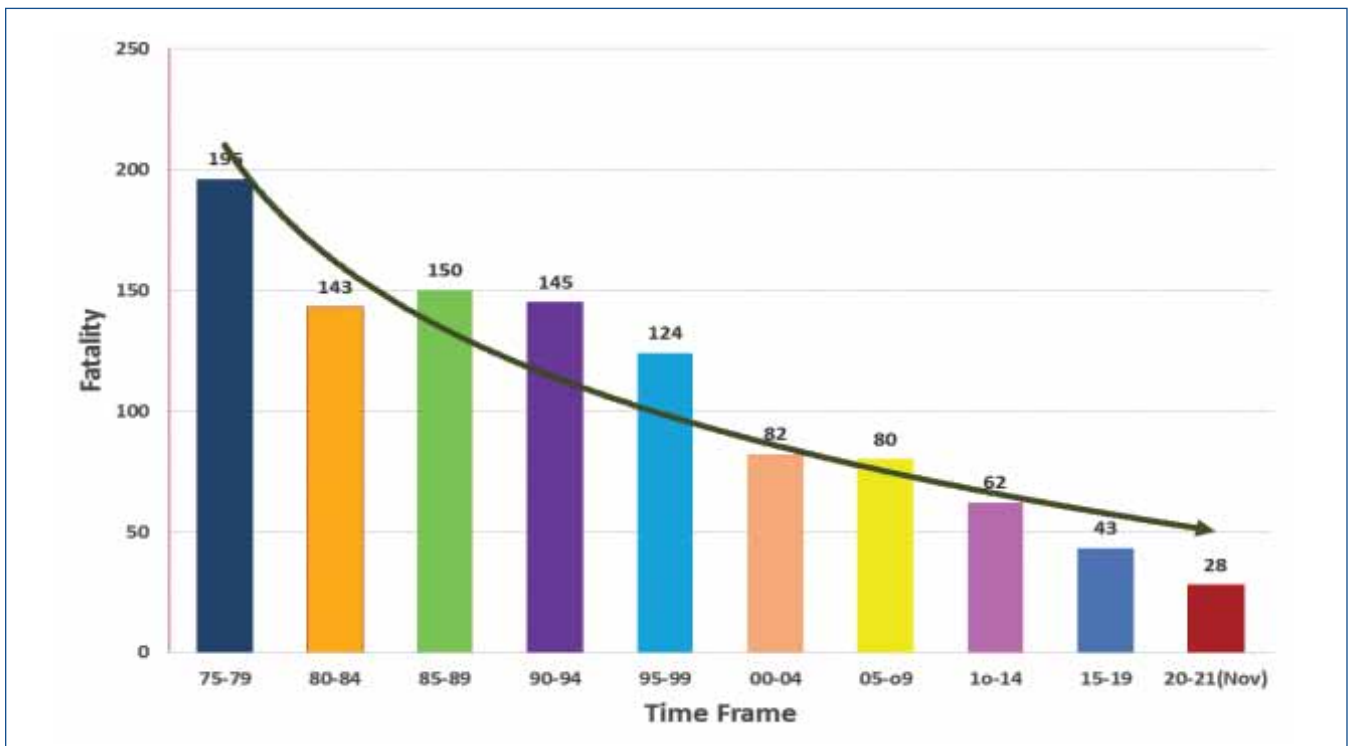
Time frame	Av. Fatal Accidents		Av. Serious Accidents		Av. Fatality Rate		Av. Serious Injury Rate	
	Accident	Fatalities	Accident	Injuries	Per Mill. Te	Per 3 Lac Manshifts	Per Mill. Te	Per 3 Lac Manshifts
1985-89	133	150	550	571	0.98	0.30	3.70	1.15
1990-94	120	145	525	558	0.694	0.30	2.70	1.19
1995-99	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
2020	29	30	73	80	0.05	0.14	0.13	0.37
2021*	23	25	55	58	0.05	0.13	0.11	0.30

*Till November 2021

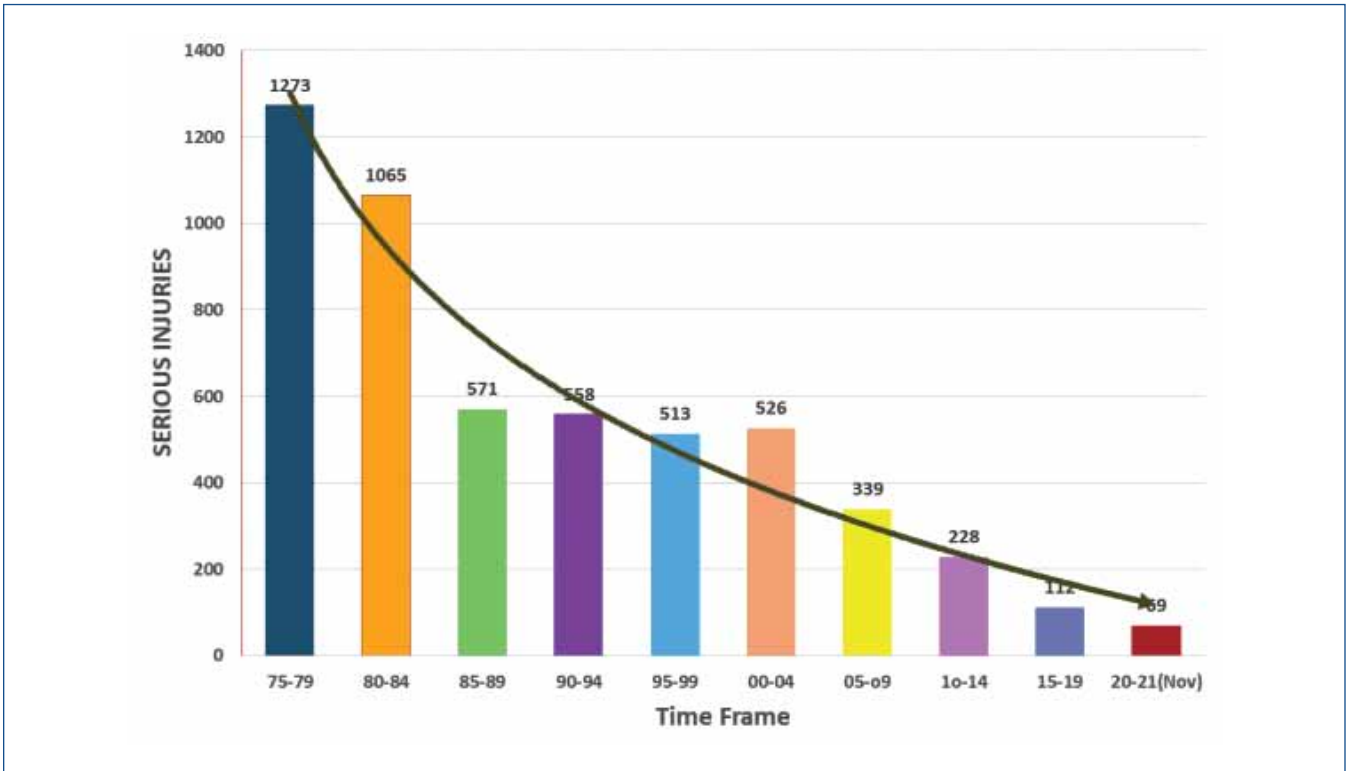
Note: Subject to reconciliation with DGMS & Accident Statistics are maintained calendar year-wise in conformity with DGMS practice

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

(In 2021 Statistics is taken up to November 2021)



Graph: 2 – Trend of 5 Yearly Average of Serious Injuries since 1975
 (In 2021 Statistics is taken up to November 2021)



Graph-3: Trend of Fatalities & Serious Injuries for last 6 years in CIL
 (In 2021 Statistics is taken up to November 2021)

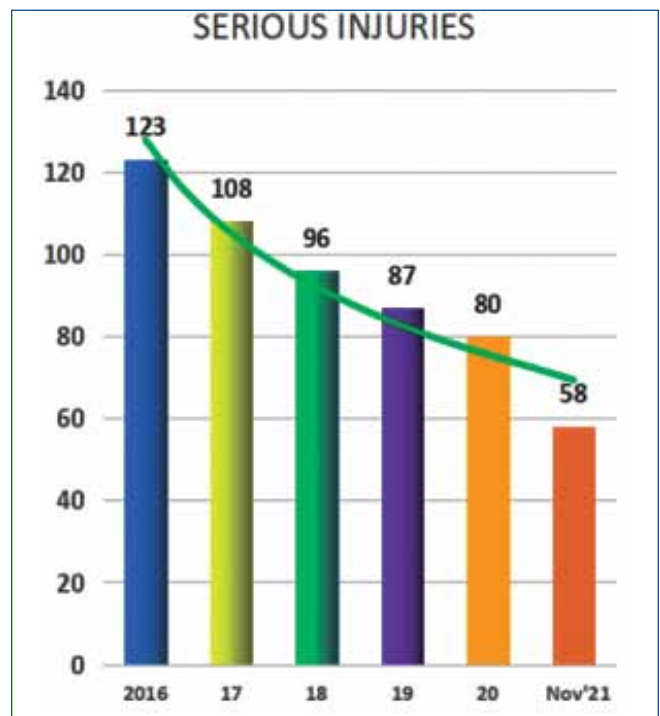
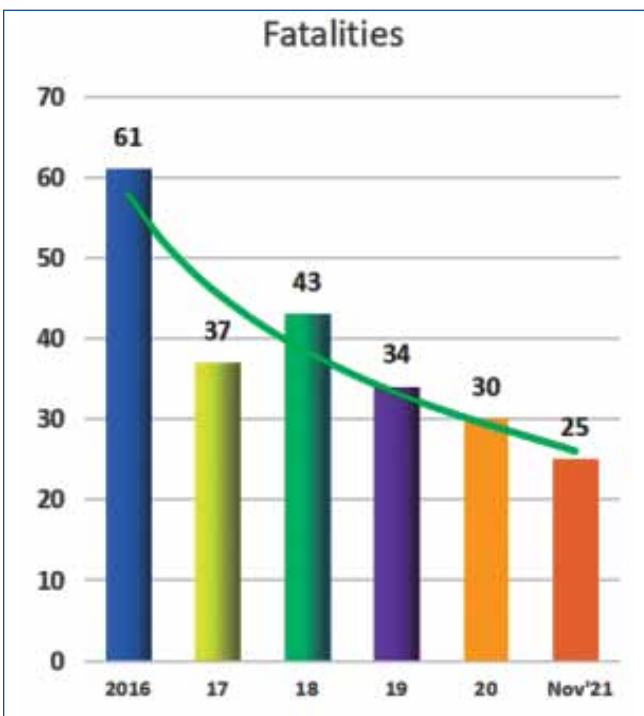


Table – 2: Overall Accident Statistics in 2021*(Nov) vis-a-vis 2020 in CIL

Sl. No.	Parameters	2020	2021*	Reduction in absolute nos.	% of Reduction
1	Number of fatal accidents	29	23	6	20%
2	Number of fatalities	30	25	5	16%
3	Number of serious Accidents	73	55	18	24%
4	Number of serious injuries	80	58	22	27%
5	Fatality Rate per Mte. of coal production	0.05	0.05	0	0%
6	Fatality Rate per 3 lakhs manshift deployed	0.14	0.13	0.01	7%
7	Serious injury Rate per Mte. of coal production	0.13	0.11	0.02	15%
8	Serious injury Rate per 3 lakhs man-shift deployed	0.37	0.30	0.07	18%

*Till November 2021

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 2021*(Nov)

Com-pany	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	6	7	10	11	0.22	0.20	0.29	0.25
BCCL	2	3	6	7	0.14	0.14	0.32	0.32
CCL	1	1	2	2	0.02	0.05	0.04	0.10
NCL	3	3	9	9	0.03	0.28	0.08	0.74
WCL	5	5	6	7	0.11	0.11	0.11	0.11
SECL	5	5	20	20	0.03	0.13	0.16	0.67
MCL	1	1	2	2	0.01	0.08	0.02	0.16
NEC	0	0	0	0	0.00	0.00	0.00	0.00
CIL	23	25	55	58	0.05	0.13	0.11	0.30

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 2019-21* (Nov)

Company	Fatal Accidents			Fatalities			Serious Accidents			Serious injuries		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
ECL	7	6	6	7	7	7	18	18	10	18	22	11
BCCL	6	2	2	6	2	3	10	9	6	12	9	7
CCL	2	1	1	2	1	1	4	7	2	4	7	2
NCL	2	2	3	2	2	3	12	14	9	12	15	9
WCL	2	4	5	2	4	5	16	6	6	17	7	7
SECL	6	10	5	7	10	5	22	15	20	23	16	20
MCL	5	4	1	8	4	1	4	4	2	4	4	2
NEC	0	0	0	0	0	0	0	0	0	0	0	0
CIL	30	29	23	34	30	25	86	73	55	90	80	58

Table - 5: Company-wise Fatality & Serious Injury Rate during the period 2019-21* (Nov)

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		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
ECL	0.14	0.15	0.22	0.16	0.16	0.20	0.35	0.47	0.29	0.40	0.50	0.25
BCCL	0.21	0.08	0.14	0.20	0.07	0.14	0.43	0.34	0.32	0.41	0.32	0.32
CCL	0.03	0.02	0.02	0.08	0.04	0.05	0.06	0.11	0.04	0.15	0.28	0.10
NCL	0.02	0.02	0.03	0.18	0.18	0.28	0.11	0.13	0.08	1.09	1.36	0.74
WCL	0.04	0.08	0.11	0.04	0.07	0.11	0.31	0.14	0.11	0.31	0.13	0.11
SECL	0.05	0.07	0.03	0.17	0.26	0.13	0.16	0.11	0.16	0.56	0.41	0.67
MCL	0.06	0.03	0.01	0.49	0.26	0.08	0.03	0.03	0.02	0.25	0.26	0.16
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	0.06	0.05	0.05	0.15	0.14	0.13	0.15	0.13	0.11	0.40	0.37	0.30

2. Major Activities for Safety & Rescue Division of CIL

- Inspection of mines to review safety status of mine & follow up action thereof to improve safety standard of mines.
- Fact finding enquiry into fatal accidents and major incidents.
- Maintenance of accidents / major incidents database.
- Analysis of mine Accident Statistics in order to find an action plan.
- Monitoring Mine Safety Audit.
- 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.
- Monitoring safety related R&D activities in CIL.
- Organizing a meeting of the CIL Safety Board and monitoring recommendations/ suggestions made during the 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 the Standing Committee on safety in coal mines and monitoring recommendations / suggestions made during the meeting.
- Liaison with various agencies on the matter of mine safety and ISOs of various subsidiaries.

- Monitoring of CIL Safety Information System (CSIS) database and ensuring timely 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.

3. Measures taken for improvement of safety in 2020

CIL has pursued several measures in the year 2021 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:

- i. **Conducting Safety Audit:** Safety Audit for FY 2021-22 in all producing mines of CIL is under progress for as salespersons safety status and to identify deficiencies, if any. Safety Audits of Mine are being done through multi-disciplinary Inter-Area Safety Audit teams. Apart from pointing out the existing safety status of mines, Safety Audit also suggests remedial measures for improving safety standards. Deficiencies pointed out during the safety audit are rectified. The ISO of the respective subsidiary is entrusted to monitor the whole process.
- ii. **Check Safety Audit:** Check Audit for FY 2021-22 for 10% of mines of CIL also are being conducted by Inter Subsidiary multidisciplinary team to reassess the audit conducted by Inter-Area Safety Audit teams.
- iii. **Safety Management Plans (SMPs)**–Site-specific risk assessment based SMPs have been prepared for each mine of CIL by involving mine officials and workmen. SMPs are

reviewed on a regular basis. Implementation of SMPs are monitored through the Internal Safety Organization (ISO) of each subsidiary. The process of Safety Management in mines is a continuous and on-going process for improving safety standards of mines.

iv. 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 Plans (TARP) are also prepared to deal with emergency situations effectively.

v. 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 a regular basis to cater to the changing mine conditions.

vi. Special Safety Drives on different Safety Issues & Risk review workshop: Special Safety drives on various safety issues & Risk review workshops were organized to improve standard of mines safety and enhance safety awareness amongst employees.



vii. Toolbox Safety Talk: In this year tool box safety talk has been introduced for effective assessment of safety related hazards before start of operation. Before commencing any work, respective supervisor(s) or expert(s)

related to the jobs give safety talk and informal risk management is done during the process.

viii. Personal Safety Counseling & Employee Assistant Program : Every employee has

been personally consulted by Safety Officer to understand the ability of the employee in terms of safety attitude and understanding; any personal problems or habits needs

immediate attention. Accordingly, the assistant program is being extended through a welfare officer or medical officer or person of influence.



- ix. **Yearly Medical Examination and Health counselling of Employees above 50 years:** All Employees having more than 50 years and working in active mining areas are being medically examined annually with related Health counselling; this program has been introduced in 2021-22.
- x. **Suraksha Mitra Mandali (Safety Circle):** Concept of Suraksha Mitra Mandali (Quality Circle in Safety) has been introduced in this year to inculcate progressive safety culture amongst employees. All employees have been distributed in groups of Mitra Mandali and these Mandalis are being guided by ISO. Inter & Intra Mandali activities of safety eg. Demonstration of safe practices, safety quizzes etc. are being organized.
- xi. **Implementation of recommendation of High Power Committee:** A high power committee was constituted to enhance safety standards in HoE operation. Standard operating procedures for operators of HoE patches have been re-formulated and distributed with joint signature of Manager and Lead Partner of the contracts.
- xii. **Constitution of Competency Board:** The competency assessment of HEMM operators is being done.
- xiii. **Meeting of Standing Committee on safety in coal mines:** The 45th & 46th meeting of the Standing Committee on safety in coal mines under the Chairmanship of Hon'ble Minister of Parliamentary Affairs, Coal and Mines were held on January 2021 & July 2021 with coal companies, Rep. of Ministry of Labour, DGMS and Central Trade Unions at New Delhi to discuss safety issues and formulation of policies at highest level.
- xiv. **Meeting of 57th CIL Safety Board and Bipartite/Tripartite meeting at subsidiary level:** 57th CIL Safety Board meeting under the Chairmanship of Chairman, CIL was held in the month of July 2021 with Central Trade Unions, all subsidiaries and DGMS. Safety issues of subsidiary level were discussed. Bipartite/Tripartite meetings at subsidiary level are also conducted to discuss safety issues of each company.



Hon'ble MoC Shri Pralhad Joshi Chaired Safety Meeting with Central Trade Union, July 2021



CIL Safety Board Meeting held in July 2021 under the Chairmanship of the Chairman, CIL



Area Level Tripartite Meeting at Amrapali, CCL

- xv. Monsoon Preparation Plan:** Micro and macro level plan has been prepared for monsoon preparation and these are implemented and monitored regularly. The Monsoon period has passed without any major safety issues.
- xvi. Preparation and sharing of Video Clips and Animation films on safety :** Video Clips / Animation Films on various Mine Safety Procedures, Dos & Don'ts related to operation and Accident Analysis are being prepared for mutually sharing amongst all employees. These video clips or Animation films are being used widely during training programs organized at different VTCs and other establishments also. This endeavor is expected to enhance safety awareness amongst all employees and to develop the best safety cultures at grass root level.

- xvii. Adoption of Star Rating of mines:** For encouraging the best practices in mines including safety practices, the Star Rating System has been adopted.

4. Special safety awareness drive for "COVID- 19" based on DGMS circulars:

Several programs have been organized to improve awareness amongst employees and their families about COVID protocol. All possible precautionary measures as suggested by DGMS are also being compiled in mines.

Apart from the above specific actions, the following measures are continued for improving safety standards:-

- i. Emphasis on adoption of the state-of-the art technology insuitable geo-mining locales.**

- a. Adoption of Mass Production Technology (MPT) in more UG mines.
- b. Deployment of more nos. of Surface Miner stoelminate blasting operation in OCPs for safe and eco-friendly operation.
- c. Deployment of relatively higher capacity HEMM in more OCPs.
- d. Mechanization of UG drilling operation for roof bolting.
- ii. *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 purpose.
 - c. Need based application of Resin Capsules in place of Cement capsules.
 - d. Use of modern Strata Monitoring Instruments as per requirement.
 - 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.
- iii. *Mechanism for monitoring of mine environment:***
 - a. Detection of mine gasses by Multi-gas detector, Methanometer, CO-detector etc.
 - b. Continuous monitoring of the 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.
- iv. *Strengthening Water Danger Management:***
 - a. Preparation and maintenance of seam-wise Water Danger Plan.
 - b. Preparation and implementation of Monsoon Action Plan.
 - c. Adequate Pumping Facilities with adequate capacity of Sumps.
 - d. Liaison with the State Meteorological Dept. & Dam Authorities.
 - e. Construction of Embankments against water bodies.
 - f. Inter-mine joint survey between adjoining mines to prove inter-mine barriers.
 - g. Conducting Check Survey & Joint Survey to eliminate errors in mine survey.
- v. *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 a regular basis.
 - e. Experienced electrical supervisors of the Area are being engaged for imparting training to electricians and electrical helpers in VTCs.

- f. Domain knowledge of experienced Agent, Mine Managers and other senior level executives are being utilized in imparting training to enhance the quality of training as well as to bring seriousness in all vocational training programs.
 - g. However, many of these programs are done through VC mode this year due to prevailing Covid-19 situations for safety reasons.
- 5. Mine Safety Inspection**
- o Round-the-clock Supervision of all mining operations by adequate number of competent & statutory Supervisors and mine Officials.
 - o Regular Inspection by Workmen Inspectors appointed in each mine.
 - o Surprise back shift mine Inspections by mine and area level officials.
 - o Regular mine Inspection by officials of the Internal Safety Organization of respective subsidiaries and CIL.
 - o Periodic mine Inspections by senior officials of CIL & Subsidiaries, Trade union representatives and officials of MOC.



6. 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 operators to hone their skills.
- e. Lighting arrangements 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. GPS based Operator Independent Truck Dispatch System (OITDS) in large OCPs for tracking movement of HEMMs inside OC mine. An 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.

7. Mine Emergency Response System

Emergency Action Plans prepared as per statute for each mine.



Mock Rehearsals for examining the efficacy of Emergency Action Plan.

- o Demarcating Emergency Escape Routes below ground.
- 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.

Rescue Services for Emergency Response System in CIL:

- o CIL is maintaining a well-established Rescue Organization comprising 6 Mine Rescue Stations (MRS), 13 Rescue Rooms-with-Refresher Training facilities (RRRT) and 17 Rescue Rooms(RR).
- o All Rescue Stations / Rescue Rooms are fully equipped with adequate numbers of rescue apparatus as per the Mine Rescue Rules (MRR) -1985.
- o This Rescue Organization is staffed by adequate numbers of Rescue Trained Personnel (RTP) as per the MRR-1985.
- o 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.
- o 29 nos. of Advanced Life Support ambulances equipped with a ventilator, a defibrillator have been introduced for ALS interventions on site & during transit to facilitate rescue and recovery operations and other medical emergencies.



CIL employs Permanent Brigade Members and RTPs for 24x7 on call. The Mine Rescue Station and Rescue Rooms are established at strategic locations. 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 , Mugma
BCCL	Dhansar		Moonidih, Madhuband, Sudamdih
CCL	Ramgarh	Kathara & Churi	Dhori, Kedla & Urimari
SECL	Manindragarh	Sohagpur, Kusmunda, Johilla, Bisrampur, Baikunthpur	Chirimiri, Raigarh, Bhatgaon, Jamuna & Kotma, Korba
WCL	Nagpur	Parasia, Pathakhera, Tadali	Mathani, Majri, Sasti & Murpar
MCL	Brajraj Nagar	Talcher	
NEC	-	Tipong	-
Total	6	13	17

8. Safety Monitoring of CIL

Safety in mines are being monitored at various levels by the following agencies:



9. Statutory Framework for Coal Mine Safety

Coal mining, world over, is a highly regulated industry due to the presence of many inherent, operational and Occupational Hazards. Coal Mine Safety Legislation in India is one of the most comprehensive and extensive statutory frameworks for ensuring Occupational Health and Safety (OHS). Compliance of these safety statutes is mandatory. 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 Mines Regulations -2017
4	The Mines Rescue Rules -1985
5	The Electricity Act- 2003

Sl. No.	Statute
6	The Central Electricity Authority (measures related to safety & supply) Reg. - 2010
7	The Mines Vocational Training Rules -1966
8	The Mines Cr/che 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

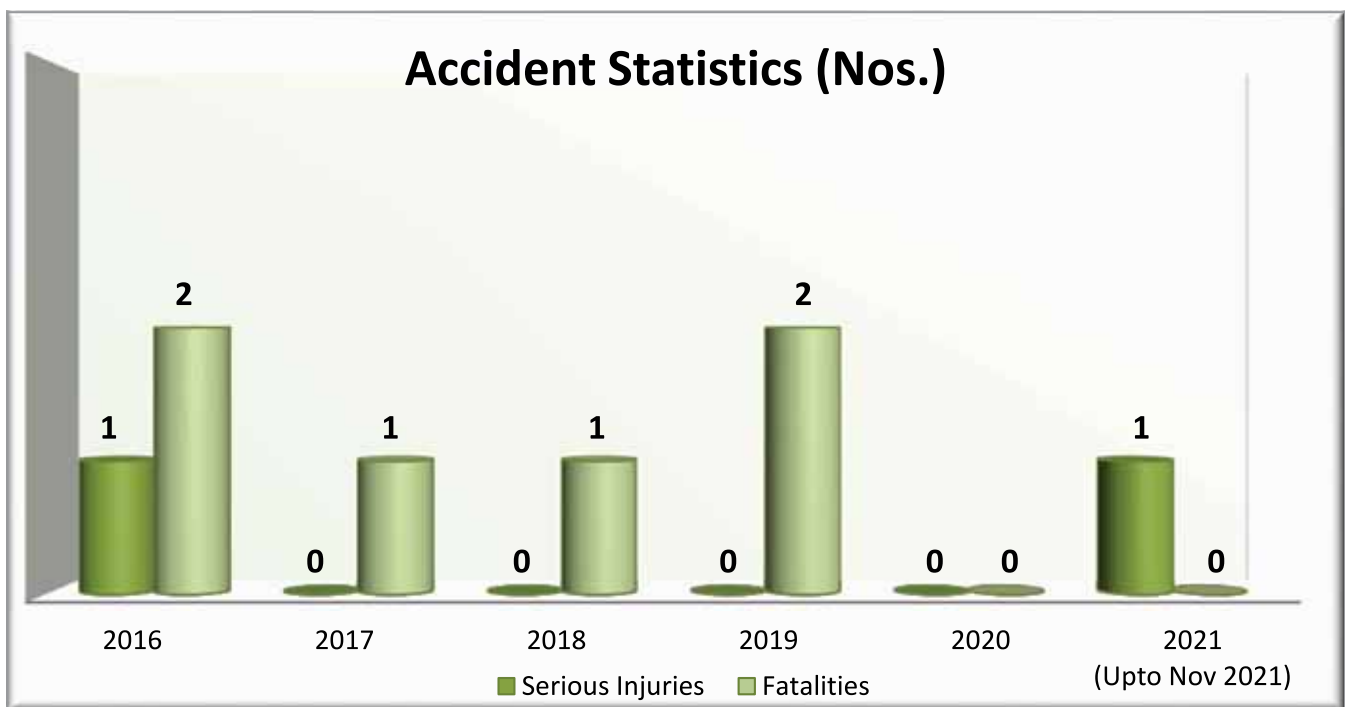
10. Safety Policy of CIL

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 is asunder:-

- 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 over coming accident proneness as maybe reflected through study of accident analysis, keeping priority in sensitive areas of roof-falls, haulage, explosives, machinery etc.
- Set up a framework 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.

11. Accident Statistics of NLCIL MINES - (for last five years)

Year	Fatalities	Serious Injuries
2016	2	1
2017	1	--
2018	1	--
2019	2	--
2020	--	--
2021 (Upto Nov. 2021)	--	1



12. Safety measures at NLCIL

The following safety measures are being adopted in NLCIL to achieve Zero Accident Potential:

1. Mines at Neyveli (Mine-I, Mine-IA & Mine-II) are being operated with State of the Art Technology i.e. Bucket Wheel Excavators, Spreaders, stackers and series of conveyors having inbuilt safety features.
2. Risk assessment-based Safety Management Plans have been prepared for all the mining activities like Bench operation, SME, Conveyor Zone, GWC, CME etc. and is being practiced.
3. Pit Safety Committee meetings conducted monthly besides special meetings.
4. Safety Audit of all Mines is carried out as per the check list by multi-disciplinary team once in every year.
5. Each mine is maintaining two fire tenders, being handled by CISF personnel, round the clock.

6. Water danger potentials are studied and well managed by a separate department called ground water control division.
7. Illumination, dust, noise and vibration studies are conducted regularly and all the parameters are maintained as per the norms.
8. SIMULATOR from 5DT Technology of South Africa was installed and commissioned at Vocational Training Centre to impart virtual based training to equipment operators to eliminate any accident during actual equipment training.

13. Safety and R&D initiatives

Usage of Drones:

Mines at Neyveli (Mine I, Mine IA & Mine II) use drones for survey measurement works and this avoids surveyor and his team members to go to hazardous and difficult to access unsafe places and renders survey measurement work safe compared to conventional type of measurement.

Electronification of Ground Water Control and Conveyor System:

Electronification of Ground Water Control and

Conveyor System in Mines is taken up as a R & D project by the Centre for Applied Research (CARD), NLCIL.

Emergency response System

- 1) Principal Hazards have been identified as a part of Safety Management plan in all the NLCIL mines and Emergency Action Plan is in place. There is also detailed Monsoon Action Plan which comes into force as soon as any weather warning is received by Mine officials from Meteorological department with regard to high wind velocities and heavy rainfall.
- 2) In order to enhance the emergency response of system and personnel, mock drills are conducted every month at different locations, different divisions and in different scenarios.
- 3) List of First Aid trained persons are displayed in all divisions along with their contact numbers to contact them in times of need. Emergency numbers are displayed in all prominent locations.

Safety Trainings

Training given at GVTC, Neyveli for the period January 2021 to November 2021

Type of training		Persons trained
Basic/Initial training imparted to employees		111
Basic/Initial training imparted to contract workers		778
Basic/Initial training imparted to Apprenticeship Trainees		54
Refresher Training	Contract workers	2628
	Regular Employees	603
Special Training	Contract workers	618
	Regular Employees	618
Other Training (Executives, Supervisors, Graduate & Diploma Apprentices and CISF etc)		358
Total no. of persons trained		6025

14. Emergency response System

Principal Hazards have been identified as a part of Safety Management plan in all the NLCIL mines and Emergency Action Plan is in place. There is also detailed Monsoon Action Plan which comes into force as soon as any weather warning is received by Mine officials from Meteorological department with regard to high wind velocities and heavy rainfall.

In order to enhance the emergency response of system and personnel, mock drills are conducted every month at different locations, different divisions and in different scenarios.

List of First Aid trained persons are displayed in all divisions along with their contact numbers to contact them in times of need. Emergency numbers are displayed in all prominent locations.

15. Occupational Health services

In the mines of NLC India Limited, the following actions have been taken with regard to OH services:

1. Health facilities are being provided to all mine workers including contract workmen. One 355 bed multi-functional general hospital is functioning at Neyveli and one Occupational Health Centre is operational at Barsingsar Mine, Rajasthan.
2. For all the workmen at NLCIL Mines, including contract workmen, Periodical medical examination is conducted once in 3 years at Industrial Medical Centre dedicated for this purpose at NLC General Hospital. Based on the result of PME necessary action is taken.
3. Each mine is provided with BLS (Basic life support) Ambulance for speedy evacuation of injured or sick person to the hospital for better medical treatment.

4. Noise and illumination surveys are regularly conducted and necessary actions are taken based on the result of measurement.
5. Occupational health and safety workshops are regularly conducted to impart health awareness among mine workers.

16. Initial Medical Examination:

Type of Medical Examination

Type of Medical Examination	Number of persons Jan 2021 to NOV 2021
	Actual
Initial Medical Examination (IME)	1229
Periodical Medical Examination (PME)	3638

The Singareni Collieries Company Limited

- SCCL has a planned and systematic approach to implement the safety policy of the organisation through an effective safety management system. SCCL has prepared Safety Management Plans (SMPs) for all UG & OC mines and regular review of these plans is being conducted to improve the work place safety.
- SCCL aims -
- to minimise risks, based on Risk Assessment methods to determine priorities and set objectives for eliminating hazards and reducing risks.
- to bring greater awareness of safety among the employees
- for reduced absenteeism
- to motivate all the employees for putting best efforts to achieve zero harm mining.

17. Accident Statistics of SCCL

Accident Statistics of SCCL –

- i. Details of fatal and serious accidents and rate of fatality and serious injury during 2015-16 to 2020-21 (up to 30th Nov, 2021) 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
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	7	7	122	123	0.11	0.17	1.92	2.90
2020-21	8	11	71	74	0.34	0.44	2.27	2.98
2021-22*	5	11	83	84	0.27	0.40	2.06	3.07

*up to 30th Nov-2021.

- ii. Details of fatal and serious accidents and rate of fatality and serious injury during 2015 to 2021 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
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	4.09
2019	8	8	138	138	0.12	0.19	2.10	3.28
2020	9	12	97	101	0.24	0.34	2.02	2.84
2021*	5	11	114	115	0.19	0.30	1.96	3.12

*up to 30th Nov-2021.

18. Safety Measures in SCCL:

- Manual loading has been completely phased out by introducing semi mechanization with LHDs, SDLs and mechanized technologies such as Longwall, Continuous Miner to reduce human drudgery and reduction of persons at active working places to reduce the risk of accidents and disasters.
- Top priority is accorded for ensuring safety of the workers exposed to the roof fall dangers. Mechanized roof bolting systems are introduced in all the UG mines.
- Illumination fortnight is conducted to improve the lighting standards in all the mines and dept.

4. All UG mines are provided with man riding/winding systems to avoid risky walking along steep gradients.
5. Below ground communication and tracking system with WIFI is proposed in 10 UG mines.
6. 2 Nos. of training simulators for 6 types of HEMM are procured at a cost of ₹4 crores for technical training centre (TTC, RG-1) for providing training on HEMM to operators of OC mines
7. Whenever the workers are exposed to higher temperatures and humid conditions in underground mines (ALP mine), air Chilling Plants are provided to create comfortable conditions and to reduce the risk to the workers.
8. Tube bundle system (ALP Mine) and Telemonitoring (VK7 and GDK 11) provided for monitoring of harmful gases.
9. Light weight cap lamps have been procured for all the UG mines.
- 10. Involvement of representatives of workmen** in Bipartite and Tripartite meetings, Regional Safety Committee meetings, Pit Safety Committee meetings inviting their suggestions regarding safety related activities and implementation of their suggestions.
- 11. LIDAR** has been commissioned at GK OC, KGM Area to assess the movement of OB dumps and benches on a real time basis for taking proper remedial actions.
12. 9 Nos. of Nevis CD-60 Model, type mounted (DFDS - Dry Fog Dust Suppression) for dust suppression machines are provided at CHPs for dust suppression
13. SCCL has 1 main hospital, 6 area hospitals and 12 Occupational Health Centers (OHS) managed by 27 OHS trained doctors to

carry out all the tests and medical examinations required as per the statute and recommendations of National Safety Conferences. Hospitals are equipped with sophisticated equipment like CT scan, 2D Echo and Dialysis Centers.

SIMTARS:

- 10 officers have been trained by SCCL at **Safety in Mines Testing and Research Station (SIMTARS)**, Australia in Risk Management.
- SCCL has established two state of art “Safety Management Training Centers” at Ramagundam and Mandamarri at the standards of SIMTARS, Australia.
- Training on “Development and Implementation of Safety Management Plan (SMP)” is being imparted to the Safety Management Teams of the concerned mines by the SIMTARS accredited trainers under the program of “Train the Trainers
- Safety Management Plans of all operating mines were prepared under the guidance of SIMTARS accredited trainers and submitted to DGMS.

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 in 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, fire incidents in villages, and fire accidents in thermal power plants.