

## SAFETY IN COAL MINES

### 9.1 JHARIA & RANIGANJ MASTER PLAN

**9.1.1** Un-scientific, unsystematic and illegal mining are the primary causes of fires resulting into subsidence Coal, which are left as safety pillars and ribs during the course of extraction (mining) in old workings and abandoned mines, catches fires due to spontaneous combustion and gets further aggravated due to illegal mining, resulting into subsidence. The population living in the old mining areas has increased many times over the years, though these areas became unsafe for habitation. In spite of the declaration of these areas unsafe by the local administration, the habitation increased unabated. The problem of subsidence and fire are being addressed by the Government from time to time. In this regard a High Level Committee was set up in 1996 under the Chairmanship of Secretary, Ministry of Coal with representatives from other Departments, Coal companies and the concerned state Governments to deal

with the problem in a comprehensive manner. Based on the recommendations of the Committee a Master Plan was prepared to deal with the problems of fire and subsidence and related rehabilitation covering the areas under Bharat Coking Coal Ltd. (BCCL) and Eastern Coalfields Ltd. in 1999 for implementation of the same in phased manner.

**9.1.2** The Master Plan for Jharia and Raniganj Coalfields dealing with fire, subsidence and rehabilitation and diversion of surface infrastructure has been approved by the Govt. in August, 2009 at an estimated investment of ₹ 9657.61 Crore (₹ 7028.40 Crore for Jharia Coalfield and ₹ 2629.21 Crore for Raniganj Coalfield) excluding ₹ 116.23 Crore sanctioned earlier for various Environmental Measures and Subsidence Control (EMSC) schemes for implementation in 10/12 years in two phases of five years each and in case of BCCL 2 years pre implementation period. Brief parameters of the Master Plan are given in the table below:

Sl. No	Particulars of the different components of Master Plan	RCF (ECL) (April '2008)	JCF (BCCL) (March '2008)
A	Dealing with fire		
1	Total no. of existing fires	7	67 (Under 45 fire projects)
2.	Estimated Cost (₹ Crore)	40.28	2311.50
B	Rehabilitation		
1	No. of sites to be Rehabilitated.	139	595
2	Area affected in sq km	8.62	25.69
3	No. of houses to be Vacated/ Rehabilitated		
i)	BCCL (Taking into account superannuation)		44155/ 25000*
ii)	Private (Authorized)		29444
iii)	Encroachers (Un-authorized)		23847
iv)	Others		868
	Total No.	33196	98314/ 79159
	Population covered	180263	395795
4	Land required for rehabilitation (Ha)	896.29	1504.99
5	Estimated Cost (₹ Crore)	2610.10	4780.60
C	Diversion of Railway line/ Road/OC pipeline	7 sites	Planning and survey with an outlay of Rs.20 Crore
1	Estimated Cost (₹ Crore)	11.35	20.00
D	Implementing Agency for fire projects & rehabilitation of BCCL/ ECL houses	ECL	BCCL
E	Implementing Agency for rehabilitation of Non-BCCL / ECL houses-Private & Encroachers	Asansol Durgapur Develop Authority (ADDA), Govt. of WB	Jharia Rehabilitation & Development Authority (JRDA) of Govt. of Jharkhand
F	Implementation Schedule, years	2 (Pre-implementation phase for BCCL only) + 10 ( in two Phases each of 5 years)	
G	Estimated Capital Requirement for fire projects, rehabilitation & diversion of rail/road/ pipeline etc. (₹ Crore)	2661.73	7112.11

**9.1.3** Jharia Rehabilitation & Development Authority (JRDA) and Asansol Durgapur Development Authority (ADDA) have been identified as implementing agencies for rehabilitation purposes. Coal companies ECL and BCCL will provide technical support and the outlay will be funded particularly through the internal resources of CIL and the cess collection under CCDA.

**9.1.4** For speedy implementation of the Master Plans, a High Powered Central Committee (HPCC) under the Chairmanship of Secretary (Coal) has been constituted with representatives from different Ministries and State Governments of Jharkhand and West Bengal. So far, nine meetings of the Committee have been held. More than 65% of demographic survey works has been completed for rehabilitation of the affected persons.

In Satellite Township, 2352 houses have been constructed in Belgoria Rehabilitation Township "Jharia Vihar" in which 1165 families have been shifted. 2000 units in BSPU houses under JNNURM norms (carpet area 25.10 sqm) are under construction and scheduled date for completion is 17.2.2015. Further out of 141 identified unstable location in

Raniganj Coalfield area under ECL, demographic survey work has been completed for 126 locations.

## **9.2 SAFETY MEASURES / INITIATIVES IN CIL:**

**9.2.1** To improve safety standard, CIL has vigorously pursued several measures in the year 2013 along with on-going safety related activities / initiatives apart from compliance of statutory requirements for safety, which are given below-

- Continuous oversight of safety status of mines is being done through the multi-disciplinary Internal Safety Organization (ISO).
- After analysis of fatal accidents which occurred at different point of time in 2013, several directives / guidelines on corrective measures to be taken for prevention of recurrence of similar type of accident in future are issued from the Safety & Rescue Division of CIL.
- Stress on preparation and implementation of Risk Assessment based Safety Management Plan (SMP) for every mine.

- A protocol for conducting safety audit by external independent agencies has been prepared to bring uniformity and efficiency in mine safety audit.

**9.2.2 For improving safety in mining operation:**

The following steps have been taken / being taken to improve safety standard in mines.

1. Stress on introduction of Mass Production Technology in UG mines.
2. More number of surface miner to be introduced to eliminate blasting operation in opencast mines to make mining operation more eco-friendly.
3. Introduction of High Wall mining wherever possible.
4. Deployment of high capacity HEMMs to reduce traffic density.
5. Mechanisation of drilling (for bolting) is being adopted in all mines.
6. Phasing out of manual loading as per recommendation of 10<sup>th</sup> National Safety Conference.
7. Man Riding Systems (MRS)

are being installed in all underground mines having long haul / arduous travel.

8. Operator Independent Truck Dispatch System (OITDS) is being used in large OCPs.

**9.2.3 Steps taken for better strata management:**

Roof & Side fall is still one of the major causes of fatal accident and fatality in underground mines. Steps taken for better strata control monitoring are as follows:

- i) Detailed site-specific geological and geo-technical characterization is done using standard strata classification systems such as Rock Mass Rating (RMR).
- ii) Design of strata support and reinforcement systems.
- iii) Strata control performance monitoring.
- iv) Subsidence monitoring and control.
- v) Use of more number of mechanised roof drilling machines.
- vi) Switching over to use of resin capsules from cement capsules in phased manner.

vii) Initiatives have been taken to develop device with appropriate audio-visual alarm to monitor the behaviour of

overlying roof strata.

viii) Several roof-monitoring devices have been developed at Area/Mine level workshops.

**Status of Mechanized Roof Drilling M/Cs in CIL**

Company	Number of district	No. of Roof bolting M/C reqd.	No. of roof bolting M/c available	Programme for Procurement
ECL	96	96	45	44
BCCL	70	143	120	10
CCL	20	20	20	-
WCL	91	101	101	17
SECL	137	229	110	145
MCL	15	17	23	-
CIL	429	600	419	216

**Type of roof drilling M/C being in use in CIL**

Company	Universal Drilling Machine (UDM)	Hydraulic drilling machine	Mechanical type roof bolter	SDL converted to roof drilling m/c/ Jumbo Drill	Pneumatic	Quad bolter	Total
ECL	26	7	7	3	0	2	45
BCCL	0	0	16	50	54	0	120
CCL	0	0	20	0	0	0	20
WCL	31	27	37	2	3	1	101
SECL	76	8	13	0	1	2	110
MCL	15	8	13	0	0	-	23
CIL	147	50	106	55	59	5	419

**Type of Strata Monitoring Devices used in some of the UG mines of CIL**

1. Auto Warning Tell-Tale
2. Multi Point Bore Hole Extensometer

3. Magnasonic Extensometer
4. Telescopic convergence recorder
5. Remote convergence recorder
6. Stress Meter

7. Load Cell (Mechanical)
8. Strain Gauge Load meter
9. Tri-axial Geophone (Micro-seismic technology)

- ii) Fresh Pressure Quantity(PQ) Survey for checking efficacy of ventilation
- iii) Procurement and installation of more number of Gas Chromatographs.
- iv) Use of Local Methane Detector (LMD) for early and accurate detection of methane.

**9.2.4 Steps being taken to prevent spontaneous heating, fire & explosion in mine:**

- i) Expedite construction of sectionalization stoppings

**Company-wise Status of Gas Detecting Apparatus provided in CIL**

Company	Methano-meter	CO - Detector	FSL	Multi-Gas Detector	LMD	ETMS
714	85	1290	184	10	2	
415	144	1018	37	45	2	
218	38	292	45	0	0	
435	76	845	83	0	3	
370	94	801	29	0	0	
70	29	185	6	0	4	
2222	466	4431	384	55	11	

**9.2.5. Safety Training & others:**

Advanced special Training is being imparted by the SIMTARS accredited Trainers for preparation of risk assessment based Safety Management Plan (SMP) and the status of training in the mines of CIL is as follows:

Company	Number of Mines		Number of mines where training is imparted	
	OC+ mixed mines	UG	OC+ Mixed mines	UG
ECL	22	87	22	87
BCCL	37	38	37	38
CCL	41	16	41	16
NCL	10	0	10	0
WCL	44	43	44	43
SECL	22	74	22	74
MCL	16	7	16	7
NEC	4	1	4	1
<b>Total CIL</b>	<b>196</b>	<b>266</b>	<b>196</b>	<b>266</b>

- i) Risk assessment based Safety Management Plan (SMP) is being prepared for all mines of CIL.
- ii) **Simulation Training to HEMM operators is being provided. Company-wise status is as under.**

Company	Number of persons trained by TRAINING SIMULATOR
ECL	38
BCCL	15
NCL	250
WCL	82
MCL	12
CIL	397

- iii) Digitization of mine plans.
- iv) Introduction of LED type light weight cap lamp.
- v) A model format for preparation of mine history sheet in comprehensive manner has been prepared and circulated through Quarterly Safety Bulletin.

**9.2.6 Safety R&D initiatives at CIL (HQ) level:**

- i) Construction of quick setting stopping by using expansion foam agent to isolate fire.

- ii) Development of notch cutting machine to facilitate construction of stopping in UG.
- iii) Eliminating the possibility of ignition of gas and incidences of explosion in UG mines due to electric fault by application of innovative technology of fault diversion.
- iv) Studies on determination of free Silica (Alfa-content) in respirable air borne dust in Coal mines and preparation of data bank of free Silica and other minerals present in dust as well as in Coal.

**9.2.7 Special drive for accident prevention in OCPS:**

- i) Formulation of Mine-specific Traffic Rule.
- ii) Code of Practices for HEMM operators, Maintenance staffs, & others.
- iii) Preparation and implementation of Risk Assessment based Safety Management Plan (SMP).
- iv) Training of Contractor's Workers involved in contractual jobs.

- v) Introduction of Safe Operating Procedures (SOP)s for safe mining operations.
- vi Procurement of advanced surveying / slope monitoring devices.

scent paint, display of the same at the entry to the mine has been done.

- iv) A Check list for dealing with emergency has been prepared and uploaded in web-site.

**9.2.8 Emergency Response Systems:**

- i) Emergency Action Plans of each mine is being reviewed from time to time
- ii) Mock Rehearsals for examining the preparedness / efficacy of Mine-wise Emergency Action Plan.
- iii) Demarcating Escape Routes: An exercise for demarcating Escape Routes in underground mines, on plans as well as belowground by fluore-

**9.2.9 Occupational Health Services:**

CIL has well-established Occupational Health Services (OHS) System for check up of Occupational diseases and conducting Initial Medical Examination (IME) & Periodical Medical Examination (PME) of its employees including contractor's workers. Company-wise status of Organization & Infrastructure for Occupational Health Services in CIL is given below:

Company	PME Center	Doctors for PME	Para medical staffs for PME	X-Ray M/C	Spirometer	Audiometer	Pathology Lab.
ECL	14	14	14	17	12	14	18
BCCL	9	9	21	9	9	9	9
CCL	13	13	45	13	13	13	12
NCL	12	12	37	6	11	11	12
WCL	10	24	11	10	0	10	10
SECL	14	14	86	18	12	14	14
MCL	2	10	9	6	2	2	5
NEC	1	2	2	1	1	1	1
CIL	75	98	225	80	60	74	81



- i) Efforts are being made for preparation of computerised database relating to medical history of the employees.

### 9.3 SAFETY MEASURES IN SCCL

- i. Pit Safety Committee meetings are being conducted regularly in mines, CHPs and Work Shops to enhance safety standards.
- ii. Monthly and Quarterly Risk Management meetings are being conducted at mines.
- iii. Mine Managers have taken up necessary modifications/ design, improvements in the components of Man riding rail car transport system as prescribed by DGMS.
- iv. Monsoon audit has been conducted of all mines by teams consisting of Area Safety Officer, Area Survey Officer and Civil Engineer from areas.
- v. Roof Bolting Audit Committee was constituted to assess the implementation and standardize roof bolting activity in the Company.
- vi. New working Districts/Machinery are started/ commiss-

- ioned only after obtaining Safety Clearance Certificate.
- vii. 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 UG and OCP.
- viii. Accident-prone mines have been identified and action plans are under implementation to bring down the accident rate.
- ix. Mine Managers have been taking necessary measures to prevent dangers from rush of water from old exploration boreholes connected to underground workings.
- x. Conducted a Workshop on "Extraction of Pillars in No.3 seam by Blasting Gallery Method" to resolve the issues raised by DGMS officials.
- xi. Meetings on regular basis are conducted with GM, Project Officers to review and enhance the Safety status in underground and open cast mines.
- xii. Guidelines have been formulated and steps are taken

- to avoid / eliminate truck movement accidents in Opencast mines
- xiii. Care is being taken to provide separate roads for Light Motor Vehicles in the premises of Mechanized Opencast Mines and to prevent failure of braking and steering systems of Dumpers in Mines.
  - xiv. Area Workshops, CSP/CHP are taking Safety measures and implementing the Code of Practice (CoP) / Safe Operating Procedure (SOP) in order to achieve the Zero Accident Potential in Surface Departments.
  - xv. Monthly Regional Safety Review Meetings and Area Safety Audit Cells have been revived to enhance safety standards.

#### 9.4 SAFETY MEASURES IN NLC:

The following safety measures are taken to prevent accident in Mines.

1. The Technology adopted in NLC is environment friendly and minimizing the accidents as Dumpers are not involved in Transportation.
2. Sophisticated mining machineries are deployed for its continuous lignite mining and allied activities and all machineries are fitted with limit switches, emergency switches, slip monitoring devices, various type of safety clutches, safety coupling like fluid couplings, brakes, like 'Eldro' and other failsafe systems, to ensure machine Safety /avoidance of wasteful breakdown/stoppage.
3. Site Mixed Emulsion is extensively used during blasting operation which greatly reduces hazards and fly rocks due to more stemming column.
4. Safety measures are implemented to avoid failure in Dump/spoil bank as per the guidelines given by DGMS and based on the recommendation of CMRI, Dhanbad and NIT, Trichy based on their study.
5. Apart from unit level monitoring of safety system, safety monitoring is also being carried out by ISO at corporate

- level to strengthen the hands of safety.
6. All the required Personal Protective Equipments are compulsorily issued specific to the job requirement to the employees / contract workers before taking up the work.
  7. Systematic in-depth Accident Analysis is being done for accident prevention / to avert recurrence of accidents.
  8. Serious/Reportable/Near miss Accident Victims are given appropriate counseling as a recurrence avoidance and behavioral transformation.
  9. Area wise responsibility with priority to Safety is being enforced at all Mine Operational /Maintenance Activities for ensuring specific site supervision.
  10. Code of practices for different operations like Specialized Mining Equipment Operations, Ancillary Equipment Operations. Traffic Rules, General Precautions are formulated and exhibited at appropriate locations, for the benefit of the employees.
  11. Inter Unit Safety Assessments are being carried out for every quarter to assess safety standards maintained as per statute.
  12. Risk Assessment and Safety Audit for Mines are being carried out by Accredited External Agencies once in 2 years.
  13. 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.
  14. On the job trainings are being imparted to inculcate safety awareness especially among the contract workers to adopt safe work practices.
  15. Continuous monitoring of behavioral sense/attitude/commitment of Employees towards Safety.

**9.5 SAFETY MONITORING IN CIL:**

Apart from statutory monitoring by

DGMS, the status of safety is being monitored at various levels by the following agencies:

Level	Monitored By
Mine level	1. Workman inspectors: as per Mines Rule-1955 2. Pit Safety Committee: constituted as per Mines Rule-1955
Area level	1. Bipartite/Tripartite Committee Meeting 2. Safety Officers' Coordination Meeting
Subsidiary HQ level	1. Bipartite/Tripartite Committee Meeting at HQ level 2. Area Safety Officers' Coordination Meeting 3. Inspections by ISO Officials
CIL HQ: Corporate Level	1. CIL Safety Board 2. CMDs meet 3. Director (Tech)'s Coordination Meeting
Ministry of Coal (MOC) / Other Ministries Level	1. Standing Committee on Safety in Coal Mines 2. National Conference on Safety in mines 3. Various Parliamentary Standing Committees

**9.6 SAFETY PERFORMANCE OF CIL:**

**9.6.1** Accident Statistics is the indicator of relative status of safety. Over the years the safety standard in mines of CIL has been significantly improved due to the following factors:

- o Genuine and collective commitment shown by the management, workers, trade union representatives and statutory regulators,
- o Continuous safety awareness drives,
- o Improvement in knowledge and skill through continuous

and need oriented training of the workforce,

- o Adoption of advanced technology in the field of mining machinery, method of mining and also application of best safety practices and procedures.

**9.6.2 Highlights of continuous improvement in safety indicators is given as under:**

- i) The 5-yearly average fatal accidents have reduced from 157 in 1975-79 to 59 in 2010-13 (i.e. 62%)

Parameters	Comparative Time frame		Reduction in absolute numbers	% of reduction
	1975-79	2010-13		
Average Fatal Accident	157.00	59.00	98.00	62
Average Fatalities	196.00	66.00	130.00	66
Average Serious Accident	1224.00	223.00	1001.00	82
Average Serious Injuries	1278.00	233.00	1045.00	85
Average Fatality Rate per MT of Coal production	2.18	0.15	2.03	93
Average Fatality Rate per 3 lakh manshift	0.44	0.24	0.20	45
Average Serious Injury Rate per MT of Coal production	14.24	0.51	13.73	96
Average Serious Injury Rate per 3 lakh manshift	2.89	0.80	2.01	70

- ii) The 5-yearly average fatalities have reduced from 196 to 66 in the said period (i.e 66%).
- iii) The 5 yearly average fatality rate per MT of Coal production have reduced from 2.18 to 0.15 in the said period (i.e. 93%)
- iv) The 5 yearly average serious injuries have reduced from 1278 to 233 (i.e 85%) in the said period.
- v) The 5 yearly serious injury rate per MT of Coal produced have reduced from 14.24 to 0.51 in the said period (i.e. 96%)

### 9.6.3 Safety objective of CIL:

Safety is always 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. Salient features are as follows:

- i) Operations and systems-planned and designed to reduce mining hazards;
- ii) Compliance of Statutory provisions;
- iii) Improvement in working conditions by adopting appropriate technology;
- iv) Provide material and monetary resources for execution of Safety Plans;

- v) Deploy safety personnel exclusively for safety;
- vi) Promoting Worker participation in Safety Management;
- vii) Prepare Annual Safety Plan and long term Safety Plan;
- viii) Multi-level monitoring for the implementation of the Safety Plans;
- ix) Continuous education, training and retraining on safety oriented skills;
- x) Continued efforts to improve standard of occupational health services.

safety (OHS). Compliance of these safety statutes is mandatory.

In India, the operations in Coalmines are regulated by the Mines Act, 1952 Mine Rules – 1955, Coal Mine Regulation-1957 and several other statutes framed thereunder. Directorate-General of Mines Safety (DGMS) under the Union Ministry of Labour & Employment (MoL&E) is entrusted to administer these statutes. The following are the statutes that are applicable in Coal mines for occupational health and safety (OHS).

**9.7 STATUTORY PROVISION 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 pervasive statutory framework for ensuring occupational health and

S. No.	Statute
1	Mines Act -1952
2	Mines Rules -1955
3	Coal Mine Regulation -1957
4	Mines Rescue Rules -1985
5	Indian Electricity Rules - 1956
6	Mines Vocational Training Rules -1966
7	Mines Crèche Rules -1966
8	Indian Explosive Act, 1884
9	The Explosive Rule - 2008
10	Indian Boiler Act, 1923
11	Mines Maternity Benefit Act & Rules -1963

## 9.8 ACCIDENT STATISTICS:

### 9.8.1 (a) Table: Comparative Accidents Statistics of CIL – 5-Yearly Averages

Time Period	Av. Fatal Accidents		Av. Serious Accidents		Av. Fatality Rate		Av. Serious Injury Rate	
	Accident	Fatalities	Accident	Injuries	Per MT	Per 3 Lac Manshifts	Per MT	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
2010-13#	59	66	223	233	0.15	0.24	0.51	0.80

, # 4 years average, nearest full number

### (b) Company-wise Accident Statistics of CIL for the year 2013:

Company	Fatal Accidents	Fatalities	Serious Accidents	Serious Injuries	Fatality Rate		Serious Injury Rate	
					Per MT	Per 3 lac manshifts	Per MT	Per 3 lac manshifts
ECL	8	8	61	62	0.23	0.14	1.75	1.10
BCCL	9	12	18	18	0.37	0.29	0.55	0.43
CCL	9	9	6	6	0.18	0.27	0.12	0.18
NCL	6	6	17	17	0.08	0.28	0.24	0.78
WCL	8	9	31	32	0.23	0.20	0.82	0.70
SECL	13	13	32	33	0.11	0.22	0.27	0.56
MCL	1	1	10	10	0.01	0.06	0.09	0.61
NEC	0	0	0	0	0.00	0.00	0.00	0.00
<b>CIL</b>	54	58	175	178	0.13	0.21	0.39	0.65

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

**9.8.2 Accident Statistics of NLC - (for last five years):**

Year	Fatalities	Serious Injuries	Injury Rate per MT production		Injury Rate per Three Lakh Man Shifts	
			F	S	F	S
2009-10	3	9	0.13	0.39	0.21	0.62
2010-11	2	2	0.09	0.09	0.14	0.14
2011-12	1	6	0.04	0.24	0.07	0.40
2012-13	4	4	0.15	0.15	0.29	0.29
2013-14	1	4	0.04	0.17	0.07	0.28

F= Fatality Rate.

S= Serious injuries Rate.

**9.8.3 Company-wise accident statistics of CIL, sccl and NLC ( for the year 2013) :**

Company	Fatal Accidents	Fatalities	Serious Accidents	Serious Injuries	Fatality Rate		Serious Injury Rate	
					Per MT	Per 3 lac manshifts	Per MT	Per 3 lac manshifts
ECL	8	8	61	62	0.23	0.14	1.75	1.10
BCCL	9	12	18	18	0.37	0.29	0.55	0.43
CCL	9	9	6	6	0.18	0.27	0.12	0.18
NCL	6	6	17	17	0.08	0.28	0.24	0.78
WCL	8	9	31	32	0.23	0.20	0.82	0.70
SECL	13	13	32	33	0.11	0.22	0.27	0.56
MCL	1	1	10	10	0.01	0.06	0.09	0.61
NEC	0	0	0	0	0.00	0.00	0.00	0.00
<b>CIL</b>	54	58	175	178	0.13	0.21	0.39	0.65
<b>NLC</b>	-	-	3	3	-	-	0.11	0.21
<b>SCCL</b>	11	12	364	369	0.24	0.24	7.38	7.43

\* Figures are subject to reconciliation with DGMS.



#### 9.8.4 Rate of Fatality and Serious Injury of CIL during the period 2010 to 2013

Company	Fatality Rate Per MT of Coal production				Fatality Rate Per 3 lac man shifts				Serious Injuries Rate Per MT of Coal production				Serious Injuries Rate 3 lac manshifts			
	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
CIL	0.22	0.12	0.13	0.13	0.32	0.19	0.22	0.21	0.64	0.60	0.42	0.37	0.95	0.90	0.68	0.65
NLC	0.09	0.08	0.16	-	0.14	0.13	0.28	-	0.36	0.21	0.20	0.11	0.57	0.33	0.35	0.21
SCCL	0.24	0.16	0.22	0.24	0.21	0.16	0.22	0.24	6.21	6.37	6.30	7.38	5.57	6.28	6.22	7.43

Note: All figures are provisional and subject to reconciliation with DGMS.

#### 9.8.5 Company-wise Accident Statistics of CIL, SCCL and NLC period 2010 to 2013:

Company	Fatal Accidents				Fatalities				Serious Accidents				Serious injuries			
	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
13	8	11	8	13	8	11	8	111	81	86	61	111	84	89	62	
7	6	12	9	7	7	12	12	60	37	28	18	61	42	30	18	
8	6	5	9	10	6	6	9	11	12	9	6	11	12	9	6	
12	5	7	6	12	5	7	6	11	10	9	17	11	12	9	17	
13	8	9	8	16	9	10	9	42	34	29	31	46	37	29	32	
19	11	10	13	33	11	11	13	51	58	43	32	62	59	45	33	
2	4	2	1	2	4	2	1	6	10	8	10	6	10	8	10	
1	2	1	0	1	2	1	0	0	0	0	0	0	0	0	0	
75	50	57	54	94	52	60	58	292	242	212	175	308	256	219	178	
2	2	4	-	2	2	4	-	3	5	5	3	8	5	5	3	
10	8	11	11	12	8	12	12	302	319	339	364	312	320	341	369	

Note: All figures are provisional and subject to reconciliation with DGMS.