

9.1 Safety is of paramount importance and Government accords top priority to the safety related issues in mines. Coal mining operations are governed under Mines Act, Rules & Regulations thereunder in regard to safety and health of persons employed in Mines. Directorate General of Mines Safety (DGMS) organisation under Ministry of Labour & Empowerment is the regulatory authority to ensure compliance of safety provisions by mine owners. Coal PSUs are totally committed to improve the safety standards of the mines both by following the statutory provisions as well as through self regulation approach. A number of initiatives have been taken by the coal companies in this regard and the same are listed below:

- Established internal safety organisations with workers representatives.
- Adopted risk assessment and management approach to assess the potential hazards and take the mitigative measures to make the operations safe.
- Conducting safety audit of the mines in a company by an independent safety auditor.
- Various steps for prevention of disasters arising out of inundation; fires; explosions etc. in mines.
- Strata management control to avoid accidents due to roof and side falls in mines, continuous monitoring of roof movement, adopting roof bolting systems, conducting R&D.
- Improving emergency response systems etc. through mine-wise emergency action plans, conducting mock rehearsals, conducting rescue rehearsals etc.
- In case of open cast mines measures are being taken on continuous basis for reducing the accidents due to truck movement, imparting training to all the concerned, developing code of practices for HEMM operators, maintenance staff etc.
- Monitoring the status of safety in mines through involvement of workmen inspector conducting the meetings of Pit Safety Committees, Area Level Tripartite Committees, Company level Tripartite Committees, CIL Safety Board, Standing Committee on Safety in

coalmines under the chairmanship of Minister for Coal, National Level Safety Conferences and through different Parliamentary Standing Committees.

9.2 JHARIA & RANIGANJ MASTER PLAN

9.2.1 The problems of subsidence and fires are the result of unscientific mining carried out by the erstwhile mine owners over more than 200 years of operations in these coalfields of Jharia and Raniganj prior to Nationalisation. 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 December, 1996 under the Chairmanship of the then 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. (ECL) in 1999 for implementation of the same in a phased manner.

9.2.2 In the meanwhile, Shri Hardhan Roy, Ex M.P. from West Bengal filed a writ petition [Public Interest Litigation (PIL)] in the Hon'ble Supreme Court in 1997 praying for initiation of immediate steps for control of subsidence and fire in BCCL & ECL and mitigation of its impact on surface in a specified time frame. Following the order of Hon'ble Supreme Court, Action Plan for shifting and rehabilitating people from unsafe areas, dealing with fire and stabilizing unstable areas in the command areas of ECL and BCCL was prepared for completion of all the activities in a phased manner over a period of 20 years by updating the master plans of BCCL & ECL prepared earlier. Subsequently, vide the order dated 3.5.2005, Hon'ble Supreme Court directed DGMS to verify the actions taken by BCCL and ECL so far and submit a report. Consequently, DGMS submitted its report in August 2005. Based on the recommendation of DGMS and observations of Planning Commission to reduce the time frame from 20 years to 10 years, the Master Plan of Jharia & Raniganj Coalfields dealing with fire, subsidence and rehabilitation and diversion of surface infrastructure was updated in March/April, 2008.

9.2.3 The Government has approved the Master Plan dealing with fire, subsidence and rehabilitation and diversion of surface infrastructure within the leasehold of Bharat Coking Coal Limited (BCCL) &

Eastern Coalfields Limited (ECL) on 12th August, 2009 at an estimated investment of Rs.9773.84 crores (Rs.7112.11 crores for Jharia Coal Field (JCF) and Rs.2661.73 crores for Raniganj Coal Field (RCF) including

Rs.116.23 crores sanctioned earlier for various Environmental Measures & Subsidence Control (EMSC) schemes. The summarized data of approved Master Plan is given in the table below:

Sl. No.	Particulars of the different components of Master Plan	RCF (ECL) (April '08)	JCF (BCCL) (March '08)
A	Dealing with fire		
1	Total no. of existing fires	7	67 (under 45 fire projects)
2	Estimated Cost (Rs. crores)	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 (Authorised)		29444
iii)	Encroachers (Un-authorised)		23847
iv)	Others		868
	Total No. of houses	33196	98314/ 79159
	Population covered	180263	395795
4	Land required for rehabilitation (Ha)	896.29	1504.99
5	Estimated cost (Rs. crores)	2610.10	4780.60
C	Diversion of Railway line/ Road/ OC pipeline	7 sites	Planning and survey with an outlay of Rs.20 crores
	Estimated Cost (Rs. crores)	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 Development Authority (ADDA) Govt. of WB	Jharia Rehabilitation & Development Authority (JRDA) of Govt. of Jharkhand
F	Implementation Schedule, years	10 (in two Phases each of 5 years)	10 (in two Phases each of 5 years) +2 years for pre implementation phase)
G	Estimated Capital Requirement for fire projects, rehabilitation & diversion of rail/road/pipeline etc. (Rs. crore)	2661.73	7112.11

9.2.4 Asansol-Durgapur Development Authority (ADDA) and Jharkhand Rehabilitation Development Authority (JRDA) have been notified by the state Governments of West Bengal and Jharkhand respectively as implementing agencies for rehabilitation purposes. Coal companies (ECL & BCCL) will provide technical support and the outlay will be funded partially through the internal resources of CIL and the cess collection under CCDA.

9.2.5 The implementation of the Master Plan for Jharia and Raniganj Coalfields is being monitored by the High Powered Central Committee constituted by this Ministry under the chairmanship of Secretary (Coal). The first meeting of this committee was held on 10.11.2009.

9.3 SAFETY MEASURES / INITIATIVES

9.3.1 Apart from complying with the statutory provisions as laid down in the Mines Act, 1952 and the Regulations, Rules and Bye-Laws framed there under, Coal PSUs have taken several measures to improve standard of safety in its mines. Some of the initiatives taken in this regard are given below:

- CIL has established a structured multi-disciplinary Internal Safety Organization (ISO) to assist the line management at various levels in matters related to Safety.

- CIL has introduced Risk Assessment based Safety Management Plan for its mines.
- Safety Audit by independent safety auditors.
- Steps for Disaster Prevention:
 - o Inundation: Thrust on Safety Audit, Check Survey, Trials of Geo-physical Methods for detection of water bodies / proving parting, adequate preparation before monsoon season etc.
 - o Fire in mines: Panel system working (so that in case of fire that can be isolated immediately), strengthening of isolation stoppings and use of fire retardant sealant etc.
 - o Explosion: Early Gas detection through various modern gadgets (both sensors & catalytic base), Continuous type computer based on-line Gas monitoring for highly gassy and fiery mines and erection of explosion proof stopping.

9.3.2 Emergency Response Systems

- Emergency Action Plans (EAP) of each mine are being reviewed from time to time and corrective action taken.
- Mock Rehearsals: CIL has introduced a system of conducting Mock

Rehearsals for examining the efficacy of Mine-wise Emergency Action Plan.

- o Demarcating Escape Routes: An exercise for demarcating Escape Routes in underground mines, on plans as well as belowground by fluorescent paint, display of the same at the entry to the mine has been done.
- o State of the art Rescue Apparatus like BG-4 Self Contained Breathing Apparatus was introduced in Rescue Stations and Rescue Personnel were trained for their use.



Mechanised Roof-Bolting process in progress for safety in an under ground coal mine

9.3.3 For reduction of Roof/Side falls accident:

Roof / Side fall accident is still one of the major causes of fatal accident in underground mines. CIL has given priority for ensuring roof support management through :

- Stress on face mechanization to reduce exposure of workmen in active working zone.
- Geo-mechanical properties of overlying rocks are being studied and Support Systems are being scientifically designed on the basis of Rock-Mass-Rating (RMR) of overlying strata and duly approved by DGMS.
- Greater use of Roof Bolting/ Stitching methods of roof support
- Introduction of mechanized drilling by roof bolting machines.
- Emphasis on development of indicators for detecting impending load on roof through R&D.

9.3.4 For reduction of accident in Opencast as well as on Surface of Mines:

The following measures are being taken for reduction of fatalities in Opencast Mines & on Surface:

- Mine-specific Traffic Rule.
- Code of Practices for HEMM operators, Maintenance staffs & others.
- Standard of Procedure related to safe operation of various mining operation.

- Risk Assessment & Management
- Training of Contractor's Workers involved in transporting
- 9.3.5 Monitoring the status of safety through the following agencies :
 - Workmen's Inspectors
 - Safety Committee at mine level
 - Area Level Tripartite Committees
 - Tripartite Safety Committee
 - CIL Safety Board
 - Standing Committee on Safety in Coal Mines
 - Conferences on Safety in Mines
 - Different Parliamentary Standing Committee

9.4 COMPANY-WISE ACCIDENT STATISTICS OF CIL, SCCL & NLC FOR THE YEAR 2009

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	9	74	75	0.93	0.32	8.45	1.93
BCCL	11	15	50	50	2.31	0.69	9.47	1.99
CCL	5	5	12	12	0.75	0.24	3.44	0.65
NCL	4	4	11	11	0.06	0.29	0.16	0.80
WCL	11	13	38	38	1.09	0.45	3.26	1.31
SECL	10	10	42	45	0.34	0.41	2.33	1.19
MCL	2	2	8	8	0.02	0.20	1.94	1.14
NEC	0	0	1	1	0.00	0.00	0.87	0.83
CIL	51	58	236	240	0.78	0.38	4.33	1.45
SCCL	17	20	397	404	0.39	0.39	8.46	8.19
NLC	3	3	8	9	0.13	0.21	0.39	0.62

Note: All figures for 2006, 2007, 2008 & 2009 are provisional and subject to reconciliation with DGMS.

9.5 COMPANY-WISE ACCIDENT STATISTICS DURING THE PERIOD 2006 TO 2009

Company	Fatal Accidents				Fatalities				Serious Accidents				Serious injuries			
	2006	2007	2008	2009	2006	2007	2008	2009	2006	2007	2008	2009	2006	2007	2008	2009
ECL	8	7	8	8	13	8	8	9	102	105	133	74	105	115	134	75
BCCL	12	10	9	11	61	10	9	15	45	66	69	50	47	66	69	50
CCL	5	7	4	5	5	8	4	5	19	16	11	12	19	16	11	12
NCL	4	5	6	4	5	5	10	4	15	10	22	11	15	10	23	11
WCL	13	12	10	11	13	12	12	13	57	60	44	38	60	61	45	38
SECL	7	10	9	10	7	10	10	10	68	60	72	42	72	63	74	45
MCL	2	4	4	2	2	4	4	2	10	9	4	8	17	9	4	8
NEC	0	0	2	0	0	0	7	0	1	0	1	1	1	0	3	1
CIL	51	55	52	51	106	57	64	58	317	326	356	236	336	340	363	240
SCCL	16	10	12	17	19	19	13	20	620	556	427	397	624	561	429	404
NLC	5	2	2	3	5	2	2	3	6	4	3	5	6	7	3	9

9.6 RATE OF FATALITY AND SERIOUS INJURY OF CIL, SCCL & NLC DURING THE PERIOD 2006 TO 2009

Company	Fatality Rate Per MT				Fatality Rate Per 3 lac manshifts				Serious Injuries Rate Per MT				Serious Injuries Rate Per 3 lac manshifts			
	2006	2007	2008	2009	2006	2007	2008	2009	2006	2007	2008	2009	2006	2007	2008	2009
CIL	0.3	0.15	0.16	0.14	0.32	0.18	0.20	0.19	0.96	0.92	0.91	0.57	1.02	1.05	1.15	0.77
SCCL	0.50	0.24	0.30	0.39	0.32	0.18	0.26	0.39	16.55	13.52	9.92	8.46	10.58	10.25	8.47	8.19
NLC	0.22	0.09	0.10	0.13	0.37	0.14	0.14	0.21	0.27	0.31	0.15	0.39	0.45	0.49	0.21	0.62