

SAFETY IN COAL MINES

9.1 JHARIA & RANIGANJ ACTION PLAN

9.1.1 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.

9.1.2 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 ₹ 9773.84 crore (₹7112.11 crore for Jharia Coal Field (JCF) and ₹2661.73 crore for Raniganj Coal Field (RCF) including ₹116.23 crore 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 (₹ 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 (₹ crores)	2610.10	4780.60
C	Diversion of Railway line/ Road/ OC pipe-line	7 sites	Planning and survey with an outlay of ₹20 crore
	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 Govt. of WB	Asansol Durgapur Development Authority (ADDA),	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. (₹ crore)	2661.73	7112.11

9.1.3 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.

9.1.4 The implementation of the Master Plan for Jharia and Raniganj Coalfields is being monitored by the High Powered Central Committee (HPCC) constituted by this Ministry under the chairmanship of Secretary (Coal). So far, six meetings of the Committee have been held. More than 50% of survey works has already been completed for rehabilitation of the affected persons. In BCCL area 2352 houses have been constructed, in which 1043 families have shifted till 31-12-11. For shifting of BCCL employees 344 houses have been built and another 1152 triple storied quarters

are under construction in various non-coal bearing zones. Further, Demographic Survey of 43 locations has been completed out of 141 identified unstable locations in Raniganj Coalfield Area under ECL.

9.2 SAFETY MEASURES / INITIATIVES

9.2.1 Safety in coal mines is of paramount importance in addition to the compliance of the provisions of prescriptive safety legislation under the Mines Act 1952, PSU coal companies have also taken steps for self regulation. These steps includes:-

- Establishment of multi-disciplinary Internal Safety Organization (ISO) to assist the line management at various levels in matters related to Safety.
- Introduction of Risk Assessment based Safety Management Plan for the mines.
- Safety Audit by independent safety auditors.

Steps for Disaster Prevention:

- 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.
- Fire in mines: Panel system working (so that in case of fire that can be isolated immediately), construction of isolation stopping where development of pillar was done without panel system, strengthening of existing isolation stoppings and use of fire retardant sealant, use modern gadgets for early detection fire/ spontaneous heating etc. Emphasis on use of Gas Chromatograph for analyzing mine air more accurately.
- 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.

9.2.2 Emergency Response Systems :

- Emergency Action Plans (EAP) of each mine are being reviewed from time to time and corrective action taken.
- Mock Rehearsals for examining the efficacy of Mine-wise Emergency Action Plan.
- 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.

- 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.

9.2.3 For reduction of Roof/Side falls accident :

Roof / Side fall accident is still one of the major causes of fatal accident in underground mines. Coal Companies have 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.
- Strata Control Cells have been established in all coal subsidiaries.
- Introduction of mechanized drilling by roof bolting machines.
- Emphasis on development of indicators for detecting impending load on roof through R&D.
- Replacement of grouting material from cement to fast setting resin capsules.
- Following Strata Monitoring Instrumentation have been introduced in some of mines:
 - Tell Tale (Duel Height, Rotary type)
 - Load Cell
 - Rib and Bore Hole Extensometer,

- Remote convergence indicator
- Magnasonic Extensometer
- Pressure Gauge

9.2.4 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 staff & others.
- Standard of Procedure related to safe operation of various mining operation.
- Risk Assessment & Control Management related to opencast activities.
- Training of Contractor's Workers involved in transporting.

- Procurement of advanced surveying/slope monitoring devices.

9.2.5 Monitoring the status of safety through the following agencies :

- Workmen's Inspectors
- Safety Committee at mine level
- Area Level Bipartite/Tripartite Committees
- Bipartite/Tripartite Safety Committees
- CIL Safety Board
- Standing Committee on Safety in Coal Mines
- National Conferences on Safety in Mines
- Different Parliamentary Standing Committee

9.3 ACCIDENT STATISTICS

9.3.1 Company-wise Accident Statistics of CIL, SCCL & NLC for the year 2011

Com-pany	Fatal Accidents	Fatalities	Serious Accidents	Serious Injuries	Fatality Rate		Serious Injury Rate	
					Per MT	Per 3 lac man shifts	Per MT	Per 3 lac man shifts
ECL	7	7	35	38	0.26	0.09	1.44	0.51
BCCL	7	8	33	38	0.30	0.16	1.42	0.77
CCL	6	6	14	14	0.14	0.16	0.33	0.37
NCL	4	4	5	6	0.06	0.21	0.10	0.32
WCL	10	10	40	44	0.23	0.22	1.00	0.97
SECL	14	14	38	39	0.13	0.23	0.38	0.65
MCL	5	5	8	8	0.06	0.28	0.09	0.44
NEC	2	2	0	0	2.06	0.80	0.00	0.00
CIL	55	56	173	187	0.14	0.18	0.48	0.61
SCCL	8	8	318	319	0.16	0.18	6.35	7.16
NLC	2	3	4	5	0.08	0.28	0.21	0.33

Note: Figures for 2011 are provisional.

9.3.2 Company-wise Accident Statistics during the period 2008 to 2011

Company	Fatal Accidents				Fatalities				Serious Accidents				Serious Injuries			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
BCCL	11	14	8	7	11	18	8	8	48	41	25	33	48	44	29	38
CCL	4	6	8	6	4	6	10	6	18	6	8	14	19	8	9	14
ECL	11	8	12	7	11	9	12	7	112	110	57	35	113	112	57	38
MCL	4	3	2	5	4	3	2	5	5	6	5	8	5	6	5	8
NCL	5	4	12	4	9	4	12	4	8	2	10	5	8	2	10	6
NEC	2	0	1	2	7	0	1	2	0	0	0	0	14	0	0	0
SECL	11	9	20	14	12	9	33	14	54	46	42	38	55	51	52	39
WCL	11	11	12	10	13	13	15	10	29	38	40	40	29	39	44	44
CIL	59	55	75	55	71	62	93	56	274	249	187	173	291	262	206	187
SCCL	12	17	10	8	13	21	12	8	427	406	302	318	429	411	312	319
NLC	2	3	3	2	2	3	3	2	2	8	5	4	3	9	6	4

Note: Figures for 2009, 2010 and 2011 are provisional.

9.3.3 Rate of Fatality and Serious Injury of CIL, SCCL & NLC during the period 2008 to 2011

Company	Fatality Rate Per MT				Fatality Rate Per 3 lac manshifts				Serious Injuries Rate Per MT				Serious Injuries Rate 3 lac manshifts			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
CIL	0.18	0.16	0.24	0.14	0.23	0.20	0.30	0.18	0.74	0.67	0.53	0.48	0.95	0.86	0.67	0.61
SCCL	0.30	0.43	0.24	0.16	0.26	0.42	0.24	0.18	9.92	8.50	6.21	6.35	8.51	8.30	6.36	7.16
NCL	0.10	0.15	0.15	0.10	0.17	0.264	0.26	0.17	0.15	0.44	0.29	0.19	0.26	0.78	0.52	0.35