

## Chapter 5

# Safety in Mining

Safety in coal mines is governed by the Mines Act, 1952 and the rules and regulations framed under this act. The Mines Rules, 1955, the Coal Mines Regulations, 1957, the Mines Rescue Rules, 1985 are some of the major statutes framed under the Mines Act. The Directorate General of Mines Safety (DGMS), under the Ministry of Labour & Employment has been empowered to enforce the statutes relating to mine safety. The Mines Act or any rule or regulation framed thereunder is amended from time to time as per necessity as deemed fit by the DGMS, in view of any recommendation of any Court of Inquiry into any major accident or otherwise. However, from time to time circulars are issued by DGMS on safety issues for adoption in mine operation. There is a Standing Committee on Safety in Coal Mines which is chaired by Minister in Charge of Coal. This meeting is attended by officers from Ministry of Coal, Ministry of Labour & Employment, DGMS, representatives of Trade Unions, Coal companies (All PSUs & Private companies), State Mines & Mineral Development Corporations. The Committee meets biannually to take stock of the safety situation in coal and lignite mines and suggests measures for bringing further improvement in the field of safety.

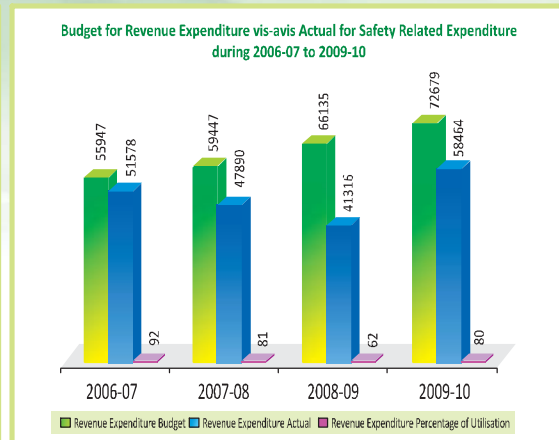
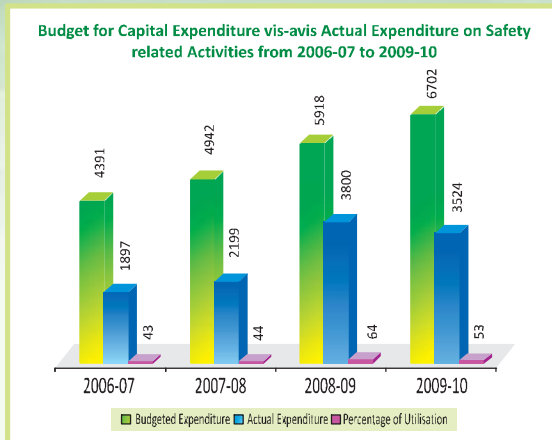
Safety is an important aspect in functioning of an industry. It is important not only for its employees and workers but also for the environment and the nations. Coal industry poses one of the most difficult challenges in the area of safety, health and environment when compared to many other industries due to complex nature of its operations and maintenance activities and wide range of hazards associated with them. Despite tremendous technological progress, the safety culture and safety at work still are serious issues. Therefore, maintaining of high standards of health, safety and environment in coal industry is of paramount importance.

### 5.1 Safety Policy

The safety policy of CIL aims at 'zero harm potential' in all mines and covers security issues like designing and implementing of safety plans, deployment of dedicated safety personnel, establishment of internal safety organization and multi level monitoring.

### 5.2 Safety budget

Each subsidiary company prepares capital and revenue budget for safety related activities. Examination of records for CIL as a whole, for the year 2006-07 to 2009-10, revealed that actual expenditure, on capital head and revenue head ranged from 41 per cent to 64 per cent and 62 per cent to 92 per cent respectively to the budgeted expenditure, as shown in the graph below.



Audit observed that individually in all the subsidiaries, the actual expenditure on capital account was less than the budgeted expenditure except SECL (2006-07, 2007-08 and 2009-10) and ECL (2008-09). On the revenue head, actual expenditure was less than the budgeted expenditure except CCL (2006-07) and NCL (2006-07 to 2008-09).

Audit is of the opinion that budget management was not adequate as despite the allocation of funds available under 'Safety' head ; expenditure on safety related issues was not spent .

### 5.3 Safety Audit

As per the safety committee of CIL, every mine should be covered by an independent safety audit at a frequency of two years to ensure adherence to the safety standards.

Audit, however, observed that safety audits were not carried out regularly in the subsidiaries. In BCCL, no safety audit of opencast mines was carried out during the period 2003-07. However, safety audit in 60 mines of BCCL was conducted during the period from September 2007 to January 2008.

The Management stated (December 2010) that safety audit would be conducted regularly in respect of all the projects.

### 5.4 Safety in respect of Overburden Dumps in Open Cast Mines

One of the major safety issues with regard to open cast mines is the maintenance of overburden dumps. These dumps have to be maintained strictly in accordance with the safety parameters imposed in terms of height, steepness of slope, etc, otherwise they may collapse, endangering human life, fauna and property, as it happened in Birsampur Area of SECL (May 2009) and Jayant Area of NCL (December 2008). These safety parameters are stipulated in the project reports and environmental clearance given by MoEF, based on local site conditions.



Out of 18 open cast mines selected in sample, Audit observed that in 10 mines<sup>11</sup>, there were cases of excess height and higher gradient and accommodation of excess overburden than prescribed in the environment clearance/ project reports. The details regarding excess height and higher gradation are given in **Annexure - 5**.

The Management stated that:

- excess height was due to non clearance of land (CCL);
- there has been no case of mudslide due to the properties of the overburden material and resultant angle of repose (ECL);
- the prescribed height was for external dumps and not for internal dumps (WCL);
- Precautionary steps were being taken in case of fresh dumping of overburden.

The fact remains that the Company compromised with the safety requirements while dumping overburden.

## 5.5 Stowing in underground mines

Stowing, the process of filling spaces left in underground mines after extraction of coal with sand and or any other material, is required for the safety of the mines as well as for the conservation of coal by combating mine fire. Improper stowing also encourages illegal mining as well as collapse of mine roof, leading to subsidence of road, rail track and other physical structure erected over it. One of the important reasons of historic mine fire in Jharia region of BCCL was the improper stowing of underground mine in pre-nationalized period.

Audit observed shortfalls in stowing in all the three subsidiaries, which have underground mines. The reported shortfall in stowing as on 31 March 2010 was 4,41,912 cum in ECL; 3774 cum in BCCL and 11330 cum in Sikra, Swang and Jarangdih underground mines of CCL

The Management stated that action would be taken to keep the backlog in stowing within permissible limits.

The fact however, remains that shortfall in stowing is fraught with the risk of hazards of accidents.

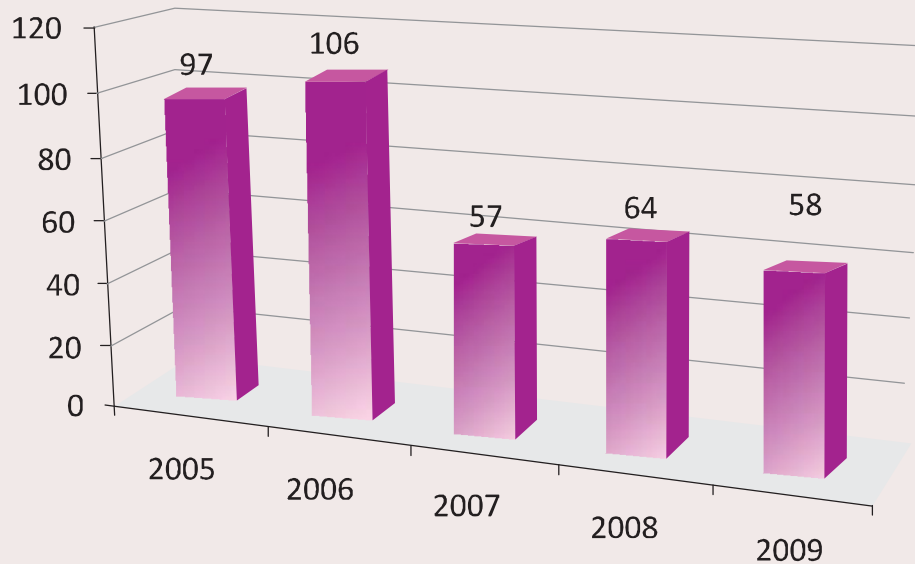
## 5.6 Accidents Reporting

The different types of accidental hazards are Roof/side Falls, Haulage, Conveyor and Winding, Trucks, Dumpers and wagons, Explosive and Electricity etc.

The details of the fatal accidents during 2005 to 2009 are shown in the chart below:

<sup>11</sup> Block II of BCCL, Urimari and Jarangdih of CCL, Rajpura and Sonepur Bazari of ECL, Lajkura of MCL, Gevra and Jamuna of SECL, Ghorawari and Umrer of WCL.

## Fatalities



- There were 285 fatal accidents involving 382 fatalities during the year 2005 to 2009 in CIL.
- Audit observed that though the number of fatal accidents, number of fatalities, number of serious accidents and serious injuries showed decreasing trend in CIL and its subsidiaries during the period from 2005 to 2009 but it was not able to achieve the zero harm target.
- The rate of accidents and injuries per million tonne of coal production in underground mines decreased from 4.15 in 2005 to 2.39 in 2009 in CIL as a whole.
- Analysis of reasons for fatal accidents done by safety committee revealed that majority of the fatal accidents were due to ground movement, wagons & dumpers, non-transport machines, explosives and electrocution etc. This indicates that the fatal accidents could have been avoided to a great extent, had proper and adequate steps been taken by the management.



The Management replied (December 2010) that rate of accident declined in 2009.

## 5.7 Shortage of Manpower and Safety Equipment

According to Mines Rules, 1955, for every mine wherein 500 or more persons are employed, there shall be designated overman, mine foreman or electrical supervisor to keep the electrical and other mechanical installations running and in safe working condition.

Audit noticed that:

- In CIL and its subsidiaries, there was an overall shortage of 3213 employees against the requirement as on 31 March 2010.
- The shortage over requirement was in the range of 0.63 per cent to 29.35 per cent in all the categories. This shortage in the non-executive cadre was observed in all the subsidiaries. (Annexure -6)
- In four<sup>12</sup> out of eight underground mines selected in sample, there were shortages of safety equipment like flame safety lamps, cap lamps, exploders, fire extinguisher, anchorage testing machine, self rescuer, carbon dioxide in absorbents, shoes, helmet, methanometer, telecommunication equipment, personal dust sampler etc.

The Management stated that action has been initiated to fill up the vacancies and shortage of safety equipments was being monitored regularly and action has been initiated for removing the shortages.

## 5.8 Subsidence and Fire in Jharia and Raniganj coal field

The problems of subsidence and fire are the result of unscientific mining carried out by the erstwhile mine owners over more than 200 years of operations in the coalfields of Jharia and Raniganj prior to nationalisation. In spite of the declaration of these areas unsafe by the local administration, the habitation increased unabated. The problem of subsidence and fire were being addressed by the Government from time to time and a high level committee was also set up in December 1996 under the chairmanship of the then Secretary, Ministry of Coal. 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 BCCL and ECL in 1999 for implementation in a phased manner.

Further, based on the recommendations of Directorate General of Mines Safety and Planning Commission to reduce the time frame from 20 years to 10 years, the Master Plan of Jharia and Raniganj coalfields dealing with fire, subsidence, rehabilitation and diversion of surface infrastructure was updated in March/ April 2008 which was approved by the Government of India in August 2009 at an estimated investment of ₹ 9773.84 crores ( ₹ 7112.11 crore for Jharia and ₹ 2661.73 crore for Raniganj) as detailed in **Annexure - 7**.

To meet this expenditure, CIL would contribute ₹ 350 crore per annum from their own resources and balance is to be provided from collection of Stowing Excise Duty under Coal Mines (Conservation & Development) Act, (CCDA), 1974. CIL has released ₹ 159.72 crore to ECL and ₹ 14.34 crore to BCCL during the year 2010-11.

<sup>12</sup> Begunia and Jhanjara (ECL), Bagdewa (SECL) and Satpura of WCL



Audit observed that the main constraint for implementation of Rehabilitation scheme by BCCL and ECL is the problem of acquisition of land in the sites located on non coal bearing areas along the periphery of Jharia / Raniganj coalfields. Therefore, Management needs to expedite acquisition of land and ensure implementation of the scheme as the funds were available.

## 5.9 Occupational Health Care

Occupational health care is of immense significance in coal mining, given the hazardous working conditions. Occupational health issues in coal mining are mainly governed by the Mines Act, 1952 and other rules and regulations framed under this Act.

### 5.9.1 Medical Examination of Workers

- According to Section 29B of the Mines Rules 1955, the pre-employment health examination is mandatory for all employees, including contractors' employees. Audit observed that although initial medical examination was done mandatorily in all the subsidiaries for the company employees, very few contractors' employees underwent initial medical examination. The percentage of contractors' employees undergoing initial medical examination in CIL and its subsidiaries was approximately 1.58 to 7 during 2005-06 to 2007-08.

The Managements replied that efforts are on to cover the initial medical examination of contractors' employees. CCL attributed the backlog to delay in finalization of charges to be recovered from the contractors.

- Further, as per the provisions of the Mines Rule 1955, one-fifth of the workers are supposed to undergo periodical medical examination every year so that each worker is covered every five years. Audit observed that there was hardly any backlog in periodical medical examination of the workers in any of the subsidiaries during the calendar years 2004 to 2009.
- Medical examination would be more effective if the medical history/findings of periodical medical examination is properly maintained. Mine Rules 1955 also provide for it through 'Form O'. The effectiveness would improve if the medical history is maintained in a computerized database. Audit observed that such a computerized database was being maintained in only one subsidiary, viz., NCL.

The Management agreed (December 2010) to look into the issue so that such data can be captured in computerized environment.

### 5.9.2 Mortality among employees

Audit analyzed the data relating to causes of death among employees in two subsidiaries, viz., BCCL and CCL for one year (2007) and observed the following:

- High percentage (BCCL-11.25 per cent and CCL-16.08 per cent) of deaths due to conditions like liver cirrhosis and alcohol abuse;
- High percentage (BCCL-6.43 per cent and CCL- 14.57 per cent) of deaths due to acute and chronic renal failure; and
- Incidence of death due to respiratory and cardio vascular diseases, malignancy and TB below the national average<sup>13</sup>.

Conclusion : There was a decreasing trend in all categories of accidents in CIL and its subsidiaries during the period under audit review. However, in order to achieve the objective of 'zero harm potential' in all the mines as envisaged in the safety policy, safety parameters in different mines need to be regularly monitored and upgraded.

Occupational health care of the workforce is of immense significance for CIL and its subsidiaries, given the hard working conditions in the mines and the adjoining areas. CIL and its subsidiaries need to pay greater attention to regular medical examinations and follow up to prevent health hazards. All efforts need to be directed towards reducing continuous exposure of the employees to hazardous environment.

In sum, the trends of mortality among employees and the analysis of the causes of mortalities point towards the need for more effective medical examination and increasing medical awareness among employees.

#### Recommendation # 5

Independent safety audit of every mine should invariably be conducted at a frequency of two years as suggested by the safety committee of CIL.

#### Recommendation # 6

All subsidiaries may maintain computerized database of medical history of employees as is being done in NCL for effective medical care.

The Ministry stated (May 2011) that:

- In MCL and NCL Safety Audit has already started and is under progress. In other subsidiaries conducting of Safety Audit is also under process of starting.
- Computerized Data base of Medical History of employees for effective medical care is being done and is under active consideration of implementation in totality in subsidiaries of CIL as being done in NCL.

<sup>13</sup> In the age group of 25 -69 years