Express Delivery.

No.MI-5(8)/58
Government of India
Ministry of Labour & Employment
****

Dated the 8th March 1958.

From

Shri K.N. Nambiar,
Deputy Secretary to the Government of India.

To

1. Shri B. Hogg,
Chairman, Indian Mining Association, 2, Fairlee Place,
Calcutta.

2. Shri Inder Mohan Thappar,
Royal Exchange Place, Calcutta.

3. Shri D.K. Samanta,
Agent, Pathavdih Sudamdih Colliery, Pathavdih, P.O.
Colliery,

Workers representatives.

4. Shri Kanti Mehta,
Secretary, Indian National Mine workers Federation,
Dhanbad.

5. Shri Mahesh Desai,
General Secretary Koyala Mazdoor Panchayat,
Jharia, Bihar.

6. Shri Kalyan Roy,
Secretary, Indian Mines Workers' Federation,
Calcutta.

7. Shri V.R. Achariar
General Secretary, Kusunda,
Hindustan Khan Mazdoor Sangh, P.O. Kirkard
District Dhanbad.

Representatives of Colliery Managers.

8. Shri A. Wright, Agent,
Lodna Colliery Company, C/o. General Manager,
Lodna Colliery Company, Dhanbad. P.O.

9. Shri T.B. Malhotra, Agent Ranipur,
Colliery, P.O. Neturia, Dist. Purulia, West Bengal.

Others.

10. Shri S.K. Nargundkar, General Manager,
Singhareni Collieries, Kothagudium.

11. Shri A.B. Guha,
Mining Adviser, Ministry of Steel,
Mines and Fuel.

12. Shri S.S. Grewal,
Chief Inspector of Mines in India, Dhanbad.

Members of Parliament.

13. Shri T.B. Vittal Rao.

14. Shri Ram SubhagSingh.

15. Shri Rajinder Singh.

Subject:- Constitution of the Steering Group on Safety in mines.

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Sir,

I am directed to say that in pursuance of the statement made by the Minister for Labour and Employment in the Parliament on the 25th February, 1958, the Government of India have set up a Steering Group with the following composition:-

Employer's Representatives.

1. Shri B. Hogg,
Chairman, Indian Mining Association, 2, Fairlee Place, Calcutta.

2. Shri Inder Mohan Thappar,
Royal Exchange Place, Calcutta.

3. Shri D.K. Samanta,
Agent, Pathavdih Sudamdih Colliery, Pathavdih, P.O. Colliery,

Workers representatives.

4. Shri Kanti Mehta,
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Members of Parliament.

13. Shri T.B. Vittal Rao.

14. Shri Ram SubhagSingh.

15. Shri Rajinder Singh.

Members may bring one or two advisers with them but the latter will not be entitled to draw travelling allowance or daily allowance from Government.

2. The Steering Group will prepare the ground for a Conference of mine workers, employers, mining engineers and Inspectorate of Mining to consider the question of safety in mines in relation to

(a) mine management practices;
(b) workers' training;
(c) arrangement for check and inspection;
(d) measures calculated to prevent accidents in mines; and
(e) allied matters.

3. A copy of a note prepared for the subject by the Chief Inspector of Mines is enclosed.

4. The meeting of the Steering Group will be held on the 17th March, 1958, at ~~9.30~~ A.M. in the Committee Room A, North Block, Central Secretariat, New Delhi.

Yours faithfully,

K N Nambiar 8.3.58

(K.N. Nambiar)
Deputy Secretary

Copy forwarded for information to the Ministry of Steel Mines & Fuel (Shri Chhedi Lal)

Copy to:-

(1) Private Secretary to Labour Minister.
(2) Private Secretary to Deputy Labour Minister.
(3) Personal Assistant to Parliamentary Secretary.
(4) Private Secretary to Secretary.
(5) Personal Assistant to Joint Secretary

C R Nair

for Deputy Secretary

Notes for use of
the Steering Committee of
THE CONFERENCE PROPOSED TO BE CALLED
TO DISCUSS SAFETY IN MINES

Introduction

1. Mining is known, all over the world, to be the most dangerous profession of peace time, accident rates in mines being 10-20 times these in factories and 3.5 times those in railways (Table I and Figure I). There are two basic factors peculiar to mining; both being due to the fact that mining involves excavation of ground. Firstly, the relentless forces of nature are to be contended with constantly and at every stage, for roof and sides have to be kept up against the force of gravity. Secondly, as fresh ground is exposed every moment, the conditions do not remain static for any length of time but exchange from day to day and even from hour to hour. The problem of safety in mining is getting more intricate as mining extends to greater depths and more machines are used in the getting of minerals.

2. In the words of the Conference on Safety in Coal Mines held recently under the aegis of the European Coal and Steel Community "greater safety can be attained primarily through a detailed study ofworking methods, through proper training of the personnel, and through full co-operation in creating safety-mindedness", though disciplinary action is also considered "indispensable." This conference is being convened to discuss the various problems of safety in mines and to devise ways and means to reduce mine accidents.

Development of Indian Mineral Industry in Recent Times.

3. Though interest in mineral deposits awakened during the times of the East India Co., the real exploitation of the minerals began only in the 1890's. Thus the number of persons employed in Coal Mines in 1901 was seven times that in 1880 and twice that in 1890. Table II gives the development of the mineral industry in India since 1900.

Development of Inspection of Mines.

4. The first concrete proposal for the inspection and regulation of mining operations in India came in 1890 from the then Secretary of State , Lord Cross who, forwarding a copy of the proceedings of the Berlin Conference of 1890, asked the Government of India to consider the advisability of undertaking legislation for the inspection of mines and regulation of employment therein of women and children.

5. As a first step, the Government of India appointed in 1894 an Inspector of Mines within the organisation of the Geological Survey of India, to inspect the mines and make recommendations on the type of regulations needed. Three Mining Specialists (one in Mining and Metallurgy, one in Coal Mining and one in Gold Mining) were also appointed in the Geological Survey.

6. Following up the first report of the Inspector of Mines (Mr. James Grundy) the Government of India appointed, in 1895, a committee to frame general rules applicable to mines or groups of mines, and to specify the heads on which legislation was desirable and the provisions which were to be made under each of the heads. The committee submitted its report early in 1896.

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7. In 1897, a disaster of large magnitude occurred in the Kolar Goldfields (in Mysore State) in which 52 persons were killed in a shaft accident. This was followed in 1899 by a mine fire in Khost Coal Mine in Baluchistan, in which 47 persons were killed. The finalisation of mining legislation was therefore given top priority and the Mines Act was enacted in 1901 and brought into force the same year.

8. Early in 1902, the Government of India created a "Bureau of Mines Inspection" and appointed the then specialist in Mining and Metallurgy in the Geological Survey of India, as Chief Inspector of Mines to head the new Bureau. In 1904, the Bureau was renamed as the Department of Mines and was shifted in 1909 to Dhanbad, which has since been the seat of the Department.

9. Table III gives the growth of the Department of Mines since 1901. The cadre as sanctioned is shown against the number of inspectors actually in position.

Safety Legislation in Mines.

10. Before the enactment of Indian Mines Act, Inspectors of Mines acted on a purely advisory basis. Inspections were usually made on invitation - and in all cases after prior arrangement. Even then, in 1900 the provisional Chief Inspector of Mines had to record that though 'the visits and suggestions of the Inspector were generally received in a friendly spirit, in more than one case admission to the mines was practically refused.'

11. The main features of the first Mines Act were:

(i) Inspectors were empowered to enter and inspect mines, and to enquire into accidents etc.

(ii) The employment of competent managers in mines was required.

(iii) The Government was empowered to frame rules etc. for regulating work in mines.

(iv) Penalties were prescribed for the contravention of various provisions.

12. The development of the safety legislation for mines since then is described in Appendix A, while Appendices B, C and D give the main features of the Coal Mines Regulations 1957, of the proposed amendments to the Mines Act 1952 and of the draft Metalliferous Mines Regulations respectively.

Accidents and Accident Rates.

13. The number of fatal accidents and of fatalities in Indian mines are given in Table IV. Table V gives the fatal accident-rates and fatality rates separately for coal mines and metalliferous mines in India. Figure 2 shows the development of fatal accident-rates in Indian mines since 1901.

14. A comparision, in respect of coal mines, with the fatality rates of other countries of the world is given in Table VI.

Disasters in Indian Mines.

15. Like any other mining industry, the history of mining in India is marred by a number of tragic disasters, each involving the death of a large number of persons. The largest one was at Poidih Colliery (in Asansol Sub-division in Bengal) in 1936 when 209 persons were killed due to an explosion.

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16. A list of accidents in which 10 or more persons were killed is given in Table VII.

Courts of Enquiry

17. Even the 1901 Act contained a provision relating to the appointment of Courts of Enquiries 'into the causes of and circumstances attending' individual accidents if the Government was of the opinion that such an enquiry should be held, the Court to consist of a single person. Assessors could, however, be appointed to assist the Court. Till date, such Courts of Enquiry have been appointed in about 30 cases. Particulars in respect of these Courts of Enquiries are given in Table VIII.

18. Appendix E details the recommendation made by different Courts of Enquiry and the action taken thereon.

Technical Aspects of Accident Prevention

19. For purposes of general discussion, accidents can be divided into two categories - high-fatality accidents(or disasters); and low-fatality accidents. Though disasters are spectacular in nature, make headlines and serve the purpose of drawing the attention of the public to dangers of mining, they do not constitute more than 7-10% of the total fatalities (Table IX). The majority of deaths in mines are accounted for by low-fatality accident.

20. Appendix F describes briefly the causes of high-fatality accidents and indicates the general lines along which preventive measures are to be developed. Appendix G discusses, in brief, the causes of and preventive measures for low-fatality accidents and also the other technical factors having a general effect on safety.

Changing Pattern of Working Conditions in Mines.

21. The mining industry in India is over a hundred years old. In several cases, the shallower and easier deposits are nearing exhaustion, and workings have now to be taken deeper into the earth as well as into more difficult deposits. Mechanisation is also on the increase. These factors are introducing new dangers into the mining practices as known hitherto in India.

22. Working of difficult deposits involves problems of exploration, planning and roof control. Problems encountered in deeper workings arise from strata control, high temperatures and humidity, and winding from depths (all mines); and also of inflammable gases and coal dust (coal mines). Mechanisation creates problems resulting from increased use of explosives and electricity, from faster development (roof control and ventilation) and from greater production of dust.

23. Mechanisation also means more concentration of workmen multiple-injury accidents.

Securing Compliance with Mining Legislation.

24. If safety could be achieved just by making regulations and putting them on the Statute Book, there would actually be no problem to be solved. No amount of legislation can, however, be of any use unless the provisions thereof are implicitly followed. Three parties are involved in this - the owners, the managerial and supervisory staff, and the workmen. Unless all of them play their proper part in their respective spheres, safety will not be achieved. Several difficulties have been experienced in this respect, arising from-

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(i) Interference in technical matters effecting safety, by unqualified owners/agents;

(ii) Overburdening of managers by non-technical statutory duties;

(iii) Low standards of supervisory staff;

(iv) Lack of training of technicians, operators and workmen;

(v) Poor discipline, etc.

25. After safety legislation has been framed, there is also the need for a Govvernment agency to enforce the same and to bring stragglers upto mark. Also, it is desirable that all operations in mines be kept under regular vigilance from the point of view of safety, so that unsafe practices - whether intentional or unintentional, are pointed out and remedied. For this purpose, it is necessary that the Governmental agency appointed for the purpose is given necessary facilities backed by suitable powers of enforcement.

Safety Education and Propagenda.

26. However, as may be clear from a description of the causes of accidents given in Appendices F and G, there is such a multitude of local factors contributing to the occurrence of an accident that no amount of enforcement or coersion alone can achieve greater safety. What is equally, if not more, important is that every person on the job should be safety-conscious and should always be on the alert against dangers. Safety Education and Propaganda can play a very useful role in promoting safety consciousness.

27. Separate programmes may be evolved for giving instruction to the supervisory staff and for educating the general body of workmen. Periodic talks on safety should be given to mining officials, and 'safety periods' observed. Study groups should be formed where individuals are encouraged to come forward and discuss their particular problem.

28. To carry home safety propaganda to the workers most of whom at present are illiterate, it is essential to adopt visual means. Documentary films on accidents and safety should be prepared, and shown regularly to the workers. The possibility of showing these safety films in the commercial cinema halls in the mining areas should also be explored.

29. Safety posters are another important medium whereby the workers can be kept constantly alert. For the more literate class, a Safety First bulletin can be of considerable help. Appendix H discusses in detail this aspect of accident prevention work.

Points for discussion

30. This Conference is being called to discuss in general the problem of safety in mines in India, and to recommend ways and means of reducing accidents in mines. This Steering Committee is meeting with the object of drawing up an Agenda for the Conference and of laying down the general procedure to be adopted. It is suggested that, during its deliberations, the Conference may like to discuss and make recommendations regarding the following points:-

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1. Management practices.

2. Discipline,

3. Training of Supervisory staff and workers,

4. Safety Education and Propaganda.

5. Technical considerations, with particular reference to gassy and dusty mines and working at greater depths.

6. Enforcement agencies, and difficulties of enforcement.

7. Enhancement of Rates of Compensation for accidents - to act as an incentive for promotion of safety.

Table I: Fatality Rates in various industries.

(From I.L.O. Year Book of Labour Statistics, 1956).

		Mining		Manufacturing.	Railways (for workers-not passengers)	Remarks
		All	Coal			
India	1952	0.81 (a)	1.00 (a)	0.10 (a)	0.24 (a)	
	1953	0.65	0.97	0.10	0.29	
	1954	0.72	0.96	0.10	0.20	
	1955	...	...	....	...	
Japan	1952	1.45 (a)*	1.48 (a)*	0.19 (a)*	0.50 (a)	*in establishments employing 100 or more persons.
	1953	1.47	1.60	0.20	0.41	
	1954	1.68	1.84	0.17	0.26	
	1955	1.73	1.91	0.15	0.28	
South Africa	1952	1.54 (a)	1.79 (a)	...	0.60	
	1953	1.56	1.80	...	0.47	
	1954	1.51	1.65	...	0.62	
	1955	1.35	1.48	...	0.52	
U.K.	1952	0.68 (b)	0.67 (b)	0.06 (a)	0.32 (a)	
	1953	0.65	0.63	0.06	0.33	
	1954	0.62	0.61	0.06	0.27	
	1955	0.72	0.70	0.05		
U.S.A.	1952	1.68 (c)	2.22 (c)	0.10 (b)	0.34 (b)	
	1953	1.46	2.15	0.10	0.31	
	1954	...	2.48	0.09	0.24	
	1955	...	2.50		0.30	
France	1952	1.14 (b)	0.95 (b)	...	0.45 (a)	
	1953	0.95	0.86	...	0.41	
	1954	1.02	0.88	...	0.43	
	1955	0.83	0.74	...	...	

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Germany (Fed.Rep.)	1952	1.39	...	...	0.42[a]
	1953	1.35	...	...	0.47
	1954	1.26	...	...	0.48
	1955	1.43	...	...	0.45

Noates :

(a) Rates per 1,000 persons employed (average).

(b) Rates per 1,000 man-years of 300 days each.

(c) Rates per 1,000 man-years of 2,400 hours each.

Table II : DEVELOPMENT OF MINING INDUSTRY IN INDIA.
1900- 1956

Year	COAL MINES				METALLIFEROUS MINES			ALL MINES		
	No. of Mines	No. of persons employed (in thousands)	Output (in million tons)	Pit-head Value (in crores of rupees)	No. of Mines.	No.of persons employed (in thousands)	Pit-head value (in crores of rupees)	No. of Mines.	No.of persons employed. in thousands)	Pit-head Value (in crores of rupees)
1900		80	6.1							
1905	280	80	7.8	..	360	29	..	640	110	..
1910	418	98	10.8	..	363	46	..	781	145	..
1915	583	146	16.3	..	538	34	..	1121	180	..
1920	783	176	17.0	..	933	58	..	1716	234	..
1925	810	173	20.0	..	1201	80	..	2011	254	..
1930	549	169	22.7	8.8	1120	92	6.8	1669	262	15.6
1935	494	159	21.0	5.8	1319	94	6.9	1813	254	12.7
1940	613	209	26.1	9.2	1194	119	3.2	1807	328	12.4
1945	973	295	26.3	29.1	1178	91	3.6	2151	386	32.7
1950	891	350	32.3	46.6	1205	121	10.4	2096	472	57.07
1955	853	348	38.2	56.0	2246	242	31.3	3099	591	87.33
1956	856	352	39.3	65.0	2521	276	35.9	3377	629	100.93

Figures for 1950 and onwards relate to Indian Union (including previous Princely States).

Figures for 1945 and earlier relate to British India (including Pakistan).

Figures for 1930 and earlier relate to British India including Burma.

Table III : Strength of Department of Mines in India

(including Chief Inspector and Electrical Inspectors)

Year	Sanctioned cadre	In position	Number of Mines	Number of persons employed (000's)	Number of Mines per inspector in position.	Number of persons per inspector in position (000's)	Remarks
1905	3	3	640	110	213	37	
1910	4	4	781	145	195	36	
1915	4	4	1,121	180	280	45	
1920	6	6	1,716	234	286	39	
1925	9	9	2,011	254	223	28	New Act and Regulations came into force.
1930	9	9	1,669	262	185	29	
1935	11	11	1,813	254	163	23	
			BURMA WAS SEPARATED				
1940	13	13	1,807	328	139	25	
1945	13	13	2,151	386	165	30	
1950	30	20	2,096	472	105	24	New Act came into force
31 Dec. 1954	40	27	2,873	568	106	21	
31 Dec. 1955	75	39	3,099	591	79	15	New Rules & Temp. Regs. came into force.
31 Dec. 1956	77	39	3,377	629	87	16	
31 Dec. 1957	77	37	...	...	...	...	New Coal Mines Regs. came into force.

Table IV.- FATAL ACCIDENTS AND FATALITIES IN MINES.

1901 - 1957.

Year.	Coal Mines		Metalliferous Mines		All Mines		Remarks.
	Number of fatal accidents.	Number of fatalities.	Number of fatal accidents.	Number of fatalities.	Number of fatal accident	Number of fatalities.	
1901	62	70	18	32	80	102	Including the State of Hyderabad.
1902	53	59	8	12	61	71	British India
1903	57	67	11	14	68	81	(including Burma and
1904	49	55	11	18	60	73	Pakinstan, bu
1905	54	58	11	18	65	71	excluding
1906	67	80	17	23	84	104	Princely States.
1907	80	89	25	33	105	122	
1908	114	165	21	29	135	194	
1909	97	119	29	33	126	152	
1910	104	160	13	26	117	128	
1911	117	148	20	26	137	174	
1912	113	157	20	28	133	185	
1913	117	185	19	26	136	211	
1914	120	145	32	46	152	191	
1915	142	166	21	22	163	188	
1916	111	169	29	27	140	206	
1917	138	165	37	38	175	201	
1918	168	197	41	46	209	243	
1919	213	260	40	52	252	312	
1920	147	172	30	53	177	225	
1921	197	257	35	36	232	293	
1922	174	209	31	34	205	243	
1923	194	332	43	55	237	287	
1924	189	230	44	51	233	281	
1925	157	186	43	47	200	233	
1926	152	171	46	56	198	227	
1927	166	181	43	66	209	247	
1928	183	218	38	41	221	258	
1929	152	194	60	72	212	266	
1930	175	211	42	46	217	257	
1931	156	185	33	42	189	227	
1932	137	151	26	49	163	200	
1933	116	124	26	29	142	153	
1934	131	157	46	52	177	209	
1935	158	264	44	48	202	312	
1936	167	420	47	57	214	477	
1937	172	200	36	48	208	248	Excluding Burma
1938	217	248	31	35	248	283	
1939	229	249	37	37	266	286	

Year	Coal Mines		Metalliferous Mines		All Mines		Remarks
	Number of fatal accidents.	Number of fatalities.	Number of fatal accidents.	Number of fatalities.	Number of fatal accidents.	Number of fatalities.	
1940	233	284	27	31	260	315	
1941	231	269	29	34	260	303	
1942	239	291	48	51	287	342	
1943	257	290	31	38	288	328	
1944	299	339	24	26	323	365	
1945	256	280	21	27	277	307	
1946	250	295	21	27	271	322	
1947	217	239	22	34	239	263	
1948	209	252	19	20	228	272	Excluding Pakistan.
1949	205	238	22	32	227	270	
1950	215	241	23	32	238	273	
1951	278	319	81	106	359	425	Including ex-Princely States.
1952	293	353	68	100	361	453	
1953	257	33	48	58	305	388	
1954	221	329	60	78	281	407	
1955	216	310	58	68	274	378	
1956	199	259	63	76	262	335	
1957	165	181	54	73	219	254	

Table V : FATAL ACCIDENTS AND FATILITY RATES PER 1000 PERSONS EMPLOYED

1901 - 1957

YEAR	COAL MINES		METALLIFEROUS MINES		ALL MINES		REMARKS
	FATAL ACCIDENT RATE	FATALITY RATE	FATAL ACCIDENT RATE	FATALITY RATE	FATAL ACCIDENT RATE	FATALITY RATE	
1	2	3	4	5	6	7	8
1901	0.73	0.82	1.66	0.93	0.76	0.98	
1902	0.69	0.66	0.75	0.49	0.70	0.70	
1903	0.72	0.84	0.49	0.62	0.67	0.79	
1904	0.60	0.67	0.43	0.71	0.56	0.68	
1905	0.67	0.72	0.38	0.45	0.59	0.64	
1906	0.74	0.89	0.44	0.68	0.65	0.82	
1907	0.78	0.86	0.51	0.67	0.69	0.80	
1908	0.95	1.37	0.48	0.66	0.82	1.18	
1909	0.89	1.08	0.92	1.05	0.90	1.08	
1910	0.99	1.32	0.33	0.66	0.81	1.29	
1911	1.10	1.38	0.50	0.65	0.94	1.18	
1912	0.93	1.29	0.47	0.65	0.81	1.12	
1913	0.88	1.39	0.39	0.54	0.75	1.16	
1914	0.87	1.05	0.68	0.97	0.83	1.03	
1915	0.98	1.04	0.61	0.64	0.91	1.04	
1916	0.77	1.18	0.53	0.68	0.71	1.04	
1917	0.90	1.06	0.64	0.65	0.83	0.95	
1918	0.95	1.12	0.67	0.75	0.88	1.02	
1919	1.12	1.37	0.68	0.88	1.01	1.25	
1920	0.84	1.98	0.51	0.90	0.76	0.96	
1921	1.03	1.35	0.59	0.61	0.92	1.17	
1922	0.94	1.13	0.70	0.77	0.90	1.06	
1923	1.06	1.82	0.82	1.05	1.01	1.65	
1924	1.01	1.23	0.62	0.72	0.90	1.09	
1925	0.91	1.07	0.53	0.58	0.79	0.92	
1926	0.89	1.00	0.51	0.63	0.76	0.87	
1927	1.00	1.10	0.41	0.63	0.78	0.92	
1928	1.11	1.33	0.37	0.40	0.83	0.97	
1929	0.92	1.17	0.58	0.69	0.79	0.99	
1930	1.04	1.25	0.45	0.50	0.83	0.98	
1931	0.99	1.17	0.46	0.58	0.82	0.98	
1932	0.92	1.02	0.46	0.87	0.80	0.98	
1933	0.80	0.86	0.42	0.47	0.68	0.74	
1934	0.87	1.04	0.59	0.67	0.77	0.91	
1935	0.79	1.66	0.46	0.51	0.80	1.23	
1936	1.02	2.58	0.44	0.54	0.80	1.77	
1937	1.05	1.17	0.37	0.50	0.78	0.93	
1938	1.08	1.23	0.29	0.33	0.81	0.92	
1939	1.13	1.23	0.36	0.36	0.87	0.94	
1940	1.11	1.36	0.23	0.26	0.79	0.96	
1941	1.05	1.23	0.22	0.26	0.75	0.87	
1942	1.11	1.35	0.34	0.36	0.80	0.96	
1943	1.11	1.31	0.23	0.28	0.77	0.94	
1944	1.17	1.32	0.22	0.24	0.89	1.06	
1945	0.87	0.95	0.23	0.29	0.72	0.79	

Contd.....

1	2	3	4	5	6	7	8
1946	0.77	0.91	0.23	0.37	0.66	0.79	
1947	0.67	0.74	0.26	0.28	0.56	0.64	
1948	0.68	0.82	0.22	0.23	0.58	0.69	
1949	0.66	0.75	0.21	0.31	0.54	0.64	
1950	0.61	0.72	0.19	0.26	0.50	0.60	
1951	0.79	0.90	0.41	0.54	0.71	0.77	
1952	0.76	1.00	0.32	0.47	0.65	0.81	
1953	0.75	0.97	0.19	0.23	0.51	0.65	
1954	0.65	0.96	0.26	0.34	0.49	0.72	
1955	0.62	0.89	0.24	0.28	0.46	0.64	
1956	0.56	0.73	0.23	0.28	0.42	0.53	
1957	0.47	0.51	0.19	0.26	0.33	0.40	

TABLE VI

Frequency Rates of Fatal Accidents in the Coal Mines of the Principal Coal Mining Countries 1929 - 1957.

Country	1929	1931	1933	1935	1937	1939	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
1. India (i)(A)	1.17	1.17	0.86	1.66	1.17	1.23	0.74	0.82	0.75	0.72	0.90	1.00	0.97	0.96	0.89	0.73	0.51*
2. Japan	4.08	4.11	4.89	5.35	3.58	3.67	1.66	1.61	1.65	1.86	1.84	1.48	1.60	1.88	1.91	..	..
3. Union of South Africa (A)	2.22	2.07	2.05	4.88	2.55	2.27	1.84	1.87	1.64	1.66	2.03	1.79	1.80	1.65	1.48	..	..
4. France (C)	1.10	0.89	0.89	0.99	0.80	..	0.98	1.14	0.83	1.09	0.87	0.95	0.86	0.88*	0.74	..	..
5. Germany (Ruhr) (3)(B)	2.03	2.02 (4)	1.83	1.56	1.65	1.59	1.76	1.72	1.47	1.64	1.55	1.52	1.50	1.37	..	..	..
6. Nether Lands(C)	0.91	0.76	1.08	0.92	0.54	0.64	0.75	0.45	0.35	0.57	0.52	0.49	0.56	0.42	..	..	..
7. United Kingdon (5)(C)	1.30	1.22	1.28	1.29	1.20	1.11	1.03	0.76	0.75	0.83	0.81	0.67	0.63	0.61	0.71	0.56	0.67*
8. United States (6)(D)	4.09	4.42	3.58	3.67	3.69	3.40	2.93	2.67	2.19	2.17	2.70	2.22	2.16	2.45	2.40	2.62*	2.81*
9. Australia(A)	1.01	0.66	0.81	0.69	2.13	0.86	0.84	0.78	1.00	0.63	0.78	0.62	0.82	0.89	..	..	..
10. Canada (C)/1948-54:(A)	2.83	3.43	1.66	3.45	3.15	1.78	2.06	2.18	2.25	2.84	2.28	2.94	1.96	2.70	2.44*	..	..

Notes : (1)Before 1947: previously British India.
(2)1953-54: mines employing at least 100 persons.
(3)Calculated by the Office on the basis of statistics relating to the area of the Dortmund Divisional Mines Inspectorate.
(4)1931-35: another type of statistics tending to give higher rates than those at present employed.
(5)Excluding Northern Ireland.
(6) Including Alaska.

Notes: Rates calculated on the following basis

(A)1000 persons employed (average strength)
(b)1000 persons employed (workers and technical employees).
(c)1000 man-years of 300 days.
(d)1000 man-years of 2400 hours each.

* Provisional figures.

Source: Information upto 1954 communicated to the I.L.O. by the Governments for the preparation of the Year Book of Labour Statistics.

's.s.10.3.'

Table VII : LIST OF MINE ACCIDENTS IN WHICH 10 OR MORE PERSONS WERE KILLED.

1901 to 1958.

No.	Date of Accident	Name of Mine	Mineral worked	No. of persons killed	Classification
1	16.6.1908	Nadir Khan	Coal	20	Explosion of fire-damp
2	7.2.1910	Dishergarh	Coal	11	-do-
3	15.10.1910	Sitalpur	Coal	12	Falls of Roof
4	26.11.1910	Namdang	Coal	14	Explosion of fire-damp
5	6.12.1910	Shivrajpur	Manganese	12	Falls of Sides
6.	9.11.1911	Kendwadih	Coal	14	Explosion of fire-damp
7	11.7.1912	Phularitand	Coal	23	Irruptions of water or falling into the water.
8	28.6.1913	Jotejanaki	Coal	13	-do-
9	22.10.1913	Chowrasi	Coal	27	Explosions of fire-damp
10.	31.8.1915	Chanda	Coal	10	Miscellaneous on surface.
11.	4.2.1916	Bhowra	Coal	24	-do-
12.	20.7.1916	Dishergarh	Coal	14	Explosions of fire damp
13.	18.11.1918	Dishergarh	Coal	10	-do-
14.	24.11.1919	Kustore South	Coal	14	In shafts, Ropes and Chains Breaking
15.	18.9.1920	Bawdwin	Leadsilver	11	In shafts, while ascending or descending by machinery
16.	28.2.1921	Amlabad	Coal	11	Explosion of fire-damp
17.	9.3.1922	Khost	Coal	13	Explosions and ignitions of fire damp
18.	4.1.1923	Parbelia	Coal	74	-do-
19.	14.4.1923	Rewanwara	Coal	16	Falls of roof
20.	16.5.1929	Bawdwin	Silver-lead-zinc.	10	Falls of roof
21.	17.2.1931	Ningah	Coal	13	By explosives
22.	12.4.1932	Lady Rangi	Mica	19	Suffocation by gases.

No.	Date of Accident	Name of Mine	Mineral worked	No. of persons killed	Classification.
23.	16.1.1935	Loyabad	Coal	11	Irruption of water
24.	29.6.1935	Bagdigi	Coal	19	Explosions and ignitions of fire-damp and coal-dust.
25.	24.7.1935	Kurhurbaree	Coal	62	-do-
26.	30.1.1936	Loyabad	Coal	35	Suffociation by gases
27.	18.12.1936	Poidih	Coal	209	Explosions and ignitions of fire-damp and coal dust.
28.	6.7.1942	Makerwal	Coal	14	Irruptions of water
29.	22.2.1943	Sodepur, 9,10 & 11 Pits	Coal	13	By fall of roof
30.	8.10.1943	Jhamuria, 7 & 8 Pits	Coal	12	By sundries underground
31.	19.3.1946	Begunia	Coal	13	By explosions and ignitions of fire-damp and coal dust.
32.	19.4.1952	Champion Reef	Gold	20	Rock Burst
33.	30.6.1952	Champion Reef	Gold	10	Rock Burst
34.	12.7.1952	Dhemo Main	Coal	12	By fall of roof
35.	5.8.1953	Majri	Coal	11	By irruption of water
36.	14.3.1954	Damra	Coal	10	Ignition of fire-damp
37.	10.12.1954	Newton Chickli	Coal	63	Irruption of water
38.	5.2.1955	Amlabad	Coal	52	Explosion of inflammable gas.
39.	27.5.1955	Champion Reef	Gold	10	Rock Burst
40.	26.9.1956	Burradhemo	Coal	28	Irruption of water
41.	29.9.1957	Rajupallem	Barytes	11	Falls of side.
42.	19.2.1958	Chinakuri 1 & 2 Pits.	Coal	175	Explosion and ignition of fire-damp.
43.	20.2.1958	Central Bhowra	Coal	23	Irruption of water.

Table VIII : Particulars of Courts of Enquiries constituted under the Mines Act to enquire into mine accidents.

Sl. No.	Year of accident	Colliery involved with cause and number of persons killed.	Constitution of Court of Enquiry	Assessors
1	2	3	4	5
1	1913	Bhatdih (Irruption) 7	(Information not readily available)	
2	1913	Jamadoba (Irruption) 7	-do-	
3	1913	Chourasi (Explosion) 27	-do-	
4	1916	Bhowrah Colly. (Subsidence) 24 (Sleeping in Dhowrahs)	Deputy Commissioner.	1. Chief Inspector of Mines 2. T.H.Ward, Mining Engr.
5	1916	Sitalpur (Failure of Winding equipment) 6	Collector of Burdwan	1. Chief Inspector of Mines. 2. G.C.Lathbury, Mining Eng.
6	1916	Dishergarh Colliery (Explosion) 14	do-	- -do-
7	1918	Dishergarh Colliery (Explosion) 10	-do-	1.Chief Inspectr. of Mines. 2. T.H.Ward, Mining Engr.
8	1919	South Kustore Colliery. (Failure of winding shackle) 14	Deputy Commissioner	1. Chief Inspector of Mines. 2. A.Wright, Mining Engr.
9	1923	Rawanwara Khas (Fall of roof) 15	-do-	Offg. Chief Inspector of Mines.
10	1923	Parbelia (Explosion) 74	-do-	1. Chief Inspector of Mines. 2. Colliery Superintendent E.I.R.
11	1925	Newton Chikli Colliery (Breaking of rope) 1	(Information not readily available)	

contin....

1	2	3	4	5
12	1928	Bhaskajuri Colliery. (Inundation) 7	District Magistrate.	1. Chief Inspector of Mines 2. J.Mackie, Mining Engr.
13	1928	Mudidih (Subsidence) 6	Addl.Deputy Commissioner	1. Chief Inspector of Mines. 2.J.B.Wardlaw, Mining Engr.
14	1929	Sripur Colly. (Fall of roof)	District Magistrate	1.Offg.Chief Inspector of Mines. 2.J.B.Wardlaw, Mining Engr. 3.J.Mackie, Mining Engr.
15	1930	Dishergarh West Colliery (Explosion) 6	Chief Inspector of Mines	1. Dr.D. Penman, Mining Engr. 2. J. Thomas, Mining Engr.
16	1935	Bagdigi Colly. (Explosion) 19	-do-	1.Addl. Deputy Commissioner 2.J.B. Wardlaw, Mining Engr.
17	1935	Karharbaree Colly. (Joktiabad) (Explosion) 62	-do-	1. Deputy Commissioner. 2. J. Mackie, Mining Engr.
18	1936	Loyabad Colliery (Suffocation by gases,after fire) 35	Commissioner, Chota Nagpur Division.	1.Inspector of Mines. 2. J. Mackie, Mining Engr. 3. B.K. Bose, Mining Engr.
19	1936	Poidih Colliery (Explosion) 209	Commissioner, Burdwan Division	1. Inspector of Mines. 2. L.A. Jacobs, Mining Engr. 3. B.K.Bose, Mining Engr.
20	1945	Noamundi Iron Ore (Fall of side) 4	(Information not readily available)	
21	1946	Begunia Colliery (Explosion) 13	Commissioner, Burdwan Div.	1.Dy. Chief Inspr.of Mines. 2.J.K. Dholakia, Mining Engr. 3. A.G. Mackay, Mining Engr.
22	1952	Champion Reef Gold Mine (Rock bursts) 20 +10.	Deputy Commissioner, Kolar Gold Field.	1.Chief Inspector of Mines. 2.Ex. C.I.M.& Explosives, Mysore. 3. W.T. Hocking, Mining Engr. (Management). 4. M.C.Narasimhan(Labour)
23	1952	Oorgaum Gold Mines (Rock burst) 1	-do-	-do-

Contin...

1	2	3	4	
24	1953	Pure Chirimiri Colliery (Fall of roof) 8	Deputy Commsr. of the Dist .	1.Chief Inspector of Mines. 2.R.L.Malaviya (Labour 3.M.S.Dhadha (management)
25	1954	Swung Colliery (Fall of roof) 7	Deputy Commsr. Hazaribagh.	1.D.R.Bagroy, Mining Engr. (Management) 2. Bindeswari Dubey, M.L.A., (Labour).
26	1954	Newton Chickli (Inundation) 63	Mr.Justice B.R.Sen Nagpur High Court.	1. M.L.Shome, Mining Engr. 2. W.S. Barlingay, M.P.
27	1955	Amlabad Colly. (Explosion) 51	Mr. Justice B.P. Jamuar of Patna High Court.	1. M.L. Shome, Mining Engr. 2. N. Das, M.P.
28	1956	Burradhemo Colly. (Inundation) 28	Commissioner, Burdwan Div.	1. Chief Inspector of Mines. 2. S.C. Samanta, M.P.

Table IX. NUMBER OF PERSONS KILLED IN DISASTERS*
All Mines 1901 - 1957.
* each involving 10 or more deaths

Year. (1)	Number of Fatalities. (2)	Number of Fatalities in Disasters* (3)	(3) as percentage of (2) (4)	Remarks. (5)
1901	102	-	-	
1902	71	-	-	
1903	81	-	-	
	254	-	-	
1904	73	-	-	
1905	71	-	-	
1906	104	-	-	
	248	-	-	
1907	128	-	-	
1908	194	20	-	20 persons killed in one accident.
1909	152	-	-	
	474	20	4	
1910	187	37	-	
1911	174	14	-	
1912	185	23	-	23 persons killed in one accident.
	546	74	13	
1913	211	40	-	27 persons killed in one accident.
1914	191	-	-	
1915	188	10	-	
	590	50	8	
1916	206	38	-	24 persons killed in one accident.
1917	201	-	-	
1918	243	10	-	
	650	48	7	
1919	312	14	-	
1920	245	11	-	
1921	293	11	-	
	850	36	4	
1922	243	13	-	
1923	387	90	-	71 persons killed in one accident.
1924	281	-	-	
	911	103	11	
1925	233	-	-	
1926	327	-	-	
1927	247	-	-	
1928	259	-	-	
1929	266	-	-	
1930	257	-	-	
	782	-	-	
1931	227	13	-	
1932	200	-	-	
1933	153	-	-	
	580	13	2	

Contd.....

(1)	(2)	(3)	(4)	(5)
1934	209	-	-	
1935	312	92	-	62 persons killed in one accident
1936	477	244	-	209 persons killed in one accident and 35 in another.
	998	336	34	
1937	248	-	-	
1938	283	-	-	
1939	286	-	-	
	817	-	-	
1940	316	-	-	
1941	303	-	-	
1942	342	14	-	
	960	14	1	
1943	328	25	-	
1944	365	-	-	
1945	307	-	-	
	1000	25	3	
1946	322	13	-	
1947	263	-	-	
1948	272	-	-	
	857	13	2	
1949	270	-	-	
1950	273	-	-	
1951	425	-	-	
	968			
1952	453	42	-	20 persons killed in one accident.
1953	388	-	-	
1954	407	73	-	63 persons killed in one accident.
	1248	115	9	
1955	378	62	-	52 persons killed in one accident.
1956	335	28	-	
1957	254	11	-	8 persons killed in one accident.
	967	101	10	
Grand Total:-14,423		948	7	

SPECIAL RULES.

3. Special Rules were established in 1905 for the control and guidance of persons acting in the management of or employed in or about mines and for the safety, convenience and discipline of work people.

Development of mining legislation during 1906-1922.

4. 23 new rules were added in 1906, relating to the types and grant of statutory certificates and the qualifications which the manager of various classes of mines must possess. In 1907 three important rules were added for the purpose of safeguarding Railways.

5. In 1908 new rules were made codifying the various existing rules. Further amendments of these rules were made in 1922.

6. In 1918 the Government of Bengal, Bihar and Orissa framed rules for providing acquaintance on the part of the coal mines officials with the number of persons working in a mine at any given time.

INDIAN MINES ACT 1923.

7. In 1923 the Indian Mines Act 1901 was replaced by a new Indian Mines Act, 1923. This Act contained new provisions relating to hours and limitation of employment of persons in the mines. Also some of the provisions of earlier Act were strengthened.

8. In 1924 rules were framed for the examinations for and grant of certificates to underground sirdars. In the same year the Government of Bengal, Bihar and Orissa made rules under the new Act, 1923 relating generally to health and sanitation in mines.

MINES REGULATIONS.

9. 1926 saw the promulgation of two new sets of regulations - the Indian Coal Mines Regulations 1926, and the Indian Metalliferous Mines Regulations 1926, replacing the (General) Rules. New important provisions in the Coal Mines Regulations related to :

(i) submission of 'abandoned mine plans' by the owners, agents and managers showing the workings upto the time of abandonment or discontinuance, to guard against danger due to irruption of water to adjacent mines.

(ii) Provision of detatching hooks in shafts more than 150 ft. in depth, to prevent accidents due to overwinding; and

(iii) Maintenance of ~~a~~ ft. barrier along the boundaries.

Development of Mining Legislation during 1927-1935.

10. In 1928, the Act was amended, the amendments relating mainly to the limitations of working hours. In the same year, the Government of Bengal Bihar and Orissa approved the model code of Bye-laws for coal mines under the 1923 Act.

11. In 1929 orders were issued requiring that plans under the regulations should be prepared by or under the supervision of a supveyor holding a 'Surveyors' Certificate of compitency'.

12. In 1933 certain provisions of the regulations were amended. Of these, those, ~~xx~~ worth special mention relate to -

(i) the procedure to be observed in the case of intentional flooding of a mine;

(ii) the procedure to be followed in the event of a premature collapse of the workings;

(iii) the requirement that the shot firer in a mine in which safety lamps are required to be used should be the holder of sirdarship certificate endorsed for gas testing..

13. In 1934, the minimum requirements for foot paths in open workings were specified. The Act was amended further in 1935.

Impact of the disasters in 1935 - 36

14. In 1935 and 1936 there were a series of explosions and fires accompanied by heavy loss of life. In 1936 temporary regulations and further amendments of the principal regulations were made to provide mainly against the dangers of fire and explosion (firedamp and coal dust) and of inundation from surface water.

15. For danger due to fires, provisions were made to have all structures and supports on the surface and some structures in the underground workings made of non-inflammable material, and for the storage of highly inflammable materials in fire-proof receptacles. Other provisions prohibited the lighting of fire in the underground workings of the mines and deposition of boiler ash etc. in coal quarries and on exposed outcrops of coal or on any broken surface caused due to extraction of coal. Provisions were also made for providing means of extinguishing fire where timber or other

inflammable materials are stored and also in other places when there danger of fire. Further provisions were made to guard against the danger of fire travelling from one seam to another, the precautions to be taken and the procedure to be followed in the event of an outbreak of fire.

16. For danger from inflammable gas, provisions were made to dam off the fire and to prevent passage of air to the fire through goal or broken strata.

17. To guard against the danger of an explosion from fire damp or coal dust, provisions were made for ensuring that all approachable places within 60 ft. of a place where a shot is to be fired are free from inflammable gas and that, if such places are dry, to treat them with water to such an extent that there would be no danger of coal dust being raised into the air by blasting of the shot. To guard against the danger from blown out shots, provisions were made to charge only well-drilled and suitably-placed shotholes with correct amounts of explosives and to stem the shotholes with suitable non-inflammable stemming materials.

18. For mines where danger of explosion exist, provisions were made for the use of 'permitted explosives'. Certain directions were also given for the use of such explosives. A list of 'permitted explosives' was published in the Gazette the same year.

19. To guard against the danger from dry coal dust, provisions were made to keep the haulage and tramming roads clean of dry coal dust and also to treat these places with water or incombustible dust. In 1938 further amendments were made requiring above provisions to be observed in the depillaring areas falling within 400 ft. of the pillars under extraction.

20. To guard against the danger of accumulation of inflammable gas in the advance headings (of gassy mines) where the ventilation remains stgnant, restrictions were imposed requring headings to be restricted the headings to be restricted to 8 ft. in width and not more than 10ft. ahead of the widened galleries. Provisions were also made regarding the precautions to be taken and the procedure to be followed in the event of detection of inflammable gas in any working place or part of a mine. Further provisions were made for maintenance of ventilation plans.

21. To guard against the danger of inundation from surface water, provisions were made requiring that no underground workings should be made at any spot lying vertically below or falling within 50 ft. from either bank of a river except with the written permission from the Chief Inspector of Mines. An amendment of this provision was made in 1938 in which the words 'tanks and reservoirs' were inserted after the word 'river'.

22. In 1937 further amendments were made in the Supplimentary Coal Mines (Temporary) Regulations, 1936. By this amendment the law relating to the danger to persons employed in mines was further strengthened.

23. The employment of women belowground was also first prohibited in 1937.

24. In the same year Coal Mines (Temporary) Regulations, 1937 were enforced. These regulations were made mainly to guard against possible danger from inflammable gas. Provisions were made that the first inspection in a mine after discontinuance of workings for a period of 7 days and in a mine in the process of being dewatered should be made with approved locked flame safety lamp. Further provisions were also made for the statutory inspection of all mines other than those in which inflammable gas had never been found and was unlikely to be found, with approved locked flame safety lamps.

25. Further temporary regulations (Supplimentary Coal Mines (Temporary) Regulations 1937) were enforced the same year. These regulations were made to guard against the danger from explosion. Provisions were made for enforcing standing orders in mines for withdrawal of persons in the event of a stoppage of the mechanical ventilator; for searching of persons for contraband articles before they enter the mines; and for more frequent examinations of safety lamps.

26. In 1938 further amendments were made in the regulations, strengthening and codifying most of the temporary regulations that were enforced in 1936 and 1937, with some additional provisions. These additional provisions related to

(i) withdrawal of persons from a place which is found dangerous,

(ii) the provision of telephonic communications on haulage roads exceeding 3000 ft. in length, and

(iii) the qualification of shot firer's, and overhauling of

approved shot firing apparatus every three months.

27. By the end of 1937 provisions were also made for establishing Central Rescue Stations for groups of mines in particular areas. The rules were enforced in 1939.

28. In 1939 the regulations were further amended. For stability of the workings, the size of pillars and galleries were specified and certain restrictions were imposed for working two or more seams in close proximity and for extraction of pillars. New provision was made empowering the Inspectors to order protective works to be made to ensure stablisation of the workings within a specified time and, in case of non-compliance, to prohibit the extraction of coal in the part of mine in which protective works were required to be done.

29. In 1941 further amendments were made to the regulations. Some of the old provisions were strengthened and the made more specific. The important new provisions related to :

(i) maintenance of joint survey plans when the workings of two adjacent mines have approached within 100 ft. of the common boundary;

(ii) for determination of the atmospheric conditions behind sealed-off fire areas, in mines where saffety lamps are required to be used; and

(iii) electric shotfiring.

MINES ACT 1952.

30. In 1952 a new Mines Act, 1952 was enforced in supersession of the 1923 Act, strengthening the old provisions of the 1923 Act and adding several new provisions. The additional provisions related to

(i) appointment of certifying surgeons; notice of certain diseases connected with mining operations and carrying out investigations into the cause of such diseases;

(ii) payment of extra wages for overtime and limitations of periods of overtime work;

(iii) employment of adolescents and their working hours; and

(iv) grant of leave with wages to the workers employed in mines.

Appendix B

Memorandum on Coal Mines Regulations, 1957.

1. INTRODUCTION: In the drafting of this revised code which replaced the Indian Coal Mines Regulations, 1926, each one of the provisions was considered in the light of the administration of the previous provisions and also against the recommendations made by Courts of Enquiry into disasters and other major accidents in mines. Comments of the various Mining Boards and State Governments as also those received from the public were also taken into consideration. The draft was also considered at the Fifth Session of the Industrial Committee on Coal Mining.

New chapters that have been added in this draft are -

(a) Duties of officials and workpersons, and

(b) Machinery and Plant.

The previous Chapter (XI) on Fencings and Gates has been omitted and the provisions contained therein have been transferred to the various chapters at appropriate places.

In this draft, an attempt has been made to bring together all the provisions concerning the same subject under one regulation, and the various provisions and even the Chapters - have been re-arranged to follow a more logical sequence.

2. CHAPTER I : (PRELIMINARY) : This chapter consists of two regulations which were previously placed immediately before Chapter I. Its provisions are almost identical with the previous draft except for a few additional definitions. An undermanager has been defined because, being the next in rank to the manager, he is the most important official of the mine and has to shoulder certain important responsibilities under the Regulations. An Overman has been defined to denote an official between the rank of a sirdar and an undermanager, who is at present given various designations such as Incharge, Supervisor, Assistant, etc. In the definition of a 'competent person' the qualification asregards age has been specified and the expression 'appointed in writing etc.' has been added to avoid repetition at each place where the expression is used. An 'auxiliary fan' has been defined to distinguish such fan from other kinds of mechanical ventilators installed belowground. A 'roadway' in the mine has been defined to distinguish it from surface 'roads'.

3. CHAPTER II: (RETURNS, NOTICES AND RECORDS):

The provisions in the previous draft have been recast so as to present brevity and proper sequence. The forms relating to notices and returns have been

grouped in the First Schedule. The latest amendments to the present code of Regulations regarding notice of accident and occupational diseases (SRO 1858, dated 23rd August, 1955) have also been incorporated in draft Regulations 10 and 11. The provisions regarding the stability of workings forming a part of the previous draft Regulations 8, 9 and 14 have been transferred to the Chapter on Mines Workings (Chapter X) in their appropriate places.

4. CHAPTER III: (CERTIFICATES OF COMPETENCY AND EXAMINATIONS): In the new Regulations, provision has been made for holding examinations for Overman. Also, for competency in Gastesting, a separate certificate is to be granted so asto provide that the technicians working in isolated areas are not endangered through ignorance of gas-risk. It has also been provided that unless declared fit, every manager or official etc. shall retire at the age of 60. The sequence has been altered to make it more rational.

5. CHAPTER IV: (INSPECTIONS AND MINE OFFICIALS): Corresponding to the previous Chapter III, it contains new provisions relating to -

(a) qualifications of Inspectors;

(b) officiating arrangements in absence of managers of mines which has been the subject of a recent amendment of regulation 24 of the Coal Mines Regulations, 1926;

(c) the provisions regarding theissue of Manager s permits by the Chief Inspector, (previously contained in the Chapter on Certificates of Competency);

(d) the compulsory appointment of qualified assistant manager, engineers, overman and surveyors in mines; and

(e) the provision requiring that all instructions regarding technical matters relating to a mine should be issued through the manager.

6. CHAPTER V: (DUTIES AND RESPONSIBILITIES OF WORKMEN, COMPETENT PERSONS AND OFFICIALS): This is an entirely new chapter based on a similar chapter in the I.L.O. Code of Model Regulations for Coal Mines, and includes all the important duties applicable to all mine officials and other competent persons at present laid down in the Code of Byelaws framed under Section 61 of Mines Act, 1952. In order to enforce the provisions in every mine, these present byelaws had to be applied individually in accordance with the procedure laid down in Section 61 of the Act which involved both delay and unnecessary correspondence. Provisions additional to those of the byelaws relate to the duties of overman, shotfirer, fan attendant, lamp-room attendant and magazine clerk. The provisions relating to the duties of managers and surveyors are more detailed and specific than the corresponding

byelaws. It is proposed that the future byelaws, bereft of the general provisions now included in this chapter, will confine themselves to a code of good practices to be observed by persons engaged in mines in special technique such as loco-traction, deep-hole blasting etc.

7. CHAPTER VI: (PLANS AND SECTIONS): Corresponding to theprevious Chapter II, it has been shifted here due to its closer relation to the Chapter on Mine Workings. The revised draft embodies the recommendations on the subject made by the Court of Enquiry that investigated the disaster at Newton Chikli Colliery. Other provisions are with respect to -

(a) incorporation of plans of workings of adjoining mines (joint survey plans) which are required under Regulation 76(4) of the 1926 code, in the main working plans;

(b) the preservation of field-books and recording of other survey notes relevant to the preparation of plans and sections;

(c) provision of suitable survey instruments;

(d) checking of plans; and

(e) responsibility of surveyors.

8. CHAPTER VII: (MEANS OF ACCESS AND EGRESS): There is no entirely new provision in this chapter. The provision relating to fencings and gates at entrances to shafts and inclines which was previously contained in Chapter XI (Fencing and Gates) has been shifted here.

9. CHAPTER VIII: (TRANSPORT OF MEN AND MATERIAL - Winding in Shafts): The existing provisions on this subject have been thoroughly revised, and regulations have been made relating to -

(a) the installation and maintenance of winding equipment;

(b) provision regarding sinking shafts;

(c) permissible life of winding ropes;

(d) more frequent and detailed examination of winding ropes and other accessories; and

(e) recording of particulars about the same.

Provision has also been made for specifying statutory certificates to be held by winding enginemen at a future date. The relevant provision about fences and gates has been shifted here from the existing Chapter XI.

All the provisions have been regrouped to follow a more logical sequence.

10. CHAPTER IX (TRANSPORT OF MEN AND MATERIALS - Haulage): Following are the new additions in this Chapter which corresponds to the present Chapter VIII:

(a) compulsory provision of separate travelling roads;

(b) periodical examination of haulage and travelling roads by supervising officials;

(c) the provision of signals on conveyor roads;

(d) detailed provisions regarding movement of railway wagons on colliery sidings; and

(e) transferred provisions relating to gates, fencings, etc.

The chapter has been placed here to follow the chapter on Winding, as both the Chapters relate to transport of men and material.

11. CHAPTER X (MINE WORKINGS): This chapter corresponding to the previous Chapter VII (Roads and Working places) is perhaps one of the most important chapters in the code. The important changes are with respect to the following -

(a) the obtaining of permission from the Inspectorate before commencing operations of extraction or reduction of pillars (contained in the Temporary Regulations);

(b) the submission of periodical reports of operations of packing or stowing of 'voids';

(c) the erection and maintenance of systematic supports;

(d) the fencing of roads, working places, disused workings, etc., and

(e) safety in sinking shafts.

The provisions relating to dangers from inrush of water or gas, outbreak of fire or spontaneous heating, which were previously included in this chapter have been transferred to the chapters that follow, in their appropriate places. The provision regarding safe working under railways and roads etc. has been transferred here to its logical place from the previous chapter on Returns and Notices, etc.

Provisions regarding the supervision of work in sinking shafts have also been included here.

12. CHAPTER XI (PRECAUTIONS AGAINST DANGERS FROM FIRE, DUST, GAS AND WATER): The previous Chapter VII-A has been completely redrafted and includes all the provisions relating to special dangers from inflammable and noxious gases and water. The provisions relating to dangers from inrush of

water etc. have been revised in the light of the recommendations contained in the report of the recent disaster at Newton Chikli Colliery. The provisions regarding prevention and suppression of dust are in conformity with the recommendations of ILO on the subject.

13. CHAPTER XII (VENTILATION): The additional provisions in this chapter (compared to the present Chapter X) relate to -

(a) details of construction, etc. of ventilation stoppings and other ventilation devices;

(b) the detection of inflammable gas (Regulation 142(1);

(c) the use of safety lamps and ancillary matters that were contained in the previous Chapter (chapter XII) on lighting.

The recommendations of the Court of Enquiry into the Amlabad Colliery disaster, relating to this subject, have also been incorporated. The various provisions have been regrouped to follow a more logical sequence The provisions regarding lighting have been placed in a new Chapter that follows.

14. CHAPTER XIII (LIGHTING AND SAFETY LAMPS): This Chapter contains all provisions relating to lighting in mines, including those promulgated in the code of temporary regulations. Provision has also been made for laying down standards of lighting for different categories of workmen and funder different conditions of environment. More detailed provisions have been made regarding the maintenance and use of safety lamps etc.

15. CHAPTER XIV (EXPLOSIVES AND SHOT FIRING): This corresponds to the previous Chapter IX, and has been thoroughly revised taking into consideration the special dangers due to presence of inflammable gas and coal dust in coal mines. The provisions relating to this subject contained in the Temporary Regulations are also included. The various provisions on the subject of explosives and shotfiring have been regrouped to follow a more logical sequence.

16. CHAPTER XV (MACHINERY AND PLANT): This is a new chapter and incorporates the provisions on the subject previously included in the Miscellaneous Chapter (No. XII). The new provisions relate to:

(a) the use of internal combustion engines belowground;

(b) construction, maintenance and examination of machinery; and

(c) danger from moving parts.

17. CHAPTER XVI (MISCELLANEOUS): The important additions in this Chapter are with respect to -

(a) the category of supervising officials empowered to carry out certain statutory inspections;

(b) the taking of articles or material as sample for any investigation (Regulation 196) by Inspectors;

(c) standard of fencings;

(d) place of accidents not to be disturbed; and

(e) use of protective equipment etc.

All provisions relating to appeals against the orders of the Chief Inspector have been brought together under this chapter.

18. SCHEDULES: The Schedules appended to the Code have been conveniently divided into three sections; the first relating to all forms of notices and returns; and second relating to the conventions that are to be used in the preparation of plans and sections and the last relating to systematic timbering rules.

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APPENDIX C

MEMORANDUM ON PROPOSED AMENDMENTS TO MINES ACT 1952

Since the coming into force of the Mines Act 1952, certain anomalies have come to light as also difficulties in the enforcement of certain provisions, such as those relating to leave with wages. Certain other amendments of the Act are also considered necessary for proper enforcement of safety legislation in mines. The draft under consideration contains all these amendments.

The definitions of 'agent', 'mine', 'month' and 'owner' have been revised to make them more comprehensive and position. New definitions of 'managing agents', 'mineral', 'workings belowground' and 'opencast workings' have been introduced. 'Shift' has been re-defined to distinguish it from 'relay'.

In light of difficulties experienced, certain amendments have been made to Section 6 dealing with functions of Inspectors.

The duties and responsibilities of a mine manager under Section 17 have been re-defined and Section 18 has been amended, so that owners and agents share responsibilities with the managers.

The scale of medical facilities (Section 21) has been revised to serve the special needs of the mine-workers.

Section 22 dealing with 'Powers of Inspectors when causes of danger not expressly provided, against exist or when employment of persons is dangerous' has been amended to include matters concerning health of workmen, to follow up contraventions of notices given under sub-section (1), to include extraction or reduction of block of minerals in metalliferous mines and risk from sudden inundation. A few small changes have also been made to lay down in the same clauses the procedure to be followed in connection with the issue of orders etc.

The Section dealing with Notices to be given of accidents (Section 23) has been amended to make it more comprehensive.

There are a number of anomalies in Chapter VI relating to hours and limitation of employment; and complications have arisen owing to the two distinct periods of work admissible for persons employed above ground and belowground. A number of sections had to be amended on the lines of similar amendment of the relevant provisions of the Factories Act. Minor amendments have also been made in the various sections relating to the usage of the term 'relay' which in fact should be 'shift'. Other amendments are-

(i) to implement the provision of certain I.L.O. conventions;

(ii) to allow operators of continuously operated machinery to relieve each other at the

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workface and to permit such operators to work double-shift if their relief does not turn up;

(iii) to require payment of overtime on daily basis;

(iv) to delete the limit on overtime for the quarter;

(v) to simplify the permanent register of employees; and

(vi) to prohibit unauthorised entry into mine workings.

The provisions of Chapter VII (dealing with Leave with Wages) were originally drafted on the same lines as previous Chapter VIII of the Factories Act. In view of the difficulty experienced in putting these provisions into effect, the entire Chapter of the Factories Act has recently been amended. In the case of the present provisions of the Mines Act, application is all the more difficult because of the two sets of concessions allowed to piece-rated workers and others. Also, certain sections of this Chapter cannot be given effect to unless relevant rules are framed under Section 58 of the Act. In suggesting the substitution of an entire chapter, all the above difficulties have been taken into account; and the important changes that are made in the revised chapter are as follows:

(i) Calendar year has been defined on the lines of Factories Act.

(ii) The distinction between employees paid on a monthly basis, piece-rate basis and others employed either aboveground, in opencast workings or belowground has been deleted.

(iii) Absence due to lay-off or maternity leave etc. has been accepted for computation for the purposes of attendance.

(iv) Accumulation of leave has been permitted to all categories of workers.

(v) The number of times in which leave may be taken during a year has been limited to three.

(vi) Wages during leave-period in case of all the three categories of persons have been uniformly made to relate to the respective full-time earnings during the previous month.

(vii) The unpaid wages for leave have been made recoverable as 'delayed wages' under the provision of the Payment of Wages Act.

Certain other amendments to the Factories Act have not been incorporated in this Chapter because in Chapter VIII of the Mines Rules 1955, provision has been made to cover identical purposes.

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Section 57 dealing with regulation-making Powers and Section 58 dealing with rule making powers have been amended to include reference to certain important matters. Section 59 has been amended to render uniform the procedure to be followed in making new regulations and rules. Reference to the preparation and maintenance of plans and sections etc. has also been included in Section 60 dealing with the framing of temporary regulations.

The punishments for contravening the various provisions, laid down in Chapter IX, are considered to be very inadequate. In the amendments of various sections in this Chapter, the scale of fines have been raised to set out deterrent punishments and imposition of imprisonment along with fine has been made compulsory in all serious breaches of the Act, Regulations etc. Also, provision has been made to enhance the penalty for the second contravention for the same offence.

The Sections relating to the procedure to be followed during prosecutions have been amended to remove certain flaws, weaknesses or ambiguities.

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Appendix D

Memorandum on draft Metalliferous Mines Regulations.

Necessity for a new Code of Regulations.

1. The Indian Metalliferous Mines Regulations were framed over 31 years ago at a time when the metalliferous mining industry in India was still in its infancy. Only about 70,000 workers (including only about 10,000 underground) were employed in all non-coal mines in the area now lying within the territories of India as well as Pakistan. Very few mines used machinery, the total h.p. of electric machinery in use in all these mines being just over 3,000. Only about 2 million lbs. of explosive were being used. Since then the metalliferous mining industry has developed severalfold such that, in 1954, in the Union of India alone 2.8 lakh persons (including as many as 33,000 underground) were employed; over 80,000 h.p. of electric machinery was being used; and the amount of explosives used had increased to over 4½ million pounds and the number of detonators to nearly 9 million. The 1926 Regulations which contain only a few provisions and those also of a very general and often vague nature, have proved to be totally inadequate to meet the requirements of such a fast-developing industry.

2. The complete inadequacy of the present Regulations is well reflected by the condition of the majority of the mines - where little planning is done; where work is carried out in a haphazard and often dangerous manner; where any person is supposed to be fit to become a supervisor, and where managers do not often know the rudiments of mining.

3. Under the impact of the second and subsequent five-yearl-plans, the expansion of the industry is expected to be still faster. More underground mines are being opened, the existing mines are being mechanised, and even in the opencast workings greater depth are being reached with the help of more machinery and more explosives. It is vital that while achieving this large expansion in mineral production, the interests of safety are not lost sight of; and that new mines are planned scientifically in accordance with the best known principles and safe practices. This can be ensured if only duly qualified persons are permitted to be engaged in the management, control and supervision of these mines. The Regulations also need to be much more detailed and specific in nature, so that fundamental requirements of safe mining are expressly laid down for the information and guidance of all concerned.

4. The need for a revision of the existing code was realised in the late 1940's; and as an enabling measure, the Mines Act was completely revised in 1952 by a new enactment. But though over five years have passed since then, the new regulations have not yet come in force, and there is a consistent demand from the public, as voiced in the Parliament and outside, for an up-to-date and more suitable code of regulations to replace the old code which has proved to be inadequate to meet needs of the expanding mineral industry of India.

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Main Features of the new Code.

5. In the drafting of this revised code (which is meant to replace the Indian Metalliferous Mines Regulations 1926, and the Mysore Gold Mines Regulations 1953) each one of the provisions has been considered in the light of experience gained in the administration of the existing regulations. Foreign legislation relating to the subject has been studied, and desirable provisions therefrom incorporated in the draft. The first draft was circulated to the various Mining Boards and State Governments and their comments have also been taken into account. For the sake of uniformity, the sequence followed is that of the Coal Mines Regulations, 1957 - with necessary modifications.

6. New Chapters that have been added in this draft to those in the 1926 regulations relate to:

(a) Examinations and Certificates of Competency and Fitness (Chapter III);

(b) Qualifications of Inspectors and Mine Officials (Chapter IV);

(c) Duties and Responsibilities of Workmen, Competent Persons and Mine officials (Chapter V);

(d) Precautions against dangerous from Fire, Dust, Gas and Water (Chapter XII);

(e) Ventilation (Chapter XII);

(f) Lighting (Chapter XIV); and

(g) Machinery and Plant (Chapter XVI).

An attempt has been made in this draft to bring together all the provisions concerning the same subject under one regulations, and the various provisions, and even Chapters, have been re-arranged to follow a more logical sequence. Details of the main changes, chapterwise, are given in the appendix. The draft was published in the Gazette of India on 28th March 1957 for public information and comments.

Implications of the new Regulations.

8. Although the whole draft code is to be the subject of discussion in this Session, it is considered advisable to explain the implications of some of the more important changes.

9. Quarterly returns have been drawn out for statistics relating to production, sale, employment etc. These statistics are indispensable for the proper assessment of the development and ptentialities of the Industry. Also, as far as possible, the information relating to non-coal mines should be similar to that of coal mines, so that a proper comparison may be made between the different classes of mines. In this

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connection it is worthwhile to note that even at present all iron ore mines are sending monthly returns to the Mines Department, and that monthly as well as annual returns containing similar details have been received from coal mines for over 30 years past.

10. In order to ensure competent management in non-coal mines, it is necessary to classify them into size-groups. The basis chosen has been that of employment. The production basis (as in coal mines) was also considered; while several other bases (e.g. the depth of workings; the h.p. of machinery used; etc.) were also suggested. But after due consideration, it was found that none of these other factors could form a satisfactory basis for a size classification. Thus, to specify output for the purpose (as in the case in coal mines) was subject to grave difficulties as there are over 50 types of minerals being worked in India- varying from road-ballast to gems. And while the output in one case is measured in tons, in another case it may be counted in hundredweights, and in others again in punds, ounces or even carats. Similarly, the amount of machinery used or the depth of workings cannot form a satisfactory basis for classifying mines. In this connection it may also be stated that the main object of appointment of qualified managers under the Mines Act is to ensure the safety of workers and of the mine workings; and for this purpose the employment figure is a very significant one.

11. As regards the manner of classification, an attempt has been made to follow the 50-year old experience of coal mines. The problem of opencast working are the same, whether the mineral raised is coal of a metalliferous ore. The problems of underground mining are more numerous and complicated in metalliferous mines than in coal mines. The present classification of coal mines is -

(i) less than 600 tons (small mines);

(ii) 600-2,500 tons (second class mines); and

(iii) more than 2,500 tons (first class mines)

of coal per month. On the basis of the national O.M.S., the corresponding employment figures come to:

(i) 60 persons for small mines;

(ii) 60-250 persons for second class mines; and

(iii) over 250 persons for first class mines,

including 25 persons, 30-100 persons, and more than 100 persons respectively in cases of mines having workings belowground. It would therefore be seen that the figures suggested for classification of non-coal mines are reasonable.

12. On this basis, the 2400 non-coal mines in India can be classified into:

(i) about 120 first class mines;

(ii) about 500 second class mines; and

(iii) about 1700 small mines.

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As may be seen, therefore, there are no grounds for any apprehension on this account. It may also be mentioned that most of the larger mines already employ qualified managers and assistants; and a number of the remaining managers are expected to qualify for the grant of Service Certificates or of Managers' Permits.

13. Similarly, if the provisions requiring the appointment of assistant managers and engineers etc. are considered on the basis of actual figures, it would be seen that the industry could only be benefitted from the services of these technicians.

14. That the industry in general does need a more competent management and supervision cannot be denied; and the scale laid down in the draft regulations in this respect is a modest one. In this connection it may also be pointed out that the employment of qualified mining engineers by every holder of a mining lease is even now required under the Mineral (Conservation and Development) Rules - though in a more general way.

15. It may be stated that the draft code is a bulky one. This was inevitable as one code had to be framed to meet the requirements of several different types of mines. Or otherwise a multitude of separate codes would have had to be prepared for the various types of mines. If the code is studied carefully, it would be found that a very large number of provisions even Chapters - do not apply to opencast mines, and that many other provisions apply only where winding and/or haulage engines or other machineries are used.

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Recommendation.	Action taken.
(5) The incombustible dust used for the purpose of this rule shall be prepared from shale or other material containing no injurious free silica.	(5) Incorporated in Regulation 87-I of Indian Coal Mines Regulations, 1926.
(6) The coal tubs shall be so constructed and maintained as to prevent as far as practicable, coal dust escaping through the sides ends or floor of the tubs.	(6)Incorporated in Regulation 96-A(2) of Indian Coal Mines Regulations, 1926.
(7) No explosive shall be used other than a "permitted" explosive on the British Home Office list.	(7) Incorporated in Regulation 116 of Indian Coal Mines Regulations,1926.
(8) As far as practicable, all blasting shall be done between shifts or when there is a minimum number of persons in the mine.	(8) Instructions issued. Now incorporated in Regulation 168(17) of Coal Mines Regulations, 1957.
(9) No shot shall be fired unless all roads within 50 years of the place of firing have been treated as laid down in (3).	(9) Incorporated in Regulation 15(3) of Indian Coal Coal Mines Regulations, 1926.
(10) No shot shall be fired in coal which has not been undercut, overcut or sidecut. The length of the shothole shall be at least 6 inches less than the length of the cut.	(10) Incorporated in Regulation 116-A(c) of Indian Coal Mines Regulations, 1926.
(11) No shot shallbe fired unless the charge is at least three feet from an open face in any direction.	(11)Regulation 107 of Indian Coal Mines Regulation 1926 was suitably amended.
(12) No shot shall be fired within 50 yards of any place where gas has been found within the previous 36 hours.	(12)Does not appear to have been accepted in view of the second part of recommendation no. 13.
(13) Not more than one shot shall be fired at one time, and immediately prior to the firing of each shot a careful test for firedamp shall be made by a competent person at the place where the shot is to be fired.	(13)Incorporated as Regulation 115(1)(b) of Coal Mines Regulations, 1926
(14) No shots shall be stemmed or fired save by, or under the personal direction of, a competent person authorised by the manager, in writing, for the purpose.	(14) Incorporated as Regulations 115(1)(a) and 108 of Indian Coal Mines Regulations, 1926,
(15) No unauthorised person shall have in his possession explosives or detonators.	(15) Incorporated in Regulation 101 of Indian Coal Mines Regulations, 1926.

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Recommendation.	Action Taken.
16. A written record shall be kept giving full details of the number of shots fired, the places in which they were fired, the quantity of explosives used in each hole, and the number of misfires. The record shall be written by the shot firer or in his presence and on his personal report; it shall in every case be signed by him.	(16)Now incorporated as Regulation 129(b) of the Coal Mines Regulations, 1957.

XI. Newton Chikli Colliery (1925): 1 death due to breakage of haulage rope.

No definite recommendation seem to have been made.

XII. Bhaskajuri Colliery (1928): 7 deaths due to irruption of water.

(a)In case of disputed boundary between adjacent mines, Revenue Survey or District Settlement plans should be consulted.	(a) Regulation 76 of Indian Coal Mines Regulations,1926 provides for reference to Court of Law in such cases. Sub-regulation 4 of Regulation 15 was also amended.
(b)Regulation 75 of Indian Coal Mines Regulations, 1926 should be amended to prevent against inundation from lower seam to upper seam.	(b) This was done.
(c) Notice of flooding the mine should be given to the C.I.M., and the adjoining mine.	(c) Incorporated as Regulations 75 A and 75 B of Indian Coal Mines Regulations,1926.

XIII. Mudidih Colliery(1928): 6 deaths due to subsidence.

(a) The management should notify pillar extraction in all cases to the C.I.M.	(a)Incorporated as Rule 17A of Coal Mines Rules.
(b) Recommended continuance of work by the Subsidence Committee.	(b) These committees were appointed by the Mining, Geological and Metallurgical Institute of India.
(c) A greater vigilance on the part of the Industry in the cases of pillar extraction operations in the vicinity of inhabited buildings.	(c) Regulation 78A of Indian Coal Mines Regulations, 1926 was framed with this object.
(d) Mine owners and managers should themselves try to get into closer touch with the Mines Deptt. for possible advice in cases in which they feel that their own judgments may prove faulty or uncertain.	(d) No action called for.

Recommendation.	Action taken.
XIV. Sripur Colliery (1929): 4 deaths due to falls of roof.	
No recommendation made of general application.	
XV. Dishergarh West Colliery (1930): 6 deaths due to explosion.	
(1) In gassy mines shots should be fired only by persons holding sirdars endorse certificates of competency endorsed to test for and detect inflammable gas.	(1) Incorporated as Regulation 115(1)(a) of Indian Coal Mines Regulations, 1926.
(2) Bye-laws for stone dusting or watering in dry and dusty places in the workings of Dishergarh Seam should be introduced at this mine.	(2) This was done.
(3) The court also recommended, "We are of opinion that the important duties of overmen and sirdars in a gassy mine should be entrusted to men possessing a higher standard of intelligence, education and training."	(3) This is possible only if suitable facilities for educating and training overmen and sirdars are available.
XVI. Bagdigi Colliery (1935): 19 deaths due to explosion.	
(1) Additional precautions under the Indian Mines Act are recommended as follows :-	
(a) to require managers of mines to take adequate steps to prevent air passing through a roof or area in which there is fire.	(1)(a) Regulation 87 of Indian Coal Mines Regulations, 1926 was amended.
(b) to require the ventilation in a mine in which there is a fire, to be controlled by artificial means.	(b) Incorporated in a modified form as Regulation 121(2) of the Indian Coal Mines Regulations, 1926.
(c) to require safety lamps to be used in a ventilating district of a mine in which there is a fire, subject to the Chief Inspector of Mines being empowered to give exemptions in certain cases.	(c) Now incorporated as Regulation 130(3) of Coal Mines Regulations, 1957.
(2) Amendments to Regulations, 13, 70(4) 72(2), 73 & 87 of the Indian Coal Mines Regulations are recommended.	(2) Done.
(3) It is suggested that precautions with respect to this danger from dry coal dust should be taken in any mine in which there is an underground fire.	(3) Incorporated in Regulation 87-I of Indian Coal Mines Regulations, 1926.

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Recommendation.	Action taken.
(4) It is suggested that working of a seam under another seam which is on fire should be restricted by regulation and that this suggestion together with other matters should be considered by the Committee appointed to enquire into the dangers from underground fire.	(4)Regulation 87 of Indian Coal Mines Regulations, 1926 amended.

XVII. Kurharbaree (Joktiabad) Colliery (1935): 62 deaths due to explosion of coal dust.

(1) In view of the circumstances attending this accident we are doubtful if liquid oxygen explosive, in the form used in the mine, is a suitable explosive for use underground in a coal mine in this country. We realise that it has several important advantages over certain other explosives with respect to safety in storage and transport and also in some aspects of the actual firing of shots but we feel that it is one which is liable to be mishandled in the processes of preparation and use, and therefore, an undesirable explosive for use underground.	(1) Incorporated as Regulation 101-A in Indian Coal Mines Regulations, 1926.
(2) and (3). Of application to Giridih Collieries only.	
(4) Regulation 115 should be split up into two regulations on the following lines:	(4) Incorporated in Regulations 115 and 116 of the Indian Coal Mines Regulations, 1926.
"115(a) In any place in which the use of a locked safety lamp is for the time being required by or in pursuance of these regulations the shotfirer shall not fire a shot until he has examined both the place itself and all contiguous accessible places within a radius of 60 feet for the presence of inflammable gas and has found such place free from gas.	
"(b) In any place which is not naturally wet, whether safety lamps are in use or not, no shot shall be fired until the place itself and all contiguous accessible places within a radius of 60 feet have been drenched with water to such an extent that there will be no danger of dry coal-dust being raised into the air by the shot."	

Recommendation	Action taken
(5) We are of the opinion that a very large measure of safety can be attained by the firing of shots between shifts. We strongly recommend, therefore, that in coal mines where explosives are used, shots should as far as practicable be fired only between shifts or when as few men as possible are in the mine. We doubt, however, whether this recommendation could suitably be framed as a regulation. We recommend it, however, to all managers of coal mines.	(5) Now incorporated as Regulation 168(17) of Coal Mines Regulations, 1957.
XVIII. Loyabad Colliery (1936): 35 deaths due to explosion.	
(1) We recommend to the management the advisability of fitting suitable hose connections at convenient intervals on main delivery columns with lengths of hoses kept in readiness or supplies of sand kept in various parts of the mine. It is our opinion that had some such arrangements been available at Loyabad the fire might have been extinguished when the manager first saw the fire as at that time it had not spread to any great extent.	(1) Regulation 87(c) of Indian Coal Mines Regulations, 1926 amended.
(2) Provision for making the installation of a telephone system compulsory in certain mines be considered. We believe it is not practicable to make it compulsory in all mines and realise that it may be difficult to specify to what class or classes of mines such a regulation should apply but we think the matter should be examined and have framed this recommendation accordingly.	(2) The suggestion was incorporated in Regulation 93 of Indian Coal Mines Regulations, 1926.
XIX. Poidih Colliery (1936): 209 deaths due to explosion.	
(1) Improvement of the present system of mining, as far as possible, so as to prevent accumulation of gas in goaf cavities, which frequently form reservoirs for the accumulation of inflammable gas. This question, we understand, is at present under the consideration of the Coal Mining Committee.	(1) This recommendation was of a very general nature. Depillaring in gassy mines is now done generally in conjunction with sandstowing.
(2) The attention of Agents and Managers of gassy mines should be drawn to the necessity of keeping mechanical ventilators working continuously in order to safeguard against any unforeseen accumulation of inflammable gas.	(2) Incorporated in a general form as Regulation 121(1) in Indian Coal Mines Regulations, 1926.
They should be advised to bring to the notice of the Inspector of Mines any prolonged stoppage of such ventilators.	Now incorporated in Regulation 133(2) of the Coal Mines Regulations, 1957.

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Recommendation.	Action taken.
(3) It is advisable that a regulation should be introduced to make it compulsory that persons entering a gassy mine should be searched. This regulation might be framed on the lines of section 35(2) of the English Coal Mines Act of 1911.	(3) Incorporated in Indian Coal Mines Regulations, 1926 by amending Regulation 135.
(4)Regulation 25 should be amended so as to provide that a bound register should be kept at every colliery, showing all appointments or authorities of competent persons by the Manager.	(4)Incorporated in Indian Coal Mines Regulations, 1926 by adding clause (2) in Regulation 25.
(5) A regulation should be framed requiring the Manager or a competent person appointed by him to examine all the safety lamps in use at the mine at least once a week, and to record the result of such examinations in a book to be kept at the mine for the purpose.	(5)Incorporated in Indian Coal Mines Regulations,1926 by adding clause (2) in Regulation 25.
(6) We think that electric safety lamps are less liable to misuse in the hands of irresponsible persons, and their use by all persons except the supervising and inspecting staff should be encouraged, in preference to the flame type of lamp. This is particularly advisable when extraction of pillars is being carried on.	(6) Powers have now been taken, vide Regulation 154(2) of the Coal Mines Regulations, 1957 to specify the types of lamp to be used in mines. The owners have also been generally advised to change over to electric safety lamps.
(7) Regulation 122 should be amended so as to specify more clearly the points at which the monthly measurements of air shall be made.	(7) This was done.
(8) A regulation should be issued requiring old workings in gassy mines and particularly places in which inflammable gas may accumulate, to be examined once a week by competent person and the results recorded in a book kept at the mine for the purpose.	(8) Regulation 70-B added to Indian Coal Mines Regulations, 1926.

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Recommendations	Action taken
(9) We are impressed with the dangers arising from coal-dust in gassy mines and are of the opinion that existing regulations and bye-laws regulating coal-dust be examined with a view to their consolidation and possibly more stringent application. But in view of the limited scope of the present enquiry, and the controversial nature of the technical questions involved, we do not make any specific recommendations. We understand that the question is one of those engaging the attention of the Coal Mining Committee.	(9) Regulation 87-J added to Indian Coal Mines Regulations, 1926.
(10) We invite attention to the fact that in Poidih mine there were goaves isolated by stoppings in such a way as to make it impossible to ascertain whether inflammable gas was accumulating behind these stoppings. It is advisable that in a stopping or series of stoppings there should be arrangements whereby atmospheric conditions behind the stoppings can be readily ascertained.	(10) Regulation 70-C added to Indian Coal Mines Regulations, 1926.

XX. Neamundi Iron Ore Mine (1945): 4 deaths due to falls of sides.

Mine authorities must be guided by the individual nature of the faces being worked and the general principles laid down in Regulation 38, 39 and 40 of Indian Metalliferous Mines Regulations, 1926 (so) however that in loose ground where mining is carried out by hand labour and not by mechanical processes, the mine's face should be worked in benches 5 ft. high with an average width of 8 ft. - benches carrying tram lines should be 10' wide- and the overall slope of the face should be 1 in 1½. Side of each bench need not be sloped but may be vertical in such short benches. No loose boulder should be left unattended to on the surface of the bench, if within 5' of the outer edge.	Instructions issued. Now incorporated in Draft Metalliferous Mines Regulations, 1957. S.R.O. 1001 of 20.8.1957

XXI. Bogonia Colliery (1946) : 13 deaths due to explosion

(1) The present enquiry revealed that five active fires were started due to the presence of bamboo mattings in the mine. It is therefore recommended that in all mines brattices should be constructed only of non- inflammable materials, exemption being granted in special cases by the Chief Inspector of Mines.	(1) The recommendation could not be accepted due to non-availability of suitable incombustible brattice material.

Recommendation.	Action taken.
(2)On the main airways of a mine which is ventilated by mechanical means, double doors constructed of strong inflammable materials such as steel should be provided in order to prevent leakage, so that in case of one of the doors being left open through carelessness or otherwise, the whole system of ventilation of the mine may not be seriously affected.	(2)Now incorporated as Regulation 135(4) of Coal Mines Regulations, 1957.
(3) It is considered that wherever practicable, the installation of auxiliary fans should be avoided and steps taken instead to ensure that the general ventilating current of the mine is adequate to ventilate blind ends.	(3) Now incorporated as Regulation 137 of Coal Mines Regulations, 1957.
(4) At present under Regulation 121(a), the Chief Inspector of Mines may require the manager of any mine to submit for his approval standing orders specifying what action should be taken with respect to the withdrawal of workmen from a mine or parts of a mine in the event of a stoppage of the mechanical ventilator. It is considered that standing orders approved by the Chief Inspector of Mines should be enforced in all mechanically ventilated mines. This will ensure precautionary measures being automatically taken by the supervising staff and the fan attendants of such mines in cases of stoppage of the main mechanical ventilator for any length of time.	(4) Now incorporated as Regulation 134 in Coal Mines Regulations, 1957.
(5) In the present case a considerable amount of time was lost in replacing the sheared off blades of the main ventilating fan. It is, therefore, recommended that wherever possible, a complete set of spare blades for the main surface fan should be kept always available at gassy mines in which safety lamps are required to be used, so that blades accidentally damaged or broken may be promptly replaced and an adequate ventilating current re-established without any loss of time.	(5) The recommendation was apparently not considered to be practicable, or suitable for incorporation in the Regulations.

Recommendation.	Action taken.
(6) According to the Indian Electricity Rules, the use of flame proof apparatus is compulsory only in the return airways of a safety lamp mine. As auxiliary fans are liable to be shifted from place in a mine, there is a possibility of a non-flame proof apparatus used in connection with auxiliary fans in the main in take airways being taken to the return airways inadvertantly. To guard against the risk arising from the use of non-flame proof apparatus in return airways or in situations where there may be danger from inflammable gas, it is considered that the use of the flame proof apparatus should be made compulsory in all part of a mine where gas has been or in likely to be found. Besides, through carelessness or otherwise, if the auxiliary fans fail to work in a gassy mine for a length of time, sufficient gas may accumulate and infiltrate into the intake airways and thereby render the non-flame proof appratus dangerous.	(6) Incorporated vide Rule 111 of the Indian Electicity Rules, 1937.
The following precautionary measures recommended by the Committee on the Amendment of the General Regulations governing the use of electiricity in mines under the British Coal Mines Act, 1911, should also be observed: "The enclosure of the apparatus shall not be opened so as to expose live conductors to the surrounding atmosphere at any time."	
(7) In respect of all mines in which inflammable gas has been or is likely to be found, the search of persons under the Indian Coal Mines Regulation No. 135(2), (3) and (4) should be made by a competent person other than the banksman on duty , irrespective of the number of persons employed in the mine in any one shift. This is necessary to ensure the operations under the Regulations being carried out efficiently and thoroughly.	(7) Now incorporated as Regulation 147(2) of the Coal Mines Regulations, 1957.

Recommendation	Action taken
(8) In respect of all mines in which inflammable gas has been or is likely to be found or where there is an underground fire, whether such fire has been sealed off or not, persons carrying out duties under the Indian Coal Mines Regulation No. 127(a) should be holders of underground Sirdar's certificate endorsed for gas testing, the reason being that such a person having knowledge of the danger arising from inflammable gas in a mine is more likely to carry out the statutory examinations in a thorough manner than a clerk without technical knowledge. In such a mine the safety lamps should be tested invariably by means of a blow pipe so that the test can be carried out thoroughly.	(8) Now incorporated as Regulation 155 of Coal Mines Regulations, 1957.
(9) In respect of all mines in which inflammable gas has been or is likely to be found, only one type of flame safety lamp should be used in the workings of any one mine. It transpired at the inquiry that lamps of two different types were used in this mine which led to some confusion in that some lamps had double gauzes while others had a single gauze in conjunction with an internal combustion tube. It would not be possible to find out from external examination whether a lamp, in which the internal combustion tube had been omitted, was being used with a single gauze only.	(9) and (10). All gazzy mines have been advised to change over to electric safety lamps. Steps have also been taken to withdraw all single-gauze flame safety lamps from mines.
(10) It is considered that in gassy mines, the use of electric safety lamps should be encouraged so as to reduce the risk of dangerous accumulation of gas being ignited by defective flame safety lamps.	
(11) It has been found that in reconditioning gauzes of flame safety lamps, their height is lessened. This reduces the effectiveness of the gauze. It is, therefore, recommended that no reconditioned gauzes should be used in any mine.	(11) Now incorporated as Regulation 157(2) of Coal Mines Regulations, 1957.
(12) In respect of all mines in which inflammable gas has been or is likely to be found safety torches are essential in the event of an emergency for the effective carrying out of rescue and recovery operations. Therefore, it is recommended that at least half a dozen safety torches of an approved type should be kept constantly available in all such mines.	(12) Instructions used.

(Contd.....13)

Recommendation	Action taken
(13) It has been found from experience that a portable chemical fire extenguisher helps considerably in dealing with the initial stage of a fire. Therefore, it is recommended that at least one chemical fire extinguisher of not less than two gallons capacity with solution for use on six occassions and at least two stirrup pumps together with sufficient hose and two buckets should be maintained in all mines where inflammable gas has been or is likely to be found or where there is an underground fire, whether such fire is sealed off or not.	(13) Now incorporated in Regulation 120 of Coal Mines Regulation, 1957, the requirement being made applicable to all mines.
(14) It was found that some delay occured in the recruiting of Proto-trained men from neighbouring mine to carry out the rescue operations at this mine. It is, therefore, recommended that at large mines, where safety lamps are required to be used, the Chief Inspector of Mines may require that at least one team of fully trained rescue men shall be maintained. Further, it is recommended that at least one extra brigade should be maintained at each Rescue Station.	(14) The Rescue Rules are being amended on these lines. Two brigades are now maintained at each of the stations.
(15) In view of our finding that supervision had for some time been far below the standard desirable in a gassy mine, it is recommended that surprise inspections, especially at night, should be made at frequent intervals by the superior supervising staff, not below the rank of a senior overman. It is desirable that the Manager himself should make personal inspection as far as practicable. Special attention should be paid to Sundays, holidays and other such occasions when there is a likelihood of slackness on the part of the subordinate supervising staff and work persons.	(15) Now incorporated in Regulations 41, 42, 43, 44, 49, and 50 of Coal Mines Regulations, 1957
(16) Much avoidable delay in sending information of the accident to the Rescue Station and to the Chief Inspector of Mines was caused by the absence of a telephone at the Begunia Colliery. To avoid similar delays in future, the installation of telephones connected with the public telephone system should be made compulsory at all mines where inflammable gas has been or is likely to be found or where there is an underground fire, whether such fire is sealed off or not. Exemption may be granted in special cases by the Chief Inspector of Mines.	(16) Incorporated in Rule 3[illegible] of Coal Mines Rescue Rules, 1939.

(Contd.....14)

Recommendation.	Action takne.

XXII. Champion Reef Cold Mines (1952) : 30 deaths due to two Rock-bursts.

Recommendations related to that particular mine.

None of general nature.

XXIII. Oorgaum Cold Mine (1952) : 1 death due to Rock-burst.

No recommendation made.

XXIV. Pure Chirimiri Colliery (1953) 8 deaths due to fall of roof.

The need for exercise of personal and more careful supervision on the part of the manager and senior overman over day-to-day progress in working of the mine was stressed.	Provisions for personal and mor careful supervision of the work in mines in general by the manager and other supervisory staff have been incorporated in Regulations 41, 42, 43, 44, 49 and 50 of Coal Mines Regulation 1957.

XXV. Swang Colliery (1954) : 7 deaths due to fall of roof.

No recommendations made.

XXVI. Newton Chikli Colliery (1954), 63 killed due to inundation.

(1) (a) The original plan of the workings of an abandoned mine should be preserved in the office of the Colliery.	(1) Incorporated as Regulation 61(2) of Coal Mines Regulation 1957.
(b) A certified copy of the plan of the abandoned mine sent to the Chief Inspector of Mines under Regulation 17 should also be preserved in the office of the colliery.	
(2) A certified true copy of the plan of an abandoned mine sent by the management under Regulation 17 to the Chief Inspector of Mines should be kept in the office of the Inspector of Mines in whose circle the mine is situated. The plan would enable the Inspector to find out the nature and extent of the danger, when the workings approach the abandoned mine.	(2)This will be done when sufficient survey staff and storage space has been made available.
(3) If, for any cause, the original plan of the abandoned mine or its certified copy be not available in the office of the colliery, the management should obtain a certified true copy of the plan from Chief Inspector of Mines.	(3) Incorporated as Regulation 61(3) of Coal Mines Regulations, 1957

(Contd.....15)

Recommendation	Action taken
(4) When the workings of a mine are within 200 feet of old workings in any horizon, the Chief Inspector of Mines should be informed and an agreed scheme of approach should be involved.	(4) Immediately incorporated in Coal Mines Temporary Regulations, 1956 - Regulation 5. Now incorporated as Regulation 127(3) of Coal Mines Regulations, 1957.
(5) It should be the duty o the lesess or owners of every working colliery or mine to ascertain whether any plans of abandoned workings within the area of such colliery or mine or within a margin of 200 feet are in the possession of - (a) the owners or lessees of the adjoining colliery, or (b) the Mines Department. If such plans are found, to examine the same and make a copy of such portion thereof as relates to the areas of their own mine and to a surrounding margin of 200 feet; (c) the lessees or owners of an adjoining colliery shall be bound to disclose the plans of abandones workings within the area os such colliery or within a margin of 200 feet.	(5) (a) & (b) Incorporated as Regulation 61(3) of Coal Mines Regulation, 1957. (c) Incorporated as Regulation 59(4)(b) of Coal Mines Regulations, 1957.
(6) The lessers of every mine shall be bound to disclose and make available for copying to their lessees all plans in their possession of abandoned workings within the area let and the surrounding margin of 200 feet.	(6) The concerned Ministry of M[illegible]R was advised to take action in this matter.
(7) All survey field books and others records relating to the preparation of statutory plans and sections with appropriate descriptions, shall be carefully preserved in every colliery office or in the central survey office, if any, and, they shall be made available by the colliery or the Central Survey Office whenever required by the Department of Mines, or any authority empowered to call for the same. The outgoing owner or owners shall hand over such books/records to the incoming owner or owners or their representatives.	(7) Immediately pointed out in C.I.M. Circular 5 of 1955. Now incorporated as Regulations 63(3) and 8(1)(b) of the Coal Mines Regulation, 1957.

(Contd.....16)

Recommendation	Action taken
(8) All statutory plans, sections and maps prepared or obtained by a colliery shall be serially numbered and a register of them maintained. Contents of such register/registers shall be periodically, not later than once in six months, verified with the actual stock of plans, sections and maps variations, if any, should be recorded, signed and dated by the both the colliery surveyor and the colliery manager. Movement of all plans shall be recorded in the register. The register shall be open to inspection by the Department of Mines or by any other authority empowered to do so.	(8) Immediately incorporated in C.I.M. Circular No. 5 of 1955. Now incorporated as Regulations 63(1) and 63(4) of Coal Mines Regulation, 1957.
(9) That the Mines Inspector should countersign the register during the time of his inspection. This will check the disappearance of plans.	(9) Instructions have been issued.
(10) The collieries should deposit certified true copies of all statutory plans, brought up-to-date, with the Mines Department every year.	(10) Incorporated as Regulation 60 of the Coal Mines Regulation, 1957.
(11) The current working plan of every mine required to be kept under Regulation 15(2) should show the position of old goaves within the leasehold and within 600 feet of the boundary of the leasehold all drifts, staple pits and exptora-tory headings in the same seam or different seam. The details and sections of such drifts, staple pits and exploratory headings should be incorporated in the index to the plan.	(11) Incorporated as Regulation 52(1) of Coal Mines Regulation, 1957.
(12)(a) Reduced levels of the floor of all galleries and roadways on a vertical rise or fall of every 10 feet or at a horizontal distance of not exceeding 100 feet should be taken and recorded on the statutory mine plan.	(12)(a) Incorporated as Regulation 59(3) of Coal Mines Regulations, 1957.
	(b) In-corporated as Regulation 61 of Coal Mines Regulation, 1957.
(b) Reduced levels shall be shown at the faces of all explora-tory galleries, drifts, and staple pits when the mine is abandened Seam contours shall be shown at stated intervals. If such an action had been taken, the difference in level between Pit No. 2 and No. 12 rise at the juction of 9 west level could have been easily detected and served as a warning against irruption of water.	Also immediately incorporated in Coal Mines Temporary Regulation, 1955 as Regulation 5.

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Recommendation	Action taken
(13) Drifts in stone and, galleries in coal at different levels, should be clearly indicated by different colours and by appropriate noting on the plan so that no speculation is necessary afterwards to appreciate their identities and relatives positions. Gradients of such galleries and drifts should also be clearly stated.	(13) Incorporated in Second Schedule of the Coal Mines Regulation-, 1957.
(14) Different plans of the same mine are required under the Regulations, but there is no standard practice of denoting them by any designation or "head line." This should be done and, each plan clearly indicated, as to which regulation it relates.	(14) In corporated as Regulation 58(1)(a) of the Coal Mines Regulations, 1957.
(15) A detailed survey of all workings must be made in every district in which the extraction of pillars, or the splitting of pillars, as a final operation is about to take place. Explanation: This is essential as otherwise the final position of galleries or exploratory headings is not known.	(15) Incorporated as Regulation 65 of Coal Mines Regulation, 1957.
(16) The throw of each fault where proved shall be written. If not proved, the word 'unknown' along the fault line should be written.	(16) Incorporated as Regulation 59(1)(vi) of Coal Mines Regulations, 1957.
(17) Barriers of coal to be left for safety or support, shall be clearly marked in green colour.	(17) Incorporated in Second Schedule of the Caol Mines Regulation, 1957.
(18) To avoid confusion with contour lines, the sentences in Regulation 15(2) - "The position of workings at the time of the last survey shall be shown by a dotted line drawn through the ends of the workings; such dotted line shall be marked with the date of the last survey" shall be replaced by the following sentence:- "The ends of all galleries shall be locked to show the position of the faces at the time of the last survey and the plan shall be dated."	(18) See comments on Recommendation No. (21).
(19) New plans should not be large, cumbersome and rolled, which caused early fatigue and cracking, but should be sectionalised. Provision should be made for flat storage.	(19) Incorporated as Regulation 68(2) of the Coal Mines Regulations, 1957

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Recommendation	Action taken
(20) Regulation 15(4) requires that the mine plans shall be normally maintained uptodate within six months. This probably worked satisfactorily and may work satisfactorily in the case of pack mining in a comparatively thick seam, as the rate of progress in such a case is small. In the case of thick seams however, progress is much quicker. With the rapid progress due to machine mining, speedy advancement by blasting alone, without recourse to mechanical coal cutters, it is necessary to keep the underground working plans uptodate within 3 months or the progress of the working shown up to a point not more than 100 feet behind the actual coal face. Regulation 15(4) should be amended accordingly.	(20) Incorporated as regulation 58(3) of Coal Mines Regulation 1957.
(21) Regulation 15(4) requires that the mine plans should be accurate, but as no offset survey is made, the width of galleries or, the line correctly shown on the plan. Offset survey should be made obligatory.	(18), (21) and (22) It was considered that these recommendations were not practicable. The preparation of offset plans for all the galleries in a mine would involve a very large amount of additional work not commensurate with the value thereof. Showing the width and height of galleries and the thickness of coal left in floor or roof on the main plans would result in 'over-crowding' - with the result that after these plans have been in use for some time, they are likely to become undecipherable.
(22) The section of the seam worked is required to be drawn on the mine plan under Regulation 15(2). Where available, the section of the strata above the working seam and seams up to the surface should also be shown. The plan should show the height of galleries worked. As the height of galleries or workings may vary from place to place in the same time, such height should be shown at the places concerned. To avoid confusion or doubt, the thickness of coal left in the floor or roof of the workings should also be stated.	In fact, due to the expected increase in the size and extent of mines, the need is that of keeping plans on smaller scales. The Fifth Session of the Industrial Committee on Coal Mining concurred with this view
(23) The plan should show the position of boreholes from surface and, section of seams encountered in such boreholes.	(23) In-corporated as Regulation 59(1)(b) of the Coal Mines Regulation, 1957.
(24) An independent body of qualified surveyors be appointed by the Chief Inspector of Mines or, by the State Government, who in some cases are the Royalty owners of the minerals, to survey each mine every year. Plans made by independent persons will thus be available and mistake made by the mine surveyor would be brought to the notice of the manager.	(24) The recommendation is a useful one but checking of all mine plans every year by Government surveyors will necessitate the employment of hundreds of persons for this work alone. Regulation 65(2) of the Coal Mines Regulations, 1957 now provides for the preparation of a plan by a Departmental surveyor if a plan is suspected to be incorrect. It is also intended to carry out occasional check-surveys at

(Contd.....19)

Recommendation	Action taken
	coal mines. The Fifth Session of the Industrial Committee on Coal Mining concurred with this view.
(25) Whenever any Inspector of Mines visits any mine for the purpose of inspection, he shall see that the statutory plan maintained by the colliery has got the edges of the workings of the abandones mine, within the colliery area shown on it. Suitable remark on the condition of the abandones mine, viz. whether filled up with water or not, whether accumulation of gas exists or not, reduced level of the edges of workings, if available, and the date of abandones shall also be made thereon.	(25) Instructions issued.
(26) Whenever a copy is made of any plan of a mine or part thereof by tracing or, by any other means, viz. a photostat copy, or by preparing a new field book from the old plan or map, a clear remark shall be made by the Surveyor on it to the effect that it has been so prepared. He should specify the original plan or document from which the copy or tracing has been made by him. The extent of working should be clearly indicated by dotted lines around the edges of the workings and, dated so that any subsequent entries may be quickly deciphered. In the case of interfilling of workings within the dotted lines, a different colour should be used and such interfilling dated and signed by the Surveyor.	(26) Incorporated as Regulation 64(3) of Coal Mines Regulation, 1957.
(27) Regulation 149, Second Para, should be deleted. Record of personal visits to underground workings by colliery managers and assistant managers, surveyors and others of supervisory staff should be maintained.	(27) Incorporated as Regulations 41, 43, 44, and 57(4) of Coal Mines Regulations, 1957.

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(39) Re Near Fan Chikli Colliery

Recommendation	Action taken (1954)
(28) Substantial increase in the Mines Inspectors: The total number of mines in India is about 3,300 out of which 850 are coal mines. There are 59 collieries and 337 other mines in Circle No.3. The Chief Inspector of Mines has stated: "There is no Regulation or Rule enjoining an Inspector to inspect a coal mine once a year or at specified intervals .... There are some collieries in Circle No.3 which had not been inspected between the 1st of January, 1954 and 31st of December, 1954." Increased dept , modernization of mines and againg of mines have brought in their trail attendant difficulties and unsafe conditions requiring constant and intelligent supervision. In our opinion, coal mines should be inspected 4 times a year, The Chief Inspector of Mines has stated: "It is desirable that a coal mine should be inspected 3 or 4 times in a year. About 8 Inspectors are necessary in order to carry out 4 inspections and hold enquiries into accidents in Circle No.3. There are 2 Inspectors at the moment and 4 more Inspectors are to be posted very shortly."	(28) Increase in the cadre of the Mines Department has been sanctioned.
(29) A consolidated list of mines inspected should be sent to the Chief Inspector of Mines at regular intervals by the Inspector of Mines of each circle.	(29) Instructions have been issued.
(30) Inspectors of Mines should have practical experience of management of a colliery. Before appointment, an Inspector should have worked for 5 years as a colliery manager.	(30) Due to the low salary-grades of Inspectors, this could not be accepted. Also it was considered that the qualities required of a good Inspector were not necessarily the same as those of a good manager.
(31) The offices of the Inspectors should be periodically inspected by the Chief Inspector of Mines or his Deputy.	(31) Steps are being taken in this direction.
(32) There should be Central Rescue Stations at suitable sites in different coal fields. Where it is not possible to have a Central Rescue Station, each colliery or a group of collieries should provide bare requirements for rescue work At present there are only 2 Central Rescue Stations - one at Jharia in Bihar and the second in Raniganj.	(32) Rescue Rules are being amended to become applicable to all coal mines in India.

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Recommendation	Action taken
(33)The second means of egress, if a shaft, should have a cage.	(33)Incorporated as Regulations 66(2) of Coal Mines Regulations 1957.
(34)Each colliery should have a qualified surveyor. Under the existing mining regulations, there is no bar against the appointment of one qualified surveyor by more than one colliery at the same time the engagement of the services of one surveyor by more than one colliery at the same time should be subject to the approval of the Chief Inspector of Mines.	(34)Incorporated as Regulation 35 of Coal Mines Regulations, 1957.
(35)A high level commission (like the Royal Commission on Safety in coal mines appointed in 1935) should be appointed to examine the provision of the Mines Act, Regulations, Rules and Byelaws now in force in the context of prevailing conditions and progressive developments and to make suitable recommendations to ensure safety in coal mines. The present Regulations, which were framed in 1926, and the Byelaws require revision.	(35)A Conference is being convened.
(36) Use of Electric Safety Lamps The question of lighting the underground passages in mines should be examined by the Commission.	(36)Incorporated as Regulation 151 of the Coal Mines Regulations, 1957.
XXVII. Amlabad Colliery (1955); 51 deaths due to explosion	
(i)I would wish my first recommendation to be what I may call "Safety First Compaign." People connected with mining operations should be made aware by intensive and extensive methods of advertisements, pictures, lectures and the like, of the kinds of dangers to which they may be exposed by carelessness and how to prevent them. It may possible be useful to form "Safety Committee" consisting of representatives of the officials and workmen in order to make persons connected with mining operations aware of the dangers and their preventions.	(1)A scheme for safety propaganda is under consideration of the Government.

Recommendation.	Action taken.
(2) The early stage of an investigation are necessarily hampered by the more urgent needs of exploration, rescue and recovery; but, at the same time, it is important that no vital evidence should be lost or destroyed during these operations. A "Special Investigation Team" may follow, as closely as possible, without interfering with the recovery operations. Its work will probably be hampered to some extent by the immediate need on hand, namely, rendering the mine safe and recovery of men, dead or alive. But such difficulties may be lessened by co-operation and systematic planning. Early collection of evidence is necessary. In the course of the present inquiry, we found that the condition of the 60 H.P. main dip haulage was not examined soon after the explosion; for if that had been done, it may have been helpful in determining its condition before the explosion. The desirability of inspecting the condition of ventilation by a Mining Engineer and the condition of electric apparatus by an Electrical Engineer (both unconnected with the Management and the Department of Mines) immediately after an accident should be realised; otherwise much valuable evidence is likely to be lost for a Court of Inquiry.	(2) It was considered that in case of major accidents, rescue operations should be kept unhampered. Appointment of a Special Investigation Team shall unduly delay such operations. Also, as it is the function of the Mines Department to investigate into mine accidents, it was considered that the collection of evidence should be left to that Department. The Fifth Session of the Industrial Committee on Coal Mining agreed with this view.
(3) The use of flame-proof apparatus should be made compulsory in every part of a gassy mine	(3) The complete replacement of the entire electrical equipment with flame-proof apparatus was not considered advisable as such apparatus is not manufactured in India. It was considered that if the relevant provisions of Electricity Rules are strictly adhered to, there is little danger of electrical equipment forming a source of ignition. The fifth Session of the Industrial Committee on Coal Mining concurred with this view.
(4) In gassy mines, electric safety lamps are less liable to misuse in the hands of less responsible persons and their use by all persons except the supervisory and the inspecting staff should be made compulsory in preference to the flame type of lamps.	(4) All gassy mines were advised. Powers have also been obtained under Regulation 154(2) of the Coal Mines Regulation, 1957, and will be exercised as soon as sufficent electric lamps are being manufactured in India.

Recommendation.	Action taken.
(5) Old workings in gassy mines, and particularly places in which inflammable gas may accumulate, should be examined at least once a week by a competent person, and the results recorded in a book kept at the mine for the purpose.	(5) Incorporated as Regulation 143 in Coal Mines Regulations, 1957.
(6) In a gassy mine, the air current ventilating a goafed area, whether packed or unpacked, and disused workings should not be allowed to ventilate the working places unless permitted by the Chief Inspector of Mines.	(6) Incorporated as Regulation 146(4) of Coal Mines Regulations 1957.
(7) Danger of accumulation of inflammable gas anywhere in a mine is always a serious matter, and it becomes a lively hazard if it is near, or if it may react upon, a working place, or it to be any possible source of ignition. In such an event, the matter should receive the careful consideration of the higher Management who should decide what is to be done about it, and the agreed policy should be made clearly known to the under-officials in charge in the area. The operation should only be done on a well-considered plan and under the close supervision of a supervisor official.	(7) Incorporated as Regulation 142 of Coal Mines Regulations, 1957.
(8) Any change in the system of ventilation in a mine where safety lamps are required to be used should at once be notified to the Inspector of Mines.	(8) Immediately incorporated in Temporary Regulations 1955, at Temp. Reg. 9(3). Now incorporated as Regulation 146(5) of Coal Mines Regulations, 1957.
(9) Whenever possible, the installation of auxiliary fans should be avoided, and steps should be taken instead to ensure that the general ventilating current of the mine is adequate. But if, a fan has to be installed, whether on the surface or underground, provision should be made in the regulations to the effect that, for installation of fans or their removal or change of site, the previous sanction of the Chief Inspector of Mines; or any other competent officer, shall be necessary.	(9) Immediately incorporated in Temporary Regulations 1955, as Temp. Regulation 9. Now incorporated as Regulations 132 and 137(4) of the Coal Mines Regulation, 1957.
(10) Provision should also be made in the Regulations that, for any major change in the ventilation system, the previous approval of the Chief Inspector of Mines should be always taken except in certain emergency cases where discretion may be left to the Manager who shall forthwith intimate the changes made to the Chief Inspector of Mines.	(10) Immediately incorporated in Temporary Regulations 1955 as Temp. Regulation 9(3). Now incorporated as Regulation 146(5) of the Coal Mines Regulations, 1957

(11) Since sand-stowing is the common method of stowing goafed area, it seems desirable that a Committee should be appointed for making a research generally and to examine the question of shrinkage of sand resulting in roof-falls. In "Transactions of the Mining, Geological and Metallurgical Institute of India, Volume 45, No.4 January, 1950" at the top of page 156, it is stated as follows:

> "As the stowing material is sand, the phenomenon known as 'bulking' may have been an effect in the underground packs. Sand, whether dry or saturated, occupies the same volume, but in any intermediate stage the volume is increased. Thus an originally perfectly saturated coarse sand pack may increase in volume by 10 per cent when the water is reduced to 4 per cent. Investigation as to how far this applies to undergrounds packs is necessary. Generally water drains off sand packs for 10 days after stowing."

During the present inquiry, opinions differed regarding shrinkage of sand. It seems to be important that this question should be examined more closely.

(11) This recommendation was referred to the Coal Board (who are responsible for carrying out research on stowing) for action.

(12) Provision should be made in the Regulations that, save in emergency no instructions with regard to matters concerned with the working of the mine should be given to any person employed in the mine except by, or under the authority of, or in consultation with and through, the Manager.

(12) Incorporated as Regulation 37(2) of Coal Mines Regulations, 1957.

(13) Provision should be made in the Regulations for fixing the minimum qualification for a person to be appointed an "underground sirdar" incharge, "overman" or munshi. The minimum qualification provided may be that of a Matriculate or some equivalent educational qualification.

(13) Incorporated as Regulations 194 and 196 of Coal Mines Regulations, 1957.

(14) A labour representative should be permitted to go underground and inspect the places where miners work, in order to afford additional safeguard for their safety.

(14) This suggestion is under the consideration of the Government.

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Recommendation.	Action taken.
(15) I have commented upon the irregular inspections by the Mines Inspectorate as well as by the Electrical Inspector. I have the impression that there is lack of co-operation between them. There ought to be complete co-operation between the two in order to avoid, or at least, minimise dangers of explosion of inflammable gases igniting from electrical sources. It is the Mines Inspectorate which ordinarily tests for inflammable gases in the mine, and they come to know the varying conditions in the mine. This information ought to be made available to the Electrical Inspector in order to take and adopt necessary safety precautions in the matter of electrical installations. Or, the Electrical Inspector of Mines may be brought under the Chief Inspector of Mines so that both sets of these officers may cor-ordinate to ensure safety in mines.	(15) The Electrical Inspector has now been brought under the control of the Chief Inspector of Mines.
(16) Provision in the Mines Act may be made making it obligatory upon the Mines Inspectorate to inspect every mine at least once a year; and more frequently, in the case of gassy mines. No such provision was brought to my notice in the inquiry, and all that the present provisions do is to given them power to inspect but cast no duty upon them to inspect at certain intervals.	(16) In order to increase the frequency of inspection of mines, the Department of Mines is being strengthened.
(17) An inspector ought to be a person of experience. He should have experience of five years at least as Manager, and then made an Inspector.	(17) Due to the comparatively poor salary paid to inspectors, this could not be accepted. Also it was considered that the qualities required of a good inspector were not necessarily the same as those of a good manager.
(18) It is necessary to increase the number of Mines Inspectors.	(18) An increase in the number of Inspectors has been sanctioned.
(19) Appointment of Assistant Managers in large mines should be made on a prescribed scale as to number and depending upon the monthly output of the mine.	(19) Incorporated as Regulations 32, 41(1)(b) and 42 of Coal Mines Regulations, 1957.
(20) A regulation should be added in the Indian Coal Mines Regulations, 1926, preferably after Regulation 25 in Chapter III of the Regulations, to the effect that no mine shall be worked unless daily personal supervision in respect of the working is exercised by the Manager, and during the period of his absence, by a person authorised by him as under Regulation 24(3) and a report of it should be kept in the manner prescribed.	(20) Incorporated as Regulation 41 of Coal Mines Regulations, 1957.

Recommendation.	Action taken.
(21) Regulation 121(1) - This regulation requires constant production in every mine of 'an adequate' amount of ventilation to dilute and render harmless inflammable and noxious gases, etc. Comment is often made as to what would be 'an adequate' amount of ventilation. Section 29(1) of the English Coal Mines Act, 1911, deals with the standard of ventilation and there is similar vagueness. The Report of the Royal Commission of Safety in Coal Mines of the year 1938 has commented on this question at pages 208 and 209. It recites that the Royal Commission on Mines in their Second Report (1909) pointed out that the General Rule as to ventilation then in force (which was incorporated in section 29(1) of the Coal Mines Act, 1911) "prescribes no definite standard and that in each case it is ultimately left to a Court of Law, on proceedings being instituted to determine whether the rule is complied with or not". The Report then proceeds as follows -	(21 Immediately incorporated in Coal Mines Temporary Regulations, 1955 as Temporary Regulation 9. Now incorporated as Regulation 130 of the Coal Mines Regulations, 1957.

> "The Commission reported that difficulties had been experienced in proving breaches of the rule and figures were given to show that prosecutions for inadequate ventilation had failed more often than in the case of other breaches of the Act. The Commission came to the conclusion 'that it should be rendered legally obligatory that every responsible endeavour should be made to maintain such a standard of ventilation as to prevent the appearance, in any open and readily accessible position of a fully formed cap in the lowered flame of an ordinary safety lamp, burning the oil in common use, and that men should not be allowed to work or pass when this standard is exceeded.' But they deferred saying what percentage of firedamp was sufficient to produce a fully-formed cap, pending inquiries. In their third Report (1911), after those further inquiries had been made, the Commission came to the conclusion that it was not possible to define in more precise terms that constituted 'adequate' ventilation, 'which must be interpreted according to the best mining knowledge of the day' and that all they could do was to recommend the fixing of a definite percentage of firedamp at which workmen must be withdrawn ....."

The difficulty to define is more precise terms what constituted "adequate ventilations"

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Recommendation.	Action taken.
is realised; but at the time, I think that the working of regulation 121(1) may, if practicable be made more definite. In this connection, reference may also be made to section 55 of the English Mines and Quarries Act, 1954.	
(22) Regulation 122 - Provision should be made in the regulations on the lines suggested by the Royal Commission on the Safety in Coal Mines in its Report (1938) at page 227 which I quote :- "We propose therefore that in addition to being measured [illegible] the downcast shaft and in every split at the point where the split commence, the quantity of air should be measured, at least once in every month, at or as near as practicable to a point ten yards back from the first working place at the working face which the air enters, and at or as near as practicable to a point ten yards on the return side of the last working face which the air leaves. In either case the district inspector should have power, if circumstances render it desirable, to substitute some other distance for the ten yards. If there is more than one face or section of work in the ventilating district, the measurement should be made at the corresponding points in respect of each face, if worked longwall, or, if worked otherwise, at such suitable points as shall be fixed by the manager, with the approval of the district inspector."	(22) Incorporated as Regulation 133(4) of Coal Mines Regulations 1957.
(23) Regulation 134 - In this regulation provision may also be made for the appointment in writing of door attendants to attend to doors, the opening of which may lead to derangement of ventilation.	(23). Immediately incorporated in Coal Mines Temporary Regulations, 1955 - Temporary Regulation 9. Now incorporated as Regulation 136(2)(c) of Coal Mines Regulations, 1957.
(24) Regulation 135(1) - This regulation prohibits a person from having in his possession inside a mine, in which the use of safety lamps is required, amongst other things, "smoking apparatus". The term is rather vague, and the intention ought to be more clearly expressed.	(24) Incorporated as Regulation 147(1) of Coal Mines Regulations, 1957.

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Recommendation.	Action taken.
(25) Regulation 135(2) - This regulation requires the search of "all persons employed below ground" before entering the mine. Literally, it provides for the search not of all persons entering the mine but of only such persons as are "employed below". For instance, a visitor would be excluded from the search. The regulation should include all persons going below ground. The corresponding provision in the English Coal Mines Act, 1911, section 35 is more clear.	(25) Incorporated as Regulation 147(2) of Coal Mines Regulations, 1957.
(26) An additional chapter may be added to the present Coal Mines Regulations, 1926, containing "Special Provisions regarding Gassy Mines" and, in it, provisions may be made (a) for the appointment of special ventilating and safety Engineer whose duty should be to supervise the maintenance of the ventilation system; (b) for periodical sampling and analysis of the air in each district by an approved apparatus capable of giving readings on the spot; (c) for providing automatic firedamp detectors; and (d) for permanent installation of gas alarm in such parts of the mine where there is suspected danger of presence of gas.	(26)(a) Incorporated as Regulation 149 of Coal Mines Regulations, 1957. (b) Incorporated as Regulation 145 of Coal Mines Regulations, 1957. (c) and (d) These instruments are not manufactured in India. They are of a delicate type and on rough usage which is inevitable in mines, go out of order very quickly. Therefore, their compulsory use at the present stage was not considered advisable. The Fifth Session of the Industrial Committee on Coal Mining endorsed this view.
(27) A National Commission ought to be appointed at an early date, and at intervals thereafter, as Royal Commissions are appointed in England to inquire "whether the safety and health of mine workers can be better ensured by extending or modifying the principles or general provisions of the Indian Mines Act, 1952 and the regulations and rules made for coal mines or the arrangements for their administration, having regard to the changes that have taken place in organisation, methods of work and equipment since they became enforceable and experience gained, and to make recommendation."	(27) This conference is being convened for this purpose.

Appendix F

MINE DISASTERS - Their Causes and Prevention.

1. High-fatality accidents (which individually involve a large number of fatalities) are usually termed 'disasters'. The different causes of mine disasters are mentioned below in order of importance:

(1) Explosions (mainly in coal mines).

(2) Inundation.

(3) Bumps & Rock-bursts.

(4) Winding in deep shafts.

(5) Fires

The various causes of these accidents and the precautions required to be taken in respect of each type are dealt with below:

EXPLOSIONS.

2. Explosions may be due to fire-damp and/or coal dust. Generally, in most explosions both fire-damp and coal dust take part; and very few purely fire-damp or coal dust explosions have occurred so far. Also; though there are cases of coal-dust explosions having been directly initiated, usually it is a fire-damp explosion which raises fine day coal-dust into a cloud and starts a coal-dust explosion.

3. The two essential factors for the occurrence of an explosion are the presence of an explosive medium, and of a source of ignition. All precautionary measures against the occurrence of explosions are directed towards the removal of these two factors.

4. Sources of ignition (in mines) are given below in order of importance:

(a) Naked lights;

(b) Defective or damaged safety lamps;

(c) Shotfiring;

(d) Fires (accidental, spontaneous or from sealed-off areas);

(e) Sparks produced by friction or rubbing of material.

5. Fire-damp can propagate an explosion only if present between 5 to 15 percent in the mine air. If the percentage of the gas present is below 5, it will ordinarily just ignite and will not propagate a wave of explosion. Similarly if the percentage of the gas exceeds 15, an explosion cannot be propagated due to insufficiency of exygen. However a high percentage of inflammable gas is frought with danger in as much that, at any time, it can form an explosive mixture by mixing with more air.

6. The lower limit of inflammability of coal dust varies with the type, age etc. of the dust. However as a general figure it is considered that 0.1 oz. of coal dust per cft. of the air forms the lower limit of inflammability. The higher limit is difficult to fix because a thick cloud of dust can, in no time, become thin and thus come within the limits of inflammability. In this connection, it may be mentioned that even 0 01 oz of coal dust per cft. of air (which would hardly be perceptible to the naked eye) is sufficient to sustain and propagate an explosion wave. The maximum intensity of explosion is caused by).35 oz. of coal dust per cft. of air.

7. As mentioned above, for a coal dust explosion to occur, it is necessary that coal dust rises in the air in the form of a cloud - which can easily be done

by a blown-out shot or by a small ignition of fire-damp etc.

8. Sources of ignition can be eliminated by the following means:

(i) Safety lamps should be properly maintained and checked. Use of naked lights should be stopped by keeping effective checks at the mine entrances.

(ii) Only permitted explosives (and if possible, sheathed explosives or substitutes for explosives) should be used. Effective precautions should be taken to guard against the existence natural breaks in the shotholes.

(iii) Use of flame-proof equipment and its maintenance in good condition.

(iv) Sparks produced by friction can be minimised by proper maintenance and supervision of all machinery in the mine. Sparks caused by the friction or impact of falling rock masses are liable to initiate an explosion only when the caving method of extraction is adopted. If extraction is accompanied by hydraulic packing, this source of ignition is greatly eliminated.

(v) As any type of fires (accidental or caused by spontaneous heating of coal or from sealed-off area) can cause an ignition, steps should be taken to minimize the chances of occurrence of any type of fire in the mine, and to extinguish or seal-off a fire that may occur.

9. Coal Mines Regulations, 1957 and Indian Electricity Rules, 1956 contain effective provisions to guard against the various sources of ignition; and if fully observed, should eliminate to a very great extent the chances of ignition of gas or coal dust in mines.

10. To guard against the dangers of <u>inflammable</u> gases, precautions should be taken to prevent accumulation of inflammable gas in percentages likely to cause explosion. To achieve this, it is necessary to circulate such a quantity of fresh air in the mine that the percentage of gas in the air is kept much below the explosive limits.

11. It should be mentioned here, however, that with machine-mining the progress of the face advance is very much faster so that much more inflammable gas may be given out in a particular length of time. The gas which is given out at the face should be diluted then and there; and this necessitates the circulation of fresh air as near to the face as possible. In quickly-developing faces, especially in bord and pillar workings this is not easy to achieve.

12. Indian Coal Mines Regulations, 1926 did not lay down a specific standard of ventilation and were vague about this point. However, Coal Mines Regulations 1957 lay down (Reg. 130(2) that a place shall be deemed to be normally kept free from inflammable gas only if the percentage of such gas does not exceed 1¼.

13. In some of the countries working highly gassy seams, a technique is being developed to drain off the gas in advance, from above the seams, through pipes.

14. Coal dust is constantly formed during all operations of coal mining, and in much larger quantities when machines are used. To tackle the problem it is necessary to minimize the production of dust, to suitably treat such dust as has been formed, and to prevent it from rising into the air and forming a cloud.

15. For minimizing the production of coal dust, precautions should start even before the cutting of coal has started by infusing the coal with water or steam. This however required an advanced technique and is not yet practised in India. Later on, precaution are necessary at every stage of coal handling to reduce breakage of coal.

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16. The object of treating coal dust is to prevent it from mixing with air to form an explosive mixture. This is achieved by cleaning and then watering and/or mixing with stone dust.

17. Indian Coal Mines Regulations, 1926 were vague about the standard of stone dusting and watering. Moreover they required the removal or treatment of coal dust only on the haulage and travelling roads. However, a coal dust explosion can occur even though the haulage and the travelling roads may be very well treated if sufficient - which, in any case, is not much - coal dust is available in the remaining workings. The Coal Mines Regulations, 1957 now lay down specific standards of stone dusting and watering. Regulations 123 requires that the roadways should be so treated with stone dust that the percentage of incombustible is not less than 70, or that if the workings are treated with water, the dust will have not less than 30 percent by weight of water in it. The type of stone dust to be used has been specified in the Regulations. If the standards laid down in Coal Mines Regulations, 1957 are maintained, the chances of an explosion should become negligible.

18. Mention may also be made here of a third type of explosion i.e. <u>water-gas</u> explosion. Water gas is a mixture of hydrogen and carbon monoxide, both of which can form an explosive mixture with air. Though such an explosion is not of a common occurrence, it is likely to occur in mines if water enterrs a fire area. By the action of water on burning coal, carbon monoxide

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and hydrogen are formed and the fire provides a ready source of ignition. Thus an explosion may take place behind a sealed-off fire area and, by breaking the seals, initiate an explosion of gas or coal dust. This danger is eliminated if the fire area is sealed off by explosion-proof stoppings.

INUNDATION.

19. Several disasters have occurred by the sudden inundation of mine workings by water. Two pre-requisites for such a situation are, firstly, a large body of water in the vicinity, and secondly, an accidental connection with it, of the mine workings at a lower-level. The body of water may be on the surface or belowground and may enter the mine workings:

(a) in the case of surface water, through entrances; through breaks and goaves etc.; or through weak ground or thin cover or a premature collapse etc.; and

(b) in the case of underground water, through connections or thin barriers with workings in the same mine or from neighbouring mines; from workings in the seams above and/or below (through connections such as drifts, staple pits, boreholes etc.; collapses of intervening strata; or geological displacements).

In addition, the failure of a dam built to hold water on the surface or belowground may also cause an inundation.

20. Connection with an underground body of water is fraught with an additional danger. As water has generally been stagnant over a long time, noxious gases like carbon dioxide, hydrogen sulphide etc. may be present and endanger persons who may otherwise have escaped.

21. Precautions against surface water include the following:-

(i) Mine entrances should be sufficiently higher than the highest known flood level of the area.

(ii) Goafed-out areas over which water may accumulate on the surface, should be kept isolated belowground by sufficiently strong water dams.

(iii) The minimum thickness of cover under which workings can be made depends upon the nature of the cover. Under normal conditions a cover of 15 metres should suffice if the size of the pillars and galleries is normal; but in cases where the cover consists of alluvium or sand etc., a thicker cover will be required for guarding against the danger of inundation.

(iv) Wherever there is any danger of water entering the mine through entrances, goaves, broken ground etc., suitable signalling arrangements should be provided to give due warning to the persons employed belowground of any apprehended danger.

22. The following precautions are necessary to guard against inundation from underground workings:

(i) Workings within 60 meteres of any water-logged workings should be made only by putting advance borehole; and whereever any doubt exists as to the extent of water-logged workings, the thickness of barrier should be proved by burn-side boring apparatus.

(ii) In order to guard against water entering an adjoining mine and then flooding other mines, sufficiently thick barriers should be left between adjacent mines.

(iii) All water dams should be of sufficient strength and should be regularly inspected to see if any deterioration in their condition has taken place.

23. For guarding against danger from any chance connection with any accumulation of water, the preparation and maintenance of accurate plans is an absolute necessity. The following precautions should be taken in this respect.

(i) the plans should be correct and correctly oriented;

(ii) the plan should be prepared on such paper or cloth and should be stored in such a way as will minimize shrinkage;

(iii) the position of all drifts, staple pits, boreholes, faults and dykes etc. should be shown on the plan;

(iv) field notes from which the plan has been prepared should be carefully preserved;

(v) wherever there are water-logged workings nearabout the workings of a mine, the extent of such workings should be marked on the plan;

(vi) all the working plans should be regularly brought up-to-date;

(vii) before any mine is abandoned, the plan of the workings should be brought up-to-date. If the workings could not be brought uptodate, the fact should be recorded on the plan.

24. The Indian Coal Mines Regulations, 1926 permitted conditional working within 30 metres of any water-logged workings. In Coal Mines Regulations, 1957 this distance has been increased to 60 metres. Flat storage of plans (to guard against shrinkage) is also now required. The specifications of water dams are required to be shown on the plan.

ROCK BURSTS AND BUMPS

25. A rockburst is the sudden and violent failure or collapse of rock under stresses greater than it can withstand and on a scale sufficient to cause material damage or to endanger personnel. A rockburst emits an earth tremor or shock wave which travels outward from the focus (or point of failure) in all directions. It is audible underground as a sharp single crack, and is perceptible on the surface as a vibration. In coal mines, a rockburst is called a bump but in metalliferous mines, a bump is the name given to a rock failure,

which emits a shock wave but which causes no damage underground.

26. Rockbursts may take place during development or during stoping. During development, they may be caused by violent arching or by the influence of fissures or adjacent excavations on the stress distribution. Both these types are, however, basically the same in that the rock surrounding the excavation fails under ring stresses greater than it can sustain.

27. Rockbursts during stoping have been classified (according to J.Spalding) as follows:-

(a) Ring Stress bursts: Their mechanism is more or less similar to that of rock-bursts during development: the ring stresses round levels, rises or winzes are so increased by the influence or an approaching stope face that at some point the rock fails. Such a burst is usually local in effect though a heavy earth tremor is caused.

(b) Shear bursts: This type is the most common. By the occurrence of a single sheer crack parallel to the face in one of the walls, the rockwall behind the shear plane is able to expand freely into the stopes, heavily compressing the supports and causing the face to disrupt and fill the place with debris.

(c) Pillar bursts: Failures of remnants and of promontories by crushing, as well as those of pillars, are termed pillar bursts.

(d) General Collapses: Haphazard working of ore shoots creates high stresses on some remnants which may collapse suddenly.

(e) Virgin Stope bursts: These are of comparatively rare occurrence, and may take place in new ore shoots with both walls of exceedingly strong unseamed rock. At great depths and pressures, the total load on the exposed area of wall may be so great that the rock fails by shear along the ends of ground before the supports have suffered any squeeze. The failure is sometimes violent and the burst may affect one of the walls.

28. Practically all rockbursts occur without any previous warning. However, sometimes one or more of

the following audible and visible warnings may be given:-

(1) 'Talking' i.e. a series of small bumps or cracking noises within the wall.

(2) Sudden silence after a long period of 'talking'.

(3) An increase of 'spitting' from the faces.

(4) An increase in the rate of 'closure'.

These warnings however are of little practical use as in most cases they may be totally absent, while in others there may be lot of false warnings. The prediction of rockburst still remains practially an impossibility.

29. Precautions against rockbursts during development include -

(i) The restriction of arching by providing suitable linings.

(ii) Laying-out development in such a manner that adjacent excavations are made a safe distance apart, or that when a hole is required it is made in the safest way.

(iii) Careful mapping of all fissures, faults and dykes, and laying-out development in accordance therewith.

30. The following recommendations made by the special sub-committee on the occurrence of rockbursts in the mines of Kolar Gold Field relate to prevention or rockbursts during stoping:

(i) The ore should be extracted as completely as possible in the first workings, leaving as few remnants as possible.

(ii) The number of winzes should be kept to a minimum.

(iii) Where two reefs are being mined, it is preferable that the hangwall reef should be worked out in advance of the footwall reef.

(iv) Blasting should be done at the end of the working period

(v) Development in the deeper levels should be kept to a minimum.

(vi) Longwall face should be adopted in stoping, and the stope face should be advanced as rapidly as possible.

(vii) Where a dyke or fault cuts across an ore body and the width of the dyke or cut-off is sufficient to warrant leaving the barren ground in site, then stoping should preferably commence at the dyke or fault and the faces should retreat from it.

31. A Bump in coal mines is a phenomenon by which slabs of coal are thrown suddenly and violently from sides, roof or floor with a loud report. A violent bump may smash or dislodge timber, and may even cause an air blast. Bumps may be 'Pressure Bumps' (where pillar or adjacent stratum is overloaded and ultimately bursts) or 'Shock Bumps' (where a sudden breakage of a rigid stratum above and spanning a subsidence cavity produces a hammer blow on the seam roof).

32. Pressure bumps may be caused when the strata above or below the seam are strong and unyielding, and where there is excessive weight of the overlying strata on the coal pillars. Shock bumps may occur when there is subsidence of some kind under a strong rigid roof which is thus standing over an excessive span, so that the roof breaks suddenly after the rock has bent sufficiently.

33. As mentioned above, bumps take place without any warning and may cause severe accidents. Moreover large quantities of inflammable gas may be liberated by the bumps.

34. Our present knowledge of the mechanism of rockbursts and bumps is very limited. It is very

necessary to carry out investigations to find out the exact causes so that precautions to minimize the occurrence and ill-effects of rockbursts and bumps can be worked out.

WINDING IN DEEP SHAFTS

35. Winding in deep shafts, vertical or inclined, presents several difficulties. If in a given time a deep shaft has to raise the same quantity of coal or ore, or has to raise or lower the same number of persons as a shallow shaft, one or more of the following steps shall have to be taken:

(1) Increasing the speed of winding.

(2) Increasing the pay load.

(3) Decreasing the time taken at the top and bottom of the shaft.

In practice all the above-mentioned methods are utilised to some extent to achieve the end in view. Larger and/or multi-deck cages etc. are used; and as more men are lowered or raised in each wind, there is a great risk of a disaster occurring in case of a mishap. This calls for better designing of equipment and use of adequate safety appliances.

36. By increasing the speed of winding, the rope and other drawgear are subjected to greater stresses; there are more chances of an overwind; and there is greater wear of the guide-rope and guide-shoes (with the attendant risk of guide-rope breakage and large play of the cages). By increasing the pay load, the factor of safety of the rope may have to be reduced; and there is more unblancing of the loaded and empty cages, so that there are greater chances of an overwind

37 The remedy for all the above-mentioned difficulties lies in the proper manufacture of winding ropes and other winding grear from flawless material, installation of reliable safety devices, proper maintenance of the entire winding equipment, and employment of a more intelligent and skilled type of winding engineman. The new Regulations contain provisions relating to all these points.

FIRES

38. Fires in mines may be accidental or may be caused by spontaneous heating. Accidental fires are caused by ignition of brattice cloth, wood, belts, coal heaps, oil or other combustibles present underground. Such fires are generally less extensive and are comparatively easier to control; but in gassy and dusty mines such a fire can cause havoc as it may initiate an explosion. The following precautions should be taken to guard against such fires.

(i) Only the minimum quantity of inflammable materials should be stored underground, and then only in specially constructed receptacles.

(ii) All brattice cloth and belts etc. should be made fire-resistant material, or should be constantly maintained in a wet condition.

(iii) Wood chips, jute, cloth used for cleaning oil etc. should not be thrown underground.

(iv) Grease used for lubricating guides, oils used for lubricating etc. and diesel or other fuel oils used underground should have a high ignition point.

(v) Steam boilers or other steam generating plant should not be installed underground All steam pipes should be preperly lagged.

(vi) Welding apparatus, blow lamps etc. should be used underground only on approval by the manager and subject to conditions laid down by him.

39. Fires caused by spontaneous heating: All coals (excepting a few high carbon anthracites) are liable to spontaneous heating. Oxidation of coal takes place at all times, the process being accompanied by the generation of heat. In normal workings this heat is carried away by the circulating air; but if (due to certain reasons, such as smaller quantity of air circulating etc.) the heat generated is not totally dissipated, the temperature rises. At higher temperatures, oxidation and the accompanying heat generation take place at a faster rate, with the result that the temperature rises to the ignition temperature and the coal ultimately catches fire.

40. There are several other factors such as carbon content and friability of the coal, presence of pyrites, moisture, carbon dioxide etc. which effect the liability of coal to spontaneous heating.

41. From the facts mentioned above it would be evident that there are two pre-requisites for spontaneous heating of coal:

(1) Presence of coal in crushed or loose form (though spontaneous heating has been detected even in solid pillars); and

(2) Presence of air (oxygen part of it) sufficient for the oxidation of coal but not sufficient to carry away the entire heat generated by oxidation.

Ideal conditions for spontaneous heating are present while pillars are extracted by the caving method. Invariably coal stooks, and sometimes even floor or roof coal or side ribs, are left in the goaf. If the roof consists of shale, that may also add to the combustible matter. As the quantity of air circulating in a goafed-out area is restricted, the conditions

are ideal for fire to break out. The period between the starting of pillar extraction and the first appearance of fire is different for different seams; it is termed "the incubation period" and forms a very important factor for planning the depillaring of coal seams liable to spontaneous heating.

42. In order to prevent spontaneous heating of coal, steps should be taken to prevent the existence of the two factors mentioned above. These precautions include the following:-

(i) Broken coal should not be allowed to remain underground.

(ii) All underground places should be properly ventilated. Provision should be made for dividing the workings into independent ventilation districts with due regard to fire risks.

(iii) Whenever any 'crush' takes place, steps should be taken to remove loose coal or to isolate the area as the case may be.

(iv) Seams liable to spontaneous heating should be worked in conjunction with stowing. Only non-inflammable material should be used for stowing the goaves. However if it is not possible to stow the goaf, the coal seam should be divided into panels of a size compatible with the incubation period of the coal seam.

(v) All goaves or crushed areas should be kept sealed, and if possible, the goaf should be drowned.

(vi) In those parts of the mine where there is chance of a fire breaking out, regular analysis of air samples should be carried out to determine the variation of CO/O2 and CO 2/O2 ratios. Effective steps by controlling the ventilation or by sealing off should be taken in case heating is suspected.

(vii) Effective arrangements such as fire extinguishers, sand, water mains should be maintained to deal with any chance of fire.

43. Once a fire by spontaneous heating has broken out in a mine, it is very important to bring it under control. A fire underground, even when it is sealed off is dangerous in that -

(i) It may spread to other areas or other seams, or even to the neighbouring mines

(ii) It may initiate an explosion.

(iii) In case of accidential breakage of any fire seal, noxious gases (such as carbon monoxide, carbon dioxide and hydrogen sulphide etc.) may infiltrate into the workings and foul the whole ventilation current.

Damage may also be caused due to collapse of surface area.

44. For controlling the fire the following steps are taken -

(i) The fire area should be sealed off by means of stoppings underground and blanketting on the surface (to minimize the leakage of of air into the fire area).

(ii) Constant watch should be kept on all fire stoppings to check any leakage of air or of noxious gases, and temperature readings should be taken on all stoppings to study the condition of fire.

(iii) Fire stoppings should be ventilated by an independent split of air.

(iv) Regular air samples from behind the stoppings should be taken to see if the fire is alive or dead.

45. It is needless to say that attempts should in all cases be made to extinguish the fire. However in

some cases this may not be possible, and the only possible course may be to keep the fire under check.

46. In order to arrest the spread of a fire, it is advisable that the following arrangements for fire-fighting etc. are made at all large mines:

(1) Irrespective of any other inspections that may be required to be made, every district liable to spontaneous heating should be inspected on idle days.

(2) (a) Fire-proof closing devices which can be operated quickly and effectively, should be provided at the top of or at a suitable place in all downcast shafts or other intake surface openings.

(b) Suitable fire arresting zones should be established in all districts of the mines.

(c) Adequate number of fire-extinguishers, or adequate quantity of stone dust or water should be maintained at all mines for fire-fighting.

(d) A trained fire-fighting squad should be maintained.

(e) A fire-fighting plan (showing the position of underground fire, fire stoppings, direction of air current etc.)

(3) (a) Whenever any opening is left in any stopping, necessary materials for building stoppings (such as sacks of sand brick, cement etc.) should be kept available underground.

(b) Before the construction of a fire stopping is begun, an adequate stone dust barrier should be erected along a sufficient length of the road.

(4) (a) The re-opening of districts that have been isolated by fire stoppings should be carried out only with the permission of the Chief Inspector of Mines in India; under the constant supervision of the manager; and by experienced workers.

(b) Before opening a stopping, sufficient material should be brought upto the stopping for re-closing it.

(c) While stoppings are being opened, a rescue brigade should be kept ready.

(d) Re-opened districts and any other districts likely to be contaminated should not be re-occupied until they have been examined and found safe.

(e) If a mine or part has been drowned to extinguish a fire, it should carefully be ascertained whether water gives of sulphuratted hydrogen. Adequate measures should be taken if such gas is suspected or detected.

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LOW-FATALITY ACCIDENTS

1. Low-fatality accidents account for over 90% of the total fatalities in mines, and are therefore really more important than disasters. Almost all non-fatal accidents are also to be classified under this head, as in disasters (high-fatality accidents), few people escape with mere injuries to their persons.

2. Low-fatality accidents may be classified, in order of importance, as being due to:

(1) Falls of ground;

(2) Haulage;

(3) Explosives;

(4) Electricity;

(5) Machinery.

More accidents are caused by falls of ground than all the other accidents taken together (including disasters like explosions, fires and inundations etc). Accidents due to explosives and electiricity are usually avoidable.

3. The new codes of Regulations lay down in sufficient detail the precautionary measures necessary to prevent such accidents and, if strictly followed, should go a long way to improve safety in mines. Better ventilation and lighting should also, by improving the working conditions in general, result in greater safety in mines.

4. In this connection, it may be added that in any programme of accident prevention no distinction should be made between fatal and non-fatal accidents.

It should be remembered that a fatality is only one bad link in a chain of circumstances consisting of (a) the cause of the accident; (b) the accident; and (c) the injury. The object therefore should be the prevention of all accidents, for if the causes for minor accidents are removed, fatal accidents will automatically be eliminated.

5. Some authorities on safety methods estimate that as many as 98 per cent of all accidents are preventable. And a study of preventable accidents has shown that 80 per cent of all preventable accidents result from unsafe acts of persons and only 20 per cent directly from physical or mechanical causes. Mechanical and physical defects thus play a relatively minor role in the occurrence of accidents; and even when they do, human failures are often contributory factors. It is therefore essential that due importance be attached to the part played by 'human element' in the occurrence of accidents. The suggestions made elsewhere relating to training of personnel, improved discipline, safety propaganda etc. are therefore the real means which should be pursued to achieve greater safety in mines.

Physical examination of mine entrants:

6. And last, but not the least, is the need for a rigid physical examination of all miners, both before and during employment. Although mining can be made relatively safer than what it was in the past, it is futile to deny that it is a strenuous and comparatively dangerous occupation; and as discussed elsewhere, deep mining and mechanisation introduce several new hazards. Persons with defective hearing,

eyesight or heart should, therefore, not be employed as they are a menace not only to themselves but also to their fellow-workmen.

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Appendix H.

SAFETY EDUCATION, PROPAGANDA AND CONTESTS ETC.

1. Besides improving discipline - which is an indispensable requirement for safer work, the other most effective means for bringing about greater safety are the adoption of suitable educational methods (which help the supervisor to assess the dangers inherent in a particular type of work and assist the worker to follow safer methods of performing his work) and safety propaganda.

Safety Education.

2. Suitable schemes should be evolved and put into practice to educate the mine staff at all levels about the necessity and requirements of safety. For the senior managerial staff, this may take the form of -

(i) Safety Conferences held occasionally, where papers relating to different aspects of safety should be read, the experience of the managerial staff regarding safety discussed, and various means explored for solving problems of safety, both old and new;

(ii) a Safety Bulletin (devoted completely to the promotion of safety in mines) issued periodically.

3. For the subordinate supervisory staff, refresher courses should be organised where senior mining engineers and officers of the Mines Department may be invited to give talks and lectures. Excursions should be made to modern and/or difficult mines to acquaint the under-officials with new techniques of mining and new sources of danger. Rescue Stations should also be visited. The value of such courses can be considerably enhanced by -

(a) holding discussions on the causes of actual cases of accidents, and on the chain of events leading to such occurrences;

(b) inviting the trainees themselves to hold discussions on safety matters brought up by them;

(c) display and discussion of diagrams and other exhibits having a bearing on safety; and

(d) requiring the trainees to appear in a test at the end of the course etc. etc.

4. Educating the workers for safety and teaching them safe habits is a more difficult problem. Vocational training as suggested earlier is likely to make them more conscious about safety; and during any such training the main stress should be on safety. Other means include showing of films and display of posters etc. about safety - discussed later.

First Aid Training and Safety

5. One of the best and most effective methods of bringing safety-mindedness to the mining personnel, officials as well as miners, is training of the entire personnel in first aid to the injured. Though according to the Mines Rules, only one person for every 50 underground workers and for every 100 surface workers is to be so trained, safety-training work does not reach anything like its full effectiveness especially in mechanised mines (where the incidence of minor injuries may be very high), unless every person has undergone such training at least once. Of course, all skilled workers and mine officials should be kept trained in rendering first aid to the injured by refresher classes and ambulance competitions.

Safety Propagand etc.

6. Propaganda has an important role to play in disseminating safety knowledge and in making people more safety conscious. To carry home safety propaganda to the workers most of whom are illiterate, it is

essential to adopt visual means. Documentary films about accidents and safety should be prepared and shown to gatherings of mine-workers. The possibility of exhibiting these films in the commercial cinema halls in the mining areas should also be explored.

7. Suitably-designed safety posters should be regularly displayed in mines to maintain the workers' interest in safety, and to act as constant reminders to them for taking adequate precautions while in or about the mine. In order that posters do not become stale, but that new ideas are developed and new designs utilised to make the posters arresting, a full-time artist should be engagad on this work.

Safety Contests etc.

8. Safety contests between different districts of the same mine and between different mines in each group have been found to be useful. Awarding prizes or bonus to winners of these contests helps in stimulating interest in safety. Observance of 'safety weeks' or 'safety months' is another means whereby the ideas of accident prevention can be inculcated amongst the mine managements and workers and their interest in the problem kept alive.

Safety Organisation at the Mine Level.

9. To obtain the workers' active participation in accident-prevention work, it is necessary that every large mine should have an active safety organisation. Pit Committees can play a very useful role in this respect.

10. Also useful at the mine-level are Officials' Safety Meetings. After the officer concerned has analysed the causes of an accident (or series of accidents), group meetings of all officials should be held to discuss the matter. In every case, the chain of events that led to an accident should be thoroughly examined. Periodic safety meetings are an excellent medium for the discussion of accidents and the evolution of corrective measures; and though not practised in India, have proved very useful in other countries.

11. In a safety meeting, stress should not be laid on placing blame on some body, as this is almost certain to result in antagonism, resentment, etc. What is needed is a spirit of friendliness; and for this purpose, criticism must be constructive and sincere.

Extracts from letter dated the 7th March, 1958 from Dr. S.V. Anantakrishnan, Professor of Chemistry, Madras Christain College addressed to the Union Minister for Labour and Employment.

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Some days back I noticed a press report that Government is planning a thorough enquiry into the explosions in the Coalmines and the explosion in Pathankot. As a distant observer and as one interested in the mechanism of chemical reactions, I felt that some scientific investigation of a fundamental nature is also called for.

Coal dust is capable of spontaneous ignition under certain oxygen pressures. This latter may be partly varied by ambient temperature conditions. There is also the inherent danger in the very process of mining where explosives are used. Is there any information regarding any Static electric charges in the region which might induce the solid phase oxidation of coal dust and set in motion the explosion wave? What is the type of coal and the overall structure of the seams? Susceptibility to spontaneous change has been reported to vary with the nature of coal dust in other countries. Have we any data on the point regarding our Coals? These and many other points will have to be cleared.

xx xx xx xx

I hope that your conference will investigate the scientific side of the problem. Any safety measure necessarily depends on a correct knowledge of the scientific position.

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Article by Professor J.B.S. Haldane on colliery explosions published in Hindu dated the 9th March, 1958.

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C O L L I E R Y E X P L O S I O N S

There has been a serious colliery explosion at Chinakuri in West Bengal, in which nearly 200 people were killed. Such explosions were common in the U.K. sixty years ago but have been rendered extremely rare. The improvement has been due to three causes, scientific research, with some of which I was associated, regulations for safety, and education not only of engineers and mine inspectors, but of miners.

It is idle to hope that safety will be achieved in Indian mines until the men working underground understand the sources of danger, and how to counteract them. And this improvement can only come as part of a general rise in the educational level. Even that will not be sufficient unless the general education includes at least some elementary science.

An explosion is a burning which happens instantaneously through a large volume. In most cases the burning is the combination of oxygen atoms with other atoms. In a solid explosive such as gunpowder the oxygen is in potassium nitrate, from which it comes off very easily, and later combines with carbon and sulphur. In an explosive such as trinitrotoluene the oxygen and the carbon and hydrogen with which it unites are originally in the same molecule, but separated by nitrogen atoms. However, in a colliery explosion things are different. The oxygen is in air, and what is burned is either a gas called methane, or coal dust.

So to prevent explosions one should take two different kinds of precaution. First, one should prevent the accumulation of gas or dust in sufficient amounts to cause an explosion. Secondly, one should avoid anything which might start an explosion if gas or dust is present. In the same way if one has a gun or pistol in the house one should take two precautions. First, the gun should not be left loaded, and, secondly, it should

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never be pointed at a human being, even if one is sure that it is not loaded.

EXPANSION OF AIR.

A gas or dust explosion is dangerous on account of the heat generated by the rapid burning. This can scorch a man's skin, but a greater danger arises from the rapid expansion of the air caused by the heat. This pushes everthing in its path, as the explosion of the mixture of air and petrol vapour in the cylinder of a car engine pushes the piston. Both gas anddust explosions use up the oxygen of the air and generate a poisonous gas, carbon monoxide. Finally an explosion may start a fire. This is what appears to have happened at Chinakuri.

Methane, which is called firedamp in England, comes out of the coal in many mines, and in such mines "naked" flames such as candles are forbidden. Either electric lamps are used or an oil lamp is used with a glass chimney, and wire gauze screens where the air enters below the flame and leaves above it. A flame can no more get through such a screen than a mosquito can get through the gauze screen of a railway carriage.

When I was a boy my father gave me what Gandhi would have called basic education in science. I first went down a mine at the age of about four, though I did not go down a coal mine till later. I remember being taken into an abandoned part of a coal mine where there was no ventilation, and gas has accumulated. Methane is lighter than air, and collects near the roof. We crawled along the floor to avoid it. Then my father told me to raise my safety lamp. It filled with blue flame and went out. If it had been as large as a railway compartment the explosion would have gathered so much force that it would have shattered the glass and ignited the gas round it. Then my father told me to stand up. As there was very little oxygen in the firedamp near the roof I soon fell down again. However, I had learned some Chemistry.

GOB FIRES.

Mixtures of gas and air in suitable proportions are rather easily set alight. A match can do so. So can a spark from an electrical apparatus, or perhaps even from a nail in a man's boot. In England a very common cause of explosions was what is called a gob fire. When the coal has been taken out of a seam the props which support the roof are withdrawn and the roof comes down. The crack which may remain between the roof and floor is called the gob or goaf. If too much coal dust and fragments are left there, and there is a drought through the gob, this waste coal may heat up and finally smoulder at a red heat. Such a gob fire can set off a gas explosion. Gob fires can sometimes be detected by smell long before any smoke is visible; but chemical methods are much more reliable.

Dust explosions are not so easily started. A cloud of coal dust must be quite dense before it explodes, Such dense clouds can be produced by wagons loaded with coal, by coal cutting machinery, and otherwise, More usually however, coal dust is stirred up by a small gas explosion, and then set alight. Dust explosions can be more violent than gas explosions. I once saw an experimental one which tossed pieces of boiler as large as carts for 600 yards or so, and, though the local newspaper was dissuaded from reporting this fact, an earthquake was reported six miles away.

Considerable care is taken in British collieries to prevent the accumulation of dust. Roads, as the tunnels between the shaft and the coal face are called, may be watered. Limestone dust may be mixed with coal dust and so on. This is particularly necessary in mines where explosives are used. Although explosives used in collieries are tested for the absence of a flash, these tests are not quite infallible and extra precautions are needed to prevent dust explosions.

From the newspaper accounts of the Chinakuri explosion which I have seen, it looks as if the explosion of a small amount of gas might have started a much larger dust explosion. Enough gas to kill more than one or two men can only accumulate through very gross negligence. But a moderate amount may suddenly come out of the coal, and if it is accidentally ignited, will explode. However, if proper precautions are taken, it will not start a dust explosion.

The explosion only lasts a second or less, but is extremely hot. So, exposed skin is scorched. But, though the clothing may be charred, the skin below it is seldom much damaged. Unfortunately in India miners wear fewer clothes than in Britain, and are likely to be burned over larger areas. Death by carbon monoxide poisoning is one of the least painful deaths that one can imagine. After a brief period of confusion, one loses consciousness. Mine rescue teams are equipped with a breathing apparatus which gives full protection against it. It has been proposed that all coal miners should carry such apparatus. But this proposal has been rejected, as the apparatus is cumbrous. I am glad to read that a rescue team saved several lives at Chinakuri. Mine rescue is one of the noblest of human occupations, combining the honour and risk of the soldier with complete non-violence. The British teams have a magnificent record of courage, even though in the last few years they have had little chance of showing it.

There is to be an enquiry into the Chinakuri disaster. Trade unions can play a most important part in such enquiries, provided their representatives have a good knowledge of the necessary science and technology. Too often they are lawyers who know no more of chemistry and physics than I know of law, and are more concerned to make the witnesses called by the owners contradict themselves than to arrive at the truth. In such an enquiry it is no doubt important to find

out, if it is possible, who was responsible for the explosion. It is much more important to prevent such explosions in future. This can only be done if the problem is regarded as a scientific rather than a legal question. But, whatever precautions are taken, I do not believe that Indian collieries will attain the high safety standards reached in Britain until the miners are sufficiently educated to understand not only what orders are given to ensure safety but why they are given.

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Memorandum of the All India Trade Union Congress

To

Steering Group for discussing Safety and Allied Matters in Coal Mines.

1. In this memorandum, we have attempted to frame a composite scheme to ensure higher ~~safety~~ standard of safety in the mines of the country, particularly in view of the series of ghastly accidents in the course of last few years which have created a sense of insecurity in minds of all sections of workers connected with mines. However, it should be remembered that it is the constant daily sniping of a life, lost here and another there, that makes up the yearly total and effective steps should be taken to prevent them.

2. It is a matter of great regret that there seems to be a kind of satisfaction in certain official quarters regarding the rate of accidents in India. Lots of statistics are presented to "convince" the general public by the Mines Department. For those who feel satisfied, we can only quote what Dr. J. W. Whitkar, Director of the Mining Research Station, said in 1956: "The mine accident rate for Indian mines is not high when compared with other countries on the basis of number of accidents --- major and minor--- per 100,000 manshifts ..... But the very method of comparison leaves much to be desired. For instance, it does not show the true picture of the number of deaths (or other accidents) caused per one million tons of coal or mineral raised. For India, the rate so expressed is high. And if we are to increase the coal output by 60 per cent, i.e., from 37 to

rates in the mines can be brought about without a basic change of attitude of mine owners and the Department of Mines ------ the attitude of indifference, contempt and hostility to workers in general and Trade Unions in particular. The present attitude is to keep the representatives of workmen completely dark about the condition inside the mines. Assistance or suggestions are not even looked into; complaints are brushed aside and permission to visit the mines wither with Inspectors of Mines or high officials are refused. So long as this attitude persists, thousands of regulations and hundreds of Inspectors will not lead to any improvement of the situation. The workmen have a major role to play in accident prevention and all other measures will not avail unless active cooperation is sought with workmen under the guidance and leadership of their chosen representatives. How this can be done, we have discussed later.

6. It is a matter of regret that inspite of our repeated demands, there appears a complete lack of interest or faith by employers in any scheme of safety organisation at the mines & in cooperation with xxxx representatives. The Indian Mining Association, the premiere organisation of the coal magnets, stated before the Colliery Tribunal that the "work of the miners underground is no more hazardous and difficult than that of agricultural labourers in the fields." So the attitude was what was the use of having a safety organisation?

7. Moreover, we strongly feel that further enactment of rules and regulations would not help unless there a serious effort is made to observe these regulations and the effort must come from employers themselves. A great number of accidents result from failure to observe regulations which already exist and position can be hardly improved merely by adding further provisions to such regulations; safety can not be secured on paper alone. What we suggest is this that not only the standard of statutory regulations be advanced and the Mines

Department reorganised, there must be effective means of enforcement and deterrent punishment for all those who violate laws.

8. We would like to emphasise that the problem of safety in mines, if substantial improvement is to be secured, must be attacked simultaneously from all sides, by adequate strengthening of the administration, the setting up of a higher standard of enforcement and observance, the formation of safety committees, the change in relations of the Mining Staff with the management, the reduction in workload, the seperation of safety officials with production section, reduction in working hours, an improvement in the material conditions under which the work is carried on, and the active cooperation of employers,unions and the Mines Department.

9. Before we place our suggestions, one fact should be kept in mind, that is, mining has become more difficult and complicated in the recent years as a result of mechanisation and with the workings of Thinner or more difficult or deeper seams. The total number of persons employed has been reduced, production has gone up, and in near and the actual working face the burden on workers has sharply increased and the task of overmen and Mining Sirdars more difficult.

10. (a) The introduction of machines and other equipment, drills etc, have created risks both in being handled in preparation for work and in their moving parts when at work, and other indirect risks, particularly at the working face, and of the noise which they usually make.

(b) There has been an increase --- in the number of shots fired per ton of coal raised and in the use of electrical machinery of all kinds.

(c) New problems of roof control in most cases from the more rapid depillaring and advance of the working face.

(d) There has been increase in the rate of emission of gas and there has been an increase in the make of coal dust both on the face and on the main road.

(e) The speed-up and pressure to get more coal has created the necissity to maintain the cycle of operations; delay in one operation affects all the others , which generally tend to hurry and bustle, and the taking of greater risks.

(f) The supervision by higher officials on the afternoon and night shifts has not kept pace with the increased size and importance of these shifts.

(g) A larger part of the 24 hours being occupied in the operations directly connected with the getting and transport of coal, less attention is paid to take various precautions.

11. THE MINES DEPARTMENT & ITS ORGANISATION & IMPROVEMENT.

1) There should a seperate MINISTRY for the MINES for the purpose of securing the most effective development and utilisation of the mineral resources of our country and the safety and welfare of those engaged in mining industry. This Ministry should in overall control of all affairs in relations to mines.

2) The exercise of the responsibility arising out under such obligations should remain a primary function of the Mines Department under the Chief Inspector of Mines.

3) The Mines Department should have two group of officials ------ one group only concerned with the safety side and the other group to look after health and other allied matters underground, research and prevention of industrial diseases. The present multifareous activities of the Mine Inspectors should be immediately discontinued. This seperation is necessary to cope with the increasing volume of work and undertake new developments, and the inspection, testing and research work.

4) Substantial additions is absolutely necessary to the present number of Inspectors and the appointment of more specialist Inspectors is needed because of the rapid progress in certain branches of mining practice devoting attention to particular problems. These include more Electrical Inspectors, Medical Inspectors, Mechanical Inspectors and other Inspectors

for dealing with Roof control and Dust Problems.

5) In view of the ever-increasing part played by machinery in modern mining, and the addition of new problems in safety which are thereby created, Inspectors of Mechinacial Engineering be appointed. Similar considerations arise in connection with Haulage and Roof Control problems. The Inspctor of Mechinacial Engineering might, at the outset, also be responsible for the central direction of haulage questions, but seperate specialist Inspectors be required to exercise general supervision of the very important question of Roof control. Besides these, special Medical Inspectors of Mines with assistance, in the study of the prevention of industrial diseases and the administration of first aid service and other matters must be appointed.

6) It must be frankly admitted that the present salary scale of the Inspectors is inadequate and so their decisions and reports of inspections sometime tend to be influenced by colliery magnets. While we do not like to discuss this in details, we think that improvement in their salary scale will enable them to withstand various pressures of employers. ~~In [illegible]~~

7) We submit that present amount of inspection is insufficient and we suggest that every mine should be inspected throughout not less often than twice a year, and that visits should be even more frequent at mines where the management is lax.

8) The Inspector of Mines must visit every nook and cranny of each mine. During the inspection, any workman or a representative of a registered trade union of the colliery will have the right to put up complaints before him regarding safety and allied matters either orally or in writing and it will be the duty of the Inspector to hold an enquiry into the complains.

9) The Inspector of Mines should have power to investigate a complain by any worker that he has been discharged because of the way he has carried his ~~xxxxx~~ safety duties and submit his report to the Chief Inspector of Mines with a copy to the worker or the union whiich filed the complain; The Chief Inspector of Mines will have the power to prosecute the owner or agent or manager on the basis of the report of the Inspector. Moreover, the workman or his representative must have the right to institute proceedings under the Act against owner, agent or Manager for violations of the SAFETY LAWS.

10) Besides yearly visits for thorough inspections of mines, it will be the duty of the Inspectors to visit and inspect a mine --- (a) on INVITATION & (b) On COMPLAINT.

11) We propose that a much larger proportion of inspections should be allocated to the afternoon and night shifts. We suggest that 40 per cent of the inspections to be on the night shift and 30 per cent each on the day and afternoon shifts.

12) Whenever an Inspector will visit a mine on receipt of a complain from a registered trade union of that particular mine, it will be his duty to take along with him a representative of the union during his inspection, if the union so desires.

13) All the reports of inspections should be posted at the pit head to enable the workmen to know if any recommendations in the reports were carried out, and whether defects defects known to them had received the attention of the Inspectors. Or in alternative, Trade unions of the colliery should have copies of such reports on request.

14) To do minimum job as required, we suggest that

a) the number of Inspectors be increased.

b) the number of collieries or the zone under one Inspector should be small in the interest of more efficient and authoritative inspections, which we believe to be one of the most effective means of securing the greater safety of the persons employed in mines. The advise of the Central Sa fety

Committee should be considered by the Chief Inspector of Mines in this connection.

15. ENFORCE OF LAW & QUESTION OF PROSECUTION

The question of enforcement of law is perhaps more important than framing of laws and regulations. The value of every statutory provision must depend ultimately on the respect with which it is regarded by those whose duty it is to comply with it. Our basic complain is this that at present mine owners are violating laws both directly and indirectly, which we will deal in connection with the duties and difficulties of overman and mining sirdar. Here, we can briefly say that only in few mines there is overman and mining sirdar in all sections in every shift and they are not allowed to write correct report and their main task today is not concerned with safety but output. Indirectly, proper men and materials are not given to them to keep the underground in safe condition.

The closure of collieries by the Mines Department for violation of laws by the management is no solution at all. It is rather an escapist devise. Instead of closure, steps should be taken to compell them to take safety measures failing which the Government should take over the mines.

16. The present practice of prosecution in ordinary local court is absolutely ineffective. Firstly, it takes too much time and secondly, it is impossible for magistrates to be completely independent from the influence of colliery owners who are the real bosses of coal fields. So SPECIAL TRIBUNALS OR COURTS must be set up at some centre (like Industrial Tribunal at Dhanbad) where all mining cases will be heard and whose judgments will be final. These courts will only deal with violations and other allied matters.

17. And as we have suggested in earlier paragraph, the right to institute prosecution cases against owner, agent and Manager must not be limited to Inspectors and Chief Inspector of Mines only, but should be estended to workmen and unions. We

feel quite strongly that it would be unreasonable to deprive workmen or their representatives from this right as they are first to die in any accident, big and small.

18. The present punishment is negligible. In view of the more statutory effect which is expected from heavier penalties, we suggest an increase in maximum penalty would be justified. Continued violation should result in confiscation of the colliery and heavy imprisonment.

19. We also suggest that with the growing complexisty of mining questions and cases, a seperate LEGAL ADVISOR for the Mines Department should be seriously considered.

20. All warnings by the Mines Department, in the event of contraventions being discovered, should be in writing. But at the same time, we feel that system of warnings, carried too far generally tempt managements to transgress law with impunity; so where there is deliberate failure to carry out the law or culpable negligence on the part of the management to see that it is carried out, proceedings should be taken without previous wanrings.

21. RESEARCH WORK

In matters of safety and health, a full saale Research Organisation, in collaboration with the Mines Department, should be set up under the Ministry with adequate staff. The present Research Station is not at all suitable for this purpose.

22. The task of the organisation will be two-fold:
a) to direct generally the research work into the causes of mining dangers and the means for preventing such dangers & (b) in cooperation with Medical Inspectors, to conduct research work into the causes and prvention of industrial diseases.

22. STATUTORY RESPONSIBILITES

Before we go to other vital questions, the problems of statutory responsibilites of owners, agents and managers must be looked into; at present the colliery owners, interested only in raising and lower cost and more profit, interfere at every

stage of mining operation and managers carry out their orders for the fear of losing jobs. But at the time of trouble, these owners shift the entire blame on the manager and others and plead complete ignorance of all violations for which they are really responsible.

24. The fundamental principle should be that the owner or the managing director ~~for~~ is primarily culpable and liable to penalty for any breach in law. Briefly, our suggestion is that owners and other superior officials like agents should not be able to escape the legal consequences of their influence on policy and methods of work by allowing managers to assume full responsibility.

25. The Manager should be given additional safeguards from interference by owners and their agents.

26. <u>WORKERS PARTICIPATION & COOPERATION</u>

We come now to one of the two fundamental points --- the question of workers cooperation --- which is core of any safety plan. The cooperation of workers is essential in any movement to secure a higher standard of safety, and they should be encouraged to collaborate more fully with the managements and the Inspectors in accident prevention, and in particular they should be called upon to exercise regularly their power to have the mines inspected on their behalf. This is done in all other countries. Union representatives are allowed to go inside mines, they have the right to accompany Mines Inspectors during their inspection --- all these rights are enjoued by unions and workmen of other countries. But in India, unions and workmen are treated with contempt as we have stated earlier and all attempts to cooperate are frowned upon. The attitude of the Mines Department is no better. I enclose a letter of the Actg. Superintendent of the MacNeill Barry & Co in reply to the union secretary (Dhemo Main Colliery) dt. 24.6.57, through the Conciliation Officer (C), Asansol, brushing aside all suggestions for cooperation. (Annexure A).

27. While we do not go as far as to suggest the appointment of Workmen's Inspectors who will inspect the mine atleast once in every month, as is done in other countries, our suggestions are:-

i. Representatives of a registered trade union with a branch and membership in a colliery should be allowed to visit the underground atleast once a week. The owner, agent or manager will have the right to accompany, or to appoint one official of the mine to accompany the union representative on all occasions.

ii. The local registered union will have rights to have notice from the management of accidents causing loss of life or serious personal injury and powers to investigate such accidents.

iii. Local representative of a registered union with membership in the colliery will have the right to accompany the Inspectors of Mines during his inspection underground.

28. FORMATION OF PIT AND SAFETY COMMITTEES

Every colliery should have pit committees elected every year which will look after the general problems from sanitation to housing etc. But there should be another committee, to be known as SAFETY COMMITTEES, closely interlikned with pit committees/

The Safety Committees should be composed of equal numbers of management and workmen's representatives. The workmen representatives of safety committees may be either nominated by local registered union or elected by ballot. In any case, membership to safety committees shoyld not be only limited to workers but also open to union representatives, who are not workers, in view of important and difficult and heavy nature of job which demand considerable education.

1. These colliery Safety Committees should be under a Central "Accident Prevention Committee" or a "Standing Advisory Committee on Safety Matters", which should consist of representatives of the industry, workmen and the Mines Department --- as a matter of fact, this committee representative of all the interests concerned and driving its power from a sincere desire to cooperate in all

practicable measures to reduce accidents will be capable to providing all the leadership, the driving power and the coordination that are necessary. And this top committee along with branches at every colliery must be set up by an Act.

ii. Such a committee at the top and colliery level, meeting at regular intervels to discuss accidents, to consider suggestions for preventing their recurrence and allied matters will be the only way to foster the safety spirit in mine.

iii. The task of the Central and colliery safety committees should be as follows with the aim to bring about safety consciousness among all.

(a) To give leadership in the organisation of safety campaigns on the mines.

(b) To stimulate amd maintain general interests in safety measures by means of the distribution of information regarding the prevention of accidents.

(c) To collect from the mines and to tabulate information as to the methods of procedure to be conductive to a reduction in the accident rate and thereafter to make such information known.

(d) To conduct "Safety Propaganda" work among workers by showing films, arranging lectures, discussions, conferences, posters, exhibitions and by bringing out publications.

It is indeed a matter of regret that the psychological side of accident prevention, popularly known as "Safety First" movement has made no progress in the mining industry, although we hear much about "Road Safety" movement.

29. SAFETY OFFICERS

In other words, if safety propaganda is to be carried out in the mining industry on a sufficiently wide front and made effective, it calls for a new class of people ---------- Safety Officers. As a matter of fact, workmen will be able to discuss all safety matters with them which may not ne possible with other high officials.

30. DUTIES, RESPONIBILITIES AND DIFFICULTIES OF OVERMAN, & MINING SIRDAR.

The second and perhaps the most important question besides workers' cooperation in relations to safety problems is duties, responsibilities and difficulties of overman and mining sirdar. No attempt has been made so far either by the Mines Department or employers to understand the difficulties of these people, whose duties are, in short, to look after the safety measures in mines and who to day in practice are engaged in everything else but safety. Yet whenever an accident happens or violation is discovered, employers and the Mines Department make them the target and they are suspended even without a shadow of enquiry. If accidents are to be reduced and real causes of accidents are to be discovered, then all aspects of their duties, difficulties and relationship with management and the Mines Department must be thoroughly studied and radical changes are necessary. Their position have become intolerable and actually contributing to accidents.

31. Their duties are provided in the Mines Act, the Rules and Regulations, Bye laws and they are responsible for maintaing safe working condition. Briefly, they are to see that coal is extracted according to Mining laws and prevent violations. They are to issue directions to various classes of workmen such as miners, timberman etc, as to the correct method of getting the coal, of erecting timber and of maintaing safe working conditions both at the working faces and on the roadways. They are also responsible for controlling haulage hands and ensuring that when tubs are hauled proper safety precautions are taken to prevent runways. They also have to keep various records, make regular inspections for all kinds of possible dangers. They are also to test gas, keep records, supervise rescue operation and see that a sufficient supply of materials and other necessities required for the safe working are kept ready. In short, they are supposed to be

Police Men to keep employers and workmen from violating laws and safety measures.

32. But what happens in actual practice?

From Police Men, they have been reduced to position of Raising Inspectors. Their jobs depend on employers whose only interest is to raise more and more coal at a minimum cost with the smallest number of men and smallest amount of materials possible. Their promotions, their whole future depend how much can they raise in one shift? When they try to avoid sections which are dangerous, they get chargesheets for less production. If they complain of shortage of timbermen or timber, bad lighting, defective equipment, dillapidated lines, bad roof, shortage of staff, lack of materials, over work or heavy workload--- they are termed as inefficients. If they point out to dangers of violating laws, they are told "You are to raise more coal. We will take care of laws." They are not allowed to write correct report of their sections. Their refusals to obey orders lead to dismissals. And when ~~they are~~ in order to keep their jobs, they are forced to resort to illegal mining methods and raise coal where they should not, and accidents take place or violations are discovered by the Mines Inspectors, it is these overmen and mining sirdars who get the entire blame.

33. In other words, when action taken by overman and mining sirdars lead to the stopping or retarding the production in their areas, they are dismissed, suspended and degraded in consequence. It is impossible for them to make complain to the Mines Inspectors because the result of complains will be --- discharge from their jobs on some other flimsy grounds. And the Mines Inspectors also for reasons known to themselves accept manager's version without a word.

34. And what is most surprising is that Inspectors of Mines immediately suspend them and seize their certificates or tokens. They do not hold any proper enquiry. They are given no enquiry

notices. They are not allowed to state their case or produce their evidence. There is no attempt to find out the truth. How can one ever hope to find out the truth if the man who is held responsible for the alleged violation or accident is not given the full chance to explain the full circumstances before a Board? If they tell the truth, they lose their jobs.

35. These difficulties of the overman and mining sirdar can only be resolved by state employment in which case their appointment and dismissal would no longer be in the hands of the mine management.

36. Till the above step is taken, the Section 26 of the Mines Regulations should be drastically amended. It is unfortunate that while drafting and finalising these Regulations, the Government did not think it necessary to incorporate any of the suggestions that were sent by the A.I.TU.C., the Indian Mine Workers Federation and The Indian National Mine Overman, Mining Sirdar and Shotfirer's Association.

(a) Statutory provision should be immediately made to set up either special Tribunals or Boards or Courts to receive complains from the overman, mining sirdar and shot-firer. And when any one of them complain that he has been discharged or degraded or transferred because of the way that he has carried out his safety duties, full enquiry should be made to find out the truth. And the complaintant should have the right to produce evidence and defend himself with the help of a lawyer or officer of his union. Similarly, no final order of suspension by the Mines Department be made without full enquiry in the above manner by a properly constituted court or Tribunal.

(b) During the period of "temporary" suspension he would be given proper allowance as decided by the authorities which will take into consideration of his years of service, salary and other factors. After the expiry of the suspension period, he must

be allowed to resume his duties in the same post in the same colliery. If the person concerned is proved to be not guilty by the Board, he should be reinstated with his full wages from the date of suspension.

The above measures are absolutely necessary for the carrying out of safety jobs by the Mining staff, faced with the problem of conflicting interests.

37. Besides what has been suggested above, the following measures should be taken:

(a) Seperate production officers should be appointed in order to enable the overman and mining sirdar to carry out purely safety duties.

(b) The size of a district is a vital point. Now the districts are arbitrarily fixed and it becomes impossible for overman and mining sirdar to carry out proper inspection. The district should be sufficiently small to enable it to be inspected completely within 1½ hours. Area of a overman should also be determined. There should be provision to enable overman and mining sirdar to complain regarding the size of his area to a Board or Tribunal.

(c) The overman and sirdar spend over 10 to 12 hours underground to complete all their work from taking over the charge to handing over the charge and this long stretch of work severly affect their health and efficiency. We suggest that their working hours should be reduced to 6 hours per shift.

(d) The present heavy duties of these people should be reduced.

(e) The Award of the Tribunal in relations to overman and Sirdar has not at all been properly implemented. Their categories have been wrongly fixed and designations have been arbitrarily reduced. Immediate measures should be taken to refer all compkains regarding correct fixation of designations and scale to Tribunals. We regret that in this matter the Industrial Relations Machinery has not been very helpful and the attitude of the Government to

send these cases to Tribunal is one of complete indifference. Moreover, the salary and other facilities of overman and sirdar should be made attractive in view of the heavy responsibility they undertake.

38. We also recommend that for better handling of safety job ----- an abstract of the Act and Regulations should be posted at the surface.

39. SHOT FIRING

No overman or mining sirdar will be asked to do shot firing. Now in a number of collieries, a sirdar is over and above his other duties carrying on the shot firer's job. This should be stopped. The man who will do the shot firer's job will not be given any other job.

(b) As regards supervision of shot firers, provision should be made of putting all the shot firers under the control of foreman shotfirer who would be responsible both for supervising all matters connected with the use of explosives in the mines and also for training prospective shot firers, for which there is no arrnagement to day.

(c) Simultaneous, shot firing should be stopped because, briefly, of danger from undetected misfires and the time thus saved is not devoted to ensure greater safety but to greater speeding up in the production of coal. In single shot-firing the shot firer can hear whether the shot has gone off or not, and the operation of dealing with one that has not gone off though dangerous, is at least an operation carried out in full knowledge of the risks involved, and with all appropriate care and precaution. In simultaneous firing, on the other hand, the sense hearing will not detect one misfire out of several shots, nor can examination of the place be certain to detect any misfire; the possibility of danger is multiplied by uncertainity.

(d) The number of shots a shotfirer may fire should not exceed, maximum, 15 per shift in a gassy mine and 25 in non-

gassy mines.

40. So far as the Electricians are concerned, there is much discontent among them. In a great number of mines, the categorisation of Electricians has been done in such a way to kill all interest in their work. Although there is a provision in the Award for the post of a Head Electrician in Category X, only in a few collieries we find any such post. And the number of electricians in collieries is small and those who supervise and those who help have been put in the same category. Complains to the Industrial Relations Machinery have not yeilded any desirable result. We suggest that all grievances of Fitters and Electricians regarding categorisation should be quickly looked into.

41. HAULAGE

The absence of any improvement in haulage accident rates over a long period calls for fundamental remidies, among which one of the most important is an improvement in the physical and material conditions under which haulage operations are carried on, including the condition of the track itself, the use of gear and appliances of sound material and of adequate strength in relations to the stresses thrown upon them, and the provision of adequate space and good lighting at places where persons employed on the haulages have to work. Proper supervision over haulage operations and the persons employed in these operations is hardly less important. In addition there should be effective dafety devices at danger points.

And we suggest that instead of burdening an over-man with this job to look after haulage, the manager should be required to appoint a seperate official in each shift to have definite responsibilities in relations to all questions regarding haulage with particular emphasis on safety.

42. ROOF FALL

Dr. J. W. Whitkar, Director, Central Mining Research Station, Dhanbad, said in 1956 that 50 per cent or more of the coal mine accidents, were due to roof fall. More steps should be taken in this direction. The more extensive use of STEEL should be encouraged. Provision should also be made to ask the managers to keep record of all falls of more than a certain size at the working faces and on main roads.

43. Provision should be made to use Safety Lamps in all mines. We suggest the total abolition of naked lights underground.

44. The problem of COAL DUST should be looked into more thoroughly and regulations in this respect strictly enforced.

45. We suggest a reduction of working hours of WINDING ENGINE KHALASIS from 8 to 6 hours in view of the strain of their work. This has been done in some collieries like Dhemo Main, Methani etc; and should be applied to the industry as a whole.

46. PROTECTIVE EQUIPMENT

There is a complete negligence on the part of employers in India to supply protective equipment to workers, which can reduce severity of many types of accidents considerably. Provisions should be made to provide workmen with articles of clothing specially designed to afford protection to the head, hands, feet, eyes or other parts of the body, consistent with the freedom of movement and comfort of the wearer.

47. Training

Changed method of conducting mining operations have brought about an unrgent need for systematic training of all sections of mine workers, and especially new workers, who should gain experience and undergo training on the surface before they are permitted to go underground.

48. Industrial Diseases & Medical Inspectors

48. INDUSTRIAL DISEASES & MEDICAL INSPECTORS

The health of a miner is as important as his safety; yet we can say without any fear of contradiction that no steps have been taken either by the Government or employers to do anything to protect workers from occupational diseases peculiar to coal mining ----- the lung diseases caused by coal dust, silicosis and pneumoconsis, skin diseases, eye diseases and other diseases. It is a metter of great regret that there is not even any statistics of occupational diseases in coal mines. The number of T.B. cases are increasing and as soon as the managements come to know of T.B., that particular worker is discharged. Even after his complete cure, and even when he is recommended by doctors for light jobs, the management refuse to take him or pay him any compensation. He is just left to die. We can give number of instances. It can not be denied that mining as an occupation is physically injurious. Moreover, lack of water, terrific overcrowding in small number of Dhowras, extremely bad sanitary condition have made cholera, small pox and typhoid and dysentry --- regular features in coal fields. There is more water availabe to officials gardens and bunglows that for entiire workmen's quarters.

49. We suggest provision should be immediately made to provide in each colliery a proper staff to look after sanitation, drainage and water problem. Medical Inspectors under the Mines Department should inspect the collieries and take suitable action in this regard. There should also be a separate Medical Research team working in cooperation with Medical Inspectors. All medical expenses for workers and their families must be paid by employers.

50. We suggest the following questions should be seriously considered and steps be taken in this direction.

(a) The amalgamation of collieries is necessary to take proper safety measures. Immediate legislation should be taken to deal with all aspects of amalgamation in consultation with employers and workmen representatives.

(b) The working hours in coal industry should be reduced.

(c) All sorts of contract system, particulary in relations to raising, must be abolished.

(d) The C.R.O., a kind of slave labour system, must be abolished.

(e) Leave and other facilities should be increased.

Kalyan Roy,
Secretary,
Indian Mine Workers Federation.

ANNEXTURE A .

(EXCERPTS)

EQUITABLE COAL COMPANY LTD.
HURRILADIH COAL COMPANY LTD.
DHEMO MAIN COLLIERIES LTD.
WEST JAMURIA COAL COMPANY LTD.

EASTERN COAL COMPANY LTD.
(Incorporated in England)

TELEGRAMS:
EQUITABLE, DISHERGARH.
TELEPHONES:
ASANSOL 218.
ASANSOL 456.

NO. CWO/57/407/3340.

OFFICE OF THE
SUPERINTENDENT OF
COLLIERIES.
MACNEIL& BARRY LTD.
DISHERGARH P.O.
BURDWAN DISTRICT
WEST BENGAL.

Date..24/25th. June1957.

The Conciliation Officer(c)
Asansol.

Dear Sir,

Representation dated 18.5.57 of Sri D.P.Mittra, Dhemo Main Colliery.

" 5.No persons of the local union can be recognised as expert in undergroundmining operations for consultation.

Avoidance of accidents and ensuring greater safetion in in the working of mines is a statutory responsibility of the management.

It is not true that the accidents referred to has creat--ed any panic in the minds of the workers. "

Yours faithfully,

sd/- Illegible.

Actg Superintendent.

CHAPTER I

Coal Industry In India.

Coal was first raised in India in 1774 in Ranigunj coalfield of West Bengal. In the early part of 19th century, the British capital and enterprise began to extend operation in this industry. It was not however, till the East Indian Railway Company opened a line from Calcutta to Ranigunj in 1885, that the industry witnessed a rapid developement. Since then, the developement of coal industry followed the extension of railway lines to the different caolfields in Bihar and Central Provinces.

Coalfields in India are distributed in several provinces, mostly in northern and central parts of the country, namely in Assam, Bengal, Bihar, Orissa, Madhya Pradesh, Vindhya Pradesh and Rajasthan. Besides, there are coalfields in Andhra Pradrsh and Madras in the south. Out of all these, the adjoining coalfields in Bengal-Bihar border districts produce more than 80% of the total annual output. The annual outputs of other fields are Madhyapradrsh 10%, Andhrapradesh 4%, VindhyaPradesh 2.53%, Orissa 1.42%, and Rajasthan.08%. The total number of coalmines in India 955, distributed in the following manner. Bihar 639, Bengal 223, Madhyapradesh 56, Assam 15, Vindhyapradesh 9, Orissa 8, Andhra 4, and Rajasthan 1.

Coalmines in India are mostly operated on a small scale, with a small number of workers, and raising a small quantity of coal. Few collieries in India are big.

Classification according to annaul output(1954)

Less than 5000 tons	5000to 10000	10000to 20000	20000to 30000	30000to 50000	50000to 100000	100000 to 200000	200000 to 300000	Above 300,000
260	94	133	89	83	96	59	29	9

(1954)Classification according to average number of workers employed daily

Less than 50 workers	51tol50	150 to 300	301to 500	501 to 1000	Above 1000
233	201	153	85	88	92

According to Indian standard even, the 70% of the collieries are small, 20% are middlesized, and only 10% are big.

In most of the mines the coal is obtained from underground by way of pits or inclines. The quarry mining is very limited in this country. The geological condition is generally favourable and in most of the mines the coal seams are available at shallow depths. Besides, the seams are thicker- 10 ft, in the average and their inclinations are comparatively easier. The mines are free from gas excepting some old mines of Raniganj. The roof strata in the collieries, excepting in Assam , are strog and good.

The production of coal has been rising continuously since 1948 to meet the increasing demand of the expanding industry of the country. The pace of increse is slow, keeping in line with the show rate of industrialisation of India.

Annual output of coal(1948-57)

1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
(In million tons)									
30.12	31.69	32.29	34.43	36.30	35.97	36.88	38.23	39.43	42

The coal produced inIndia is classified into several grades according to the ash content and volatility. Beginning from high grade to,lower down, there are five classes i.e., Selected A, Selected B, Grade I, Grade II, Grade IIIA, and Grade IIIB. Nearly 80% of the total output is of high grade variety and fall in the first three classes.

The mechanisation in the mines is still at a nascent stage, which is aptly borne out by the figures given below.
Only 149 collieries using 495 coalcutting machines in total.
Only 349 collieries using in aggregate 222006 H.P. of electricity.
Only 143 collieries using 223 mechanical ventilators.
Only 5 mechanical loaders, and 33,753 conveyor belt is under operation. (All figures relating to 1953)

As a result, majority of the operations in the collieries both underground and surface, are required to be done by manual labour,with the simple tools. The pattern is, that the smaller the colliery, fewer the number of machines. Even there are collieries, where there is no machine, except a ramshackle pump and tiny vertical boiler, which also come into use only during the rains.

The productivity in the Indian coalmines is much lower than the western countries, where the mining operations are mostly mechanised. The output per manyear in 1943 was 107 tons, which began to sag down because of very unattractive wages, and employment condition in the war time, and touched lowest point in 1946 at 83.6 tons. After the partial betterment of the wages and employment condition in 1947 the productivity began to increase year by year, and has now surpassed the 1943 figures by a little. The productivity of Indian coalminers has immense scope of increase, provided the necessary conditions are fullfilled, by introducing increasing number of machines and progressively improveing the techniquef extraxtion.

Most of the coal rased in India is consumed inside the country, and the mode of transportation is predominantly, by railway. But since a long time the railways have been failing to move not only the quantity demanded, but the quantity raised each year. In the last 10 years production of coal has been lagging behing the demand and the movement of coal lagging behind production.

	Demand	Production	Despatches	(In million tons)
1949	33.28	31.69	28.12	
50	34.74	32.30	27.11	
51	37.19	34.43	29.21	
52	39.01	36.30	31.18	
53	37.50	35.97	30.76	
54	39.47	36.88	31.91	

This is the brief sketch of the coal industry of India.

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CHAPTER II

Bosses, Labour, and Government.

The British capitalists, who pioneered in this field, adopted a policy of getting quick, easy, and high profit. They acquired vast, and best coalbearing land, opened mines to work the most profitable seams, and extracted coal without any regard to sceintific method, safety, conservation, and future cost, and abandoned the mine as soon as its high profitability was exhusted, to repeat the same process over again in another part of their leasehold. To keep this process continuous, they grabbed huge areas of coalfields as their reserves with the help of the then colonial administration. By following this practice they amassed huge fortunes and came to own the coal industry of the country in the pre war period.

In those times there were few big Indian firms operating in in the coal industry. But quite a large number of small Indian capitalists were working as contractors in the big British firms and invested small amount of capital in that process. That was the beginning of the entry of the Indian capital and enterprise in the coal industry. The Indian capitalists entered in large numbers in the industry during the last war, and the mines operated by them were mostly small or medium. Besides them, large number of local merchants invested small capital in the local coalfields, and opened a large number of tiny collieries. That is why the number of collieries rose steeply, though the annual output increased at a snails pace in this period. These Indian investors could harvest a big return on their capital due to the prevailing high prices of coal and cheap labour cost, and thus were able to strengthene their positon, gradually.

Since the attainment of independence by India in 1947 the inflow of Indian capital became greater and the capital structure of the industry underwent a change in that the share of Indian capital in the ownership and control of the industry has increased much, compared to the pre-war days. Apart from these purely Indian firms, the Indian capitalists have acquired large shares in the British companies and the number of directors in these companies has increased much,.

Though

Though there has been a sort of fusion of British and Indian capital in these companies the Britishers still retain their lead in the ownership and control of this industry. The number of joint stock companies and their paid up capital have increased in the following manner in the recent years.

Year.	No. of companies	Paid up capital in million Rs.
1946-47	362	124.7
47-48	383	154.4
48-49	403	172.2
49-50	427	186.9
50-51	446	196.5
51-52	448	210.9
52-53	458	216.8
53-54	475	224.2

Of the capital,invested by the individuals and their family members in partnership, there is no reliable statistics.

Most of the big joint stock companies are administered through the big managing agents firms of Calcutta. A handfull of managing agents firms such as Bird & Heilgers, Turner Morrison, Jardine & Henderson, Tatas, Andrew Yule, Macniel & Barry, and Shaw Wallace etc. control all the big coal companies, and by virtue of this they dominate the coal industry. About 90% of the annual output is raised by these joint stock companies.

Ther is no reliable statistics on the profit in the coal industry. The All India Colliery Tribunal calculated on the basis of insufficient and unreliable datas an average profit of 10.43% on the total capital in 1953. Besides, the trend of profit can be understood from the figures given below.

Base year 1939

1947	55 companies	171.8
48	53 "	201
49	48 "	287.7
50	46 "	209.2
51	44 "	178.4
52	45 "	220.4

The big companies like Bengal Coal, Borrea Coal, and Amalgamated Coalfields etc. have been regularly distributing dividends, ranging from 25% to 40%. The average dividend of all the big companie is somewhere round 20% . All these firms have ploughed back huge

huge quantities of news capital, built up more than sufficient depreciation reserves, and over and above, amassed reserve capital equalling, even, exceeding their total paid up capital.

The big companies are very well organised in their All India organisation, Indian Mining Association, Calcutta. This association repsersent the coal companies whose share in the annual output is between 70% to 80% of the country's total production. There are othe organisations, namely, Indian Colliery Owners Association, and Indian Mining Federation, representing the large number of small and medium collieries. There is clash of interst and rancour amongst these organisations caused by their interminable disputes on grading, transport facility, marketing and credit etc. But recently they hav set up a joint committee to defend their intersts against the wage demands of the workers, and for securing higher price from the consu ers.

In the colonial period, in twenties, the power of the British bosses and their agents was similar to that feddal lords in the mediaval Europe. They exercised their power of,life and death not only over the workers, but on the peasantry of the coal bearing land as well, whose land they appropriated by fraud and force, with the help of the local govt. organs.

The Indian national movement against the imperialists reached the coalfields in the thirties. And with the birth of first trade uni the unrestricted power of the bosses began to be challenged for the first time. When the popular governments assumed power in the provin in 1939 leading to the appearances of fissures in the well knit alliance of the govt. organs and the coal bosses; large scale trade union movement was born as a real opposition force in the coal field Since that time, the workers have greatly succeeded in reducing the social power of the bosses by a perpetual tug-of-war, through many ups and downs.

Labour.

In the old days the colliery workers were treated no better than pharia dogs. The pauperised and uprooted peasantry,forced to flee their home by remorseless hunger were lured to the mines by the wily recruiters with rosy hopes of a d

with rosy hopes of a daily bread.

And though their illusions used to be shattered in a few days they could not leave the mines, because of the perpetual rural unemployment. He fled again and again from these horrid dungeons to his village home but was forced to come back every time by hunger and unemployment in the countryside.There was no law or organisation to protect his intersts in those days, and he was still unable to defend his own, lacking organisation, conciousness, and experience. His wages was always below subsistence level and his working life was limited to a maximum of 10 years. Due to total callousness of the bosses towards their limbs and lifes, and absence of safety measures, they were subjected to a high rate of accident, inspite of the congineal mining conditions.

At the beginning of the thirties the coalminers made first attempt in organising trade unions and apply the pressure of concerted action on the employers. They had to work against tremendous odds, and to surmount which they had to stake their everything and manytimes their lives. With the ushering in of the Congress ministries in the provinces in 1939 the trade union movement burst in the coalfields, and washed away many obstacles in their path.The workers, divided into groups, according totheir dialect, life habits, province and even districts, and kept seperated from each others by the watch dogs of the bosses, succeeded in brigging the gulf among themselves, and evolved a class solidarity and conciousness. They took to the fields with reckless courage, underwent untold sufferings, and many a times defeated the bosses, thereby blowing up the myth about their absolute power.For the first time they tasted the elation of victory, and power of unity, which however transient and limited, gave them confidence and hope. Since that time began the real life of the coalminers.

In the last 20 years the coalminers fought for and gained much. Their unions were broken again and again,but never ceased to be rebuilt. They were defeated in numerous skirmishes, but ultimately won most of the battles forcing the owners to concede greater concessions and the government to make more provisions for protestion of their

Compared to the twenties or even the pre-war days, their lot has bettered to great extent. But to attain the level of their European brethren, they have yet to traverse a long way, and overcome still more numerous obstacles.

The numbero coalminers at present is little more than 350,000, of whome nearly 50% are organised in the trade unionm. About 75% of the organised workers are distributed between the two all Indian federations, namely, Indian National Mine Workers Federation(affiliated to INTUC and ICFTU) and Indian Mine Workers Federation(affiliated to AITUC and WFTU). The other trade unions are limited in the individual coalfields, companies, and even in the collieries. The INMWF which is a trade department of INTUC, which is an adjunct of the ruling Congress party, enjoys exclusive recognition from the owners on the strength of am implicit compact between the Congress party and the industrialists of the country. Nurtured by the ruling party, and patronised by the employers and govt.'s organs the INMWF stll maintain the leading position in the miners' organisation. The Indian Mine Workers Federation which came into existence only in 1955 and developed through continuous struggles , and rallied round its banner thousands of coalminers in five provinces by virtue of its unflinching leadership, and correct guidance of the movement.

After a protracted wage struggle lasting for three years the coal miners have won a remarkable victory in this year. They have secured through the awards of the two Tribunals the following concessions.

1. A minimum wage of Rs. 2-10-6 per day applicable to the whole industry.
2. Equal pay for the male and female workers.
3. An extra allowance of 12½% of the basic rate for underground work.
4. Standardisation of job descriptions for all workers and their categorisation in 10 broad categories, with progressive minimum prescribed for each category.
5. Specified the workload of some piece-rated workers.
6. Provided for minimum guaranteed wages for the piece-rated workers who, constitute more than70% of total strength.
7. Provided for incremental grade and scale of pay for all monthly paid staffs and workers.

as allowance at a graduated scalewith the provision of automatic cushioning of future rise in the cost of living index, above a specific maximum.

9. Porovided for difficulty allowances in certain cases.

10. Seven days festval holidays in a year with pay.

11. Both way railway fare, once a year, from to colliery to home.

12. Retention of free housing facility.

As usual the awards of these Tribunals have not been implemented correctly, and fully everywhere, thus giving rise to a number of fresh disputes, which are at present under the examination of the all party tripartite committee, for amicable settlement. Apart from these awards the workers are enjoying the benifits of the following legislations to the extent they are organised , and systemtic functioning of their unions.

1. Coal Mines Bonus Scheme,1948, provides for payment of 4 months basic wage in a year dependent upon rigorous attendance qualification.
2. Coal Mines Provident Fund Scheme 1950,provides for equal contribution by the employees and the employers.
3. Indian Mines Act,1952,,provides for 8 hour working day,extra wages for overtime work,annual leave with pay etc.
4. Coal Mine Regulations,1957, provides for measures to be taken by the management and the workers, for maintaining safety, ventilation,adequate supervision, first aid etc.
5. Coal Mines Welfare Fund Scheme,1950,provide for free medical treatment to the workers in the Central and regional hospitals, run by a semi-govt. organisation.
6. Coal Mines Standing Orders,,provides for a service rule for the workers, although very unsatisfactory.
7. Coal,Mines Maternity Benifit Act, provides for maternity leave for the working women,for six weeks with partial payment.
8. Apart from these, ther are several all Indian legislations like, Payment of Wages Act,Workmen's Compensation Act, and Industrial Disputes Act, of,which the miners can also take advantege, depending on their strength.

It is not that the all these laws are respected by the employers and the miners get the benifits automatically. The govt. has not provided any machinery to make available these benifits to the unorganised workers. Consequently, wherever the workers the workers are not organised in a strong and functioning trade union they are deprived of most of these benifits. Even where the workers are well organised they can snatch these be ifits from the unwilling hands of the employers only throught protracted litigation, and this alos ina country, where admittedly , the law favours the highest bidder.

In the colonial period, the govt. had very little to do, with the miners , their only function being, to prevent and suppress the workers, and thereby to protect the interests of the owners, chiefly the British. It was only after the occurrence of a mumber of severe mining disasters that the gogernment enacted a Minis Act, and set up. an office of the Chief Inspector Of Mines to enforce the provisions of the Act and the regulations made thereunder. Its power and functions were so limited that it could ódovery little in checking slaughter mining effectively. It is only very recently, the Congress govt., moved by the repeated mining disasters in 1953-54-55, has enhanced the powers and functions of thisé office. Until the coming up of national govt. the governmental functions vis-a-vis the miners were nil. It was due to the war necessities, the colonial govt. was forced to take move interest in the coal industry, in the IInd world war period. It created a n office of the Coal Commissioner, in Calcutta to exercise control on distribution, wagon supply,price, grading etc. When the National gvt. came into existence in 1947 it was immediately faced with the rumbling mass of coalminers agitated and discontented. The govt. hastily set up a tiny conciliation office in order to solve the industrial disputes , which was however soon overwhelmed with the huge number of disputes,multiplying steadily. From that time onwards , the govt. in order to keep pace with the ever increasing number of disputes , has expanded thisóoffice to an enormous proportion, with branches distributed in all principal coalfields. But the effectiveness of tnis department has not changed much from the date of its birth, dhe to the inherent defects in the policies of the govt.

Since the assumption of office by the Congress party, it has been their effort to increase governmental control,and guidance in various aspects of the coal industry, motivated by their desire for its planned developement. From the pursuance of this objective the govt. has constituted a number of committees and institutions which are as follws.

1. The Indian Buerea of Mines for prospecting the recoverable mineral wealth of the country.
2. The Indian Fuel Research Institute for carrying research in fuel utilisation.
3. The Indian Miningn Research Institute for developeing mining technique suitable to our country's condition.
4. A Coal Board for grading the coal seams.
5. The Coal Mines Welfare Organisation advisory committee.
6. The Coal Transport advisory committee.
7. The Coal Mines Provedent Fund advisory Committee.
8. A Stowing Board for supervising stowing operation.
9.

Apart from these paermanenet bodies the govt. has appointed some committees for the fulfilment of some specific jobs. Some of these are Coalfield Enquiry Commitee of 1946, Indian Coalfields Committee of 1950, Indenturedlabour(Gorakhpuri) enquiry committee, Price revesion Committee, and Amalgamatuon of small Collieries Committee.

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CHAPTER III

The Movement Begins.

The first trade union movement in thencoalmines starting in the Jharia coalfield in the early thrties. This was the period when the trade union movement in the country as a whole, was advancing at a rapid pace towards a higher form of struggle and organisation. The second national non-cooperation movement, combined togather woth the great capitalist crisis of 1930 was wocking the country from one end to another as never before. In this turbulent period, Jharia coalfield , the heart of the coal industry, became the cradele of the coalminers movement.

The Bengal Bihar border region, which contains the three major coalfields of the country, namely, Jharia,Ranigunj, and Karanpura, jointly produce 80% of thee country' s total production, and engage about the same percentage of the country's coalminers. Of these three fields, which are almost contguous, Jharia field is smallestin area(200 square miles) but richest in recoverable coal is the highest producer, and engages highest number of workers.(Jharia-135.000, Ranigunj-80,000, and Karanpura-60,000). The concentration of labour in Jharia is highest, which fact has impatted a special importance to this field, and rightly Jharia is called the heart of the coalindustry of India. The ups and downs of the coalminers movement in Bengal Bihar coal region decides all the issues of victory and defeat, progress and retrogression for the coalminers of the counrty as awhole.

Before the IInd World War.

In the twenties Swami Biswananda , a religious social worker attempted a movement in Jharia Fieldmto improve the lot of the miners. and tried to organise a workers welfare organisation. It was more like a philanthropic association than a trade union, and the workers themselves took very little part in its work. But it served its purpose in reusing the interest of some people,having nationalist, and humanitarian inclination to take active interest in the condition of the miners.

In 1927-28 some local congress-men organised an union for the first time with the name of Coalmines Employees Association. This association was not yet a real trade unionof the workers and had little living link with them. It was mainly concerned with the interests and grievances of the staffs and was supported by them. Besides, these trade union leaders were getting the support from the contractors and many managerial officers on the basis of their nationalistic appeal directed against the the prevailing rabidly discriminatory treatment of the Indian officers and contractors. Naturally, these trade union leaders were also the most energetic and popular congress nationalists of that time. Inspite of all these limitations, the association could at ~~that ti-~~ me times took up cudgel on behalf of the miners also in limited speheres, and limited times. It was with the effort of this organisation and the help of all the nationalist elements in thisfield a session of All India Trade Union Congress was held in Jharia in 1930, under the presidentship of Pandit Jawaharlal Nehru.

But real trade union movement began not until after 1930, when Sri Subhas Chandra Bose, of I.N.A fame came to these parts and provided active leadership in building up of a movement and organisation. Sri Bose who was connected with the Jamshedpur Labour Association of Tatanagar, came to this field, and organised a trade union named, Tata's Collieries Labour Association with the help of a victimised employee of Jamadoba Colliery, Sri Satya Bimal Sen. Sri Sen was the first trade union leader of this field who was able to to secure a real working class base and organised a trade union of the workers in real sense, of course with all the limitations of that time.Subhas Bose was one of the finest orator- agitator, that the national movement produced. Moved and welded togater, by his oratory and organisational talent the workers of Tata's collieries was orgainsed before long in the abovenamed association, of which Sri Bose himself was the president. It should be noted in this connection that it was greatly due to the consistent, painstaking, and unceasing toil of Sri Satya Bimal Sen that the un-ion assumed

that the union assumed its important shape and prestige of being the first major trade union of the coalminers. Such and organisation of the miners could not exist in that period without coming at a loggeshead, before late, and the economic crisis of the thirties which had also held the coal industry of India in its cold grip provided for such a situation.

In 1932-33 the Tatas imposed an wage cut of 10% on the miners from which the officers were exempted. The union opposed this and raised the demand of a graduated wage cut - lowest for the miners, and highest for the officers. The dispute culminated into a strike of 4000 workers of Jamadoba Colliery. This was the first big strike in the coalfields. Though, the Tatas was an Indian concern, the govt. machinery was not a bit late in jumping into the arenaand applying all the draconian anti people measure of that time. Immediately, the meetings, processions,and assemblage of more than five persons were banned and Sri Sen was externed out of the strike-bound area. A large number of workers were arrested. The strike continued one week after another,in the face of these repressive measures. But due to the crisis economy the employers, were not keen for production, and were conviniently placed for a long duell. The conciousness and organisation of the miners was yet unequal for such a long drwan struggle. After one month, the workers lost heart in the face of naked starvation, and their ranks were broken by the false promises of the employers agents. The strike fizzled out slowly. But his defeat did not affect much the course of developement of the coal workers movement which is proved by the fact from immediately afterwards, not only the TCLA could reorganise itself, but new unions in other collieries began to crop up. From year 1933 to 35 Sri Sen with Sri Subhas Bose's help organised tnes of thousands of workers of a dozen of big collieries belonging to Eastern Coal Co., East India Coal Co., and Lodna Coal Co.

the movement was still in its formative stage, and so,although small scale skirmishes occurred here and there, many a times, no major strike took place before the Jealgora Strike in early 1937. Jealgora colliery was owned by East India Coal Co. and was employing 3000 workers. The dispute arose on the question of wage increase and the removal of some bullies of the management. This strike was better organised than the former one, and the ensuing police repression was not found very effective although its intensity was no less than in case of Jamadoba strike. But the economic situation had undergone some change, thus affording the workers a convinient position for a hard bargain.The strike continued for more than a month and ended in a partial victory, which nevertheless made it less significant. This was perhaps the first successful strike in the coalfields.

With the advent of power by the popular congress ministries in 1937 some more congress leaders began a serious attempt to organise the coalminers, this time on a much broader scale. A number of new trade unions began to crop up in the collieries belonging to the Bird & Co. and Kilburn Coal Co. The slackening of administrative restrictions on the activities of the trade unionsaccorded very real advantege to these newly formed organisations in their formative period.The older organisations also were not slow to take advantege of this situation and managed to strengthen themselves to a considerable extent. The number of organised workers grew rapidly and with its increase the morale of the workers rose to meet the employer's arrogance and hostility- in whose eyes the meekest protest of their labourers would look like a sinister revolt. As the gotvt. was not arresting the labour leaders as in the good olden days there remained none to prevent clashes breaking out. And it broke out in mad fury, Much to the surprise of the employers, the labour leaders, and the minersthemselves, the coal workers fought so heroically that it was difficult for anybody to believe that they were fighting for the first time in their lives.

...s in these struggles, the coalminers showed the magnitude of their fighting capacity in somewhat favourable condition.

Two prominent new comers in the coalfield trade union movement were Sri Mukutdhari Singh, and Prof. Abdul Bari both congress men. In 1938 a new organisation was formed under the able leadership of Mukutdhari Singh with the name of Chhotanagpur Mazdoor Sangh. This grew into a fairly large organisation, second only to the group of unions led by Sri Subhas Bose and Satya Sen. Sri Abdul Bari came to this field only on few occassions, in connection with the strike at Mudidhi colliery. The strike at Mudidhi colliery, owned by Bird & Co. took place in 1938 on the issue of victimisation and wage cut. That strike continued for nearly three months, as the local leaders of the strike could procure a sizeable quantity of aid from various sources. But though it was the first long strike in the coalfield it ended in a failure because of many mishandling and the unreliable conduct of some of the leaders. This defeat of the Mudidhi strikers was followed by the victory of the Kustore Strikers, 6000 strong, in late 1939.

War began in 1939 and following it the prices of the cereals and other consumers commodities began to increase in India due to the predatory war preparation by the colonial govt. of Lord Linlithgow. Pressed by the increased lahour agitation for a dearness allowance and advised by the govt. the Indian Mining Association, the premiere organisation of the bosses agreed to give a 10% D.A. to the colliery employees. This was made easy because the market price of coal was bounding upwards at a rapid pace at that very time, The employer of Kustore colliery which was the biggest mine employing 6000 workers did not follow other employers in paying the D.A. This acted as such a powerful detonator that all the 6000 workers struck work spontaneously without any leadership at the beginning. The strike continued for 20 days and ended in a complete victory. This was perhaps the highest point of the tide of trade union movement in the coalfields in the pre-independence days.

During the IInd World War.

after the failure of the efforts of the political settlement between the British imperialist govt. and the Congress party, the congress ministries in the provinces resigned in 1940 and the administration once again passed under the exclusive control of the British buereacrats.The political situation thus changed against the workers and in favour of the employers. The bosses were not slow in taking advantege of this and began to attack the unions to break the source of power of their much despised employees. The second Kustore strike took place under these conditions, and in resistance against the employers offensive to break the union. That strike lasted a 100 days and ended in victory of the workers. The hands of the bosses were restrained and the workers retained their privileges. This strike of 6000 workers for 100 days, although very spectacular did not indicate the the real organisational strength of the workers , because such a long struggle was made possible by the combination of some transient favourable factors. Due to the attractive wages in the war services, and the absorption of thousads of local workers in those services (a number of military camps, stores, and establishments were situated in and around of this field) the collieries began to face increasing labour shortages.In that circumstance it was possible for a large number of strikers to get temporary jobs in the surrounding collieries, and to meet starvation, the employers sharpest weapon. Secondly, various elements, who usually have no common interst with the working class rendered valuable aid to the strikers prompted by their temporary interest in some particular strikes.

After that another strike of bigger dimension occurred in the collieries of Eastern Coal, Tatas, and East India Coal Cos, due to the same reason as aboeve. Between 25 to 30 thousands workers took part in that strike,,and was the biggest one in the coalmines in the pre-independence days. But the govt. was not in a position to tolerate such a big strike in a vital industry like coal in the war conditions , and adopted blanket measures of repression to break the strike.

All the strike leaders were externed out of the field, and the strike was crushed by the govt. might. Before the movement was finally crushed for the time being the Kustore miners fought for the last time a back to wall struggle in 1941 which also lasted for 100 days. With the defeat of this strike and the externment of Sri Mukutdhari Singh the first period of the coalminers movement ended. All shreds of movement and organisation was finally stamped out in the month of August, 1942 by rounding up of all political elements with the beginning of the "Quit India" movement.

The old absolute reign of the bosses once again came back, with all its evil accompaniment. The standard of living of the miners began to sink lower and lower by the sky rocketting of the prices of everyday necessitees. The different concessions trickling one after another in the form of deraness allowance, attendance bonus, free ration, and cheap ration neither could resore the living standard nor could induce the miners to remain the coalfields. The labour shortage in the collieries grew so acute that in 1943 the govt. was compelled to revive the system of employing women workers in the underground, and the recruitment of indentured labour from the distressed districts of Gorakhpur and around.

Besides Jharia, the miners movement found an organised shape in the Giridhi State collieries of Karanpura field in 1938-39 as a result of the efforts of a small group of communists working inside the congress. They organised one of the oldest unions in Bihar with the name of Coal Workers Union, but there is no report of any large scale struggle in that period under its leadership. It was perhaps due to the fact that these communist caders could function for a very limited time as with the beginning of the war most of them were rounded up and kept in detention.

In Raniganj coalfield, a group of communist caders succeded in organising an union in 1944-45. But that union did not make any imprint in the movement in that period, because it could neither lead the workers in any sizeable struggles, or could maintain its functioning in a proper shape for any longer time.

CHAPTER IV

Rise and decline of second movement. (1945-49)

The IInd world war ended in 1945 and shortly afterwards the political leaders and workers of the country were released from behind the prison walls. Mahatma Gandhi and Lord Wavell's parley on political settlement was continuing and the draconian laws of the wartime that so long stifled the people's cry of anguish, were withdrawn. And on the eve of 1946 Indian saw the mighty upsurge of a national freedom movement - sparked by the revolt in the army and the navy and I.N.A. prisoners trial- which turned this sub-continent into a seething mass of anger and fury, roaring in a deafening crescendo, Quit British, quit India".

The fringe waves of these turmoils in the cities reached the coalfields and succeeded in breaking the crust of confusion and demoralisation that was still containing the potential movement, pregnant with new victories to,come. The working class movement took life from the warmth of this national upsurge, broke the shell and stepped out under the sun, to contend with the willy and powerful coal bosses.

This tuime the growth of the movement was facilitated by a number of factors that were truning more and more favourable for the workers. The movement began simultaneously in all the coalfields of Bengal- Bihar region. A large number of social political workers of all the parties came swarming in these coalfields and picked up the old threads of organisation and began building one union after another. The Interim government which came into power at the centre borne on the crest of anti-imperialist struggle did not interfere in the growth of the trade unions, as its hands were full of far more important problems. And besides, the central ministry of labour was concious of the gap between the prevailing high cost of living and the low wages and the unassailable justice of the demands of the labour..The congress party which was then in power, itself undertook leadership in the movement at many places and the forces of disruption were lying low for the time being.

The political set up of India was changing so fast in this period of transition that the employers associations were not sure off their position and were unable to undertake any determined counter-offensive.

The coalminers who underwent a terrible privation during the war and were smarting under deep sense of injustice responded readily to the efforts of the large number of social political workers, who were operating in their midst. Wherever they could find a courageous man as their leader, theynot only enrolled wholesale in the union but immediately went into battle in defence of their newly built organisations with unexpected solidarity and boldness, And the old unions which had been sollong in a state of hibernation once again came to lifeand rallied its scattered forces fro fresh battles. As previously, this time also the major part was played in the matter of organising the movement, by the three principal political parties of the country Congress(nationalist), Congress- socialist (social democrat) and communists. In the formative period at the beginning there was no or very little clash among these trade leaders as their spheresof influence were yet to meet each other at the borders. In this period the central unions did not came into existence, and the unions could be distinguished only by the political allegience and alliance of their leaders.

Although the fommunist group was still the smallest nevertheless it had the honour to initiate the first major battle in this period. In 1946 the 11,000 workers of the state collieries of Giridhi (then owned by the railways) struck work in support of their demands for increased dearness allowance, paid leave, sick leave, security of employment etc. The strike was conducted by the Coal Workers Union in which the hundred per cent of the employees were on strike for 16 days, and the employers being unable to break the strike, had to bow down and come to asettlement of the union.

This successful struggle of the Giridhi miners was the first successful strike of the coalfields in this period and it gave a strong impetus to the trade union movement in other coalfields of the