COMMISSION OF THE EUROPEAN COMMUNITIES

SIXTH REPORT OF THE MINES SAFETY AND HEALTH COMMISSION

ANNEXES

SEPTEMBER 1969

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ANNEX I

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS AT MINES IN 1968

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Germany
Coal-field: Ruhr (Land North Rhine/Westphalia)

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	936	33		4.63	0.16	-	-	-
2) Haulage and transport	401	28		1.98	0.13	-	-	-
3) Movement of personnel	676	16		3.34	0.08	-	-	-
4) Machinery, handling of tools and supports	268	1		1.32	0.01	-	-	-
5) Falling objects	760	10		3.76	0.05	-	-	-
6) Explosives and fumes	1	-		0.01	-	-	-	-
7) Explosions of firedamp or coal dust	1	17		0.01	0.08	1	-	17
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	3	1		0.01	0.01	-	-	-
12) Other causes	94	6		0.46	0.03	-	-	-
TOTAL	3 140	112	202 302 165	15.52	0.55	1	-	17

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Germany
Coal-field: Aachen (Land North Rhine/Westphalia)

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	181	6		4.022	0.133	-	-	-
2) Haulage and transport	68	4		1.511	0.089	-	-	-
3) Movement of personnel	140	4		3.111	0.089	-	-	-
4) Machinery, handling of tools and supports	69	1		1.533	0.022	-	-	-
5) Falling objects	123	2		2.733	0.044	-	-	-
6) Explosives and fumes	-	-		-	-	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	-	-		-	-	-	-	-
12) Other causes	25	-		0.555	-	-	-	-
TOTAL	686	17	45.005.456	13.465	0.378	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Germany
Coal-field: Saar

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	163	2		5.454	0.067	-	-	-
2) Haulage and transport	84	3		2.811	0.100	-	-	-
3) Movement of personnel	99	2		3.313	0.067	-	-	-
4) Machinery, handling of tools and supports	50	2		1.673	0.067	-	-	-
5) Falling objects	163	2		5.454	0.067	-	-	-
6) Explosives and fumes	2	1		0.067	0.033	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	1	-		0.033	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	-	-		-	-	-	-	-
12) Other causes	-	-		-	-	-	-	-
TOTAL	562	12	29 886 356	18.805	0.402	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Germany
Coal-field: Total

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	1.280	41		4.618	0.148	-	-	-
2) Haulage and transport	553	35		1.994	0.126	-	-	-
3) Movement of personnel	915	22		3.300	0.079	-	-	-
4) Machinery, handling of tools and supports	387	4		1.396	0.014	-	-	-
5) Falling objects	1.046	14		3.773	0.051	-	-	-
6) Explosives and fumes	3	1		0.011	0.004	-	-	-
7) Explosions of firedamp or coal dust	1	17		0.004	0.061	1	-	17
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	1	-		0.004	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	3	1		0.011	0.004	-	-	-
12) Other causes	119	6		0.429	0.022	-	-	-
TOTAL	4.308	141	277 193 977	15.540	0.509	1	-	17

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Belgium
Coal-field: Borinage/Centre

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	49	1		7.204	0.147	-	-	-
2) Haulage and transport	23	2		3.382	0.294	-	-	-
3) Movement of personnel	3	1		0.441	0.147	-	-	-
4) Machinery, handling of tools and supports	24	-		3.529	-	-	-	-
5) Falling objects	7	-		1.029	-	-	-	-
6) Explosives and fumes	3	1		0.441	0.147	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	-	-		-	-	-	-	-
12) Other causes	1	-		0.147	-	-	-	-
TOTAL	110	5	6 801 216	16.173	0.735	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Belgium
Coal-field: Charleroi/Namur

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	64	5		4.464	0.349	-	-	-
2) Haulage and transport	57	1		3.976	0.070	-	-	-
3) Movement of personnel	25	-		1.744	-	-	-	-
4) Machinery, handling of tools and supports	37	-		2.581	-	-	-	-
5) Falling objects	4	-		0.279	-	-	-	-
6) Explosives and fumes	-	-		-	-	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	-	-		-	-	-	-	-
12) Other causes	9	-		0.628	-	-	-	-
TOTAL	196	6	14 336.608	13.672	0.419	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Belgium
Coal-field: Liège

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	49	2		5.641	0.230	-	-	-
2) Haulage and transport	33	1		3.799	0.115	-	-	-
3) Movement of personnel	14	-		1.612	-	-	-	-
4) Machinery, handling of tools and supports	14	-		1.612	-	-	-	-
5) Falling objects	-	1		-	0.115	-	-	-
6) Explosives and fumes	-	-		-	-	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	-	1		-	0.115	-	-	-
12) Other causes	-	-		-	-	-	-	-
TOTAL	110	5	8 686 672	12.664	0.575	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Belgium
Coal-field: South

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	162	8		5.431	0.267	-	-	-
2) Haulage and transport	113	4		3.789	0.134	-	-	-
3) Movement of personnel	42	1		1.408	0.034	-	-	-
4) Machinery, handling of tools and supports	75	-		2.515	-	-	-	-
5) Falling objects	11	1		0.369	0.034	-	-	-
6) Explosives and fumes	3	1		0.101	0.034	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	-	1		-	0.034	-	-	-
12) Other causes	10	-		0.335	-	-	-	-
TOTAL	416	16	29 824 496	13.948	0.537	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Belgium
Coal-field: Campine

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	64	3		2.022	0.095	-	-	-
2) Haulage and transport	85	3		2.685	0.095	-	-	-
3) Movement of personnel	27	1		0.853	0.031	-	-	-
4) Machinery, handling of tools and supports	42	4		1.327	0.127	-	-	-
5) Falling objects	11	-		0.347	-	-	-	-
6) Explosives and fumes	-	-		-	-	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	1	1		0.031	0.031	-	-	-
12) Other causes	4	-		0.126	-	-	-	-
TOTAL	234	12	31 657 848	7.391	0.379	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Belgium
Coal-field: Total

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	226	11		3.676	0.179	-	-	-
2) Haulage and transport	198	7		3.220	0.114	-	-	-
3) Movement of personnel	69	2		1.122	0.033	-	-	-
4) Machinery, handling of tools and supports	117	4		1.903	0.065	-	-	-
5) Falling objects	22	1		0.358	0.016	-	-	-
6) Explosives and fumes	3	1		0.049	0.016	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	1	2		0.016	0.033	-	-	-
12) Other causes	14	-		0.228	-	-	-	-
TOTAL	650	28	61 482 344	10.572	0.456	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: France
Coal-field: Nord/Pas-de-Calais

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	414	13		4.424	0.139	-	-	-
2) Haulage and transport	154	11		1.645	0.117	-	-	-
3) Movement of personnel	212	2		2.265	0.021	-	-	-
4) Machinery, handling of tools and supports	263	1		2.810	0.011	-	-	-
5) Falling objects	204	3		2.180	0.032	-	-	-
6) Explosives and fumes	-	-		-	-	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	1	-		0.011	-	-	-	-
12) Other causes	29	-		0.310	-	-	-	-
TOTAL	1 277	30	93 593 872	13.645	0.320	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: France
Coal-field: Lorraine

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	149	6		4.649	0.187	-	-	-
2) Haulage and transport	69	3		2.153	0.094	-	-	-
3) Movement of personnel	136	2		4.243	0.062	-	-	-
4) Machinery, handling of tools and supports	50	-		1.560	-	-	-	-
5) Falling objects	103	2		3.214	0.062	-	-	-
6) Explosives and fumes	-	1		-	0.031	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	3		-	0.094	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	1	-		0.031	-	-	-	-
11) Electricity	-	-		-	-	-	-	-
12) Other causes	1	-		0.031	-	-	-	-
TOTAL	509	17	32 051 840	15.881	0.530	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: France
Coal-field: Centre-Midi (excl. Provence)

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	98	9		3.240	0.298	-	-	-
2) Haulage and transport	86	2		2.843	0.066	-	-	-
3) Movement of personnel	99	-		3.273	-	-	-	-
4) Machinery, handling of tools and supports	166	-		5.488	-	-	-	-
5) Falling objects	72	-		2.380	-	-	-	-
6) Explosives and fumes	-	-		-	-	-	-	-
7) Explosions of firedamp or coal dust	-	6		-	0.198	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	-	-		-	-	-	-	-
12) Other causes	7	-		0.231	-	-	-	-
TOTAL	528	17	30 246 248	17.457	0.562	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: France
Coal-field: Total (excl. Provence)

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	661	28		4.162	0.177	-	-	-
2) Haulage and transport	309	16		1.946	0.101	-	-	-
3) Movement of personnel	447	4		2.815	0.025	-	-	-
4) Machinery, handling of tools and supports	479	1		3.016	0.006	-	-	-
5) Falling objects	379	5		2.386	0.031	-	-	-
6) Explosives and fumes	-	1		-	0.006	-	-	-
7) Explosions of firedamp or coal dust	-	6		-	0.038	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	3		-	0.019	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	1	-		0.006	-	-	-	-
11) Electricity	1	-		0.006	-	-	-	-
12) Other causes	37	-		0.233	-	-	-	-
TOTAL	2 314	64	158 816 056	14.570	0.403	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Italy
Coal-field: Sulcis

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	1	-		0.812	-	-	-	-
2) Haulage and transport	1	-		0.812	-	-	-	-
3) Movement of personnel	1	-		0.812	-	-	-	-
4) Machinery, handling of tools and supports	9	-		7.304	-	-	-	-
5) Falling objects	8	-		6.493	-	-	-	-
6) Explosives and fumes	-	-		-	-	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	-	-		-	-	-	-	-
12) Other causes	1	-		0.812	-	-	-	-
TOTAL	21	-	1 232 153	17.043	-	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN THE E.C.S.C. COUNTRIES

Year: 1968
Country: Netherlands
Coal-field: Limburg

CAUSE	Number of casualties		Man-hours worked	Number of disablements as under (a) per million man-hours (to third decimal place)	Number of fatalities as under (b) per million man-hours (to third decimal place)	Group accidents as under (c) below		
	Disablements as under (a) below	Fatalities as under (b) below				Number of accidents	Number of disablements as under (a)	Number of fatalities
1) Falls of ground	57	4		2.450	0.172	-	-	-
2) Haulage and transport	56	2		2.407	0.086	-	-	-
3) Movement of personnel	27	-		1.160	-	-	-	-
4) Machinery, handling of tools and supports	24	-		1.031	-	-	-	-
5) Falling objects	37	1		1.590	0.043	-	-	-
6) Explosives and fumes	-	-		-	-	-	-	-
7) Explosions of firedamp or coal dust	-	-		-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-		-	-	-	-	-
9) Underground combustion and fires	-	-		-	-	-	-	-
10) Inrushes of water	-	-		-	-	-	-	-
11) Electricity	-	-		-	-	-	-	-
12) Other causes	7	-		0.301	-	-	-	-
TOTAL	208	7	23 267 816	8.939	0.301	-	-	-

(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(c) Accidents involving more than five persons killed or disabled as under (a).

Comparative table of number of persons
incapacitated by underground accidents for eight weeks or longer
in 1968
per million man-hours

C A U S E	Germany	Belgium	France (1)	Italy	Netherlands	Community
1) Falls of ground	4.618	3.676	4.162	0.812	2.450	4.261
2) Haulage and transport	1.994	3.220	1.946	0.812	2.407	2.139
3) Movement of personnel	3.300	1.122	2.815	0.812	1.160	2.795
4) Machinery, handling of tools and supports	1.396	1.903	3.016	7.304	1.031	1.945
5) Falling objects	3.773	0.358	2.386	6.493	1.590	2.858
6) Explosives and fumes	0.011	0.049	-	-	-	0.015
7) Explosions of firedamp, or coal dust	0.004	-	-	-	-	0.002
8) Sudden outbursts of firedamp suffocation by natural gases	-	-	-	-	-	-
9) Underground combustion and fires	0.004	-	-	-	-	0.002
10) Inrushes of water	-	-	0.006	-	-	0.002
11) Electricity	0.011	0.016	0.006	-	-	0.010
12) Other causes	0.429	0.228	0.233	0.812	0.301	0.341
TOTAL	15.540	10.572	14.570	17.043	8.939	14.370

(1) Excluding Provence.

Comparative table of accidents
resulting in death within eight weeks
in 1968
per million man-hours

C A U S E	Germany	Belgium	France (1)	Italy	Netherlands	Community
1) Falls of ground	0.148	0.179	0.177	-	0.172	0.160
2) Haulage and transport	0.126	0.114	0.101	-	0.086	0.115
3) Movement of personnel	0.079	0.033	0.025	-	-	0.054
4) Machinery, handling of tools and supports	0.014	0.065	0.006	-	-	0.017
5) Falling objects	0.051	0.016	0.031	-	0.043	0.040
6) Explosives and fumes	0.004	0.016	0.006	-	-	0.006
7) Explosions of firedamp, or coal dust	0.061	-	0.038	-	-	0.044
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	0.019	-	-	0.006
9) Underground combustion and fires	-	-	-	-	-	-
10) Inrushes of water	-	-	-	-	-	-
11) Electricity	0.004	0.033	-	-	-	0.006
12) Other causes	0.022	-	-	-	-	0.012
TOTAL	0.509	0.456	0.403	-	0.301	0.460

(1) Excluding Provence.

ANNEX II

TERMS OF REFERENCE OF THE VARIOUS WORKING PARTIES OF THE MINES SAFETY AND HEALTH COMMISSION

I. Working Party on Electrification - Chairman Mr. LOGELAIN

A. Terms of reference

1. Comparing adopted safety and accident prevention provisions relating to:

   a) electric shock,

   b) fire hazard,

   c) explosion hazard.

2. Ascertaining the present position in Community countries with regard to safety regulations on underground electrical networks of low and medium voltage (up to 1,100 V) and feeder cables for movable equipment, with due regard to the specifications for the said cables.

3. Reporting on steps to be taken when work has to be carried out on electrical equipment under voltage.

4. Studying the deleterious effects on electrical equipment used underground of moisture in salt pastes and salt pastes used in dust suppression.

5. Studying the construction of high-tension cables (of up to 6,000 V) used underground, and protective equipment.

6. Comparison of safety provisions relating to underground electric locomotives, with emphasis on the possibility of reducing the frequency of trolley wire sparking.

7. Study of over-voltage caused by lightning and the problem of stray currents.

B. Preliminary work undertaken by the Secretariat

1. Periodic reports on oil-powered contactors used in gassy environments.

2. Investigations of the use of remote-control circuits in automated mining operations.

II. Working Party on Rescue Arrangements, Fires and Underground Combustion - Chairman Mr. HELLER

General terms of reference (Section 7 of the Mines Safety and Health Commission's Terms of Reference)

Exchange of information on rescue work and fire-fighting in connection with accidents of interest to the Working Party.

A. Rescue work

Terms of reference

1. Communication of the annual reports issued by the rescue stations and regular discussion of these documents.

2. Convening meetings on special occasions (accidents from which new information can be gained, technical innovations in materials, equipment, etc.).

3. The publication every two years of a report outlining in particular the situation as regards rescue organisations in the Community and the United Kingdom.

4. Improvements in respirators used by rescue workers.

5. Improvements in self-rescuers.

6. Listing of materials for use in special rescue operations.

7. Examination of the technique for rescuing trapped miners by means of large boreholes with a view to formulating rules based on experience gained in different countries and submitting practical regulations to the mining authorities.

8. Drawing up of a synoptic comparison of the rules and regulations relating to rescue arrangements and medical assistance, as drafted by the mining authorities of the Community and of the United Kingdom.

   The practical application of experience gained in this field.

9. Studying of the Community criteria for fireproof clothing and general requirements.

B. Underground fires

Terms of reference

1. Continuing the study of the problem of fire-fighting in very deep pits, if necessary with the help of small-scale model tests and full-scale experiments, should a favourable opportunity arise.

2. Continuing the study of the problem of sealing off fire and ventilation stoppings, as well as roadway walls, by means of urethane foam. Examining this question so that, if appropriate, suitable proposals may be submitted to the Mines Safety and Health Commission.

3. Continuing the study of specifications and test conditions applicable to fire-resistant fluids:

   a) comparing test results so as to prevent products being differently assessed;

   b) where necessary, adapting test criteria to technological progess;

   c) in addition, examining to what extent it might be possible to relax these criteria and test methods so that the said products may be more easily assessed and approved.

4. Studying the stabilisation of ventilation in the event of pit fires in accordance with Professor BUDRYK's theory, and any practical conclusions to be drawn from it with reference to Community mines.

   This item to be extended to cover general ventilation problems by reason of their special importance, especially in connection with fires.

5. Exchanging views on the reopening in the Community and the United Kingdom, views of stoppings of fire zones, and where necessary to adapt regulations already drafted.

6. The early detection of underground combustion and the rapid provision of air-tight stoppings.

   Studying technological advances in this field in both the Community and the United Kingdom.

7. Drawing up a synoptic comparison of the rules and regulations relating to the prevention and control of underground combustion, as drafted by the mining authorities of the Community and of the United Kingdom.

   The practical application of experience gained in this field.

III. Working Party on Winding Ropes and Shaft Guides - Chairman Mr. MARTENS

Terms of reference

1. Follow-up of progress made in the electro-magnetic testing of winding ropes so as to obtain information on their use in Community mines.

2. Testing of couplings for circular and flattened winding ropes.

3. Arrangements for the installation of capels.

4. Control of shaft guides by means of automatic decelerometers.

5. Maintenance required to ensure safe operation of winding ropes and balance ropes.

IV. Working Party on Mining Accident Statistics - Chairman Mr. KOCH

Terms of reference

Examination of the methods used in Community countries for establishing mining accident statistics. Particular examination of the criteria applied in defining the term "Mining accident" and the criteria used in classifying the accidents according to cause, duration of stoppage and, possibly, position of the injuries.

With the exact definition of these criteria as a basis, establishing differences between the statistical elements assembled in each country and ways of taking these differences into account in comparisons on a Community level.

V. Working Party on Combustible Dusts - Chairman Mr. SCHNEIDER

The detailed terms of reference given by the Mines Safety and Health Commission to this Working Party are as follows:

To carry out a study of precautions against dust combustion, particularly:

- dust neutralisation (dust control in situ, stone-dusting, spraying, dust fixation by spreading salts and coagulating pastes, etc.),

- dust barriers (different types of dust barriers, their construction, siting, etc.),

taking into account:

a) the mechanism of dust combustion and of flame propagation

b) factors, such as these listed below, which may affect ignition and the propagation of the dust explosion:

nature of the coal and/or the volatile matter content
fineness of the coal
concentration of dust
methane content
cause of ignition
effect of moisture
geometrical features of the roadway.

The Working Party may make any suggestions for research work considered necessary to advance the knowledge of the phenomena studied and to promote safety in these fields.

In its meeting of 10.10.1968 the Mines Safety and Health Commission clarified and extended certain items in the terms of reference, as follows:

1. The Working Party must take account of the fact that methane is frequently involved in explosions. In particular:

   a) the "aide-mémoire" to investigators shall be extended to methane explosions and reports thereon shall be distributed in the same way as reports on accidents due to dust explosions;

   b) the study of the mechanism of the initiation and propagation of the explosions and the factors affecting them, as set out in the terms of reference, shall take into account the involvement of methane in the phenomenon;

   c) with regard to dust barriers, to halt dust explosions, mixed dust/methane explosions and pure methane explosions, the Secretariat shall follow up the results of tests in hand and, at the proper time, assemble for the use of the Working Party the information required to work out a practical draft recommendation.

2. The study of the neutralisation of dusts shall include:

   the comparative analysis of the regulations and instructions applied in the Community countries and in the United Kingdom;

   the various methods of application: the nature of the substance, frequency of spreading, frequency of inspection, and the detailed justification of the sampling method used.

VI. Working Party on Health in Coal Mines - Chairman Mr. VANDENHEUVEL

Studying, from the standpoint of technical prevention and industrial medicine, the prevention of environmental risks to the health of workers in coal mines.

A. Terms of reference

1. Where necessary, making recommendations on means of dust control, and general measures to reduce dustiness in underground workings, recognised as being to some extent effective (wet drilling, water infusion, spraying, special attachments to winning machines, pulsed-infusion shotfiring, etc.);

2. Where necessary, making recommendations on the organisation of specialised dust-control services.

B. Preliminary work to be undertaken by the Secretariat

The assembling of documentary material and comparison of legislation in the various Community countries with reference to:

1. General rules covering the prevention of dust in respect of the design and use of winning machines.

   Standards to be observed to ensure minimum dustiness arising from the use of these machines.

2. Dust measurement (methods, frequency, measuring points, conclusions to be drawn etc.) and where necessary establishing a scale of comparison of the various methods employed.

3. Establishment of dustiness thresholds. Definition of categories of permissible dustiness. Steps to be taken when faced with various categories of dustiness.

VII. Working Party on Effects of Working Time on Safety at Work, especially in Difficult or Unhealthy Conditions - Chairman Mr. VAN DER HOOFT

Provisional terms of reference (definitive text to be submitted to the Restricted Committee):

Number of hours worked in wet working points. Determining in what cases a working point is to be considered wet and the precautions to be taken.

VIII. Working Party on Psychological and Sociological Factors affecting Safety - Chairman Mr. SCHNASE

Terms of reference

1. Safety campaigns.

2. A draft recommendation on the employment of foreign and young workers.

ANNEX III

PRACTICAL CONCLUSIONS ON THE APPLICATION OF THE THEORY OF STABILISATION OF VENTILATION

CONTENTS

I. INTRODUCTION

The Permanent Mines Safety Commission had instructed the old Working Group on "Mine Fires" to study the theory of Professor Budryk which has been applied for more than 30 years on the Polish mining industry in fighting underground fires, and to investigate the possibility of applying this theory in the coal industry of Western Europe.

The Working Party instructed a group of experts to draw up a report on the stabilisation of ventilation in the event of fire in accordance with Professor Budryk's theory.

The result of the examination of this report by the Working Party was that "the principles of stabilisation of ventilation in the event of fire in roadways with rising ventilation", as described in the report of the experts on the basis of Professor Budryk's theory, should also be applied in the coal industry in Western Europe.

All the specialist ventilation engineers and all the engineers in charge of fire-fighting and rescue work should be made perfectly familiar with the theory of stabilisation of ventilation in the event of fire and with its application. Similarly, the management and officials should know the principles of this theory and their application. In the Community countries, it is the responsibility of the managements of the different mines and of the executives to lay down which officials are responsible for these problems.

In order to apply the results of the theoretical research as soon as possible in practice, the Working Party on Rescue and Mine Fires has assembled in the form of a report the following conclusions approved by the Mines Safety Commission at its meeting on 10.10.1968. The Mines Safety Commission expressed the hope that these conclusions would be brought to the attention of the coal industry in the member countries, and would thus contribute to the improvement of safety in mines.

II. PRACTICAL CONCLUSIONS

Conclusion No. 1 - Supervision of ventilation

The supervision of ventilation in a mining system requires an overall view, and should therefore be entrusted to a single man specially appointed, having at his disposal all the necessary means for carrying out his task.

Comments

Unified supervision of ventilation must be achieved where shafts or workings not necessarily under the same management are connected, and thus form part of the same system.

The underground officials in these pits thus cannot have an overall view of the effect of measures which they may take in a district in their charge on other districts in the colliery. For this reason the Working Party has drawn up conclusions drawing attention to the need for a unified scheme for supervision of ventilation.

The necessary means to be placed at the disposal of the person appointed ventilation supervisor are:

a) the assistance of a competent Institute and of specialists who are able to use the latest techniques and equipment;

b) the support of a team for measuring and controlling ventilation, with specialised training, and provided with the most suitable equipment.

Conclusion No. 2 - Fundamental factors in ventilation

Apart from a regular inspection and analysis of ventilation conditions in mines, ventilation officials require to have data on

the actual characteristics of the main and auxiliary ventilation fans,

the order of magnitude of the aerodynamic effect of natural ventilation in summer and winter,

the potentials of the intersections (at least the main ones).

Comments

It seems appropriate to draw attention to the need for knowing the real characteristics curves of the main and auxiliary fans installed with due allowance for the utilisation site, and not only the theoretical curves given by the manufacturer which are the results of previous calculations; practice shows that there are sometimes considerable differences, which could involve a risk of falsifying the basic data of the ventilation system.

Conclusion No. 3 - Additional representations of ventilation systems

In order to obtain a precise picture of the overall structure of ventilation systems and to reveal possible instabilities, it would be advisable when necessary to have, in addition to the regulation diagrams, representations of other types, such as, for example:

a) a representation of the whole of the mine workings in perspective (isometric or any other equivalent system);

b) a diagram without any topographical information.

Comments

To take an example, electrical diagrams or the Polish conventional system (1) comply with the requirements of paragraph b) above.

This type of diagram should, like the perspective plan of ventilation system, include all the air currents in the system, the roadway junctions identified by their reference numbers, and the main technical ventilation data.

Plans and diagrams should be accompanied, where necessary, by plans or intermediate diagrams and by detailed plans, or alternatively by simplified plans, when the complexity of the ventilation systems requires, and, where necessary, by three-dimensional models and diagrams of the distribution of pressure losses (2).

Conclusions No. 4 - Characteristics of ventilation

The representations mentioned in conclusion No. 3 should make available all the data necessary for the understanding of analysis of ventilation, particularly:

a) at the measuring points

the air quantities
the direction of the airflow
the methane content
the temperatures
the pressures (at least at the principal intersections)

b) in addition

the lengths and average cross-sections of the roadway
the calculated resistances
the angles of inclination, particularly at the ends of the inclined and vertical sections
the positions of the air doors and control doors, and of the barriers.

Comments

The ventilation plans should supply complete diagrams of the system showing all air currents including short-circuit currents, leakage currents, etc.

Conclusion No. 5 - Inspection of ventilation conditions

In each mine, there should be a systematic analysis of the ventilation system, at least once a year and after any major modification of the system, in order to detect any probable cases of instability under the normal operating conditions.

In addition, cases of instability which may be caused by the introductions of additional aeromotive sources, or the changing or elimination of the existing aeromotive sources, should also be examined.

Comments

Seeing that the ventilation conditions in a mine vary continually in step with the extraction of the panel and the progress of winning, it is indispensible that the characteristics and data of the ventilation system should be checked, together with their effect on probable cases of instability, particularly in cases of fire, these checks being carried out at regular intervals.

The schemes as proposed in conclusion No. 3 provide for the examination of these cases of instability.

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(1) The document contains a detailed description of the diagrams.

(2) The document mentions such representations.

Unstable ventilation conditions occur particularly in diagonal roadways; the connections between two intake airways and two return airways are the simplest forms of diagonal roadways.

In roadways with upcast ventilation, approximate formulae, (1) for example $H < \frac{Z}{3}$ make it possible to indicate if inversions of ventilation are possible.

In districts where different workings lead to serious pressure losses under normal conditions, there is no risk in case of fire, except in the event of failure in the main ventilation system.

On the other hand, in mines or ventilation districts with a low negative pressure, or in the case of distant districts with loop ventilation, or again in the case of inclines and adjacent workings with low pressure losses, there will often be found to be risks of reversal of ventilation.

Complicated or doubtful cases should be studied by means of a ventilation similator or other suitable method in order to define accurately the extent of the risk and the most effective methods to apply for ventilation in order to avoid unwanted inversions. After this examination, preventive measures can be devised, e.g.: shifting the regulating doors, installation of frames to take ventilation doors and evacuation of personnel threatened by fire.

Conclusion No. 6 - Informing the personnel

Taking into account the importance of ventilation for the whole of the underground workings, each responsible person should be informed of ventilation conditions within his own field. Furthermore it is essential that separate meetings should be held once a year at least, as well as after any major modification in the ventilation system, at which the colliery ventilation engineer will explain the ventilation conditions obtaining at the pit, together with any modifications which have recently been made, in the presence of:

a) the management officials, the technical departments, the chief of the rescue team and the officials responsible for ventilation;

b) the local officials, each in respect of his own speciality.

On these occasions, attention should be drawn to districts where instabilities are already likely in normal conditions and, in particular, cases of instability which make the occurrence of a fire likely.

Comments

Conventional types of diagrams or similar methods are very suitable for giving information on conditions of stability in certain parts of the underground workings. Risks of inversion of ventilation, together with the existence of seats of fires underground add to, and aggravate, risks which are not due to these causes; consequently, these facts should be known to all mine officials.

Conclusion No. 7 - Exercises on plans

Once a year at least, the management or the competent mining authority should organise an exercise on plans covering measures to be taken in the event of an underground fire. This should be attended by the mine owner or his representative, the ventilation engineer and the competent officials responsible for the organisation of fire-fighting and rescue operations.

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(1) See Document, Chapter I and Annex III.
H = difference of pressure at the intersections of the roadways,
Z = difference of levels in these roadways.

Comments

Exercises on plans are intended in the first place as an exercise for those responsible for the organisation and execution of rescue and fire-fighting work to enable them to appreciate correctly the ventilation conditions and familiarise them with the various possibilities of rapidly stabilising the ventilation systems in the event of fire.

It would be advisable to combine the exercise on plans with rescue exercises during which experiments should also be carried out in putting into practice the various measures for stabilising the ventilation while studying the effects produced thereby.

Conclusion No. 8 - Position of regulation doors

When doors are necessary for regulating ventilation they should be placed as near as possible to roadway junctions, taking into account other requirements, in order to facilitate access in smoky conditions.

Comments

The Working Party does not consider it advisable in general to place regulating doors in intake airways, as in Poland, owing to the drawbacks resulting from raising dust or the hindrance to movements of personnel and haulage of products.

On the other hand, regulating doors necessary to regulate the flow of air should if possible be placed at appropriate points so that they can also be used, in case of fire, for ventilation stabilisation.

Conclusion No. 9 - Measures and equipment for slowing-down ventilation

In all collieries, devices for rapidly slowing-down ventilation in order to stabilise it shall be installed in all intake airways, subject to exceptions to be previously determined, after each roadway junction or branch, and as near as possible to it.

Comments

These preparatory measures may if necessary, for preventive purposes, include doors kept off their hinges, and frames - the position of which in the roadways should be marked on the ventilation plans. This also applies to the locations chosen for the storage of necessary equipment (brattice cloths, prefabricated panels, etc.).

Conclusion No. 10 - Instructions to officials in the event of underground fire

Apart from the usual provisions regarding the obligation to attack any seat of a fire in order to extinguish it as soon as possible, and to inform the officials and management without delay, there should be instructions to officials laying down the other measures to be taken in the event of a mine fire in order to slow down ventilation so as to avoid an increase in the air supply to the seat of the fire.

Comments

The slowing-down of the ventilation should be carried out upstream in the ventilation current of the fire and downstream of any junction, unless this is impossible.

Conclusion No. 11 - Instructions to management officials in the event of underground fire

No decision to modify the ventilation is to be taken by the management staff with a study being made of the consequences, by means of application of the theory of the stabilisation of ventilation, and with the help of plans and ventilation schemes which have previously been prepared in respect of all the possible causes of ventilation inversion, whether these causes result from the fire or from the structure of the mine (ventilation by multiple fans etc.).

ANNEX IV

COMPOSITION OF THE MINES SAFETY AND HEALTH COMMISSION AND ITS WORKING PARTIES (AS AT 31.12.1968)

A.- MINES SAFETY AND HEALTH COMMISSION

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Workers' Representative

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INTERNATIONAL LABOUR ORGANISATION, GENEVA

A representative of the International Labour Office sitting as an observer.

B.- RESTRICTED COMMITTEE

The Restricted Committee consists of the Government members of the Mines Safety and Health Commission.

C.- WORKING PARTIES ON TECHNICAL QUESTIONS

I. Working Party on Electrification

- Members of the Working Party

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V. Working Party on Common Statistics of Accidents in Coal-mines

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