Bulletin 288

DEPARTMENT OF COMMERCE

WILLIAM F. WHITING, SECRETARY

BUREAU OF MINES

SCOTT TURNER, DIRECTOR

QUARRY ACCIDENTS IN THE UNITED STATES

DURING THE CALENDAR YEAR 1926

BY

WILLIAM W. ADAMS

PRICE 15 CENTS

Sold only by the Superintendent of Documents, U. S. Government Printing Office
Washington, D. C.

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON
1928

CONTENTS

TABLES

QUARRY ACCIDENTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1926

By WILLIAM W. ADAMS

INTRODUCTION

The stone-quarrying industry showed a slight increase in the death rate from accidents and a small reduction in the injury rate in 1926, as compared with 1925, according to reports received from operating companies. The death rate, based upon a standard of 300 days of exposure to risk, was 1.87 per thousand employees, as compared with 1.78 in the preceding year; the injury rate was 160 per thousand, as compared with 170 in 1925.

For purposes of the bureau's study of accidents at quarries, the companies' reports were classified into seven main groups, according to kind of stone produced, as follows: Limestone, marble, slate, granite, sandstone and bluestone, cement rock, and trap rock. Reduced fatality rates were reported for quarries producing cement rock, sandstone, slate, and trap rock, and lower injury rates were reported for quarries that produced cement rock, sandstone, trap rock, and granite.

The quarry industry, as a whole, employed 91,146 men who worked 24,708,400 shifts; both of these figures are slightly lower but substantially the same as in 1925. The average workdays per man were 271, as compared with 273 in the previous year. Accidents at the quarries, crushers, and other outside plants resulted in the death of 154 employees and the injury of 13,201. Most of the fatal accidents were caused by falls or slides of rock or overburden, by explosives, haulage, machinery, electricity, falls of persons, and burns. Most of the nonfatal injuries—all of the injuries being what are called "lost-time" injuries, because they caused the employee to lose time from his work—were caused by flying objects, handling rock, machinery, haulage, falling objects, falls of persons, hand tools, and falls or slides of rock or overburden.

Of the total number of men employed, 50,620 worked inside the quarries and 40,526 worked at crushers, limekilns, cement mills, and other plants outside the quarries. The men in the quarries worked 12,812,387 shifts, an average of 253 shifts per man. The men employed at "outside" plants worked 11,896,013 shifts, an average of 294 shifts per man. The average number of workdays per man represented no material change from the previous year, the figures for 1925

showing that the men inside the quarries averaged 254 workdays and those outside the quarries averaged 297 workdays. Accidents resulted in 110 deaths and 8,006 injuries among the workers in the pits and 44 deaths and 5,195 injuries among the employees at the outside plants. For the former group the death rate was 2.58 and the injury rate was 187; for the latter group the rates were 1.11 for fatalities and 131 for injuries.

An examination of the records of the chief stone-producing States (those employing 1,000 or more men inside the quarries) shows that the following States had lower accident rates (fatal and nonfatal) in 1926 than in 1925 for work inside the pits: Georgia, Illinois, Indiana, Massachusetts, Michigan, Missouri, New York, Pennsylvania, and Vermont. Similarly, lower accident rates among employees at the "outside" plants were shown for the following States having 1,000 or more men employed at plants outside the quarries: California, Indiana, Michigan, New York, and Ohio.

In the manner explained on page 70 it is estimated that the 154 deaths and 13,201 injuries at all quarries and outside plants in 1926 were equal to a loss of 1,458,000 man days of work. This loss of time was equal to 109 days per accident, as compared with 104 days in the preceding year, and represented 5.9 per cent of the total number of shifts worked by all employees in the industry during the year, as compared with 6 per cent in 1925.

Number of men employed, days of labor performed, and number of men killed and injured at all quarries in the United States, 1911 to 1926

Year	Average days active	Men employed		Total shifts	Number killed		Number injured	
		Actual number	Equivalent in 300-day workers (calculated)		Total	Per thousand 300-day workers (calculated)	Total	Per thousand 300-day workers (calculated)
1911	228	110,954	84,417	25,325,094	188	2.23	5,390	63.85
1912	249	113,105	93,837	28,151,042	213	2.27	6,552	69.82
1913	246	106,278	87,141	26,142,237	183	2.10	7,739	88.81
1914	233	87,936	68,187	20,456,157	180	2.64	7,836	114.92
1915	246	100,740	82,447	24,734,224	148	1.80	9,671	117.30
Average for 5 years	240	103,803	83,206	24,961,750	182	2.19	7,437	89.39
1916	253	90,797	76,457	22,937,178	173	2.26	13,427	175.62
1917	261	82,290	71,525	21,457,357	131	1.83	13,242	185.14
1918	260	68,332	59,285	17,785,504	125	2.11	8,719	147.07
1919	253	75,505	63,794	19,138,308	123	1.93	9,199	144.20
1920	267	86,488	77,089	23,126,648	178	2.31	11,217	145.51
Average for 5 years	259	80,682	69,630	20,888,999	146	2.10	11,161	160.29
Average for 10 years	249	92,243	76,418	22,925,375	164	2.15	9,299	121.69
1921	233	77,185	59,958	17,987,547	120	2.00	10,465	174.54
1922	261	79,081	68,861	20,658,338	132	1.92	11,839	171.93
1923	276	92,455	85,153	25,545,859	143	1.68	14,990	176.04
1924	269	94,242	84,426	25,327,858	138	1.63	14,777	175.03
1925	273	91,872	83,487	25,045,955	149	1.78	14,165	169.67
Average for 5 years	263	86,967	76,377	22,913,111	136	1.78	13,247	173.44
1926	271	91,146	82,361	24,708,400	154	1.87	13,201	160.28

ACKNOWLEDGMENTS

The Bureau of Mines gratefully acknowledges the cooperation of quarry operators throughout the United States, whose voluntary reports of accidents and employment furnish the basis of the tables in this bulletin. Miss Lillian Chenoweth, of the Bureau of Mines, assisted by Miss E. V. Walters, also of the bureau, prepared the statistical tables herein presented.

SCOPE OF STATISTICS

The tables in this paper have been compiled by the Bureau of Mines from reports received directly (except for California, from which reports for quarries were received through the industrial accident commission of that State) from operators of quarries, and they represent all stages of the quarrying industry. The total figures are based on returns representing 1,519 operators whose 1,700 quarries were worked all or part of the year.

The Bureau of Mines is authorized to collect data on accidents at mines and quarries, but there is no Federal law compelling operators to render such data; hence the reports received from operators are voluntary responses to the bureau's requests for information. Although the data herein presented may not be complete for the entire industry, every effort has been made to make them so, and the figures given are believed to be thoroughly representative of the hazards to which quarry workers are exposed. Moreover, the figures are comparable as between State and State, a fact extremely significant in view of the lack of uniformity among the States as regards classes of plants covered by State records, classes of accidents covered by State laws, and other factors that tend to make impracticable or impossible the comparison of the accident experience of one State with that of another.

CLASSIFICATION OF INJURIES

Since 1915, the bureau's statistics of accidents at quarries have divided all injuries into five main classes, as follows: (1) Fatalities, (2) permanent total disabilities, (3) permanent partial disabilities, (4) temporary disabilities lasting more than 14 days, (5) temporary disabilities lasting more than the remainder of the shift on which the accident occurred but not exceeding 14 days.

The following table covers the 10 years 1917 to 1926. During this period 123,207 accidents at quarries were reported to the Bureau of Mines. Of these 1,393 (1.13 per cent) resulted fatally, 141 (0.11 per cent) caused permanent total disability, 3,532 (2.87 per cent) caused permanent partial disability, 21,495 (17.45 per cent) caused

disability exceeding 14 days, and 96,646 (78.44 per cent) caused disability of 1 to 14 days. During this period more than 220,000,000 shifts were worked by all quarry employees, so that the volume of exposure to occupational hazards indicates that the foregoing distribution of accidents may be accepted as typical of the severity of accidents to workers in the industry.

Number of quarry accidents, 1917 to 1926

Injury	Total 1917–1921	1922	1923	1924	1925	1926	Total 1922–1926
1. Fatal	677	132	143	138	149	154	716
2. Serious (time lost, more than 14 days):							
A. Permanent disability—							
Total[1]	59	20	12	13	22	15	82
Partial[2]	1,421	377	431	457	430	416	2,111
B. Others	9,133	2,142	2,567	2,708	2,627	2,318	12,362
3. Slight (time lost, 1 to 14 days, inclusive)	42,229	9,300	11,980	11,599	11,086	10,452	54,417
Total	53,519	11,971	15,133	14,915	14,314	13,355	69,688
Men employed	389,800	79,081	92,455	94,242	91,872	91,146	448,796

[1] Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.
[2] Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

Accident rates per thousand 300-day workers, classified by severity of injury

Injury	Total, 1917–1921	1922	1923	1924	1925	1926	Total, 1922–1926
1. Fatal	2.041	1.917	1.679	1.635	1.785	1.870	1.771
2. Serious (time lost, more than 14 days):							
A. Permanent disability—							
Total[1]	.178	.290	.141	.154	.264	.182	.203
Partial[2]	4.285	5.475	5.061	5.413	5.150	5.051	5.221
B. Others	27.538	31.106	30.146	32.075	31.466	28.144	30.577
3. Slight (time lost, 1 to 14 days, inclusive)	127.329	135.055	140.688	137.387	132.787	126.905	134.600
Total	161.371	173.843	177.715	176.664	171.452	162.152	172.372
Number of 300-day workers	331,651	68,861	85,153	84,426	83,487	82,361	404,288

[1] Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.
[2] Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

TABLE 1.—*All quarries: Men employed and days of labor performed, by kinds of quarries, during the years ended December 31, 1926 and 1925*

Kind of quarry	Active operators	Men employed			Days of labor performed			Average days active		
		In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total
1926										
Cement rock	104	4,850	18,146	22,996	1,474,164	5,853,993	7,328,157	304	323	319
Granite	255	6,688	3,924	10,612	1,620,793	1,069,351	2,690,144	242	273	254
Limestone	766	26,532	12,507	39,039	6,572,902	3,311,158	9,884,060	248	265	253
Marble	39	2,359	3,098	5,457	672,579	947,444	1,620,023	285	306	297
Sandstone and bluestone	171	3,915	1,003	4,918	921,187	240,343	1,161,530	235	240	236
Slate	74	3,196	1,108	4,304	857,517	291,817	1,149,334	268	263	267
Trap rock	110	3,080	740	3,820	693,245	181,907	875,152	225	246	229
Total, 1926	1,519	50,620	40,526	91,146	12,812,387	11,896,013	24,708,400	253	294	271
1925										
Cement rock	84	4,547	16,252	20,799	1,388,020	5,356,168	6,744,188	305	330	324
Granite	273	8,247	3,773	12,020	2,108,846	1,011,005	3,119,851	256	268	260
Limestone	794	27,391	13,034	40,425	6,793,719	3,618,655	10,412,374	248	278	258
Marble	38	2,334	3,078	5,412	684,826	925,690	1,610,516	293	301	298
Sandstone and bluestone	171	3,844	1,123	4,967	910,891	265,015	1,175,906	237	236	237
Slate	71	2,832	1,135	3,967	732,905	305,641	1,038,546	259	269	262
Trap rock	125	3,029	1,253	4,282	659,708	284,866	944,574	218	227	221
Total, 1925	1,556	52,224	39,648	91,872	13,278,915	11,767,040	25,045,955	254	297	273

TABLE 2.—*All quarries: Number killed and injured, by kinds of quarries, during the years ended December 31, 1926 and 1925*

Kind of quarry	Number killed			Number injured. (Time lost, more than 1 day)			Widows	Orphans
	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total		
1926								
Cement rock	10	27	37	608	1,486	2,094	25	55
Granite	19	1	20	972	688	1,660	13	26
Limestone	55	14	69	4,544	2,067	6,611	41	68
Marble	7	2	9	359	423	782	5	14
Sandstone and bluestone	4		4	439	187	626	1	3
Slate	8		8	518	182	700	3	6
Trap rock	7		7	566	162	728	4	12
Total, 1926	110	44	154	8,006	5,195	13,201	92	184
1925								
Cement rock	16	24	40	827	1,501	2,328	22	31
Granite	10		10	1,230	876	2,106	5	12
Limestone	43	18	61	4,530	2,185	6,715	37	90
Marble	2	1	3	269	354	623	3	7
Sandstone and bluestone	10	3	13	525	260	785	11	20
Slate	8	1	9	419	166	585	5	15
Trap rock	12	1	13	832	191	1,023	8	23
Total, 1925	101	48	149	8,632	5,533	14,165	91	198

TABLE 3.—*All quarries: Fatalities and injuries per thousand 300-day workers employed during the years ended December 31, 1911 to 1926*

Kind of quarry	Number of 300-day workers			Killed per thousand 300-day workers			Injured per thousand 300-day workers		
	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total
1926									
Cement rock	4,914	19,513	24,427	2.04	1.38	1.51	123.73	76.15	85.72
Granite	5,402	3,565	8,967	3.52	.28	2.23	179.93	192.99	185.12
Limestone	21,910	11,037	32,947	2.51	1.27	2.09	207.39	187.28	200.66
Marble	2,242	3,158	5,400	3.12	.63	1.67	160.12	133.95	144.81
Sandstone and bluestone	3,071	801	3,872	1.30		1.03	142.95	233.46	161.67
Slate	2,858	973	3,831	2.80		2.09	181.25	187.05	182.72
Trap rock	2,311	606	2,917	3.03		2.40	244.92	267.33	249.57
Total, 1926	42,708	39,653	82,361	2.58	1.11	1.87	187.46	131.01	160.28
1925									
Cement rock	4,627	17,854	22,481	3.46	1.34	1.78	178.73	84.07	103.55
Granite	7,029	3,370	10,399	1.42		.96	174.99	259.94	202.52
Limestone	22,646	12,062	34,708	1.90	1.49	1.76	200.04	181.15	193.47
Marble	2,283	3,086	5,369	.88	.32	.56	117.83	114.71	116.04
Sandstone and bluestone	3,036	883	3,919	3.29	3.40	3.32	172.92	294.45	200.31
Slate	2,443	1,019	3,462	3.27	.98	2.60	171.51	162.90	168.98
Trap rock	2,199	950	3,149	5.46	1.05	4.13	378.35	201.05	324.87
Total, 1925	44,263	39,224	83,487	2.28	1.22	1.78	195.02	141.06	169.67
Total, 1924	50,506	33,920	84,426	1.90	1.24	1.63	178.00	170.61	175.03
Total, 1923	50,226	34,927	85,153	1.97	1.26	1.68	178.11	173.05	176.04
Total, 1922	39,788	29,073	68,861	2.31	1.38	1.92	177.16	164.76	171.93
Total, 1921	36,082	23,876	59,958	2.22	1.68	2.00	167.09	185.79	174.54
Total, 1920	45,617	31,472	77,089	2.81	1.59	2.31	139.62	154.04	145.51
Total, 1919	39,278	24,516	63,794	2.29	1.35	1.93	146.65	140.28	144.20
Total, 1918	37,042	22,243	59,285	2.19	1.98	2.11	148.29	145.03	147.07
Total, 1917	45,449	26,076	71,525	2.00	1.53	1.83	162.95	223.81	185.14
Total, 1916	49,077	27,380	76,457	2.32	2.15	2.26	158.63	206.06	175.62
Total, 1915	54,832	27,615	82,447	2.17	1.05	1.80	127.57	96.90	117.30
Total, 1914	(1)	(1)	68,187			2.64			114.92
Total, 1913	(1)	(1)	87,141			2.10			88.81
Total, 1912	(1)	(1)	93,837			2.27			69.82
Total, 1911	(1)	(1)	84,417			2.23			63.85

[1] Not segregated prior to 1915.

QUARRIES CLASSIFIED

The quarries covered by this report have been classified according to the kind of rock, as follows: Cement rock, granite, limestone, marble, sandstone and bluestone, slate, and trap rock. Separate statistical tables are presented for each group and for all the groups combined. Clay pits, sand, and sand-and-gravel pits are not included. The tables show the number of persons employed, the average number of working days per man, the total number of shifts worked by all employees, and the number of men killed or injured, thus making it possible to base fatality and injury rates throughout this report on a uniform number of days during which workmen were exposed to the hazards of their occupations.

A summary of the more important figures for all quarries in the United States during the year 1926 is given in Tables 1 to 3, inclusive. The causes of accidents are shown in Tables 8, 14, 15, and 27. The

percentage of accidents due to any one cause is given in Table 16, and the accident rates, by causes, per thousand 300-day workers are shown in Table 17. Whenever possible, comparative figures for previous years are given.

CEMENT-ROCK QUARRIES

All quarries that produced cement rock or limestone for the manufacture of cement are classified under cement-rock quarries. Previous to 1925 the bureau's returns from producing companies were probably incomplete as to the number of employees and accidents at cement mills. For that year, and for 1926, special effort was made to obtain reports from cement mills, with the result that the returns for "outside employees" covered many cement-mill employees that had not been included in the returns for previous years. For this reason the accident rates for "outside employees" at this class of quarries for 1925 and 1926 are not strictly comparable with the rates for previous years that did not so completely cover the mills. However, the rates for the quarries proper are comparable, because data on working conditions inside the quarries were not materially affected by the special effort to obtain more complete returns covering the mills, since the extra employees thus reported were included with other employees at "outside plants" and not with the employees "inside" the quarries.

Companies operating cement-rock or limestone quarries whose product was intended chiefly for use in the manufacture of cement reported a total of 22,996 men employed in 1926, of whom 4,850 worked in the quarries and 18,146 worked at the crushers, cement mills, and other outside plants. Men employed in the pit worked 1,474,164 shifts, an average of 304 shifts per man; the "outside" men worked 5,853,993 shifts, an average of 323 shifts per man. The combined working time for all employes was 7,328,157 shifts, an average of 319 shifts per man. Accidents during the year killed 10 men in the quarries and 27 men in the mills and other outside plants, a total of 37; the fatality rates per thousand 300-day workers were 2.04 for the quarry employees, 1.38 for "outside" employees, and 1.51 for all employees considered together. The death rate for the quarries proper has never before been so low; the rate for employees in outside plants was better than in any previous year except 1915 and 1925, and the death rate for all employees combined was the best ever recorded. A similar improvement was shown by the reports of nonfatal injuries; in this group were included all permanent injuries, also all temporary injuries that incapacitated an employee beyond the day on which the accident occurred. These reports showed 608 injuries to the men employed inside the quarries and 1,486 injuries to the outside-plant employees—a total of 2,094 injuries.

The records showed 124 injuries among each thousand employees (based on a standard of 300 workdays per year) for the quarries proper, 76 for the outside plants, and 86 for both groups considered together. Each of these figures indicates a new low record for injuries among this group of quarries.

Safety work has for many years been emphasized by the cement producers and by the Portland Cement Association; the marked progress made by the cement industry in the prevention of both fatal and nonfatal injuries is without doubt largely attributable to this fact.

The number of men employed, number of accidents, and other data are given in Tables 3, 4, 17, 21, 23, 27, 30, 50, and 52.

The causes of accidents, as given in Tables 8 and 17, show that most of the fatalities inside the quarries were due to falls or slides of rock or overburden, to explosives, boiler or air-tank explosions, haulage, and to burns. At the mills, crushers, and other outside plants the chief causes of the fatal accidents were machinery, burns, haulage, falls of persons, and flying objects. The chief causes of nonfatal injuries inside the quarries were falls or slides of rock or overburden, haulage, flying objects, falling objects, falls of persons, machinery, handling rock at the face, and explosives. The main causes of nonfatal injuries among employees at the outside plants were falling objects, falls of persons, machinery, flying objects, burns, and hand tools.

Of the 2,131 injuries at the quarries and outside plants, 37 were fatal, 1 caused permanent total disability, 91 caused permanent partial disability, 432 caused temporary disability exceeding 14 days, and 1,570 caused temporary lost-time injury not exceeding 14 days. Estimating the aggregate loss of time from these accidents in the manner explained on page 70, the figures represent the loss of approximately 320,000 man days, an average of 150 days per accident, and a loss of time equal to 4.4 per cent of the total man days worked in 1926 by all employees.

Fifty-five per cent of the men employed in the quarries in 1926 worked at quarries where the standard workday was 10 hours, 24 per cent worked at 8-hour quarries, and 7 per cent at 9-hour quarries. Thirty-five per cent of the employees at outside plants, including cement mills, crushers, etc., worked 8 hours a day, and 24 per cent worked 12 hours a day. Reports covering the remaining plants did not show the length of shift, or else showed some other workday than 8 or 12 hours.

MARBLE QUARRIES

The marble-quarrying industry in the United States employs a few more than 5,000 men, of whom about 40 per cent work inside the quarries and about 60 per cent are engaged on stone-dressing or other

work outside the quarries. Accidents during each year injure about one man in every 7 to 17 men employed, but only a small number are fatal. The number of fatalities during the past few years ranged from 2 to 9 per year.

According to the operators' reports for 1926, the average number of men employed during the year was 5,457, of whom 2,359 worked inside the quarries and 3,098 worked outside the quarries. The inside employees worked 672,579 man days, the outside employees 947,444 man days, a total of 1,620,023 man days, representing an average of 297 workdays per man. The employees inside the quarries averaged 285 days, and the outside employees 306 days.

Accidents during the year caused 9 deaths and 782 lost-time injuries among the workers. The death rate was 1.67 per thousand employees, based on a standard of 300 workdays per man, whereas the nonfatal injury rate was 145. Both the fatality rate and the injury rate represented increases over the previous year. The increase in the fatality rate is not especially significant, because a change of even one or two fatalities may materially affect a death rate calculated on so small a number of men as the marble industry employs. More significance, however, attaches to the injury rate, because the figures for 1926 and previous years show that the number of injuries in relation to the number of employees has increased steadily during the past nine years with the exception of 1925. Marble quarries, however, are not alone in this respect; some other classes of quarries, also, such as limestone and slate, have experienced increases in the frequency of injuries among their employees in recent years.

Seven of the nine fatal accidents in 1926 occurred inside the quarries, three of them being due to falling objects and one each to machinery, electricity, explosives, and handling rock. Of 782 nonfatal injuries, 359 occurred inside the quarries, the chief causes being handling of rock, timber, or hand tools, flying objects, drilling and channeling, and machinery. The chief causes of injuries to employees outside the quarries were handling rock, machinery, flying objects, hand tools, falls of persons, and falling objects.

The nonfatal injuries were classified as follows: 1 permanent total, 16 permanent partial, 167 temporary, with a loss of time more than 14 days, and 598 temporary, with a loss of 1 to 14 days. It is estimated that these injuries, together with the 9 fatalities, represent a loss of 80,000 man days, a loss of time equal to 5 per cent of the total number of man days worked by all employees during the year, as compared with 2.9 per cent in 1925. The average time-lost equivalent for each accident in 1926 was 101 days.

The length of workday for the pit workers at marble quarries is about equally divided between 9 and 10 hours, the 10-hour group

being slightly in excess of the 9-hour group in 1926, as regards the number of men employed. Outside work at the quarries is predominantly on a 9-hour basis.

SLATE QUARRIES

The number of men employed in the quarrying of slate in the United States is approximately 4,000, but in 1926 slightly more than this number were employed. Three-fourths of the men work inside the quarries and one-fourth at plants outside the quarries. The men normally average 260 workdays or more per year. Fatal accidents usually number less than 10 and nonfatal accidents between 500 and 700.

In 1926 the number of men employed, according to the operators' reports, was 4,304, of which number 3,196 represented the employees inside the quarries and 1,108 represented the employees at outside plants. Eight fatalities and 700 injuries occurred during the year, of which all the fatalities and 518 of the injuries were inside the quarries. The fatality rate per thousand 300-day workers was 2.09 based upon all employees combined, or 2.80 based upon the pit employees only. The injury rates were 181 for the inside workers, 187 for the outside workers, and 183 for both classes of employees combined. The fatality rate was lower than in 1925, but the injury rate was higher.

Six of the eight fatalities at slate quarries were caused by falls or slides of rock or overburden, 1 by explosives, and 1 by falling objects. The chief causes of nonfatal injuries to employees inside the quarries were handling rock, machinery, falls or slides of rock or overburden, flying objects, timber or hand tools, and falling objects. The chief causes of injuries outside the quarries were handling rock, machinery, falling objects, flying objects, and falls of persons.

It is estimated that the 8 fatalities and 700 injuries that occurred during the year represent a loss of time equal to 75,000 man days, an average of 107 days per accident. The total estimated loss of time caused by accidents was 6.6 per cent of the total number of man days worked by all employees during the year, as compared with 10.3 per cent in 1925. The nonfatal injuries were grouped as follows: 2 permanent total, 12 permanent partial, 121 temporary more than 14 days, and 565 temporary 1 to 14 days.

Nearly all slate quarries are operated on the basis of 9 hours a day.

TRAP-ROCK QUARRIES

Approximately 4,000 men are employed at quarries that produce trap rock. The quarries are operated from 225 to 250 days annually, on an average. Accidents injure 700 to 1,000 men each year, and of this number, from 7 to 18 men are injured fatally.

Reports from operating companies for 1926 showed 3,820 men employed, of whom 3,080 worked inside and 740 worked outside the pits. The total working time for all of the employees was equal to 875,152 man shifts, representing an average of 229 workdays per man. The employees inside the quarries worked 693,245 shifts, an average of 225 days per man, those outside the quarries worked 181,907 shifts, an average of 246 days per man. The total working time for all employees—875,152 shifts—represented a reduction from the record for 1925 and most previous years.

Accidents at the plants caused 7 deaths (all inside the quarries) and 728 nonfatal injuries, of which 566 occurred inside the quarries and 162 occurred at outside plants. Three of the fatalities were caused by explosives, 2 by haulage, and 2 by falls or slides of rock or overburden. The chief causes of nonfatal injuries among employees inside the quarries were flying objects, handling rock, falls or slides of rock or overburden, machinery, haulage, and falling objects. Most of the injuries to men employed at outside plants were due to flying objects, machinery, falling objects, falls of persons, and hand tools. The nonfatal injuries at quarries and outside plants included 13 cases of permanent partial disability, 136 cases of temporary disability lasting more than 14 days, and 579 temporary disabilities lasting 1 to 14 days. These injuries and the 7 deaths represent a loss of time equal to approximately 59,000 man days, an average of 80 days per accident, and amounting to 6.7 per cent of the total number of man days worked by all employees at the quarries during the year in which the accidents occurred. The corresponding percentage for the previous year was 13.6.

Nine and ten hours, in about equal proportions, constitute the standard workday at trap-rock quarries, both for the pit work proper and for the crushing and other operations outside the pits.

107521—28——2

TABLE 4.—*Cement-rock, marble, slate, and trap-rock quarries: Men employed, number killed and injured, and days worked, by States, during the year ended December 31, 1926*

State	In and about quarry					In outside works					Total						Widows	Orphans
	Men employed	Days of labor performed	Average days active	Killed	Injured	Men employed	Days of labor performed	Average days active	Killed	Injured	Active operators	Men employed	Days of labor performed	Average days active	Killed	Injured		
Cement rock:																		
California	425	138,300	325	1	68	2,580	913,984	354	7	367	10	3,005	1,052,284	350	8	435	7	8
Illinois	332	99,224	299	1	22	1,187	376,961	318	1	32	5	1,519	476,185	313	2	54	1	4
Kansas	173	47,787	276	1	15	430	140,438	327	1	22	7	603	188,225	312	2	37	------	------
New York	372	98,891	266	------	36	1,097	328,057	299	2	65	8	1,469	426,948	291	2	101	2	7
Pennsylvania	1,169	385,286	330	------	140	4,607	1,487,117	323	2	368	16	5,776	1,872,403	324	2	508	------	------
Washington	92	23,910	260	2	31	208	59,437	286	------	33	3	300	83,347	278	2	64	------	------
Not segregated	2,287	680,766	298	5	296	8,037	2,547,999	317	14	599	55	10,324	3,228,765	313	19	895	15	36
Total, 1926	4,850	1,474,164	304	10	608	18,146	5,853,993	323	27	1,486	104	22,996	7,328,157	319	37	2,094	25	55
Total, 1925	4,547	1,388,020	305	16	827	16,252	5,356,168	330	24	1,501	84	20,799	6,744,188	324	40	2,328	22	31
Marble:																		
California	90	28,727	319	1	21	10	2,484	248	------	2	5	100	31,211	312	1	23	------	------
Georgia [1]																	------	------
Massachusetts	51	15,328	301	------	4	49	14,902	304	------	2	4	100	30,230	302	------	6	------	------
Missouri	61	13,270	218	------	22	46	14,055	306	------	6	3	107	27,325	255	------	28	------	------
New York	50	14,872	297	------	6	17	4,930	290	------	2	3	67	19,802	296	------	8	------	------
Tennessee	936	254,223	272	------	133	101	29,900	296	------	1	10	1,037	284,123	274	------	134	------	------
Vermont	729	220,714	303	4	73	1,985	610,580	308	2	225	5	2,714	831,294	306	6	298	4	10
Not segregated	442	125,445	284	2	100	890	270,593	304	------	185	9	1,332	396,038	297	2	285	1	4
Total, 1926	2,359	672,579	285	7	359	3,098	947,444	306	2	423	39	5,457	1,620,023	297	9	782	5	14
Total, 1925	2,334	684,826	293	2	269	3,078	925,690	301	1	354	38	5,412	1,610,516	298	3	623	3	7
Slate:																		
Pennsylvania	1,678	433,720	258	5	258	671	176,001	262	------	100	36	2,349	609,721	260	5	358	1	------
Vermont	1,097	313,435	286	1	201	127	32,230	254	------	35	26	1,224	345,665	282	1	236	1	2
Virginia	213	50,892	239	2	7	110	26,000	236	------	4	3	323	76,892	238	2	11	1	4
Not segregated	208	59,470	286	------	52	200	57,586	288	------	43	9	408	117,056	287	------	95	------	------
Total, 1926	3,196	857,517	268	8	518	1,108	291,817	263	------	182	74	4,304	1,149,334	267	8	700	3	6
Total, 1925	2,832	732,905	259	8	419	1,135	305,641	269	1	166	71	3,967	1,038,546	262	9	585	5	15

Trap rock:																	
California	391	98,500	252	3	116	173	47,829	276	-------	28	30	564	146,329	259	3	144	2	4
Connecticut	335	77,324	231	-------	82	62	14,147	228	-------	36	5	397	91,471	230	-------	118	-------	-------
Maryland	271	56,937	210	1	34	74	17,884	242	-------	7	5	345	74,821	217	1	41	-------	-------
Massachusetts	437	87,958	201	2	100	83	20,219	244	-------	37	15	520	108,177	208	2	137	2	8
New Jersey	823	182,401	222	-------	132	155	34,410	222	-------	18	28	978	216,811	222	-------	150	-------	-------
New York	74	14,583	197	-------	12	18	4,830	268	-------	2	2	92	19,413	211	-------	14	-------	-------
Pennsylvania	510	127,855	251	1	64	119	30,679	258	-------	21	14	629	158,534	252	1	85	-------	-------
Not segregated	239	47,687	200	-------	26	56	11,909	213	-------	13	11	295	59,596	202	-------	39	-------	-------
Total, 1926	3,080	693,245	225	7	566	740	181,907	246	-------	162	110	3,820	875,152	229	7	728	4	12
Total, 1925	3,029	659,708	218	12	832	1,253	284,866	227	1	191	125	4,282	944,574	221	13	1,023	8	23

[1] Not segregated.

GRANITE QUARRIES

The fatality rate for granite quarries was increased in 1926 over the previous year, but the nonfatal injury rate was lower. The increase in the death rate was more particularly among employees inside the quarries, although the rate for persons employed at the outside plants also increased in a less degree. The nonfatal injury rate for "inside-the-quarry" employees was slightly higher than in 1925 but was more than offset by a reduction in the rate for "outside-plant" employees; hence the net rate for the industry as a whole showed an improvement over the previous year.

Reports from producing companies showed 10,612 employees, of whom 6,688 worked in the quarries and 3,924 were engaged on work outside the quarries. A total of 2,690,144 man shifts was reported for all employees combined—a loss of about 14 per cent from the preceding year. This loss was entirely among employees inside the quarries, the total working time for the group being 1,620,793 man shifts, as compared with more than 2,000,000 shifts in the previous year. The working time for all outside employees was 1,069,351 shifts, a slight increase over the year before. The industry, as a whole, averaged 254 workdays per employee, the average for quarry workers being 242 days and the average for outside employees being 273 days. Accidents during the year resulted in 20 deaths and 1,660 injuries among the employees, of which 19 deaths and 972 injuries occurred inside the quarries. The chief causes of fatal accidents were falls or slides of rock or overburden, explosives, haulage, and electricity. Of the nonfatal injuries inside the quarries, the chief causes were flying objects, handling rock, machinery, falls or slides of rock or overburden, and drilling and channeling. Injuries outside the quarries resulted mainly from flying objects, handling rock, hand tools, and falling objects.

Of the 1,660 nonfatal injuries at granite quarries, 49 caused permanent partial disability, 189 caused temporary injury lasting more than 14 days, and 1,422 caused loss of time from 1 to 14 days. It is estimated that all of these injuries, with the 20 fatal accidents, represent a loss of time equal to 171,000 man days—an average loss of 102 days per accident, representing 6.3 per cent of the total number of man shifts worked by all employees at granite quarries during the year. The estimated loss of time from accidents in 1925 was 4.1 per cent of all shifts worked that year.

The granite-quarrying industry is generally operated on the 8-hour-day basis, particularly for the rock dressing and other work done outside the pits. However, about 18 per cent of the employees inside the pits worked 10 hours a day in 1926, and a slightly smaller number worked 9 hours a day.

TABLE 5.—*Granite quarries: Men employed, number killed and injured, and days worked, by States, during the year ended December 31, 1926*

State	In and about quarry					In outside works					Total						Widows	Orphans
	Men employed	Days of labor performed	Average days active	Killed	Injured	Men employed	Days of labor performed	Average days active	Killed	Injured	Active operators	Men employed	Days of labor performed	Average days active	Killed	Injured		
California	656	165,926	253	2	96	392	98,284	251	.....	29	28	1,048	264,210	252	2	125	1	.....
Colorado	25	5,220	209	.....	3	25	7,500	300	.....	3	5	50	12,720	254	.....	6	.....	.....
Connecticut	130	32,962	254	.....	20	13	1,300	100	.....	2	10	143	34,262	240	.....	22	.....	.....
Georgia	605	135,181	223	.....	69	454	126,476	279	.....	41	15	1,059	261,657	247	.....	110	.....	.....
Maine	633	144,765	229	1	51	265	74,573	281	.....	17	22	898	219,338	244	1	68	1	7
Massachusetts	613	152,917	249	3	141	698	188,988	271	1	253	29	1,311	341,905	261	4	394	4	5
Minnesota	362	91,190	252	.....	103	361	102,021	283	.....	29	21	723	193,211	267	.....	132	.....	.....
New Hampshire	420	106,964	255	.....	49	311	86,964	280	.....	92	21	731	193,928	265	.....	141	.....	.....
New York	67	9,941	148	.....	9	82	22,300	272	.....	35	5	149	32,241	216	.....	44	.....	.....
North Carolina	885	206,646	233	5	69	634	181,523	286	.....	40	9	1,519	388,169	256	5	109	3	3
Oregon	94	14,458	154	1	28	25	2,955	118	.....	1	4	119	17,413	146	1	29	.....	.....
Pennsylvania	160	38,612	241	1	25	43	10,568	246	.....	2	15	203	49,180	242	1	27	1	4
Rhode Island	172	47,647	277	1	33	15	4,110	274	.....	4	6	187	51,757	277	1	37	.....	.....
Texas	48	12,094	252	.....	11	23	5,972	260	.....	.....	5	71	18,066	254	.....	11	.....	.....
Vermont	821	231,429	282	3	74	109	30,036	276	.....	.....	22	930	261,465	281	3	74	3	7
Virginia	122	25,600	210	1	23	29	6,752	233	.....	.....	5	151	32,352	214	1	23	.....	.....
Washington	31	6,360	205	.....	.....	16	3,587	224	.....	.....	6	47	9,947	212	.....	.....	.....	.....
Wisconsin	325	72,481	223	.....	78	226	62,371	276	.....	120	9	551	134,852	245	.....	198	.....	.....
Not segregated	519	120,400	232	1	90	203	53,071	261	.....	20	18	722	173,471	240	1	110	.....	.....
Total, 1926	6,688	1,620,793	242	19	972	3,924	1,069,351	273	1	688	255	10,612	2,690,144	254	20	1,660	13	26
Total, 1925	8,247	2,108,846	256	10	1,230	3,773	1,011,005	268	.....	876	273	12,020	3,119,851	260	10	2,106	5	12

LIMESTONE QUARRIES

Nearly half of the number of persons that work in the quarry industry are employed at quarries that produce limestone. Producers' reports to the Bureau of Mines showed an average of 39,039 men employed in 1926, of whom 26,532 worked inside the quarries and 12,507 worked outside the quarries. The total working time for all employees was 9,884,060 shifts, giving an average of 253 shifts per man. Employees inside the quarries worked 6,572,902 shifts, an average of 248 days per man; those outside the quarries worked 3,311,-158 shifts, an average of 265 days per man. Accidents resulted in 69 deaths and 6,611 lost-time injuries, of which 55 deaths and 4,544 injuries occurred inside the quarries, and 14 deaths and 2,067 injuries occurred among the employees at outside plants. The fatality rate per thousand 300-day workers was 2.09 for all employees considered as a single class, the rate being 2.51 for the inside workers and 1.27 for the outside workers. The rate for outside employees represented an improvement over the previous year—not a sufficient improvement, however, to compensate for an increased rate among inside employees which caused a rise in the rate for all classes of employees combined. The injury rate was 201 per thousand employees, 207 for inside employees and 187 for outside employees. All three rates were slightly higher than in 1925.

Explosives and falls or slides of rock or overburden caused most of the fatalities inside the quarries; next in importance were haulage, machinery, electricity, and flying objects. The chief causes of fatal accidents outside the quarries were machinery, electricity, haulage, and falls of persons. Nonfatal injuries inside the quarries were due mainly to handling rock, flying objects, haulage, machinery, and falls or slides of rock or overburden. Nonfatal injuries at outside plants were caused by machinery, haulage, flying objects, falling objects, and falls of persons.

Accidents reported for limestone quarries and outside plants in 1926 were classified as follows: 69 fatal, 7 permanent total, 215 permanent partial, 1,167 temporary disability lasting more than 14 days, and 5,222 temporary lost-time disabilities lasting 1 to 14 days. It is estimated that these fatal and nonfatal injuries represent a loss of 684,000 man days, an average of 102 lost days per accident; and they represent a period of disability equal to 6.9 per cent of the total number of man days worked by all employees at limestone quarries and outside plants in 1926. Corresponding records for 1925 showed a loss of time equal to 5.9 per cent of the total man days worked that year.

Nearly half of all pit workers at limestone quarries in 1926 worked at plants where the standard work day was 10 hours, about one-fourth worked at 9-hour plants, and slightly less than one-fourth worked at 8-hour plants. At the outside plants nearly two-fifths of the men worked 10 hours a day, 15 per cent worked 9 hours, and 11 per cent worked 8 hours a day.

TABLE 6.—*Limestone quarries: Men employed, number killed and injured, and days worked, by States, during the year ended December 31, 1926*

State	In and about quarry					In outside works					Total						
	Men employed	Days of labor performed	Average days active	Killed	Injured	Men employed	Days of labor performed	Average days active	Killed	Injured	Active operators	Men employed	Days of labor performed	Average days active	Killed	Injured	Widows	Orphans
Alabama	875	242,837	278	4	147	170	53,789	316	------	8	15	1,045	296,626	284	4	155	4	12
Arizona	107	37,893	354	------	13	44	15,302	348	------	1	4	151	53,195	352	------	14	------	------
Arkansas	108	30,345	281	------	10	49	15,840	323	------	------	5	157	46,185	294	------	10	------	------
California	260	74,232	286	1	53	214	54,926	257	2	62	23	474	129,158	272	3	115	------	------
Colorado	267	75,655	283	------	45	117	31,575	270	------	1	7	384	107,230	279	------	46	------	------
Georgia	116	27,618	238	------	11	57	14,598	256	------	12	4	173	42,216	244	------	23	------	------
Illinois	2,148	508,424	237	8	351	593	159,103	268	1	166	39	2,741	667,527	244	9	517	4	10
Indiana	2,263	408,860	181	1	282	1,993	326,913	164	2	132	40	4,256	735,773	173	3	414	2	3
Iowa	328	58,400	178	3	56	40	5,516	138	------	------	17	368	63,916	174	3	56	3	------
Kansas	293	58,875	201	1	21	198	52,298	264	------	30	13	491	111,173	226	1	51	1	2
Kentucky	715	146,645	205	2	131	198	48,290	244	------	26	25	913	194,935	214	2	157	2	2
Maine	163	49,399	303	------	57	355	115,035	324	------	78	5	518	164,434	317	------	135	------	------
Maryland	213	64,607	303	------	62	77	20,604	268	------	3	12	290	85,211	294	------	65	------	------
Massachusetts	286	91,699	321	------	80	342	105,960	310	1	103	10	628	197,659	315	1	183	1	1
Michigan	1,077	253,159	235	3	155	378	85,660	227	2	115	14	1,455	338,819	233	5	270	4	9
Minnesota	164	36,283	221	------	59	109	24,485	225	------	14	10	273	60,768	223	------	73	------	------
Missouri	2,201	500,507	227	3	256	837	241,036	288	------	102	60	3,038	741,543	244	3	358	3	------
Montana	42	14,571	347	------	4	9	2,764	307	------	5	4	51	17,335	340	------	9	------	------
Nebraska	76	13,413	176	------	12	33	6,267	190	------	4	5	109	19,680	181	------	16	------	------
New Jersey	318	94,364	297	1	66	346	115,626	334	------	19	8	664	209,990	316	1	85	1	3
New Mexico	70	11,877	170	------	1	19	2,767	146	------	------	5	89	14,644	165	------	1	------	------
New York	1,671	412,829	247	4	405	512	127,151	248	1	88	50	2,183	539,980	247	5	493	3	6
North Carolina	115	34,076	296	------	35	90	27,209	302	------	8	3	205	61,285	299	------	43	------	------
Ohio	2,385	614,593	258	4	407	1,604	454,494	283	1	389	68	3,989	1,069,087	268	5	796	1	4
Oklahoma	366	82,317	225	1	75	35	7,175	205	------	13	7	401	89,492	223	1	88	------	1
Pennsylvania	5,097	1,347,786	264	10	867	1,998	587,927	294	3	411	154	7,095	1,935,713	273	13	1,278	6	4
Tennessee	495	127,680	258	3	124	204	61,875	303	------	9	14	699	189,555	271	3	133	2	2

Texas	680	171,279	252	3	146	290	86,047	297	------	41	16	970	257,326	265	3	187	2	------
Utah	348	88,024	253	------	53	52	15,918	306	------	12	12	400	103,942	260	------	65	------	------
Vermont	81	22,832	282	1	27	65	20,232	311	------	5	8	146	43,064	295	1	32	1	6
Virginia	800	237,890	297	2	173	535	152,184	284	------	70	31	1,335	390,074	292	2	243	1	3
Washington	49	15,272	312	------	17	19	4,894	258	------	5	5	68	20,166	297	------	22	------	------
West Virginia	1,178	305,923	260	------	109	399	118,922	298	------	46	12	1,577	424,845	269	------	155	------	------
Wisconsin	739	189,738	257	------	166	295	75,555	256	------	85	37	1,034	265,293	257	------	251	------	------
Wyoming	112	33,727	301	------	20	4	1,240	310	------	------	4	116	34,967	301	------	20	------	------
Not segregated	326	89,273	274	------	48	227	71,981	317	1	4	20	553	161,254	292	1	52	------	------
Total, 1926	26,532	6,572,902	248	55	4,544	12,507	3,311,158	265	14	2,067	766	39,039	9,884,060	253	69	6,611	41	68
Total, 1925	27,391	6,793,719	248	43	4,530	13,034	3,618,655	278	18	2,185	794	40,425	10,412,374	258	61	6,715	37	90

SANDSTONE AND BLUESTONE QUARRIES

Approximately 5,000 men are employed in the production of sandstone and bluestone in the United States. About four-fifths of these men work inside the quarries and one-fifth work at the crushers and other plants outside the quarries. The industry, as a whole, averages about 235 or 240 days of operation each year. Accidents at the plants injure from 600 to 800 employees annually; this includes all injuries that cause an employee to lose time from his work for more than the remainder of the day on which the accident occurred.

Reports from operating companies for the calendar year 1926 showed 4,918 men employed, of whom 3,915 worked in the quarries and 1,003 worked at the outside plants. The amount of labor performed by all employees was equal to 921,187 man shifts for the quarries and 240,343 man shifts for the outside plants. The former group of employees averaged 235 workdays per man, the latter group 240 days, the average for both groups being 236 days. Accidents caused 4 deaths (all occurring inside the quarries) and 626 nonfatal injuries, of which 439 occurred inside the quarries. The death rate per thousand 300-day workers was 1.03 for all inside and outside employees considered together; the rate based on inside workers only was 1.30. The injury rate for all employees was 162 per thousand—143 for quarries proper and 233 for outside plants. Both the injury rate and the fatality rate for 1926 represented an improvement over the preceding year.

Two of the fatalities in 1926 were due to handling rock at the face; one was caused by falling objects and one by flying objects. Of 626 nonfatal injuries, 439 occurred inside the quarries; of this latter number the main causes were handling rock, flying objects, haulage, falls of persons, falls or slides of rock or overburden, and machinery. The chief causes of the 187 injuries among the employees at the outside plants were falling objects, falls of persons, machinery, hand tools, and flying objects.

It is estimated that the 4 fatalities and 626 injuries that occurred in 1926 represent a loss of time equal to 69,000 man days, an average of 110 days per accident. The total estimated loss of time was 5.9 per cent of the total number of man days worked by all employees at the plant during the year in which the accidents occurred. The corresponding percentage for 1925 was 8.9.

Ten hours a day was the standard working shift of 56 per cent of the men inside the quarries, and 9 hours a day was the standard shift for 31 per cent of the men. At the outside plants 47 per cent of the men worked 10 hours a day and 32 per cent worked 9 hours a day.

TABLE 7.—*Sandstone and bluestone quarries: Men employed, number killed and injured, and days worked, by States, during the year ended December 31, 1926*

State	In and about quarry					In outside works					Total						Widows	Orphans
	Men employed	Days of labor performed	Average days active	Killed	Injured	Men employed	Days of labor performed	Average days active	Killed	Injured	Active operators	Men employed	Days of labor performed	Average days active	Killed	Injured		
Arkansas	74	4,118	56		2	3	90	30			4	77	4,208	55		2		
California	47	10,982	234		8	5	873	175			6	52	11,855	228		8		
Colorado	41	5,293	129		7	12	1,572	131			8	53	6,865	130		7		
Kentucky	137	28,318	207		11	40	8,420	211		1	5	177	36,738	208		12		
Minnesota	50	10,075	202		7	11	2,725	248		6	3	61	12,800	210		13		
New York	358	62,060	173		31	82	19,133	233		11	26	440	81,193	185		42		
Ohio	1,380	372,445	270	1	156	351	96,872	276		99	20	1,731	469,317	271	1	255		
Pennsylvania	1,102	262,622	238	2	138	366	75,280	206		61	52	1,468	337,902	230	2	199	1	3
West Virginia	126	33,171	263		22	33	9,748	295		2	6	159	42,919	270		24		
Wisconsin	162	37,026	229	1	32	27	6,230	231		1	13	189	43,256	229	1	33		
Not segregated	438	95,077	217		25	73	19,400	266		6	28	511	114,477	224		31		
Total, 1926	3,915	921,187	235	4	439	1,003	240,343	240		187	171	4,918	1,161,530	236	4	626	1	3
Total, 1925	3,844	910,891	237	10	525	1,123	265,015	236	3	260	171	4,967	1,175,906	237	13	785	11	20

TABLE 8.—*All quarries: Fatalities and injuries, by causes and kinds of quarries, during the year ended December 31, 1926*

Kind of quarry	In and about quarry															In outside works											Grand total
	Falls or slides of rock or overburden	Handling rock at face	Timber or hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Nails, splinters, etc.	Boiler and air-tank explosions	Burns	Other causes	Total	Haulage	Machinery	Hand tools	Nails, splinters, etc.	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling rock by hand	Burns	Other causes	Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20	21	22	23	24	25	26		
Killed:																													
Cement rock	3			3	1								2	1		10	4	8				4		1		7	3	27	37
Granite	9			3	3	1			2		1					19											1	1	20
Limestone	12	1		12	11	2	1	3	4		5		1		3	55	2	5			3	2	1			1		14	69
Marble		1		1			3		1		1					7					1		1					2	9
Sandstone and bluestone		2					1	1								4													4
Slate	6			1			1									8													8
Trap rock	2			3	2											7													7
Total	32	4		23	17	3	6	4	7		7		3	1	3	110	6	13			4	6	2	1		8	4	44	154
Injured:																													
Cement rock	75	42	12	36	75	47	48	67	7	24	46	14		13	102	608	87	171	103	75	34	179	180	151	11	132	363	1,486	2,094
Granite	82	137	38	38	27	50	56	233	4	60	89	35		11	112	972	8	49	72	16	1	34	67	269	122	4	46	688	1,660
Limestone	412	823	190	161	541	231	234	595	15	194	472	102	3	70	501	4,544	255	278	160	83	23	216	220	252	87	139	354	2,067	6,611
Marble	6	76	51	6	14	22	18	44	3	31	29	9		7	43	359	21	55	38	15	4	35	34	49	135	5	32	423	782
Sandstone and bluestone	29	98	23	12	37	33	17	44	1	19	27	4		5	90	439	7	21	18	4		25	29	17	13	5	48	187	626
Slate	40	166	35	16	11	15	33	38	2	7	46	7		3	99	518	5	23	1	5	2	10	18	12	74	2	30	182	700
Trap rock	75	78	21	27	45	38	42	86	3	16	59	17		10	49	566	12	25	13	8	2	14	18	34	7	2	27	162	728
Total	719	1,420	370	296	750	436	448	1,107	35	351	768	188	3	119	996	8,006	395	622	405	206	66	513	566	784	449	289	900	5,195	13,201

TABLE 9.—*All quarries: Number of active operators reporting during the years ended December 31, 1926 and 1925*

State	Cement rock [1]	Granite	Limestone	Marble	Sandstone and bluestone	Slate	Trap rock	Total, 1926	Total, 1925
Alabama	3		15	2	2			22	22
Arizona		1	4					5	6
Arkansas			5	2	4			11	11
California	10	28	23	5	6	1	30	103	111
Colorado	2	5	7	1	8			23	22
Connecticut		10	3		2		5	20	19
Georgia	4	15	4	2		1		26	28
Idaho	1		2		1			4	5
Illinois	5		39		4			48	50
Indiana	3		40		1			44	59
Iowa	3		17					20	22
Kansas	7		13		1			21	21
Kentucky	1		25		5			31	34
Maine		22	5			2		29	26
Maryland	2	2	12	1	2	1	5	25	28
Massachusetts		29	10	4	3		15	61	68
Michigan	4		14		1	1	2	22	20
Minnesota	2	21	10		3		1	37	35
Missouri	1	1	60	3				65	63
Montana	1	2	4		1		1	9	10
Nebraska	1		5					6	6
New Hampshire		21						21	22
New Jersey	3		8		2	1	28	42	39
New Mexico			5					5	5
New York	8	5	50	3	26	2	2	96	98
North Carolina		9	3					12	12
Ohio	5		68		20			93	97
Oklahoma	3	1	7					11	13
Oregon	2	4	4				1	11	7
Pennsylvania	16	15	154		52	36	14	287	288
Rhode Island		6	1				2	9	10
South Dakota	1	4	5		1			11	8
Tennessee	4		14	10				28	29
Texas	3	5	16				1	25	28
Utah	2	1	12	1				16	15
Vermont		22	8	5		26		61	64
Virginia	3	5	31		3	3	1	46	42
Washington	3	6	5		1		1	16	16
West Virginia	1		12		6			19	18
Wisconsin		9	37		13		1	60	62
Wyoming			4		3			7	5
Not segregated		6	5					11	12
Total, 1926	104	255	766	39	171	74	110	1,519	
Total, 1925	84	273	794	38	171	71	125		1,556

[1] Includes quarries producing limestone for manufacture of cement.

TABLE 10.—*All quarries: Men employed and equivalent in 300-day workers, by States, during the years ended December 31, 1926 and 1925*

State	Men employed				Equivalent in 300-day workers			
	In and about quarry	In outside works	Total, 1926	Total, 1925	In and about quarry	In outside works	Total, 1926	Total, 1925
Alabama	1,226	718	1,944	1,827	1,176	761	1,937	1,825
Arkansas	209	72	281	269	129	75	204	219
California	1,884	3,374	5,258	6,075	1,733	3,728	5,461	6,129
Colorado	399	423	822	912	349	411	760	849
Connecticut	585	179	764	944	484	165	649	713
Georgia	1,226	1,778	3,004	2,862	1,051	1,832	2,883	2,749
Illinois	2,512	1,780	4,292	4,872	2,039	1,787	3,826	4,399
Indiana	2,547	3,029	5,576	5,457	1,619	2,089	3,708	5,164
Iowa	475	1,024	1,499	1,270	332	1,009	1,341	1,115
Kansas	469	628	1,097	1,299	356	642	998	1,117
Kentucky	900	250	1,150	1,131	627	200	827	748
Maine	867	775	1,642	1,687	720	791	1,511	1,624
Maryland	685	713	1,398	1,430	596	712	1,308	1,374
Massachusetts	1,428	1,179	2,607	2,635	1,184	1,104	2,288	2,301
Michigan	1,213	1,132	2,345	2,191	949	1,007	1,956	1,910
Minnesota	679	533	1,212	1,434	559	481	1,040	1,226
Missouri	2,492	921	3,413	3,501	1,921	885	2,806	3,190
New Hampshire	420	311	731	792	356	290	646	684
New Jersey	1,218	653	1,871	1,721	1,002	669	1,671	1,486
New Mexico	131	118	249	98	102	106	208	47
New York	2,626	1,822	4,448	4,390	2,078	1,702	3,780	3,471
North Carolina	1,000	724	1,724	1,405	802	696	1,498	1,185
Ohio	3,974	2,993	6,967	6,620	3,491	3,053	6,544	6,014
Oklahoma	526	310	836	1,091	452	314	766	980
Pennsylvania	9,716	7,804	17,520	18,138	8,653	7,892	16,545	16,631
Rhode Island	202	43	245	240	183	42	225	219
Tennessee	1,562	562	2,124	2,256	1,404	576	1,980	2,183
Texas	895	892	1,787	1,844	782	983	1,765	1,829
Utah	404	190	594	530	335	205	540	410
Vermont	2,728	2,286	5,014	4,603	2,628	2,310	4,938	4,441
Virginia	1,388	1,291	2,679	2,281	1,295	1,314	2,609	2,062
Washington	198	249	447	553	160	229	389	541
West Virginia	1,364	578	1,942	1,933	1,180	570	1,750	1,855
Wisconsin	1,256	551	1,807	2,031	1,009	481	1,490	1,636
Not segregated	1,216	641	1,857	1,550	972	542	1,514	1,161
Total, 1926	50,620	40,526	91,146		42,708	39,653	82,361	
Total, 1925	52,224	39,648		91,872	44,263	39,224		83,487

TABLE 11.—*All quarries: Days of labor performed and average number of days quarries were operated, by States, during the years ended December 31, 1926 and 1925*

State	Days of labor performed				Average days active			
	In and about quarry	In outside works	Total, 1926	Total, 1925	In and about quarry	In outside works	Total, 1926	Total, 1925
Alabama	352,778	228,303	581,081	547,614	288	318	299	300
Arkansas	38,888	22,430	61,318	65,558	186	312	218	244
California	519,892	1,118,380	1,638,272	1,838,548	276	331	312	303
Colorado	104,495	123,364	227,859	254,727	262	292	277	279
Connecticut	145,224	49,362	194,586	213,921	248	276	255	227
Georgia	315,172	549,670	864,842	824,732	257	309	288	288
Illinois	611,822	536,064	1,147,886	1,319,647	244	301	267	271
Indiana	485,650	626,629	1,112,279	1,549,241	191	207	199	284
Iowa	99,720	302,523	402,243	334,464	210	295	268	263
Kansas	106,737	192,736	299,473	335,162	228	307	273	258
Kentucky	188,163	60,010	248,173	224,446	209	240	216	198
Maine	215,969	237,258	453,227	487,305	249	306	276	289
Maryland	178,810	213,692	392,502	412,116	261	300	281	288
Massachusetts	355,221	331,149	686,370	690,244	249	281	263	262
Michigan	284,759	302,089	586,848	573,131	235	267	250	262
Minnesota	167,788	144,251	312,039	367,815	247	271	257	256
Missouri	576,262	265,453	841,715	956,882	231	288	247	273
New Hampshire	106,964	86,964	193,928	205,084	255	280	265	259
New Jersey	300,633	200,804	501,437	445,688	247	308	268	259
New Mexico	30,713	31,819	62,532	14,138	234	270	251	144
New York	623,276	510,601	1,133,877	1,041,288	237	280	255	237
North Carolina	240,722	208,732	449,454	335,535	241	288	261	253
Ohio	1,047,317	915,891	1,963,208	1,804,312	264	306	282	273
Oklahoma	135,533	94,335	229,868	294,052	258	304	275	270
Pennsylvania	2,595,881	2,367,572	4,963,453	4,989,186	267	303	283	275
Rhode Island	54,880	12,684	67,564	65,648	272	295	276	274
Tennessee	420,983	172,905	593,888	654,979	270	308	280	290
Texas	234,684	294,813	529,497	548,631	262	331	296	298
Utah	100,434	61,460	161,894	123,101	249	323	273	232
Vermont	788,410	693,078	1,481,488	1,332,351	289	303	295	289
Virginia	388,327	394,318	782,645	618,522	280	305	292	271
Washington	48,118	68,698	116,816	162,199	243	276	261	293
West Virginia	354,034	170,887	524,921	556,484	260	296	270	288
Wisconsin	302,605	144,492	447,097	490,934	241	262	247	242
Not segregated	291,523	162,597	454,120	348,270	240	254	245	225
Total, 1926	12,812,387	11,896,013	24,708,400	----------	253,	294	271	--------
Total, 1925	13,278,915	11,767,040	----------	25,045,955	254	297	--------	273

TABLE 12.—*All quarries: Number of fatalities and injuries, by States, during the years ended December 31, 1926 and 1925*

State	Number killed				Number injured			
	In and about quarry	In outside works	Total, 1926	Total, 1925	In and about quarry	In outside works	Total, 1926	Total, 1925
Alabama	6	1	7	2	194	60	254	237
Arkansas					15	1	16	16
California	8	9	17	17	363	488	851	952
Colorado		1	1	1	69	35	104	119
Connecticut				1	122	41	163	161
Georgia	1		1	1	180	252	432	400
Illinois	9	2	11	4	380	198	578	664
Indiana	1	4	5	9	285	163	448	855
Iowa	3		3	1	69	116	185	62
Kansas	2	1	3	2	36	52	88	164
Kentucky	2	1	3	3	162	32	194	183
Maine	1		1	2	134	124	258	243
Maryland	1	1	2	7	123	22	145	261
Massachusetts	5	2	7	1	329	395	724	786
Michigan	3	2	5	5	163	168	331	431
Minnesota					198	65	263	404
Missouri	3		3	4	347	108	455	597
New Hampshire				2	49	92	141	184
New Jersey	1		1	1	205	55	260	246
New Mexico					17	16	33	3
New York	4	3	7	12	515	208	723	688
North Carolina	5		5	2	104	48	152	194
Ohio	5	7	12	13	572	555	1,127	1,073
Oklahoma	1		1		99	37	136	158
Pennsylvania	19	5	24	31	1,492	963	2,455	2,506
Rhode Island	1		1		40	5	45	55
Tennessee	5	1	6	8	281	49	330	351
Texas	3	1	4	5	170	93	263	336
Utah					61	33	94	104
Vermont	9	2	11	3	375	265	640	601
Virginia	6		6	1	217	92	309	241
Washington	2		2	1	49	38	87	84
West Virginia				2	132	52	184	188
Wisconsin	1		1	1	278	209	487	409
Not segregated	3	1	4	7	181	65	246	209
Total, 1926	110	44	154		8,006	5,195	13,201	
Total, 1925	101	48		149	8,632	5,533		14,165

TABLE 13.—*All quarries: Fatality rates and injury rates, by States, during the years ended December 31, 1926 and 1925*

State	Killed per thousand 300-day workers				Injured per thousand 300-day workers			
	In and about quarry	In outside works	Total, 1926	Total, 1925	In and about quarry	In outside works	Total, 1926	Total, 1925
Alabama	5.10	1.31	3.61	1.10	164.97	78.84	131.13	129.86
Arkansas					116.28	13.33	78.43	73.06
California	4.62	2.41	3.11	2.77	209.46	130.90	155.83	155.33
Colorado		2.43	1.32	1.18	197.71	85.16	136.84	140.16
Connecticut				1.40	252.07	248.48	251.16	225.81
Georgia	.95		.35	.36	171.27	137.55	149.84	145.51
Illinois	4.41	1.12	2.88	.91	186.37	110.80	151.07	150.94
Indiana	.62	1.91	1.35	1.74	176.03	78.03	120.82	165.57
Iowa	9.04		2.24	.90	207.83	114.97	137.96	55.61
Kansas	5.62	1.56	3.01	1.79	101.12	81.00	88.18	146.82
Kentucky	3.19	5.00	3.63	4.01	258.37	160.00	234.58	244.65
Maine	1.39		.66	1.23	186.11	156.76	170.75	149.63
Maryland	1.68	1.40	1.53	5.09	206.38	30.90	110.86	189.96
Massachusetts	4.22	1.81	3.06	.43	277.87	357.79	316.43	341.59
Michigan	3.16	1.99	2.56	2.62	171.76	166.83	169.22	225.65
Minnesota					354.20	135.14	252.88	329.53
Missouri	1.56		1.07	1.25	180.64	122.03	162.15	187.15
New Hampshire				2.92	137.64	317.24	218.27	269.01
New Jersey	1.00		.60	.67	204.59	82.21	155.60	165.55
New Mexico					166.67	150.94	158.65	63.83
New York	1.92	1.76	1.85	3.46	247.83	122.21	191.27	198.21
North Carolina	6.23		3.34	1.69	129.68	68.97	101.47	163.71
Ohio	1.43	2.29	1.83	2.16	163.85	181.79	172.22	178.42
Oklahoma	2.21		1.31		219.03	117.83	177.55	161.22
Pennsylvania	2.20	.63	1.45	1.86	172.43	122.02	148.38	150.68
Rhode Island	5.46		4.44		218.58	119.05	200.00	251.14
Tennessee	3.56	1.74	3.03	3.66	200.14	85.07	166.67	160.79
Texas	3.84	1.02	2.27	2.73	217.39	94.61	149.01	183.71
Utah					182.09	160.98	174.07	253.66
Vermont	3.42	.87	2.23	.68	142.69	114.72	129.61	135.33
Virginia	4.63		2.30	.48	167.57	70.02	118.44	116.88
Washington	12.50		5.14	1.85	306.25	165.94	223.65	155.27
West Virginia				1.08	111.86	91.23	105.14	101.35
Wisconsin	.99		.67	.61	275.52	434.51	326.85	250.00
Not segregated	3.09	1.85	2.64	6.03	186.21	119.93	162.48	180.02
Total, 1926	2.58	1.11	1.87		187.46	131.01	160.28	
Total, 1925	2.28	1.22		1.78	195.02	141.06		169.67

TABLE 14.—*All quarries: Fatalities, by causes and States, during the year ended December 31, 1926*

State	In and about quarry															In outside works											Grand total
	Falls or slides of rock or overburden	Handling rock at face	Timber or hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Nails, splinters, etc.	Boiler and air-tank explosions	Burns	Other causes	Total	Haulage	Machinery	Hand tools	Nails, splinters, etc.	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling rock by hand	Burns	Other causes	Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20	21	22	23	24	25	26		
Alabama		1		4	1											6						1					1	7
Arkansas																												0
California	3			2	2						1					8	2	4				2				1	9	17
Colorado																		1									1	1
Connecticut																												0
Georgia				1												1												1
Illinois	3			2	1				1		1				1	9		1				1					2	11
Indiana											1					1		1					1			2	4	5
Iowa					1			2								3												3
Kansas					1									1		2										1	1	3
Kentucky				2												2		1									1	3
Maine									1							1												1
Maryland	1															1		1									1	2
Massachusetts	2			3												5	1									1	2	7
Michigan					3											3		1			1						2	5
Minnesota																												0
Missouri	2								1							3												3
New Hampshire																												0
New Jersey											1					1												1
New Mexico																												0
New York				1					2						1	4					1	1					1	3	7

North Carolina	4				1										5													5
Ohio				1	2	1		1							5		1				1				3	2	7	12
Oklahoma	1														1													1
Pennsylvania	6	2		3	3		1	1			2				1	19	1	1			1			1		1	5	24
Rhode Island											1					1												1
Tennessee	1	1			1								2			5	1										1	6
Texas	2						1									3		1									1	4
Utah																												0
Vermont	2					1	3		2				1			9					1		1				2	11
Virginia	4			1		1										6												6
Washington	1			1												2												2
West Virginia																												0
Wisconsin							1									1												1
Not segregated				2	1											3	1										1	4
Total, 1926	32	4		23	17	3	6	4	7		7		3	1	3	110	6	13			4	6	2	1		8	4	44	154
Total, 1925	34	3		20	11	8	1	3	3	1	13			1	3	101	11	13			3	7	3	2		6	3	48	149

TABLE 15.—*All quarries: Injuries, by causes and States, during the year ended December 31, 1926*

State	In and about quarry																In outside works											Grand total
	Falls or slides of rock or overburden	Handling rock at face	Timber or hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Nails, splinters, etc.	Boiler and air-tank explosions	Burns	Other causes	Total	Haulage	Machinery	Hand tools	Nails, splinters, etc.	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling rock by hand	Burns	Other causes	Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20	21	22	23	24	25	26		
Alabama	18	12	1	3	29	12	13	37	1	4	10	4	----	2	48	194	2	1	1	2	4	4	----	1	7	1	37	60	254
Arkansas	1	5	----	2	2	----	----	1	1	1	----	----	----	----	2	15	----	1	----	----	----	----	----	----	----	----	----	1	16
California	79	49	15	17	27	44	11	38	2	22	38	6	----	3	12	363	36	74	39	28	8	64	82	51	9	41	56	488	851
Colorado	1	34	4	----	10	3	----	9	----	4	3	----	----	1	----	69	4	1	3	2	2	1	1	3	1	----	17	35	104
Connecticut	12	28	6	4	9	8	10	8	----	7	16	7	----	----	7	122	3	3	7	4	----	4	5	7	2	----	6	41	163
Georgia	14	41	15	5	13	3	5	27	----	8	26	2	----	4	17	180	21	30	16	11	3	17	31	47	52	2	22	252	432
Illinois	40	53	25	20	50	19	28	34	4	16	42	20	----	5	24	380	19	39	10	6	2	15	21	27	3	20	36	198	578
Indiana	27	33	9	13	8	19	14	30	----	10	49	3	----	4	66	285	7	25	8	3	2	11	23	19	8	10	47	163	448
Iowa	5	4	3	----	13	6	6	12	----	4	6	----	----	3	7	69	9	10	9	1	3	13	15	30	2	14	10	116	185
Kansas	3	10	----	----	3	2	2	6	----	----	3	2	----	1	4	36	2	8	2	2	2	15	4	2	----	4	11	52	88
Kentucky	19	22	6	6	23	4	5	29	4	7	15	2	----	----	20	162	----	7	1	----	----	2	2	6	10	----	4	32	194
Maine	17	26	13	2	7	12	8	14	1	3	15	----	----	1	15	134	4	17	13	3	----	10	19	12	17	7	22	124	258
Maryland	13	26	5	4	6	1	11	23	----	11	9	9	----	----	5	123	3	5	----	1	----	4	3	2	----	1	3	22	145
Massachusetts	9	56	20	8	23	12	42	80	----	10	21	6	----	7	35	329	17	24	35	8	----	31	40	117	68	5	50	395	724
Michigan	12	18	8	1	18	14	20	14	3	3	21	1	----	3	27	163	9	20	15	9	2	23	28	27	1	4	30	168	331
Minnesota	13	32	7	7	10	11	5	51	2	4	15	24	----	1	16	198	----	11	6	----	----	5	5	23	9	----	6	65	263
Missouri	42	59	12	4	35	9	25	67	----	14	16	9	----	2	53	347	8	10	7	7	----	9	16	10	15	5	21	108	455
New Hampshire	----	4	9	----	2	6	9	2	----	4	5	1	----	----	7	49	----	6	4	3	----	7	7	58	3	----	4	92	141
New Jersey	15	16	6	5	26	17	11	34	1	12	26	6	----	5	25	205	5	4	3	5	----	9	11	10	1	----	7	55	260
New Mexico	----	----	----	8	----	----	----	1	----	5	1	1	----	----	1	17	----	----	----	1	----	1	2	9	2	1	----	16	33
New York	22	75	35	10	33	37	30	50	3	26	66	16	----	15	97	515	26	17	20	12	3	22	22	32	15	15	24	208	723

North Carolina	15	14	----	6	1	1	2	15	----	14	9	----	----	5	22	104	4	9	7	----	----	4	5	6	6	1	6	48	152
Ohio	29	24	36	22	75	42	32	61	4	30	96	8	----	17	96	572	68	76	36	18	11	45	59	58	9	40	135	555	1, 127
Oklahoma	17	23	----	1	12	4	3	17	----	----	7	3	----	----	12	99	5	5	3	3	----	5	3	----	2	2	9	37	136
Pennsylvania	135	403	38	40	178	67	91	168	5	68	81	19	----	15	184	1, 492	104	107	75	51	10	108	98	112	57	70	171	963	2, 455
Rhode Island	4	----	----	4	----	1	1	11	2	2	11	1	----	1	2	40	1	1	----	----	1	----	2	----	----	----	----	5	45
Tennessee	20	66	24	13	20	19	11	55	----	9	18	9	3	3	11	281	2	3	----	1	----	4	4	1	1	4	29	49	330
Texas	13	32	6	4	17	10	2	33	----	3	25	11	----	3	11	170	8	17	6	4	4	7	8	11	1	12	15	93	263
Utah	7	18	2	3	6	3	1	7	----	----	5	2	----	3	4	61	2	5	3	----	2	1	2	4	3	1	10	33	94
Vermont	20	71	*43	4	2	15	25	43	1	15	42	9	----	4	81	375	2	34	23	5	3	21	20	15	105	4	33	265	640
Virginia	24	38	10	47	20	5	4	19	1	7	18	2	----	4	18	217	7	14	5	4	----	13	3	12	7	4	23	92	309
Washington	12	1	1	4	8	2	5	2	----	4	5	2	----	3	----	49	1	16	1	2	3	----	----	----	1	----	14	38	87
West Virginia	32	17	2	3	24	10	3	15	----	10	4	----	----	----	12	132	8	3	5	----	----	9	6	4	3	7	7	52	184
Wisconsin	11	74	8	4	26	13	8	78	----	6	23	3	----	4	20	278	6	15	28	2	----	19	16	66	28	6	23	209	487
Not segregated	18	36	1	22	14	5	5	16	----	8	21	----	----	----	35	181	2	4	14	8	1	10	3	2	1	8	12	65	246
Total, 1926	719	1, 420	370	296	750	436	448	1107	35	351	768	188	3	119	996	8, 006	395	622	405	206	66	513	566	784	449	289	900	5. 195	13, 201
Total, 1925	846	1, 639	335	229	912	410	462	1267	47	436	674	183	4	130	1, 058	8, 632	433	638	468	215	81	471	568	1099	397	280	883	5, 533	14, 165

ACCIDENTS BY PRINCIPAL CAUSES

Table 16 compares the percentage of accidents from various causes in the quarries and at outside works for all classes of quarries combined. The table shows the percentage of fatalities, by causes, for the entire industry, the percentage of accidents inside the quarries, and the percentage of accidents outside the quarries. The percentages of accidents inside and outside the quarries separately show more nearly the true hazard of each branch of the industry than those based on the industry as a unit. However, the annual fluctuation in quarry hazards is even more accurately indicated in Table 17, which shows separately the number of accidents for each class of quarries from any given cause based on 1,000 full-time or 300-day workers. By this method of presentation the injury rate from any given cause may be followed from year to year uninfluenced by the increase or decrease in other classes of accidents.

Particular attention is called to Tables 25, 26, and 27. The first two classify the accidents according to the degree of disability of the injured person, and Table 27 further segregates the different classes of accidents by the kind of quarry in which they occurred.

TABLE 16.—*All quarries: Causes of fatalities and injuries, showing percentage due to each cause and corresponding rates per thousand 300-day workers employed during the year ended December 31, 1926*

Cause of accident	Number killed				Number injured			
	Per cent of—		Per thousand 300-day workers		Per cent of—		Per thousand 300-day workers	
	Grand total	Class total	Grand total	Class total	Grand total	Class total	Grand total	Class total
	1	2	3	4	5	6	7	8
In and about quarry:								
1. Falls or slides of rock or overburden	20.78	29.09	0.39	0.75	5.45	8.98	8.73	16.84
2. Handling rock at face	2.60	3.64	.05	.09	10.76	17.74	17.24	33.25
3. Timber or hand tools					2.80	4.62	4.49	8.66
4. Explosives	14.93	20.91	.28	.54	2.24	3.70	3.59	6.93
5. Haulage	11.04	15.46	.21	.40	5.68	9.37	9.11	17.56
6. Falls of persons	1.95	2.73	.04	.07	3.30	5.44	5.29	10.21
7. Falling objects (other than 1 and 2)	3.90	5.45	.07	.14	3.39	5.59	5.44	10.49
8. Flying objects	2.60	3.64	.05	.09	8.39	13.83	13.44	25.92
9. Electricity	4.54	6.36	.08	.17	.27	.44	.43	.82
10. Drilling and channeling (by machine or hand)					2.66	4.38	4.26	8.22
11. Machinery	4.54	6.36	.08	.17	5.82	9.59	9.33	17.98
12. Nails, splinters, etc					1.42	2.35	2.28	4.40
13. Boiler and air-tank explosions	1.95	2.73	.04	.07	.02	.04	.04	.07
14. Burns	.65	.90	.01	.02	.90	1.49	1.45	2.79
15. Other causes	1.95	2.73	.04	.07	7.55	12.44	12.09	23.32
Total	71.43	100.00	1.34	2.58	60.65	100.00	97.21	187.46
In outside works:								
16. Haulage	3.90	13.64	.07	.15	2.99	7.60	4.79	9.96
17. Machinery	8.44	29.55	.16	.33	4.71	11.97	7.55	15.69
18. Hand tools					3.07	7.80	4.92	10.21
19. Nails, splinters, etc					1.56	3.97	2.50	5.20
20. Electricity	2.60	9.09	.05	.10	.50	1.27	.80	1.66
21. Falls of persons	3.90	13.64	.07	.15	3.89	9.88	6.23	12.94
22. Falling objects (rocks, timbers, etc.)	1.29	4.54	.02	.05	4.28	10.90	6.87	14.27
23. Flying objects	.65	2.27	.01	.03	5.94	15.09	9.52	19.77
24. Handling rock by hand					3.40	8.64	5.45	11.32
25. Burns	5.19	18.18	.10	.20	2.19	5.56	3.51	7.29
26. Other causes	2.60	9.09	.05	.10	6.82	17.32	10.93	22.70
Total	28.57	100.00	.53	1.11	39.35	100.00	63.07	131.01
Grand total	100.00		1.87		100.00		160.28	

TABLE 17.—*All quarries: Number injured per thousand 300-day workers, by causes, during the years ended December 31, 1925 and 1926*

Cause of accident	Cement rock		Granite		Limestone		Marble		Sandstone and bluestone		Slate		Trap rock		Total	
	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926
In and about quarry:																
1. Falls or slides of rock or overburden	22.909	15.263	12.804	15.180	19.915	18.804	5.256	2.676	16.140	9.443	12.280	13.996	49.113	32.454	19.113	16.835
2. Handling rock at face	20.099	8.547	32.864	25.361	43.054	37.563	8.760	33.898	23.386	31.911	44.208	58.083	64.120	33.752	37.029	33.249
3. Timber or hand tools	5.835	2.442	4.837	7.034	6.624	8.672	11.827	22.748	11.858	7.489	7.777	12.246	19.100	9.087	7.568	8.663
4. Explosives	1.945	7.326	4.979	7.034	5.741	7.348	.876	2.676	3.623	3.908	5.321	5.598	13.188	11.683	5.174	6.931
5. Haulage	26.151	15.263	7.256	4.998	25.788	24.692	7.446	6.245	16.469	12.048	2.865	3.849	37.290	19.472	20.604	17.561
6. Falls of persons	12.103	9.564	10.386	9.256	8.611	10.543	9.637	9.813	5.929	10.746	6.549	5.248	13.643	16.443	9.263	10.209
7. Falling objects (other than 1 and 2)	15.129	9.768	11.524	10.367	9.671	10.680	7.446	8.029	7.246	5.536	9.824	11.547	13.188	18.174	10.438	10.490
8. Flying objects	24.854	13.635	35.709	43.132	27.820	27.157	10.950	19.625	21.739	14.328	15.145	13.296	65.029	37.213	28.624	25.920
9. Electricity	1.081	1.424	.569	.741	1.060	.685	-------	1.338	.988	.326	.410	.700	4.547	1.298	1.062	.820
10. Drilling and channeling (by machine or hand)	6.267	4.884	14.938	11.107	9.626	8.854	14.893	13.827	3.623	6.187	3.684	2.449	13.643	6.924	9.850	8.219
11. Machinery	12.103	9.361	12.235	16.475	14.925	21.543	19.273	12.935	12.517	8.792	15.555	16.095	33.652	25.530	15.227	17.983
12. Nails, splinters, etc	3.890	2.849	3.983	6.479	4.018	4.655	3.942	4.014	1.976	1.302	3.275	2.449	10.459	7.356	4.134	4.402
13. Boiler and air-tank explosions	-------	-------	.285	-------	.088	.137	-------	-------	-------	-------	-------	-------	-------	-------	.090	.070
14. Burns	3.890	2.645	1.280	2.036	3.179	3.195	1.314	3.122	5.600	1.628	1.228	1.050	3.638	4.327	2.937	2.786
15. Other causes	22.477	20.757	21.340	20.733	19.915	22.866	16.207	19.179	41.831	29.306	43.389	34.640	37.744	21.203	23.903	23.321
Total	178.733	123.728	174.989	179.933	200.035	207.394	117.827	160.125	172.925	142.950	171.510	181.246	378.354	244.916	195.016	187.459
Number of 300-day workers in and about quarry	4,627	4,914	7,029	5,402	22,646	21,910	2,283	2,242	3,036	3,071	2,443	2,858	2,199	2,311	44,263	42,708
In outside works:																
16. Haulage	5.825	4.459	4.154	2.244	21.804	23.104	5.185	6.650	10.193	8.739	6.869	5.139	21.053	19.802	11.039	9.961
17. Machinery	9.242	8.763	15.134	13.745	23.794	25.188	12.962	17.416	29.445	26.217	16.683	23.638	54.737	41.254	16.266	15.686
18. Hand tools	6.777	5.278	29.080	20.196	14.923	14.497	10.694	12.033	14.722	22.472	7.851	1.028	15.789	21.452	11.931	10.214
19. Nails, splinters, etc	4.257	3.844	8.902	4.488	5.472	7.520	5.833	4.750	12.457	4.994	7.851	5.139	6.316	13.201	5.481	5.195
20. Electricity	2.352	1.742	1.780	.280	2.073	2.084	.972	1.267	4.530	-------	-------	2.056	1.053	3.301	2.065	1.665
21. Falls of persons	10.250	9.173	5.638	9.537	15.337	19.570	8.101	11.083	30.578	31.211	12.758	10.277	20.000	23.102	12.008	12.937
22. Falling objects (rocks, timbers, etc.)	11.314	9.225	8.902	18.794	19.234	19.933	10.369	10.766	47.565	36.205	6.869	18.499	24.210	29.703	14.481	14.274
23. Flying objects	8.906	7.738	143.917	75.456	30.094	22.832	6.805	15.516	47.565	21.223	12.758	12.333	16.842	56.106	28.019	19.772
24. Handling rock by hand	2.184	.564	22.849	34.222	7.710	7.883	35.645	42.749	23.783	16.230	52.012	76.053	4.211	11.551	10.121	11.323
25. Burns	6.273	6.765	.594	1.122	10.529	12.594	8.101	1.583	4.530	6.242	1.963	2.056	8.421	3.301	7.139	7.288
26. Other causes	16.691	18.603	18.991	12.903	30.177	32.074	10.045	10.133	69.083	59.925	37.291	30.832	28.421	44.554	22.512	22.697
Total	84.071	76.154	259.941	192.987	181.147	187.279	114.712	133.946	294.451	233.458	162.905	187.050	201.053	267.327	141.062	131.012
Number of 300-day workers in outside works	17,854	19,513	3,370	3,565	12,062	11,037	3,086	3,158	883	801	1,019	973	950	606	39,224	39,653
Total injured (rate)	103.554	85.725	202.519	185.123	193.471	200.656	116.037	144.815	200.306	161.674	168.977	182.720	324.865	249.571	169.667	160.282
Total 300-day workers	22,481	24,427	10,399	8,967	34,708	32,947	5,369	5,400	3,919	3,872	3,462	3,831	3,149	2,917	83,487	82,361

FALLS OR SLIDES OF ROCK OR OVERBURDEN

Falls or slides of rock or overburden are the chief cause of fatal accidents at stone quarries. They are not, however, the chief cause of nonfatal injuries. Moreover, the injury rate from accidents of this kind is influenced greatly by the type of quarrying operations and is from two to three times as high for quarries where the stone is to be crushed or used in nondimension form as it is for quarries that produce dimension stone.

Nearly 21 per cent of fatal accidents at all quarries and outside plants in 1926 and 29 per cent of all fatal accidents at the quarries proper, exclusive of outside plants, were caused by falls or slides of rock or overburden. Similar records for nonfatal injuries show that the same class of accidents covered 5½ per cent of the total number of injuries at the quarries and outside plants combined and nearly 9 per cent of the total for the quarries exclusive of the outside plants.

Accidents from falls or slides of rock or overburden resulted in 32 deaths and 719 lost-time injuries during 1926. The lost-time injuries included 1 permanent total disability and 31 permanent partial disabilities. The death rate per thousand 300-day workers was 0.39 when figured on the basis of all employees and 0.75 when based on the quarry or "inside" employees only. The corresponding injury rates were 8.73 and 16.84, respectively. All of these rates represent an improvement when compared with the previous year. The injury rates also indicate an improvement over the year 1921 and all succeeding years. The fatality rates, however, although lower than those for 1925, were higher than for the four years immediately preceding 1925. Both dimension-stone quarries and nondimension-stone quarries contributed to the reduction of the injury rate in 1926. Lower injury rates were shown for quarries producing cement rock, limestone, marble, sandstone, and trap rock. Tables 16, 17, and 24 show the accident rates from falls or slides of rock or overburden in 1926 and preceding years.

EXPLOSIVES

In 1926 the quarry industry, together with open-pit mining of nonmetallic minerals other than coal, used 77,000,000 pounds of dynamite and other high explosives and 6,000,000 pounds of black blasting powder. Most of these explosives were consumed at quarries, but the figures for the two industries are not segregated.

Accidents caused by the use of explosives account for about 15 per cent of all deaths and from 2 to 3 per cent of all injuries among quarry workers, including workers at plants outside the quarry pits. The proportion based exclusively on workers inside the quarries is 21 per cent for fatalities and 3 to 4 per cent for nonfatal injuries.

During the calendar year 1926 there were 23 deaths and 296 nonfatal lost-time injuries caused by explosives at quarries. Based on the number of men working inside the quarries, where the accidents occurred, these figures indicate a death rate of 0.54 and an injury rate of 6.93 per thousand 300-day employees. The same figures, if charged against all employees, including those at the outside plants, show a fatality rate of 0.28 and an injury rate of 3.59. The rates for 1926 were higher than those for the preceding year, and a comparison of the record back to and including the year 1921 shows that both the fatality rate and the injury rate in 1926 were higher than those rates for any year except 1922, so far as the quarry pits alone are concerned. For the industry as a whole, including workers at outside plants, the fatality rate in 1926 was not as high as in 1922, nor was the injury rate as high as it was in 1922, 1923, or 1924.

As previously stated, 23 of the accidents from explosives during 1926 were fatal and 296 were nonfatal. All but 30 of the nonfatal injuries caused temporary disability only; the temporary injuries included 49 cases where disability exceeded 14 days, and 217 cases where disability exceeded the remainder of the shift on which the accident occurred but did not exceed 14 days. The 30 permanent injuries included 2 cases of total disability and 28 cases of partial disability. The reports showed that for each fatal accident from explosives there were between 12 and 13 nonfatal injuries.

TABLE 18.—*Fatalities and injuries due to explosives during the year ended December 31, 1926*

Kind of quarry	Transportation	Charging	Drilling into old holes	Striking in loose rock	Thawing	Caps, detonators, etc.	Unguarded shots	Returned too soon	Premature shots	Delayed blast	Miscellaneous	Total
Killed:												
Cement rock									2		1	3
Granite								1			2	3
Limestone		2		2				1	2	1	4	12
Marble											1	1
Sandstone and bluestone												0
Slate											1	1
Trap rock		2								1		3
Total, 1926		4		2				2	4	2	9	23
Total, 1925		1	6			1			6		6	20
Total, 1924		3				1		1	10		1	16
Total, 1923	1	2	1					2	5	1		12
Total, 1922	1	14	2			1			13	1	4	36
Total, 1921		3	2				1		5		6	17
Total, 1920		12	3	1		1	2	3	11	2	1	36
Total, 1919		3	2			2		3	8	2	4	24
Total, 1918		4	1				1	1	6		4	17
Total, 1917	4			1		1		1	10	(1)	4	21
Injured:												
Cement rock	3	2	1			6			4	1	19	36
Granite	5	1	2					1	1	1	27	38
Limestone	5	5	5	18	1	5	3	12	17	5	85	161
Marble				2					3		1	6
Sandstone and bluestone				1	2	3			3		3	12
Slate			1						2		13	16
Trap rock	1	4	1	2				1	6		12	27
Total, 1926	14	12	10	23	3	14	3	14	36	7	160	296
Total, 1925	11	6	12	11	1	9	2	8	28	4	137	229
Total, 1924	18	17	16	4		12	10	12	24	8	192	313
Total, 1923	13	12	25	26		6	10	13	44	11	154	314
Total, 1922	7	22	12	15		7	3	8	20	7	187	288
Total, 1921	6	14	11	17	1	4	1	7	35	8	94	198
Total, 1920	8	8	16	5	5	13	2	13	22	13	109	214
Total, 1919	9	17	14	8		4	7	18	24	1	65	167
Total, 1918	10	6	8	5	1	3	7	18	18	1	74	151
Total, 1917	8	10	12	25		17	7	30	18	(1)	144	271

[1] Not segregated.

HAULAGE

From 15 to 20 per cent of all deaths at quarries and at "outside" plants in the United States are due to haulage accidents, and about 9 per cent of all nonfatal lost-time injuries are due to the same cause. Complete returns for the calendar year 1926 from operating companies showed that haulage accidents caused 17 deaths and 750 injuries among quarry workers and 6 deaths and 395 injuries among workers at "outside" plants—that is, at the crushers, mills, rock-dressing plants, and limekilns. The death rate, based on the number of men employed in the entire industry, was 0.28 per thousand 300-day workers, and the injury rate was 13.90. The death rate was slightly in excess of that for the previous year, but the injury rate was lower; moreover, the injury rate was lower than that for any of the five years preceding 1926. Being based on larger numbers, a reduction

in the injury rate from haulage is more significant as a mark of progress in accident prevention than the fatality rate, as fatalities from haulage each year are relatively few and the rates based thereon may fluctuate widely with a decrease or increase of only one or two cases in the number of fatal accidents.

Injuries from haulage accidents are more frequent among men working in the quarry pits than among employees who work at plants outside the quarries. The haulage-accident rate is also higher for pit workers at quarries producing crushed or nondimension stone than at quarries producing dimension stone. The rate for dimension-stone quarries is only about one-fourth as high as that for nondimension-stone quarries. In 1926 the injury rate per thousand 300-day employees was 22.93 for nondimension stone and only 5.18 for dimension stone. For workers outside the quarries the injury rate from haulage was 11.24 for nondimension stone and 4.75 for dimension stone; these figures are typical of the relation between the rates for the two classes of quarries in previous years.

Of the 1,168 accidents from haulage in 1926 at all quarries and outside plants, 23 resulted in the death of the injured employees, 3 in permanent total disability, 62 in permanent partial disability, 294 in temporary disability for more than 14 days, and 786 in temporary disability for 1 to 14 days. The figures as a whole showed one fatality for every 50 nonfatal injuries.

A classification of accidents from haulage inside the quarries, as given in Tables 19 and 26, shows that hand and animal haulage was responsible for 257 accidents, mechanical haulage for 161, and railway cars and locomotives for 349. A similar classification of haulage accidents outside the quarries showed 130 accidents caused by hand and animal haulage, 86 by mechanical haulage, and 185 by railway cars and locomotives.

TABLE 19.—*Fatalities and injuries due to haulage*[1] *during the year ended December 31, 1926*

Kind of quarry	In and about quarry				In outside works				Grand total
	Hand and animal	Mechanical	Railway cars and locomotives	Total	Hand and animal	Mechanical	Railway cars and locomotives	Total	
Killed:									
Cement rock			1	3			4	4	7
Granite		2	1	1					1
Limestone		1	10	11		1	1	2	13
Marble									0
Sandstone and bluestone									0
Slate									0
Trap rock		2		2					2
Total, 1926		5	12	17		1	5	6	23
Total, 1925	1	1	9	11		2	9	11	22
Total, 1924	1		10	11	2	4	6	12	23
Total, 1923		4	14	18	2		8	10	28
Total, 1922		2	7	9		1	5	6	15
Total, 1921	2	2	8	12	2		3	5	17
Total, 1920	5	6	21	32	1	1	8	10	42
Total, 1919	3	5	11	19	1		8	9	28
Total, 1918	1	5	6	12	4	2	10	16	28
Total, 1917	2	3	10	15	1	3	9	13	28
Injured:									
Cement rock	23	6	46	75	27	11	49	87	162
Granite	7	7	13	27	4	1	3	8	35
Limestone	195	110	236	541	91	58	106	255	796
Marble	4	6	4	14	6	6	9	21	35
Sandstone and bluestone	18	6	13	37		3	4	7	44
Slate	2	6	3	11	1	2	2	5	16
Trap rock	8	15	22	45	1	4	7	12	57
Total, 1926	257	156	337	750	130	85	180	395	1,145
Total, 1925	294	177	441	912	157	73	203	433	1,345
Total, 1924	314	213	440	967	111	88	176	375	1,342
Total, 1923	273	166	512	951	227	77	221	525	1,476
Total, 1922	270	134	361	765	125	74	136	335	1,100
Total, 1921	150	119	285	554	106	52	138	296	850
Total, 1920	234	157	399	790	180	76	194	450	1,240
Total, 1919	192	117	354	663	92	51	150	293	956
Total, 1918	206	128	342	676	84	38	110	232	908
Total, 1917	283	209	334	826	114	83	240	437	1,263

[1] Does not include "Handling rock at face."

MACHINERY

Thirteen per cent of all fatalities at quarries and outside plants in 1926 were caused by machinery, and more than 10 per cent of the nonfatal lost-time injuries were due to the same cause. The preceding figures do not cover drilling accidents, which caused no deaths during the year, but which were responsible for between 2 and 3 per cent of all injuries.

Accidents from machinery include those caused by hoisting cables and attachments, guys, cranes, derricks, pumps and hoisting engines, steam shovels, crushers, and all other machinery except drills. The reports from operating companies showed that 7 deaths and 768 injuries to men working inside the quarries and 13 deaths and 622

injuries to men working outside the quarries were caused by accidents from machinery during 1926. The death rates per thousand 300-day workers were 0.17 for pit workers and 0.33 for outside-plant employees, a combined rate of 0.24 for all employees considered together. The corresponding injury rates were 17.98, 15.69, and 16.88, respectively. Of the 1,390 nonfatal injuries during the year, 5 resulted in permanent total disability, 81 in permanent partial disability, 330 in temporary disability lasting more than 14 days, and 974 in temporary disability lasting 1 to 14 days. The ratio of fatalities to nonfatal injuries was 1 to 70.

TABLE 20.—*Fatalities and injuries due to machinery during the year ended December 31, 1926*

Kind of quarry	In and about quarry						In outside works						Grand total
	Hoisting cables and attachments	Guys, cranes, derricks, and attachments	Pumps and hoisting engines	Steam shovels	Other machinery	Total	Hoisting cables and attachments	Guys, cranes, derricks, and attachments	Pumps and hoisting engines	Crushers	Other machinery	Total	
Killed:													
Cement rock							1			1	6	8	8
Granite	1					1							1
Limestone	1		1	2	1	5		2			3	5	10
Marble		1				1							1
Sandstone and bluestone													0
Slate													0
Trap rock													0
Total, 1926	2	1	1	2	1	7	1	2		1	9	13	20
Total, 1925	3	5		4	1	13	2			1	10	13	26
Total, 1924	4	3			1	8	4			2	6	12	20
Total, 1923	3		1	3	2	9				4	8	12	21
Total, 1922	3	2		1	1	7	2	1		2	12	17	24
Total, 1921	2	1		3	2	8				2	8	10	18
Total, 1920	3			2		5				4	10	14	19
Total, 1919	3	3	1	2	3	12		2		2	3	7	19
Total, 1918		3	1	1	3	8	2	2			5	9	17
Total, 1917	2	1	1		1	5	[1]	2		2	6	10	15
Injured:													
Cement rock	9	1	2	30	4	46	26	9	1	21	114	171	217
Granite	26	36	2	8	17	89	4	19	2	4	20	49	138
Limestone	98	43	22	162	147	472	38	38	12	67	123	278	750
Marble	13	7			9	29	8	5	1		41	55	84
Sandstone and bluestone	5	9	1	5	7	27	2	6	2	2	9	21	48
Slate	19	4		3	20	46	3	4	1	1	14	23	69
Trap rock	6	9	3	22	19	59	4	1	2	10	8	25	84
Total, 1926	176	109	30	230	223	768	85	82	21	105	329	622	1,390
Total, 1925	141	91	40	231	171	674	93	73	16	137	319	638	1,312
Total, 1924	157	105	28	231	170	691	115	59	21	139	377	711	1,402
Total, 1923	139	127	28	286	244	824	97	84	17	136	462	796	1,620
Total, 1922	147	88	26	186	156	603	83	72	17	95	385	652	1,255
Total, 1921	109	72	24	136	209	550	59	42	24	92	361	578	1,128
Total, 1920	131	75	13	181	118	518	77	50	23	157	402	709	1,227
Total, 1919	105	95	16	137	148	501	57	41	28	80	317	523	1,024
Total, 1918	112	90	27	124	125	478	48	34	13	70	304	469	947
Total, 1917	120	92	54	[1]	184	450	[1]	83		186	632	901	1,351

[1] Not segregated.

DIMENSION-STONE QUARRIES AND NONDIMENSION-STONE QUARRIES CLASSIFIED

In this bulletin dimension stone includes stone for building, monuments, pulpstone, grindstone, curbing, flagstone, foundations, paving blocks, electrical purposes, and roofing; nondimension stone includes stone for road work, fluxing, ballast, concrete, concrete blocks, refractories, furnace bottoms, brickmaking, granules, stucco, open-hearth smelters, sugar, glass, paper, paint, mineral wool, filter stone, poultry grit, and roofing gravel, and included with the nondimension stone is some broken stone, such as rubble, riprap, and material used for sea walls, retaining walls, and bridge work.

ACCIDENTS IN DIMENSION-STONE QUARRIES AND NONDIMENSION-STONE QUARRIES

For the purpose of comparing their safety records, all quarries may be divided into two classes—those that produce dimension stone for monuments, buildings, etc., and those that produce stone that is to be crushed for use in the manufacture of cement or lime, or for use as ballast, or for any other purpose that does not require the stone to be of any particular shape or dimension.

Comparative data for these two classes of quarries have been compiled by the Bureau of Mines since 1916. The figures have invariably shown lower accident rates for quarries that produced dimension stone. In 1926, for example, the death rate for workers inside the quarry was 2.50 per thousand 300-day workers for dimension-stone quarries and 2.64 per cent for nondimension-stone quarries. The injury rate was 171 for dimension stone and 192 for nondimension stone. The following figures show the comparative accident rates for the two classes of quarries since 1916.

Accidents at dimension-stone and nondimension-stone quarries [1]

[Per thousand 300-day workers]

Year	Dimension stone		Nondimension stone	
	Fatal	Nonfatal	Fatal	Nonfatal
1926	2.50	171	2.64	192
1925	1.94	181	2.59	193
1924	1.28	161	2.25	189
1923	1.15	144	2.21	187
1922	1.94	140	2.50	190
1921	3.23	104	3.40	231
1920	1.22	152	2.66	213
1919	2.15	137	4.23	240
1918	1.41	169	1.89	193
1917	1.04	191	2.08	193
1916	2.79	126	3.05	239

[1] Figures relate to quarries only; outside plants not included.

An examination of the accident rates in Table 24 will show that, as a class, quarries that produce nondimension stone have higher injury rates from various classes of accidents. For example, injuries from falls or slides of rock or overburden occur about twice as frequently in nondimension-stone quarries as they do in dimension-stone quarries. Haulage accidents are also of greater frequency per man employed in dimension-stone quarries, as are also accidents caused by explosives and those due to handling rock at the face. On the other hand, accidents caused by machinery have, at least during the past three years, occurred more frequently at dimension-stone than at nondimension-stone quarries, as may be seen in Table 24.

The situation at "outside" plants is quite different from that inside the quarry pits. The figures show higher injury rates at "outside" plants at dimension-stone quarries than at "outside" plants at nondimension-stone quarries. Strictly speaking, "outside" work at the two classes of quarries is hardly comparable. The handling and rock dressing of dimension stone are quite different from the operations connected with handling and treatment of crushed stone, particularly when the latter type of stone is used in the manufacture of cement or lime. Yet a comparison of each of the two classes of plants as a whole shows a higher accident-frequency rate for rock dressing and other "outside" work at dimension-stone quarries. Table 24 shows that the higher rates are due to a greater frequency of accidents from hand tools, flying objects, and handling rock by hand. The figures covering all kinds of accidents at "outside" plants at dimension-stone quarries in 1926 showed 169 injuries per thousand men employed (300-day workers), as compared with 117 per thousand employed at "outside" plants of nondimension-stone quarries.

TABLE 21.—*Dimension-stone and nondimension-stone quarries: Men employed and number killed and injured during the year ended December 31, 1926*

Kind of quarry	In and about quarry					In outside works					Total					Widows	Orphans
	Men employed	Days of labor performed	Average days active	Killed	Injured	Men employed	Days of labor performed	Average days active	Killed	Injured	Men employed	Days of labor performed	Average days active	Killed	Injured		
Dimension stone:																	
Cement rock																	
Granite	3,689	924,233	251	8	534	2,466	694,406	282		507	6,155	1,618,639	263	8	1,041	7	18
Limestone	2,461	488,688	199	3	353	2,181	389,121	178	3	163	4,642	877,809	189	6	516	6	11
Marble	2,021	585,503	290	7	314	3,053	934,262	306	2	409	5,074	1,519,765	300	9	723	5	14
Sandstone and bluestone	1,987	504,651	254	2	203	622	155,717	250		126	2,609	660,368	253	2	329	2	3
Slate	3,112	837,037	269	8	503	1,108	291,817	263		182	4,220	1,128,854	268	8	685	2	6
Trap rock	72	17,644	245		4						72	17,644	245		4		
Total	13,342	3,357,756	252	28	1,911	9,430	2,465,323	261	5	1,387	22,772	5,823,079	256	33	3,298	22	52
Nondimension stone:																	
Cement rock	4,850	1,474,164	304	10	608	18,146	5,853,993	323	27	1,486	22,996	7,328,157	319	37	2,094	25	55
Granite	1,573	338,359	215	7	275	342	70,662	207		50	1,915	409,021	214	7	325	2	
Limestone	21,957	5,526,835	252	48	3,727	9,639	2,737,686	284	11	1,732	31,596	8,264,521	262	59	5,459	33	55
Marble	78	17,251	221		13	45	13,182	293		14	123	30,433	247		27		
Sandstone and bluestone	1,751	375,945	215	2	215	283	62,936	222		37	2,034	438,881	216	2	252		
Slate	4	480	120								4	480	120				
Trap rock	2,554	572,887	224	6	477	628	152,457	243		141	3,182	725,344	228	6	618	3	8
Total	32,767	8,305,921	253	73	5,315	29,083	8,890,916	306	38	3,460	61,850	17,196,837	278	111	8,775	63	118
All other and not stated:																	
Cement rock																	
Granite	1,426	358,201	251	4	163	1,116	304,283	273	1	131	2,542	662,484	261	5	294	4	8
Limestone	2,114	557,379	264	4	464	687	184,351	268		172	2,801	741,730	265	4	636	2	2
Marble	260	69,825	269		32						260	69,825	269		32		
Sandstone and bluestone	177	40,591	229		21	98	21,690	221		24	275	62,281	226		45		
Slate	80	20,000	250		15						80	20,000	250		15		
Trap rock	454	102,714	226	1	85	112	29,450	263		21	566	132,164	234	1	106	1	4
Total	4,511	1,148,710	255	9	780	2,013	539,774	268	1	348	6,524	1,688,484	259	10	1,128	7	14

TABLE 22.—*Dimension-stone and nondimension-stone quarries: Accident rates compared on a 300-day basis during the year ended December 31, 1926*

Kind of quarry	Number of 300-day workers			Killed						Injured					
				In and about quarry		In outside works		Total		In and about quarry		In outside works		Total	
	In and about quarry	In outside works	Total	Number	Per thousand 300-day workers	Number	Per thousand 300-day workers	Number	Per thousand 300-day workers	Number	Per thousand 300-day workers	Number	Per thousand 300-day workers	Number	Per thousand 300-day workers
Dimension stone:															
Granite	3,081	2,314	5,395	8	2.60			8	1.48	534	173.32	507	219.10	1,041	192.96
Limestone	1,629	1,297	2,926	3	1.84	3	2.31	6	2.05	353	216.70	163	125.67	516	176.35
Marble	1,952	3,114	5,066	7	3.59	2	.64	9	1.78	314	160.86	409	131.34	723	142.72
Sandstone and bluestone	1,682	519	2,201	2	1.19			2	.91	203	120.69	126	242.77	329	149.48
Slate	2,790	973	3,763	8	2.87			8	2.13	503	180.29	182	187.05	685	182.04
Trap rock	59		59							4	67.80			4	67.80
Total	11,193	8,217	19,410	28	2.50	5	.61	33	1.70	1,911	170.73	1,387	168.80	3,298	169.91
Nondimension stone:															
Cement rock	4,914	19,513	24,427	10	2.04	27	1.38	37	1.51	608	123.73	1,486	76.15	2,094	85.72
Granite	1,127	236	1,363	7	6.21			7	5.14	275	244.01	50	211.86	325	238.44
Limestone	18,422	9,126	27,548	48	2.61	11	1.21	59	2.14	3,727	202.31	1,732	189.79	5,459	198.16
Marble	58	44	102							13	224.14	14	318.18	27	264.71
Sandstone and bluestone	1,253	210	1,463	2	1.60			2	1.37	215	171.59	37	176.19	252	172.25
Slate	2		2												
Trap rock	1,910	508	2,418	6	3.14			6	2.48	477	249.74	141	277.56	618	255.58
Total	27,686	29,637	57,323	73	2.64	38	1.28	111	1.94	5,315	191.97	3,460	116.75	8,775	153.08
All other and not stated:															
Granite	1,194	1,014	2,208	4	3.35	1	.99	5	2.26	163	136.52	131	129.19	294	133.15
Limestone	1,858	615	2,373	4	2.15			4	1.69	464	249.73	172	279.67	636	268.02
Marble	233		233							32	137.34			32	137.34
Sandstone and bluestone	135	72	307							21	155.56	24	333.33	45	146.58
Slate	67		67							15	223.88			15	223.88
Trap rock	342	98	440	1	2.92			1	2.27	85	248.54	21	214.29	106	240.91
Total	3,829	1,799	5,628	9	2.35	1	.56	10	1.78	780	203.71	348	193.44	1,128	200.43
Grand total	42,708	39,653	82,361	110	2.58	44	1.11	154	1.87	8,006	187.46	5,195	131.01	13,201	160.28

TABLE 23.—*Dimension-stone and nondimension-stone quarries: Fatalities and injuries, by causes, during the year ended December 31, 1926*

Kind of quarry	In and about quarry																In outside works												Grand total
	Falls or slides of rock or overburden	Handling rock at face	Timber or hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Nails, splinters, etc.	Boiler and air-tank explosions	Burns	Other causes	Total	Haulage	Machinery	Hand tools	Nails, splinters, etc.	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling rock by hand	Burns	Other causes	Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20	21	22	23	24	25	26		
DIMENSION STONE																													
Killed:																													
Cement rock																													0
Granite	4					1			2		1					8													8
Limestone									2		1					3		1				1	1					3	6
Marble		1		1			3		1		1					7					1		1					2	9
Sandstone and bluestone		1						1								2													2
Slate	6			1			1									8													8
Trap rock																													0
Total	10	2		2		1	4	1	5		3					28		1			1	1	2					5	33
Injured:																													
Cement rock																													0
Granite	28	66	25	20	15	34	37	100	2	37	61	31		5	73	534	6	43	59	14	1	25	56	181	87	2	33	507	1,041
Limestone	23	38	10	10	14	19	16	59	2	13	51	15		2	81	353	7	26	6	2	1	11	15	19	21	4	51	163	516
Marble	5	64	44	6	13	18	17	39	3	27	25	4		7	42	314	18	52	36	14	4	33	32	48	135	5	32	409	723
Sandstone and bluestone	7	16	13	5	5	18	9	17	1	13	19	2		4	74	203	3	15	8	3		11	27	8	11	2	38	126	329
Slate	40	151	35	16	11	15	33	38	2	7	46	7		3	99	503	5	23	1	5	2	10	18	12	74	2	30	182	685
Trap rock						3	1									4													4
Total	103	335	127	57	58	107	113	253	10	97	202	59		21	369	1,911	39	159	110	38	8	90	148	268	328	15	184	1,387	3,298

NONDIMENSION STONE																												
Killed:																												
Cement rock	3			3	1							2	1		10	4	8				4		1		7	3	27	37
Granite	2			2	3										7													7
Limestone	11	1		11	10	2	1	3	2		3		1		3	48	2	4			3	1				1		11	59
Marble																													0
Sandstone and bluestone		1					1									2													2
Slate																													0
Trap rock	2			2	2											6													6
Total	18	2		18	16	2	2	3	2		3		3	1	3	73	6	12			3	5		1		8	3	38	111
Injured:																													
Cement rock	75	42	12	36	75	47	48	67	7	24	46	14		13	102	608	87	171	103	75	34	179	180	151	11	132	363	1,486	2,094
Granite	48	49	2	17	8	7	10	70		14	16	3		6	25	275	2	4	8	1		2	6	1	18	2	6	50	325
Limestone	368	720	157	142	483	185	186	443	13	168	338	78		61	385	3,727	228	213	142	74	21	194	191	207	59	125	278	1,732	5,459
Marble	1	6	1			1	1			2		1				13	3	3	2	1		2	2	1				14	27
Sandstone and bluestone	16	81	8	7	31	11	7	26		6	6	2			14	215	2	5	7			9	1	4	1	1	7	37	252
Slate																													0
Trap rock	60	73	18	26	38	32	34	69	1	15	50	11		8	42	477	11	21	13	5	2	11	15	30	7	2	24	141	618
Total	568	971	198	228	635	283	286	675	21	229	456	109		88	568	5,315	333	417	275	156	57	397	395	394	96	262	678	3,460	8,775
ALL OTHER																													
Killed:																													
Cement rock																													0
Granite	3			1												4										1	1		5
Limestone	1			1	1						1					4													4
Marble																													0
Sandstone and bluestone																													0
Slate																													0
Trap rock				1												1													1
Total	4			3	1						1					9										1	1	10	
Injured:																													
Cement rock																													0
Granite	6	22	11	1	4	9	9	63	2	9	12	1			14	163		2	5	1		7	5	87	17		7	131	294
Limestone	21	65	23	9	44	27	32	93		13	83	9	3	7	35	464	20	39	12	7	1	11	14	26	7	10	25	172	636
Marble		6	6		1	3		5		2	4	4			1	32													32
Sandstone and bluestone	6	1	2		1	4	1	1			2			1	2	21	2	1	3	1		5	1	5	1	2	3	24	45
Slate		15														15													15
Trap rock	15	5	3	1	7	3	7	17	2	1	9	6		2	7	85	1	4		3		3	3	4			3	21	106
Total	48	114	45	11	57	46	49	179	4	25	110	20	3	10	59	780	23	46	20	12	1	26	23	122	25	12	38	348	1,128

TABLE 24.—*Dimension-stone and nondimension-stone quarries: Injury rates, by causes, compared on a 300-day basis for the years ended December 31, 1922 to 1926*

Cause	Dimension stone					Nondimension stone				
	1922	1923	1924	1925	1926	1922	1923	1924	1925	1926
In and about quarry:										
1. Falls or slides of rock or overburden	7.68	7.44	9.92	9.27	9.20	20.27	20.56	21.27	21.87	20.52
2. Handling rock at face	23.13	19.42	22.87	27.89	29.93	33.60	35.37	35.32	39.92	35.07
3. Timber or hand tools	4.98	5.62	10.97	9.42	11.35	8.36	6.66	6.37	6.52	7.15
4. Explosives	4.81	5.41	2.86	3.89	5.09	8.36	6.32	7.99	5.46	8.23
5. Haulage	6.75	5.35	6.53	6.36	5.18	23.16	23.59	26.63	26.49	22.93
6. Falls of persons	9.20	8.73	8.98	10.25	9.56	8.36	8.41	10.02	8.90	10.22
7. Falling objects (other than 1 and 2)	10.30	9.74	8.17	12.26	10.09	9.32	10.12	9.45	9.89	10.33
8. Flying objects	21.52	29.84	30.80	32.68	22.60	26.13	28.96	26.34	25.74	24.38
9. Electricity	.25	.27	.23	.60	.89	.50	.67	.89	.99	.76
10. Drilling and channeling (by machine or hand)	6.25	8.25	8.52	13.01	8.67	6.86	7.67	7.39	7.45	8.27
11. Machinery	18.32	16.64	14.87	16.45	18.05	13.99	16.20	13.22	13.23	16.47
12. Nails, splinters, etc	3.38	3.99	3.27	3.59	5.27	3.01	2.39	3.55	4.11	3.94
13. Boiler and air-tank explosions	.17	----	.23	.08	----	.11	.03	.13	.11	----
14. Burns	2.70	1.49	2.62	1.87	1.88	3.20	3.44	2.50	3.37	3.18
15. Other causes	20.68	22.26	29.87	32.98	32.97	24.74	17.06	17.97	19.36	20.52
Total injured in and about quarry	140.12	144.45	160.71	180.60	170.73	189.97	187.45	189.04	193.41	191.97
In outside works:										
16. Haulage	6.75	9.20	6.62	4.77	4.75	13.57	18.24	12.38	12.68	11.24
17. Machinery	23.00	18.54	23.11	15.46	19.35	22.57	24.65	19.61	15.40	14.07
18. Hand tools	11.19	12.17	17.30	20.35	13.39	11.13	11.08	13.34	8.83	9.28
19. Nails, splinters, etc	3.83	7.08	4.73	7.73	4.62	6.40	6.32	5.39	4.78	5.26
20. Electricity	.77	.42	1.08	1.82	.97	2.65	2.09	1.89	2.17	1.92
21. Falls of persons	9.35	8.35	11.48	11.60	10.95	14.56	15.62	14.51	11.96	13.40
22. Falling objects (rocks, timbers, etc.)	21.16	16.13	15.40	15.92	18.01	17.16	21.35	19.17	13.68	13.33
23. Flying objects	50.14	60.29	63.23	60.03	32.62	23.35	23.09	20.18	18.29	13.29
24. Handling rock by hand	28.36	40.90	35.40	31.27	39.92	6.09	3.38	4.02	3.95	3.24
25. Burns	3.07	2.12	1.62	4.21	1.83	15.29	13.83	13.18	8.08	8.84
26. Other causes	29.13	23.92	31.08	24.45	22.39	29.13	32.21	32.35	21.17	22.88
Total injured in outside works	186.75	199.12	211.05	197.61	168.80	161.90	171.86	156.02	120.99	116.75
Grand total injured	156.68	162.13	175.89	187.35	169.91	178.02	181.09	174.48	156.64	153.08

TABLE 25.—*All quarries: Accidents during the year ended December 31, 1926, by States and severity of injury*

State	Killed	Permanent total [1]	Permanent partial [2]	Temporary			Total non fatal	Grand total
				More than 14 days	1 to 14 days	Total		
Alabama	7		8	42	204	246	254	261
Arkansas		1	3	4	8	12	16	16
California	17		19	242	590	832	851	868
Colorado	1		4	20	80	100	104	105
Connecticut			1	17	145	162	163	163
Georgia	1		15	47	370	417	432	433
Illinois	11		12	73	493	566	578	589
Indiana	5		8	69	371	440	448	453
Iowa	3	2	6	35	142	177	185	188
Kansas	3		7	25	56	81	88	91
Kentucky	3		3	55	136	191	194	197
Maine	1		6	103	149	252	258	259
Maryland	2		3	25	117	142	145	147
Massachusetts	7		7	134	583	717	724	731
Michigan	5		7	100	224	324	331	336
Minnesota			9	35	219	254	263	263
Missouri	3		5	36	414	450	455	458
New Hampshire			3	4	134	138	141	141
New Jersey	1	1	16	39	204	243	260	261
New Mexico				4	29	33	33	33
New York	7		43	109	571	680	723	730
North Carolina	5		4	8	140	148	152	157
Ohio	12	1	60	173	893	1,066	1,127	1,139
Oklahoma	1	1	2	23	110	133	136	137
Pennsylvania	24	3	61	450	1,941	2,391	2,455	2,479
Rhode Island	1			4	41	45	45	46
Tennessee	6		42	44	244	288	330	336
Texas	4		7	41	215	256	263	267
Utah				9	85	94	94	94
Vermont	11	2	13	135	490	625	640	651
Virginia	6		12	53	244	297	309	315
Washington	2		3	21	63	84	87	89
West Virginia			6	46	132	178	184	184
Wisconsin	1	3	8	60	416	476	487	488
Not segregated	4	1	13	33	199	232	246	250
Total, 1926	154	15	416	2,318	10,452	12,770	13,201	13,355
Total, 1925	149	22	430	2,627	11,086	13,713	14,165	14,314

[1] Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

TABLE 26.—*All quarries: Accidents during the year ended December 31, 1926, by causes and severity of injury*

Cause	Killed	Permanent total [1]	Permanent partial [2]	Temporary			Total non-fatal	Grand total
				More than 14 days	1 to 14 days	Total		
1. Falls or slides of rock or overburden	32	1	31	181	506	687	719	751
2. Handling rock at face	4	2	23	242	1,153	1,395	1,420	1,424
3. Timber or hand tools			4	59	307	366	370	370
4. Explosives:								
(a) Transportation					14	14	14	14
(b) Charging	4			6	6	12	12	16
(c) Drilling into old holes			1	2	7	9	10	10
(d) Striking in loose rock	2			2	21	23	23	25
(e) Thawing					3	3	3	3
(f) Caps, detonators, etc			7	2	5	7	14	14
(g) Unguarded shots			1		2	2	3	3
(h) Returned too soon	2	2	1	1	10	11	14	16
(i) Premature shots	4		7	8	21	29	36	40
(j) Delayed blast	2		2	2	3	5	7	9
(k) Miscellaneous	9		9	26	125	151	160	169
5. Haulage:								
(a) Hand and animal		1	3	57	196	253	257	257
(b) Mechanical	5		14	42	100	142	156	161
(c) Railway cars and locomotives	12	2	28	90	217	307	337	349
6. Falls of persons:								
(a) Falling into quarry from surface, benches, or face	3		12	67	177	244	256	259
(b) Falling from hoists, derricks, ladders, etc		1	13	43	123	166	180	180
7. Falling objects (other than 1 and 2)	6		9	77	362	439	448	454
8. Flying objects:								
(a) From sledging			36	66	534	600	636	636
(b) Others	4		14	38	419	457	471	475
9. Electricity:								
(a) Direct contact with trolley wire	1							1
(b) Bar or tool striking trolley wire	1							1
(c) Contact with motor	3		2	1	5	6	8	11
(d) Others	2		1	6	20	26	27	29
10. Drilling and channeling (by machine or hand)			8	48	295	343	351	351
11. Machinery:								
(a) Hoisting cables and attachments	2	1	16	22	137	159	176	178
(b) Guys, cranes, derricks, and attachments	1		5	37	67	104	109	110
(c) Pumps and hoisting engines	1		4	5	21	26	30	31
(d) Steam shovels	2	1	10	49	170	219	230	232
(e) Other machinery	1	1	5	41	176	217	223	224
12. Nails, splinters, etc			3	13	172	185	188	188
13. Boiler and air-tank explosions	3				3	3	3	6
14. Burns	1		2	21	96	117	119	120
15. Other causes	3		9	130	857	987	996	999
Total, in and about quarry	110	12	280	1,384	6,330	7,714	8,006	8,116
16. Haulage:								
(a) Hand and animal			4	34	92	126	130	130
(b) Mechanical	1		2	21	62	83	85	86
(c) Railway cars and locomotives	5		11	50	119	169	180	185
17. Machinery:								
(a) Hoisting cables and attachments	1	1	5	29	50	79	85	86
(b) Guys, cranes, derricks, and attachments	2		2	39	41	80	82	84
(c) Pumps and hoisting engines			2	5	14	19	21	21
(d) Crushers	1	1	5	13	86	99	105	106
(e) Other machinery	9		27	90	212	302	329	338
18. Hand tools			5	42	358	400	405	405
19. Nails, splinters, etc			2	7	197	204	206	206

[1] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other conditions permanently incapacitating workman from doing any work of a gainful occupation.

[2] Permanent partial disability: Loss of 1 foot, leg, hand, eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

TABLE 26.—*All quarries: Accidents during the year ended December 31, 1926, by causes and severity of injury*—Continued

Cause	Killed	Permanent total	Permanent partial	Temporary			Total nonfatal	Grand total
				More than 14 days	1 to 14 days	Total		
20. Electricity:								
(*a*) Direct contact with trolley wire	1				4	4	4	5
(*b*) Bar or tool striking trolley wire				1		1	1	1
(*c*) Contact with motor			1	4	5	9	10	10
(*d*) Others	3		1	14	36	50	51	54
21. Falls of persons	6		11	138	364	502	513	519
22. Falling objects (rocks, timbers, etc.)	2		14	130	422	552	566	568
23. Flying objects:								
(*a*) From sledging		1	4	10	158	168	173	173
(*b*) From crushing				4	46	50	50	50
(*c*) Others	1		10	31	520	551	561	562
24. Handling rock by hand			4	91	354	445	449	449
25. Burns	8		9	56	224	280	289	297
26. Other causes	4		17	125	758	883	900	904
Total, in outside works	44	3	136	934	4,122	5,056	5,195	5,239
Grand total	154	15	416	2,318	10,452	12,770	13,201	13,355
Dimension stone	33	3	65	548	2,682	3,230	3,298	3,331
Nondimension stone	111	12	331	1,613	6,819	8,432	8,775	8,886
All other and not stated	10		20	157	951	1,108	1,128	1,138

TABLE 27.—*All quarries: Injuries, classified by kind of quarry and character of disability, during the year ended December 31, 1926*

Character of disability	1. Falls or slides of rock or overburden	2. Handling rock at face	3. Timber or hand tools	4. Explosives: (a) Transportation	4. Explosives: (b) Charging	4. Explosives: (c) Drilling into old holes	4. Explosives: (d) Striking in loose rock	4. Explosives: (e) Thawing	4. Explosives: (f) Caps, detonators, etc.	4. Explosives: (g) Unguarded shots	4. Explosives: (h) Returned too soon	4. Explosives: (i) Premature shots	4. Explosives: (j) Delayed blast	4. Explosives: (k) Miscellaneous	5. Haulage: (a) Hand and animal	5. Haulage: (b) Mechanical	5. Haulage: (c) Railway cars and locomotives	6. Falls of person: (a) Falling into quarry from surface, benches, or face	6. Falls of person: (b) Falling from hoists, derricks, ladders, etc.	7. Falling objects (other than 1 and 2)	8. Flying objects: (a) From sledging	8. Flying objects: (b) Others	9. Electricity: (a) Direct contact with trolley wire	9. Electricity: (b) Bar or tool, striking trolley wire	9. Electricity: (c) Contact with motor	9. Electricity: (d) Others	10. Drilling and channeling (by machine or hand)	11. Machinery: (a) Hoisting cables and attachments	11. Machinery: (b) Guys, cranes, derricks, and attachments	11. Machinery: (c) Pumps and hoisting engines	11. Machinery: (d) Steam shovels	11. Machinery: (e) Other machinery	12. Nails, splinters, etc.	13. Boiler and air-tank explosions	14. Burns	15. Other causes	Total in and about quarry
Permanent total: [1]																																					
Cement rock																																					
Granite																																					
Limestone	1										2						1		1									1									6
Marble																																					
Sandstone and bluestone		2													1		1																				4
Slate																															1	1					2
Trap rock																																					
Total	1	2									2				1		2		1									1			1	1					12
Permanent partial: [2]																																					
Cement rock	6		1						6			2		3		1	7	2	3	1	2	2						1			1						38
Granite	6	3	1			1						1					1	3	2	1	9	4			1			3		1	2	1					40

Limestone	16	13	1	---	---	---	---	---	1	1	1	---	2	4	3	10	17	5	7	7	21	6	---	---	1	---	5	10	4	2	7	3	2	---	2	8	159
Marble	---	3	1	---	---	---	---	---	---	---	---	---	---	---	---	2	---	1	1	---	---	---	---	---	---	---	1	1	1	---	---	---	1	---	---	---	12
Sandstone and bluestone	1	1	---	---	---	---	---	---	---	---	---	1	---	1	---	---	1	1	---	---	2	---	---	---	---	1	1	---	---	1	---	1	---	---	---	1	13
Slate	---	3	---	---	---	---	---	---	---	---	---	2	---	1	---	---	1	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	8
Trap rock	2	---	---	---	---	---	---	---	---	---	---	1	---	---	---	1	1	---	---	---	2	2	---	---	---	---	1	---	---	---	---	---	---	---	---	---	10
Total	31	23	4	---	---	1	---	---	7	1	1	7	2	9	3	14	28	12	13	9	36	14	---	---	2	1	8	16	5	4	10	5	3	---	2	9	280
Temporary (more than 14 days):																																					
Cement rock	20	9	3	---	1	---	---	---	---	---	---	---	1	4	3	4	12	11	1	11	6	5	---	---	---	---	4	1	1	1	17	3	4	---	5	17	144
Granite	15	15	3	---	1	---	---	---	---	---	---	---	1	1	---	2	4	10	3	10	3	3	---	---	---	2	4	3	21	1	2	3	1	---	---	14	122
Limestone	106	159	28	---	2	1	2	---	2	---	---	6	---	14	47	26	59	27	23	38	47	24	---	---	1	1	27	9	10	2	26	30	3	---	12	58	790
Marble	2	16	9	---	---	---	---	---	---	---	---	---	---	---	2	---	2	3	4	3	4	---	---	---	---	1	9	4	4	---	---	2	3	---	---	9	77
Sandstone and bluestone	5	15	5	---	---	---	---	---	---	---	---	---	---	---	4	---	5	4	3	3	---	2	---	---	---	---	2	1	---	---	---	---	1	---	1	15	66
Slate	10	13	9	---	---	1	---	---	---	---	---	---	---	5	1	4	2	4	1	6	3	1	---	---	---	1	---	3	1	---	---	1	---	---	1	14	81
Trap rock	23	15	2	---	2	---	---	---	---	---	1	2	---	2	---	6	6	8	8	6	3	3	---	---	---	1	2	1	---	1	4	2	1	---	2	3	104
Total	181	242	59	---	6	2	2	---	2	---	1	8	2	26	57	42	90	67	43	77	66	38	---	---	1	6	48	22	37	5	49	41	13	--	21	130	1,384
Temporary (1 to 14 days):																																					
Cement rock	49	33	8	3	1	1	---	---	---	---	---	2	---	12	20	1	27	20	10	36	14	38	---	---	1	6	20	7	---	1	12	1	10	---	8	85	426
Granite	61	119	34	5	---	1	---	---	---	---	1	---	---	26	7	5	8	23	9	45	129	85	---	---	---	1	56	20	15	---	4	13	34	---	11	98	810
Limestone	289	651	161	5	3	4	16	1	2	2	9	11	3	67	145	74	159	99	69	189	297	200	---	---	2	10	162	78	29	18	129	114	97	3	56	435	3,589
Marble	4	57	41	---	---	---	2	---	---	---	---	3	---	1	2	4	2	8	5	15	21	19	---	---	1	1	21	8	2	---	---	7	5	---	7	34	270
Sandstone and bluestone	23	80	18	---	---		1	2	3	---	---	2	---	2	13	6	6	12	13	14	28	12	---	---	---	---	16	4	9	---	5	6	3	---	4	74	356
Slate	30	150	26	---	---	---	---	---	---	---	---	---	---	7	1	2	---	7	3	27	10	24	---	---	---	1	7	15	3	---	2	18	7	---	2	85	427
Trap rock	50	63	19	1	2	1	2	---	---	---	---	3	---	10	8	8	15	8	14	36	35	41	---	---	1	1	13	5	9	2	18	17	16	---	8	46	452
Total	506	1,153	307	14	6	7	21	3	5	2	10	21	3	125	196	100	217	177	123	362	534	419	---	---	5	20	295	137	67	21	170	176	172	3	96	857	6,330
All quarries:																																					
Permanent total	1	2	---	---	---	---	---	---	---	---	2	---	---	---	1	---	2	---	1	---	---	---	---	---	---	---	---	1	---	---	1	1	---	---	---	---	12
Permanent partial	31	23	4	---	---	1	---	---	7	1	1	7	2	9	3	14	28	12	13	9	36	14	---	---	2	1	8	16	5	4	10	5	3	---	2	9	280
Temporary (more than 14 days)	181	242	59	---	6	2	2	---	2	---	1	8	2	26	57	42	90	67	43	77	66	38	---	---	1	6	48	22	37	5	49	41	13	---	21	130	1,384
Temporary (1 to 14 days)	506	1,153	307	14	6	7	21	3	5	2	10	21	3	125	196	100	217	177	123	362	534	419	---	---	5	20	295	137	67	21	170	176	172	3	96	857	6,330
Total	719	1,420	370	14	12	10	23	3	14	3	14	36	7	160	257	156	337	256	180	448	636	471	---	---	8	27	351	176	109	30	230	223	188	3	119	996	8,006

[1] Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

TABLE 27.—*All quarries: Injuries, classified by kind of quarry and character of disability, during the year ended December 31, 1926*—Con.

Character of disability	In outside works																							Grand total, 1926	Grand total, 1925
	Haulage			Machinery					Hand tools	Nails, splinters, etc.	Electricity				Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects			Handling rock by hand	Burns	Other causes	Total outside works		
	(a) Hand and animal	(b) Mechanical	(c) Railway cars and locomotives	(a) Hoisting cables and attachments	(b) Guys, cranes, derricks, and attachments	(c) Pumps and hoisting engines	(d) Crushers	(e) Other machinery			(a) Direct contact with trolley wire	(b) Bar or tool striking trolley wire	(c) Contact with motor	(d) Others			(a) From sledging	(b) From crushing	(c) Others						
	16			17					18	19	20				21	22	23			24	25	26			
Permanent total:[1]																									
Cement rock							1																1	1	5
Granite																									3
Limestone																	1						1	7	10
Marble				1																			1	1	
Sandstone and bluestone																								4	
Slate																								2	
Trap rock																									4
Total				1			1										1						3	15	22
Permanent partial:[2]																									
Cement rock	1	2	4	3			1	15	1						5	5			2		3	11	53	91	89
Granite							1	1	1						1		1		3	1			9	49	45
Limestone	2		7	2	1		1	7	3	2			1	1	3	8	3		3		6	6	56	215	165
Marble								2												2			4	16	26
Sandstone and bluestone						2		1							1	1			2				7	20	25
Slate					1			1							1					1			4	12	61
Trap rock	1						2																3	13	19
Total	4	2	11	5	2	2	5	27	5	2			1	1	11	14	4		10	4	9	17	136	416	430

Temporary[1] (more than 14 days):																								
Cement rock	7	4	17	9	8	----	3	29	9	1	----	1	4	8	49	46	----	----	6	2	36	49	288	432	515
Granite	2	1	----	----	13	----	1	2	4	1	----	----	----	1	3	14	2	1	7	12	----	3	67	189	241
Limestone	25	11	27	13	12	4	6	34	18	4	----	----	----	3	61	46	5	3	15	22	17	51	377	1,167	1,186
Marble	----	----	2	3	3	----	----	17	7	1	----	----	----	1	9	4	2	----	2	32	1	6	90	167	181
Sandstone and bluestone	----	1	1	----	3	----	----	2	4	----	----	----	----	----	10	9	----	----	1	2	1	6	40	106	171
Slate	----	1	1	2	----	----	----	4	----	----	----	----	----	1	2	2	1	----	----	20	1	5	40	121	81
Trap rock	----	3	2	2	----	1	3	2	----	----	----	----	----	----	4	9	----	----	----	1	----	5	32	136	252
Total	34	21	50	29	39	5	13	90	42	7	----	1	4	14	138	130	10	4	31	91	56	125	934	2,318	2,627
Temporary (1 to 14 days):																								
Cement rock	19	5	28	14	1	1	16	70	93	74	1	----	4	16	125	129	18	1	124	9	93	303	1,144	1,570	1,719
Granite	2	----	3	4	6	2	2	17	67	15	----	----	----	----	30	53	80	2	173	109	4	43	612	1,422	1,817
Limestone	64	47	72	23	25	8	60	82	139	77	3	----	----	15	152	166	37	25	160	65	116	297	1,633	5,222	5,354
Marble	6	6	7	4	2	1	----	22	31	14	----	----	----	3	26	30	8	2	35	101	4	26	328	598	416
Sandstone and bluestone	----	2	3	2	3	----	2	6	14	4	----	----	----	----	14	19	4	1	9	11	4	42	140	496	589
Slate	1	1	1	1	3	1	1	9	1	5	----	----	1	----	7	16	1	2	8	53	1	25	138	565	443
Trap rock	----	1	5	2	1	1	5	6	13	8	----	----	----	2	10	9	10	13	11	6	2	22	127	579	748
Total	92	62	119	50	41	14	86	212	358	197	4	----	5	36	364	422	158	46	520	354	224	758	4,122	10,452	11,086
All quarries:																								
Permanent total	----	----	----	1	----	----	1	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	3	15	22
Permanent partial	4	2	11	5	2	2	5	27	5	2	----	----	1	1	11	14	4	----	10	4	9	17	136	416	430
Temporary (more than 14 days)	34	21	50	29	39	5	13	90	42	7	----	1	4	14	138	130	10	4	31	91	56	125	934	2,318	2,627
Temporary (1 to 14 days)	92	62	119	50	41	14	86	212	358	197	4	----	5	36	364	422	158	46	520	354	224	758	4,122	10,452	11,086
Total	130	85	180	85	82	21	105	329	405	206	4	1	10	51	513	566	173	50	561	449	289	900	5,195	13,201	14,165

[1] Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

LENGTH OF WORKDAY INSIDE THE QUARRIES AND ACCIDENT RATES BASED THEREON

The vast majority of men who work at quarries in the United States are employed at plants that are operated on the basis of 8, 9, or 10 hours a day or shift. Men employed at 10-hour quarries form the largest group and are greatly in excess of the 9-hour employees, which form the next largest group; the employees at the 8-hour plants are slightly less in number than those at the 9-hour plants. The preponderance of 10-hour employees in the industry as a whole is due to the fact that a still greater number of the 10-hour employees work in the nondimension-stone branch of the quarry industry, as the dimension-stone quarries employ more 9-hour men than any other class. The figures for dimension-stone quarries, as given in Table 28, show about an equal number of men employed at 8 and 10 hour plants, each of these groups being about two-thirds as large as the 9-hour group. A somewhat similar statement may be made regarding the 8 and 9 hour men at nondimension-stone quarries; that is to say, approximately equal numbers of men are employed in these two groups, but the number employed in each group is less than half as large as the number at 10-hour plants.

The accident rates are not uniform for the different groups of plants. Table 29 shows the number of accidents per million hours of exposure for the 8, 9, and 10 hour quarries. It should not be understood, however, that variations in accident rates are due entirely to differences in the length of workday. Many other factors may be involved; among them may be mentioned the unequal distribution of 8, 9, and 10 hour plants among various stone-producing States, and possible variations in the safety laws and the rigidity of their enforcement or their observance by operating companies in the different States. As to the unequal distribution of the employees at the 8, 9, and 10 hour plants in the various States and among the different kinds of quarries, reference should be had to Tables 30, 31, 32, and 33. Accident rates are influenced by other factors, such as the size of the plant and whether or not the plants are operated steadily or only part time; these factors are referred to in Tables 35 to 38, inclusive.

TABLE 28.—*Accident data based on hours of exposure by employees inside the quarries, during the year ended December 31, 1926*

Length of shift	Men employed		Days of labor performed	Total hours	Average days per man	Average hours per man	Killed	Permanent total	Permanent partial	Temporary			Total non-fatal	Grand total
	Actual number	Equivalent in 300-day workers								More than 14 days	1 to 14 days	Total		
ALL QUARRIES														
8 hours	10,994	9,349	2,804,648	22,437,184	255	2,041	19	-------	49	278	1,100	1,378	1,427	1,446
9 hours	13,159	11,441	3,432,255	30,890,295	261	2,347	37	3	46	434	1,959	2,393	2,442	2,479
10 hours	21,198	18,008	5,402,447	54,024,470	255	2,549	50	8	171	565	2,681	3,246	3,425	3,475
11 hours	92	97	29,070	319,770	316	3,476	-------	-------	-------	-------	15	15	15	15
12 hours	73	66	19,785	237,420	271	3,252	-------	-------	-------	4	2	6	6	6
All other and not stated	5,104	3,747	1,124,182	----------	220	----------	4	1	14	103	573	676	691	695
Total	50,620	42,708	12,812,387	----------	253	----------	110	12	280	1,384	6,330	7,714	8,006	8,116
DIMENSION-STONE QUARRIES														
8 hours	3,323	2,839	851,533	6,812,264	256	2,050	9	-------	14	69	437	506	520	529
9 hours	5,021	4,528	1,358,268	12,224,412	271	2,435	12	1	10	118	607	725	736	748
10 hours	3,374	2,901	870,433	8,704,330	258	2,580	6	-------	15	71	385	456	471	477
All other and not stated	1,624	925	277,522	----------	171	----------	1	1	5	44	134	178	184	185
Total	13,342	11,193	3,357,756	----------	252	----------	28	2	44	302	1,563	1,865	1,911	1,939
NONDIMENSION-STONE QUARRIES														
8 hours	6,916	5,851	1,755,303	14,042,424	254	2,030	8	-------	32	185	584	769	801	809
9 hours	7,090	6,000	1,800,203	16,201,827	254	2,285	22	2	31	288	1,213	1,501	1,534	1,556
10 hours	16,114	13,662	4,098,602	40,986,020	254	2,544	40	8	151	441	1,909	2,350	2,509	2,549
11 hours	92	97	29,070	319,770	316	3,476	-------	-------	-------	-------	15	15	15	15
12 hours	73	66	19,785	237,420	271	3,252	-------	-------	-------	4	2	6	6	6
All other and not stated	2,482	2,010	602,958	----------	243	----------	3	-------	8	53	389	442	450	453
Total	32,767	27,686	8,305,921	----------	253	----------	73	10	222	971	4,112	5,083	5,315	5,388
ALL OTHER AND NOT STATED														
8 hours	755	659	197,812	1,582,496	262	2,096	2	-------	3	24	79	103	106	108
9 hours	1,048	913	273,784	2,464,056	261	2,351	3	-------	5	28	139	167	172	175
10 hours	1,710	1,445	433,412	4,334,120	253	2,535	4	-------	5	53	387	440	445	449
All other and not stated	998	812	243,702	----------	244	----------	------	-------	1	6	50	56	57	57
Total	4,511	3,829	1,148,710	----------	255	----------	9	-------	14	111	655	766	780	789

TABLE 29.—*Fatalities and injuries per million hours of exposure, classified by length of shift, during the year ended December 31, 1926*

[Inside only]

Character of disability	8 hours	9 hours	10 hours	Total, 8, 9, and 10 hours	
				1926	1925
ALL QUARRIES					
Fatal	0.847	1.198	0.926	0.987	0.841
Permanent total	----------	.097	.148	.103	.154
Permanent partial	2.184	1.489	3.165	2.478	2.179
Temporary (more than 14 days)	12.390	14.050	10.458	11.895	13.996
Temporary (1 to 14 days)	49.026	63.418	49.626	53.469	54.756
Total injuries	63.600	79.054	63.397	67.945	71.085
Total fatalities and injuries	64.447	80.252	64.323	68.932	71.926
DIMENSION-STONE QUARRIES					
Fatal	1.321	.982	.689	.973	.704
Permanent total	----------	.082	----------	.036	.088
Permanent partial	2.055	.818	1.723	1.406	2.463
Temporary (more than 14 days)	10.129	9.653	8.157	9.300	12.493
Temporary (1 to 14 days)	64.149	49.654	44.231	51.512	50.178
Total injuries	76.333	60.207	54.111	62.254	65.222
Total fatalities and injuries	77.654	61.189	54.800	63.227	65.926
NONDIMENSION-STONE QUARRIES					
Fatal	.570	1.358	.976	.983	.962
Permanent total	----------	.124	.195	.140	.187
Permanent partial	2.279	1.913	3.684	3.004	2.081
Temporary (more than 14 days)	13.174	17.776	10.760	12.832	14.499
Temporary (1 to 14 days)	41.588	74.868	46.577	52.029	53.616
Total injuries	57.041	94.681	61.216	68.005	70.383
Total fatalities and injuries	57.611	96.039	62.192	68.988	71.345
ALL OTHER AND NOT STATED					
Fatal	1.264	1.218	.923	1.074	.292
Permanent total	----------	----------	----------	----------	.146
Permanent partial	1.896	2.029	1.154	1.551	1.755
Temporary (more than 14 days)	15.166	11.363	12.229	12.529	16.376
Temporary (1 to 14 days)	49.921	56.411	89.291	72.190	89.191
Total injuries	66.983	69.803	102.674	86.270	107.468
Total fatalities and injuries	68.247	71.021	103.597	87.344	107.760

TABLE 30.—*All quarries: Accident and labor data, based on length of shift, during the year ended December 31, 1926*

Length of shift	In and about quarry					In outside works				
	Men employed	Days of labor performed	Average days active	Killed	Injured	Men employed	Days of labor performed	Average days active	Killed	Injured
Cement rock:										
8 hours	1,165	340,439	292	3	129	6,269	2,110,854	337	14	556
9 hours	362	105,148	290	2	54	100	29,013	290	-------	2
10 hours	2,646	817,338	309	5	229	911	271,879	298	2	43
11 hours	62	19,140	309	-------	4	176	61,658	350	-------	4
12 hours	68	18,785	276	-------	6	4,438	1,340,714	302	6	270
All other and not stated	547	173,314	317	-------	186	6,252	2,039,875	326	5	611
Total	4,850	1,474,164	304	10	608	18,146	5,853,993	323	27	1,486
Granite:										
8 hours	3,937	984,379	250	11	636	2,957	824,647	279	1	578
9 hours	1,074	263,009	245	2	117	251	68,455	273	-------	70
10 hours	1,197	258,862	216	6	168	213	47,026	221	-------	24
11 hours	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
12 hours	-------	-------	-------	-------	-------	15	3,750	250	-------	-------
All other and not stated	480	114,543	239	-------	51	488	125,473	257	-------	16
Total	6,688	1,620,793	242	19	972	3,924	1,069,351	273	1	688
Limestone:										
8 hours	4,685	1,214,707	259	3	483	1,406	390,133	277	4	254
9 hours	5,780	1,509,363	261	16	1,325	1,904	531,585	279	2	405
10 hours	12,554	3,151,776	251	32	2,339	4,558	1,242,132	273	5	741
11 hours	30	9,930	331	-------	11	71	20,515	289	-------	11
12 hours	-------	-------	-------	-------	-------	1,259	395,217	314	1	343
All other and not stated	3,483	687,126	197	4	386	3,309	731,576	221	2	313
Total	26,532	6,572,902	248	55	4,544	12,507	3,311,158	265	14	2,067
Marble:										
8 hours	180	51,727	287	1	27	35	9,984	285	-------	3
9 hours	901	267,184	297	4	105	2,609	797,992	306	2	371
10 hours	1,101	310,068	282	2	226	414	127,343	308	-------	49
11 hours	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
12 hours	-------	-------	-------	-------	-------	40	12,125	303	-------	1
All other and not stated	177	43,600	246	-------	1	-------	-------	-------	-------	-------
Total	2,359	672,579	285	7	359	3,098	947,444	306	2	513
Sandstone and bluestone:										
8 hours	447	95,059	213	-------	59	70	13,537	193	-------	4
9 hours	1,202	289,260	241	1	149	323	89,632	277	-------	90
10 hours	2,201	520,747	237	3	228	474	104,930	221	-------	71
11 hours	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
12 hours	5	1,000	200	-------	-------	80	17,904	224	-------	12
All other and not stated	60	15,121	252	-------	3	56	14,340	256	-------	8
Total	3,915	921,187	235	4	439	1,003	240,343	240	-------	187
Slate:										
8 hours	15	3,225	215	-------	1	-------	-------	-------	-------	-------
9 hours	2,554	698,816	274	6	431	638	172,289	270	-------	115
10 hours	388	91,038	235	2	43	230	52,654	229	-------	13
11 hours	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
12 hours	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
All other and not stated	239	64,438	270	-------	43	240	66,874	279	-------	54
Total	3,196	857,517	268	8	518	1,108	291,817	263	-------	182
Trap rock:										
8 hours	565	115,112	204	1	92	108	26,754	248	-------	6
9 hours	1,286	299,475	233	6	261	292	69,954	240	-------	102
10 hours	1,111	252,618	227	-------	192	289	71,318	247	-------	51
11 hours	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
12 hours	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
All other and not stated	118	26,040	221	-------	21	51	13,881	272	-------	4
Total	3,080	693,245	225	7	566	740	181,907	246	-------	162

TABLE 31.—*Percentage of men employed at plants working shifts of indicated hours per day in 1926*

Kind of quarry	Dimension stone					Nondimension stone				
	8 hours	9 hours	10 hours	All other and not stated	Total	8 hours	9 hours	10 hours	All other and not stated	Total
In and about quarry:										
Cement rock						24.02	7.46	54.56	13.96	100.00
Granite	79.91	15.83	4.23	0.03	100.00	36.24	9.28	47.68	6.80	100.00
Limestone	5.44	10.77	28.97	54.82	100.00	20.21	23.09	48.75	7.95	100.00
Marble	7.77	41.86	49.78	.59	100.00	29.49	70.51			100.00
Sandstone and bluestone	3.47	40.57	55.71	.25	100.00	18.50	20.50	59.97	1.03	100.00
Slate	.48	79.37	12.47	7.68	100.00					
Trap rock		69.44	5.56	25.00	100.00	15.50	42.80	37.78	3.92	100.00
Total	24.91	37.63	25.29	12.17	100.00	21.10	21.64	49.18	8.08	100.00
In outside works:										
Cement rock						34.55	0.55	5.02	59.88	100.00
Granite	87.06	2.03	2.03	8.88	100.00	37.43	6.43	35.96	20.18	100.00
Limestone	2.84	4.04	6.42	86.70	100.00	13.35	18.13	40.96	27.56	100.00
Marble	1.08	85.16	12.45	1.31	100.00	4.44	20.00	75.56		100.00
Sandstone and bluestone		45.98	40.35	13.67	100.00	20.14	11.66	66.43	1.77	100.00
Slate		57.58	20.76	21.66	100.00					
Trap rock						11.31	41.56	40.60	6.53	100.00
Total	23.77	38.83	11.15	26.25	100.00	26.87	7.47	18.77	46.89	100.00

TABLE 32.—*All quarries: Number of plants and number of men employed, classified by length of workday, for the year ended December 31, 1926*

[Inside only]

State	8 hours		9 hours		10 hours		All other and not stated		Total inside	
	Number of plants	Number of employees	Number of plants	Number of employees	Number of plants	Number of employees	Number of plants	Number of employees	Number of plants	Number of employees
Alabama	1	50	4	179	17	937	2	60	24	1,226
Arkansas	2	11	4	58	4	103	2	37	12	209
California	80	1,317	18	272	5	90	3	205	106	1,884
Colorado	20	338	2	14	2	41	1	6	25	399
Connecticut	10	130	16	276	1	129	3	50	30	585
Georgia	4	40	9	485	9	615	3	86	25	1,226
Illinois	15	1,236	8	130	19	619	10	527	52	2,512
Indiana	3	114	6	203	32	794	27	1,436	68	2,547
Iowa	3	68	3	33	9	266	5	108	20	475
Kansas	5	112	5	100	6	176	5	81	21	469
Kentucky	2	46	9	241	20	558	2	55	33	900
Maine	20	614	10	252			1	1	31	867
Maryland			12	289	11	314	3	82	26	685
Massachusetts	36	735	32	693					68	1,428
Michigan	1	9	6	229	16	960	1	15	24	1,213
Minnesota	19	329	4	40	9	234	3	76	35	679
Missouri	6	166	38	961	23	838	5	527	72	2,492
New Hampshire	20	420							20	420
New Jersey	2	83	23	491	15	549	2	95	42	1,218
New Mexico	5	86	1	6	1	39			7	131
New York	15	209	45	632	40	1,644	5	141	105	2,626
North Carolina	3	92	1	207	11	666	1	35	16	1,000
Ohio	10	237	29	1,126	82	2,459	4	152	125	3,974
Oklahoma	3	34	3	187	6	270	1	35	13	526
Pennsylvania	29	1,718	97	3,114	163	4,115	27	769	316	9,716
Rhode Island	5	157	4	45					9	202
Tennessee	5	112	2	30	23	1,255	2	165	32	1,562
Texas	3	83	6	162	16	618	1	32	26	895
Utah	15	373	1	31					16	404
Vermont	21	811	43	1,852			3	65	67	2,728
Virginia	1	52	9	130	38	1,142	1	64	49	1,388
Washington	14	173					1	25	15	198
West Virginia	3	355	9	465	12	544			24	1,364
Wisconsin	3	90	17	179	39	703	12	284	71	1,256
Not segregated	45	594	5	47	20	520	5	55	75	1,216
Total	429	10,994	481	13,159	649	21,198	141	5,269	1,700	50,620

TABLE 33.—*All quarries: Injury rates, including fatal accidents, by States, based on hours of exposure of employees inside the quarries during the year ended December 31, 1926*

State	Dimension stone			Nondimension stone		
	8 hours	9 hours	10 hours	8 hours	9 hours	10 hours
Alabama					54.25	61.77
Arkansas					31.25	55.41
California	105.76			92.46	100.57	52.18
Colorado	92.78			83.05		
Connecticut	79.27	17.13			101.11	
Georgia	100.54	42.25				43.52
Illinois				38.81	122.91	77.48
Indiana			89.06	14.81	7.97	45.37
Iowa						88.77
Kansas					87.35	26.11
Kentucky			41.34		146.95	84.07
Maine	47.60	123.67			128.21	
Maryland					147.53	24.27
Massachusetts	117.91			57.97	118.83	
Michigan					37.76	65.98
Minnesota	137.28	255.95	58.89			83.26
Missouri		89.63	30.10	56.01	89.70	35.08
New Hampshire	40.79					
New Jersey					75.46	85.43
New Mexico	106.10					
New York	127.91	65.56	77.24	9.80	95.19	99.11
North Carolina						58.12
Ohio		59.98	32.12	53.53	60.55	68.75
Oklahoma						80.04
Pennsylvania		60.04	42.07	30.72	119.85	49.65
Rhode Island					78.94	
Tennessee			54.77	75.26		62.35
Texas		92.77			58.76	76.47
Utah				81.53		
Vermont	47.40	58.84			170.99	
Virginia			17.68		67.97	72.11
Washington				159.31		
West Virginia		105.29		20.09	101.21	12.86
Wisconsin		11.87	113.07		103.54	80.87
Not segregated	76.46	26.76	84.54	98.17	78.92	52.81
Total	77.65	61.19	54.80	57.61	96.04	62.19

TABLE 34.—*All quarries: Fatality and injury rates per thousand 300-day workers, based on number of men employed inside the quarry, classified by dimension-stone and nondimension-stone, during the year ended December 31, 1926*

State	Dimension stone		Nondimension stone		Total (inside quarry)	
	Fatality rate	Injury rate	Fatality rate	Injury rate	Fatality rate	Injury rate
Alabama	8.40	243.70	5.22	166.14	5.10	164.97
Arkansas		200.00		119.05		116.28
California	4.78	248.80	4.97	219.55	4.62	209.46
Colorado		219.51		190.64		197.71
Connecticut		145.99		293.10		252.07
Georgia	1.67	175.00		174.94	.95	171.27
Illinois	7.75	286.82	3.57	164.88	4.41	186.37
Indiana	1.17	208.92		72.35	.62	176.03
Iowa			11.58	208.49	9.04	207.83
Kansas		333.33	6.06	90.91	5.62	101.12
Kentucky		123.89	3.98	292.83	3.19	258.37
Maine	2.19	150.98		314.92	1.39	186.11
Maryland		150.00	2.13	211.09	1.68	206.38
Massachusetts	4.82	262.65	3.24	281.55	4.22	277.87
Michigan		23.81	3.41	169.13	3.16	171.76
Minnesota		334.17		426.09		354.20
Missouri	2.92	169.10	.80	187.10	1.56	180.64
New Hampshire		97.87				137.64
New Jersey		102.56	1.22	221.27	1.00	204.59
New Mexico		228.57		31.25		166.67
New York		215.31	2.21	255.39	1.92	247.83
North Carolina		145.83	4.90	183.82	6.23	129.68
Ohio	.82	123.46	2.05	175.56	1.43	163.85
Oklahoma			2.23	220.49	2.21	219.03
Pennsylvania	4.25	158.47	1,77	173.25	2.20	172.43
Rhode Island	6.94	229.17		185.19	5.46	218.58
Tennessee		164.23	8.99	164.04	3.56	200.14
Texas		280.00	4.35	197.10	3.84	217.39
Utah				189.44		182.09
Vermont	3.22	142.22	16.95	372.88	3.42	143.69
Virginia	11.56	40.46	3.83	197.32	4.63	167.57
Washington			13.79	331.03	12.50	306.25
West Virginia		250.00		103.42		111.86
Wisconsin		259.26	1.55	294.57	.99	275.52
Not segregated		135.80	4.24	199.43	3.09	186.21
Total	2.50	170.73	2.64	191.97	2.58	187.46

SIZE OF QUARRIES AND PERIOD OF ACTIVITY

Most of the men engaged in quarrying stone in the United States are employed at a relatively small number of plants. Reports from operating companies for 1926 showed that about one-third of the quarries employed approximately four-fifths of the workers. This statement relates to the quarry pits only and has no reference to the cement mills, limekilns, or other plants outside of the quarries. (See Table 35.)

As might be expected, the larger quarries were in operation a greater number of days during the year than the smaller plants. In this connection see Tables 35 and 36. The larger quarries also had lower death rates and injury rates from accidents to their employees.

In Table 35 all quarry reports for 1926 have been arranged into different groups according to the number of men employed in the pits. The number of employees and the number of deaths and injuries from accidents are shown for each group. Although there is some fluctuation in the figures, the accident rates show a general

downward trend as the size of the quarry increased. A similar downward trend in the accident rates as the number of operating days increased is shown by the figures in Table 36. In Table 37 an attempt has been made to show the relationship between the two factors—namely, size of plant and days of operation.

The reports showed that dimension-stone quarries employing 1 to 49 men and operating 150 days or more during the year on an 8-hour day shift had 92 accidents (fatal and nonfatal) for each thousand man hours of exposure to hazard, while other plants that were similar in all respects, except that they employed 50 or more men, had 64 accidents per thousand hours of exposure. In the same general class the 9-hour quarries had an accident rate of 69 for the small plants and 56 for the large plants. Again, the 10-hour quarries had an accident rate of 56 for the small plants and 54 for the large plants.

As to the influence of the period of operation, a comparison can be made for the small plants only, as practically all of the large plants were in operation most of the year. The reports for the small plants (having 1 to 49 employees) were arranged into two groups—those for quarries that were active from 1 to 149 days and those that were active 150 days or more. On this basis the figures for dimension-stone quarries showed that 9 and 10 hour plants that were active 150 days or more had lower accident rates than similar plants that were active less than 150 days. The rate for the 8-hour plants, however, was higher for the longer period of activity and in this respect was out of harmony with the rates for the other groups, not only for dimension-stone but also for nondimension-stone quarries. The figures for 8-hour nondimension-stone quarries showed an accident-frequency rate of 128 per million man hours for plants working less than 150 days and a rate of 86 for plants working 150 days or more. Similar plants working 9 hours a day had an accident rate of 121 for the shorter period of activity, as compared with 91 for plants operating 150 days or more. The 10-hour plants working less than 150 days during the year had an accident rate of 75, as compared with a rate of 60 for plants working 150 days or more. Table 36 shows the accident rates per thousand 300-day workers for each of the groups.

TABLE 35.—*Comparison of injury rates at large and at small quarries during the year ended December 31, 1926*

[Inside only]

Men employed	Number of plants	Men employed		Days of labor performed	Average days active	Killed	Injured	Killed per thousand 300-day workers	Injured per thousand 300-day workers
		Actual number	Equivalent in 300-day workers						
ALL QUARRIES									
1 to 4	223	599	300	89,977	150	3	54	10.00	180.00
5 to 9	275	1,852	1,225	367,384	198	3	271	2.45	221.22
1 to 9	498	2,451	1,525	457,361	187	6	325	3.93	213.11
10 to 14	239	2,772	2,061	618,427	223	13	497	6.31	241.15
15 to 19	187	3,052	2,416	724,816	237	6	527	2.48	218.13
10 to 19	426	5,824	4,477	1,343,243	231	19	1,024	4.24	228.72
20 to 24	142	2,971	2,432	729,473	246	7	509	2.88	209.29
1 to 24	1,066	11,246	8,434	2,530,077	225	32	1,858	3.79	220.30
25 to 49	345	11,846	10,058	3,017,454	255	29	1,970	2.88	195 86
50 to 99	200	13,072	11,579	3,473,620	266	21	1,992	1.81	172.04
100 or more	89	14,456	12,637	3,791,236	262	28	2,186	2.22	172.98
25 to 100 or more	634	39,374	34,274	10,282,310	261	78	6,148	2.28	179.38
Total	1,700	50,620	42,708	12,812,387	253	110	8,006	2.58	187.46
DIMENSION-STONE QUARRIES									
1 to 4	91	237	129	38,691	163	1	12	7.75	93.02
5 to 9	79	539	368	110,443	205	1	74	2.72	201.09
1 to 9	170	776	497	149,134	192	2	86	4.02	173.04
10 to 14	65	748	593	177,852	238	3	128	5.06	215.85
15 to 19	33	540	433	129,929	241	1	86	2.31	198.61
10 to 19	98	1,288	1,026	307,781	239	4	214	3.90	208.58
20 to 24	29	613	494	148,082	242	3	112	6.07	226.72
1 to 24	297	2,677	2,017	604,997	226	9	412	4.46	204.26
25 to 49	85	2,911	2,479	743,539	255	6	459	2.42	185.16
50 to 99	53	3,525	3,037	911,142	258	5	487	1.65	160.36
100 or more	23	4,229	3,660	1,098,078	260	8	553	2.19	151.09
25 to 100 or more	161	10,665	9,176	2,752,759	258	19	1,499	2.07	163.36
Total	458	13,342	11,193	3,357,756	252	28	1,911	2.50	170.73
NONDIMENSION-STONE QUARRIES									
1 to 4	120	330	155	46.590	141	2	38	12.90	245.16
5 to 9	176	1,183	769	230,819	195	2	180	2.60	234.07
1 to 9	296	1,513	924	277,409	183	4	218	4.33	235.93
10 to 14	151	1,747	1,248	374,327	214	7	309	5.61	247.60
15 to 19	130	2,118	1,664	499,261	236	4	389	2.40	233.77
10 to 19	281	3,865	2,912	873,588	226	11	698	3.78	239.70
20 to 24	93	1,948	1,615	484,360	249	4	331	2.48	204.95
1 to 24	670	7,326	5,451	1,635,357	223	19	1,247	3.49	228.77
25 to 49	228	7,906	6,721	2,016,276	255	21	1,261	3.12	187.62
50 to 99	130	8,390	7,481	2,244,439	268	14	1,278	1.87	170.83
100 or more	59	9,145	8,033	2,409,849	264	19	1,529	2.37	190.34
25 to 100 or more	417	25,441	22,235	6,670,564	262	54	4,068	2.43	182.95
Total	1,087	32,767	27,686	8,305,921	253	73	5,315	2.64	191.97

TABLE 36.—*All quarries: Accident data, based on average number of days quarries were operated by employees inside the quarry, during the year ended December 31, 1926*

Average number of days	1926								
	Number of plants	Men employed		Average employees per plant	Days of labor performed	Killed	Injured	Killed per thousand 300-day workers	Injured per thousand 300-day workers
		Actual number	Equivalent in 300-day workers						
ALL QUARRIES									
300 days or more	435	16,788	17,782	39	5,334,567	42	3,176	2.36	178.61
250 to 299 days	390	14,909	13,645	38	4,093,547	35	2,469	2.57	180.95
200 to 249 days	344	9,606	6,994	28	2,098,217	21	1,465	3.00	209.47
150 to 199 days	207	4,854	2,796	23	838,736	.8	501	2.86	179.18
100 to 149 days	137	2,803	1,147	20	344,222	2	283	1.74	246.73
50 to 99 days	118	1,280	312	11	93,575	2	105	6.41	336.54
Less than 50 days	69	380	32	6	9,523	-------	7	--------	218.75
Total	1,700	50,620	42,708	30	12,812,387	110	8,006	2.58	187.46
150 days or more	1,376	46,157	41,217	34	12,365,067	106	7,611	2.57	184.66
149 days or less	324	4,463	1,491	14	447,320	4	395	2.68	264.92
DIMENSION STONE									
150 days or more	371	11,894	10,652	32	3,195,571	27	1,790	2.53	168.04
149 days or less	87	1,448	541	17	162,185	1	121	1.85	223.66
NONDIMENSION STONE									
150 days or more	868	29,959	26,812	35	8,043,571	70	5,061	2.61	188.76
149 days or less	219	2,808	874	13	262,350	3	254	3.43	290.62
ALL OTHER AND NOT STATED									
150 days or more	137	4,304	3,753	31	1,125,925	9	760	2.40	202.50
149 days or less	18	207	76	12	22,785	-------	20	--------	263.16

TABLE 37.—*Accident data, based on number of employees inside the quarries and number of days plants were active during the year ended December 31, 1926*

Men employed	1 to 99 days					100 to 199 days					200 to 299 days					300 or more days					Total				
	Number of plants	Men employed	Days of labor performed	Killed	Injured	Number of plants	Men employed	Days of labor performed	Killed	Injured	Number of plants	Men employed	Days of labor performed	Killed	Injured	Number of plants	Men employed	Days of labor performed	Killed	Injured	Number of plants	Men employed	Days of labor performed	Killed	Injured
DIMENSION STONE																									
1 to 14	38	161	7,166		4	69	375	56,555		35	99	737	185,845	3	120	29	251	77,420	2	55	235	1,524	326,986	5	214
15 to 49	5	103	7,880		12	23	636	100,020	1	52	71	1,938	490,423	7	325	48	1,387	423,227	2	268	147	4,064	1,021,550	10	657
50 or more						11	1,031	145,979	1	81	42	4,288	1,118,775	4	538	23	2,435	744,466	8	421	76	7,754	2,009,220	13	1,040
Total	43	264	15,046		16	103	2,042	302,554	2	168	212	6,963	1,795,043	14	983	100	4,073	1,245,113	12	744	458	13,342	3,357,756	28	1,911
NONDIMENSION STONE																									
1 to 14	104	558	33,936	1	53	110	784	113,177	3	89	161	1,318	317,867	5	257	72	600	186,756	2	128	447	3,260	651,736	11	527
15 to 49	26	555	33,937	1	21	82	2,108	326,515	1	212	191	5,150	1,276,607	18	913	152	4,159	1,362,838	9	835	451	11,972	2,999,897	29	1,981
50 or more	4	228	16,682		22	20	1,967	314,345	3	199	92	8,798	2,230,896	16	1,456	73	6,542	2,092,365	14	1,130	189	17,535	4,654,288	33	2,807
Total	134	1,341	84,555	2	96	212	4,859	754,037	7	500	444	15,266	3,825,370	39	2,626	297	11,301	3,641,959	25	2,093	1,087	32,767	8,305,921	73	5,315

TABLE 38.—*Accident data based on number of employees inside the quarries and number of hours of exposure during the year ended December 31, 1926*

Men employed	8 hours					9 hours					10 hours					All other and not stated					Total				
	Number of plants	Men employed	Days of labor performed	Killed	Injured	Number of plants	Men employed	Days of labor performed	Killed	Injured	Number of plants	Men employed	Days of labor performed	Killed	Injured	Number of plants	Men employed	Days of labor performed	Killed	Injured	Number of plants	Men employed	Days of labor performed	Killed	Injured
DIMENSION STONE																									
1 to 14	106	607	128,065	3	87	81	572	131,467	1	83	36	254	50,369	1	27	12	91	17,085	----	17	235	1,524	326,986	5	214
15 to 49	47	1,216	312,954	3	226	54	1,493	407,892	6	247	34	919	225,193	1	132	12	436	75,511	----	52	147	4,064	1,021,550	10	657
50 or more	19	1,500	410,514	3	207	24	2,956	818,909	5	406	21	2,201	594,871	4	312	12	1,097	184,926	1	115	76	7,754	2,009,220	13	1,040
Total	172	3,323	851,533	9	520	159	5,021	1,358,268	12	736	91	3,374	870,433	6	471	36	1,624	277,522	1	184	458	13,342	3,357,756	28	1,911
NONDIMENSION STONE																									
1 to 14	109	711	127,330	2	110	121	922	199,059	2	179	179	1,392	280,518	7	212	38	235	44,829	----	26	447	3,260	651,736	11	527
15 to 49	76	1,913	470,113	4	312	120	2,993	716,504	12	569	222	6,158	1,571,913	12	887	33	908	241,367	1	213	451	11,972	2,999,897	29	1,981
50 or more	38	4,292	1,157,860	2	379	37	3,175	884,640	8	786	100	8,564	2,246,171	21	1,410	14	1,504	365,617	2	232	189	17,535	4,654,288	33	2,807
Total	223	6,916	1,755,303	8	801	278	7,090	1,800,203	22	1,534	501	16,114	4,098,602	40	2,509	85	2,647	651,813	3	471	1,087	32,767	8,305,921	73	5,315

ACCIDENT RATES FOR CEMENT MILLS

In the bureau's canvass of accidents in the quarry industry in 1925 special effort was made to obtain reports covering cement mills. Returns for earlier years seemed to be incomplete for plants engaged in the manufacture of cement, although the bureau's report form specifically requested information from the mills. In 1926 the bureau continued its effort to obtain reports from all cement mills, and it is believed that the returns for that year are fairly complete. The results of the canvass are shown in Table 39.

According to the returns from producing companies, 14,857 men were employed at cement mills in 1926. This number includes the employees at crushing plants, but not the employees inside the quarry pits. The operating time for all mills was 4,820,463 man days or shifts, an average of 324 shifts per man.

Accidents caused 23 deaths and 1,201 nonfatal lost-time injuries, indicating a death rate of 1.43 and an injury rate of 74.74 per thousand 300-day workers. Figures for each of the foremost cement-manufacturing States are given in Table 39.

TABLE 39.—*Selected quarries: Accident rates, men employed, etc., at cement mills (including crushers) during the year ended December 31, 1926*

State	Men employed		Days of labor performed	Average days active	Killed	Permanent total	Permanent partial	Serious	Slight	Total nonfatal	Killed per thousand 300-day workers	Injured per thousand 300-day workers
	Actual number	Equivalent in 300-day workers										
California	2,492	2,962	888,784	357	7	---	10	89	268	367	2.36	123.90
Illinois	1,187	1,245	373,397	315	1	---	2	13	17	32	.80	25.70
Kansas	552	597	179,128	325	1	---	---	17	34	51	1.68	85.43
Michigan	352	293	87,832	250	---	---	---	33	22	55	---	187.71
New York	1,091	1,128	338,296	310	2	---	3	26	35	64	1.77	56.74
Ohio	1,038	1,215	364,525	351	6	1	1	8	57	67	4.94	55.14
Pennsylvania	4,483	4,815	1,444,418	322	2	---	2	29	294	325	.42	67.50
Not segregated	3,662	3,813	1,144,083	312	4	---	22	21	197	240	1.05	62.94
Total, 1926	14,857	16,068	4,820,463	324	23	1	40	236	924	1,201	1.43	74.74

TABLE 40.—*Fatalities and injuries, classified by character of disability, for the five-year period, 1922 to 1926*

Year	In and about quarry															In outside works											Grand total
	Falls or slides of rock or overburden	Handling rock at face	Timber or hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Nails, splinters, etc.	Boiler and air-tank explosions	Burns	Other causes	Total	Haulage	Machinery	Hand tools	Nails, splinters, etc.	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling rock by hand	Burns	Other causes	Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20	21	22	23	24	25	26		
Killed:																													
1922	25	2	1	36	9	4	4		3	1	7					92	6	17		1	3	3	5			1	4	40	132
1923	31	4		12	18	11	5	4			9		1	1	3	99	10	12			1	5	7		1	5	3	44	143
1924	26	2		16	11	13	4	4	4	1	8	2		1	4	96	12	12			1	3	7			3	4	42	138
1925	34	3		20	11	8	1	3	3	1	13			1	3	101	11	13			3	7	3	2		6	3	48	149
1926	32	4		23	17	3	6	4	7		7		3	1	3	110	6	13			4	6	2	1		8	4	44	154
Total	148	15	1	107	66	39	20	15	17	3	44	2	4	4	13	498	45	67		1	12	24	24	3	1	23	18	218	716
Permanent total:																													
1922	2			3	1										1	7	4					1		1	1	1	5	13	20
1923	1			2	1	1		3			2					10	1	1										2	12
1924	2			3	2		2			1			1			11	1										1	2	13
1925	3	2		4	2	1	1	2			1			1		17			1		1		1				2	5	22
1926	1	2		2	3	1					3					12		2						1				3	15
Total	9	4		14	9	3	3	5		1	6		1	1	1	57	6	3	1		1	1	1	1	1	1	8	25	82
Permanent partial:																													
1922	30	27	8	25	35	14	9	37		19	28	1		1	5	239	10	39			2	6	10	14	40	1	16	138	377
1923	35	48	3	18	46	11	6	46	2	13	31			3	14	276	12	61	8	2		8	19	18	17	1	9	155	431
1924	32	39	9	23	44	12	13	52	2	13	50	3		4	30	326	23	44	5	3	2	5	9	14	10	5	11	131	457
1925	40	23	4	26	45	11	11	32	1	9	49			2	21	274	15	48	4	6	3	18	11	14	18	4	15	156	430
1926	31	23	4	28	45	25	9	50	3	8	40	3		2	9	280	17	41	5	2	2	11	14	14	4	9	17	136	416
Total	168	160	28	120	215	73	48	217	8	62	198	7		12	79	1,395	77	233	22	13	9	48	63	74	89	20	68	716	2,111

Temporary (more than 14 days):																											
1922	199	196	53	71	205	96	72	80	9	45	126	7	1	14	166	1,340	89	120	55	15	11	101	104	63	58	74	112	802	2,142
1923	240	241	52	56	234	129	101	116	5	51	167	7	....	13	122	1,534	121	179	59	24	17	131	136	52	46	64	204	1,033	2,567
1924	246	269	48	65	251	116	98	127	10	67	155	14	....	21	166	1,653	94	193	64	18	17	129	144	41	80	70	205	1,055	2,708
1925	190	294	66	49	232	128	106	135	12	83	146	18	2	20	157	1,638	102	143	67	24	23	142	122	112	68	59	127	989	2,627
1926	181	242	59	49	189	110	77	104	7	48	154	13	....	21	130	1,384	105	176	42	7	19	138	130	45	91	56	125	934	2,318
Total	1,056	1,242	278	290	1,111	579	454	562	43	294	748	59	3	89	741	7,549	511	811	287	88	87	641	636	313	343	323	773	4,813	12,362
Temporary (1 to 14 days):																											
1922	490	962	243	189	524	254	310	863	9	207	449	121	4	102	736	5,463	232	493	279	153	48	284	432	759	205	269	683	3,837	9,300
1923	668	1,233	277	238	670	331	400	1,277	19	332	624	140	1	120	796	7,126	391	555	338	209	44	363	559	993	305	315	782	4,854	11,980
1924	578	1,241	345	222	670	353	335	1,229	20	336	486	156	7	101	921	7,000	257	474	419	156	41	326	468	1,024	309	276	849	4,599	11,599
1925	613	1,320	265	150	633	270	344	1,098	34	344	478	165	2	107	880	6,703	316	447	396	185	54	311	434	973	311	217	739	4,383	11,086
1926	506	1,153	307	217	513	300	362	953	25	295	571	172	3	96	857	6,330	273	403	358	197	45	304	422	724	354	224	758	4,122	10,452
Total	2,865	5,909	1,437	1,016	3,010	1,508	1,751	5,420	107	1,514	2,608	754	17	526	4,190	32,622	1,469	2,372	1,700	900	232	1,648	2,315	4,473	1,484	1,301	3,811	21,795	54,417
Total injured:																											
1922	721	1,185	304	288	765	364	391	980	18	271	603	129	5	117	908	7,049	335	652	334	168	61	392	546	837	304	345	816	4,790	11,839
1923	944	1,522	332	314	951	472	507	1,442	26	396	824	147	1	136	932	8,946	525	796	405	235	61	502	714	1,063	368	380	995	6,044	14,940
1924	858	1,549	402	313	967	481	448	1,408	32	417	691	173	8	126	1,117	8,990	375	711	488	177	60	460	621	1,079	399	351	1,066	5,787	14,777
1925	846	1,639	335	229	912	410	462	1,267	47	436	674	183	4	130	1,058	8,632	433	638	468	215	81	471	568	1,099	397	280	883	5,533	14,165
1926	719	1,420	370	296	750	436	448	1,107	35	351	768	188	3	119	996	8,006	395	622	405	206	66	513	566	784	449	289	900	5,195	13,201
Total	4,088	7,315	1,743	1,440	4,345	2,163	2,256	6,204	158	1,871	3,560	820	21	628	5,011	41,623	2,063	3,419	2,100	1,001	329	2,338	3,015	4,862	1,917	1,645	4,660	27,349	68,972
Total killed and injured:																											
1922	746	1,187	305	324	774	368	395	980	21	272	610	129	5	117	908	7,141	341	669	334	169	64	395	551	837	304	346	820	4,830	11,971
1923	975	1,526	332	326	969	483	512	1,446	26	396	833	147	2	137	935	9,045	535	808	405	235	62	507	721	1,063	369	385	998	6,088	15,133
1924	884	1,551	402	329	978	494	452	1,412	36	418	699	175	8	127	1,121	9,086	387	723	488	177	61	463	628	1,079	399	354	1,070	5,829	14,915
1925	880	1,642	335	249	923	418	463	1,270	50	437	687	183	4	131	1,061	8,733	444	651	468	215	84	478	571	1,101	397	286	886	5,581	14,314
1926	751	1,424	370	319	767	439	454	1,111	42	351	775	188	6	120	999	8,116	401	635	405	206	70	519	568	785	449	297	904	5,239	13,355
Total	4,236	7,330	1,744	1,547	4,411	2,202	2,276	6,219	175	1,874	3,604	822	25	632	5,024	42,121	2,108	3,486	2,100	1,002	341	2,362	3,039	4,865	1,918	1,668	4,678	27,567	69,688

TABLE 41.—*All quarries: Severity of accidents, by causes, 1922 to 1926, showing percentage of accidents in each degree of severity*

Cause	Killed	Seriously injured (time lost more than 14 days)			Slightly injured (time lost 1 to 14 days)	Total non-fatal	Grand total (per cent)	Number killed	Number injured
		Permanent total disability	Permanent partial disability	Others					
In and about quarry:									
1. Falls or slides of rock or overburden	3.49	0.21	3.97	24.93	67.40	96.51	100.00	148	4,088
2. Handling rock at face	.20	.06	2.18	16.95	80.61	99.80	100.00	15	7,315
3. Timber or hand tools	.06	-------	1.60	15.94	82.40	99.94	100.00	1	1,743
4. Explosives	6.92	.90	7.76	18.75	65.67	93.08	100.00	107	1,440
5. Haulage	1.50	.20	4.87	25.19	68.24	98.50	100.00	66	4,345
6. Falls of persons	1.77	.14	3.32	26.29	68.48	98.23	100.00	39	2,163
7. Falling objects (other than 1 and 2)	.88	.13	2.11	19.95	76.93	99.12	100.00	20	2,256
8. Flying objects	.24	.08	3.49	9.04	87.15	99.76	100.00	15	6,204
9. Electricity	9.71	-------	4.57	24.57	61.15	90.29	100.00	17	158
10. Drilling and channeling (by machine or hand)	.16	.05	3.31	15.69	80.79	99.84	100.00	3	1,871
11. Machinery	1.22	.17	5.49	20.76	72.36	98.78	100.00	44	3,560
12. Nails, splinters, etc	.24	-------	.85	7.18	91.73	99.76	100.00	2	820
13. Boiler and air-tank explosions	16.00	4.00	-------	12.00	68.00	84.00	100.00	4	21
14. Burns	.63	.16	1.90	14.08	83.23	99.37	100.00	4	628
15. Other causes	.26	.02	1.57	14.75	83.40	99.74	100.00	13	5,011
Total	1.18	.14	3.31	17.92	77.45	98.82	100.00	498	41,623
In outside works:									
16. Haulage	2.13	.29	3.65	24.24	69.69	97.87	100.00	45	2,063
17. Machinery	1.92	.09	6.68	23.27	68.04	98.08	100.00	67	3,419
18. Hand tools	-------	.05	1.05	13.66	85.24	100.00	100.00	-------	2,100
19. Nails, splinters, etc	.10	-------	1.30	8.78	89.82	99.90	100.00	1	1,001
20. Electricity	3.52	.29	2.64	25.51	68.04	96.48	100.00	12	329
21. Falls of persons	1.02	.04	2.03	27.14	69.77	98.98	100.00	24	2,338
22. Falling objects (rocks, timbers, etc)	.79	.03	2.07	20.93	76.18	99.21	100.00	24	3,015
23. Flying objects	.06	.04	1.52	6.44	91.94	99.94	100.00	3	4,862
24. Handling rock by hand	.05	.05	4.64	17.89	77.37	99.95	100.00	1	1,917
25. Burns	1.38	.06	1.20	19.36	78.00	98.62	100.00	23	1,645
26. Other causes	.38	.17	1.45	16.53	81.47	99.62	100.00	18	4,660
Total	.79	.09	2.60	17.46	79.06	99.21	100.00	218	27,349
Grand total	1.03	.12	3.03	17.74	78.08	98.97	100.00	716	68,972

TIME LOST THROUGH QUARRY ACCIDENTS

The reports that quarry operators send to the Bureau of Mines at the close of each calendar year do not show the amount of time lost as a result of each individual accident, but they do classify the accidents into five main groups, based upon the severity of the injuries, and from this classification the aggregate loss of time from the accidents may be estimated.

Special studies of accidents at certain mines and quarries that have been cooperating with the Bureau of Mines have indicated that the average temporary injury causing loss of time incapacitates the injured employee for 14 days. Some of these accidents cause only one day's loss of time; others disable the employee for several weeks or months. The average for all temporary disabilities, however, was 14 days. Furthermore, it was found that if all temporary injuries at mines were classified into two main groups—those involving more than 14 days' disability and those involving 1 to 14 days' disability—

the accidents in the former group averaged 32 days of disability each and those in the latter group 6 days each. The yearly accident reports received from quarry operators throughout the United States show the number of temporary injuries arranged in the two groups mentioned; they also show the number of fatalities, the number of permanent total disabilities, and the number of permanent partial disabilities.

In the calculation of the loss of time from accidents each fatality and permanent total disability has been considered as representing the loss of 6,000 days, in accordance with the scale adopted by the International Association of Industrial Accident Boards and Commissions. A loss of 800 days has been used for each permanent partial disability, as the operators' yearly summarized reports of such injuries do not indicate the actual time lost or the nature of the injury. However, 800 days represent, in round figures, the average loss of time from permanent partial disabilities reported by industries in California to the Industrial Accident Commission of that State, as indicated by the commission's published reports, and the figure has been used herein for estimating the time lost from permanent partial disabilities at quarries in 1926 and previous years as reported to the Bureau of Mines. For temporary injuries, in order to estimate conservatively, a weight of 30 days instead of 32 has been assigned to each injury causing more than 14 days' disability, and a weight of 4 days instead of 6 has been assigned to each injury causing from 1 to 14 days of disability. On this basis, therefore, the aggregate loss of time from all accidents, fatal and nonfatal, at quarries and outside plants in the United States in 1926 is estimated at 1,458,000 days, an average of 109 days per accident. In 1925 the corresponding estimate was 104 days per accident. The estimated loss of time from all accidents in 1926 was equal to 6 per cent of the time worked that year by all employees; for 1925 the percentage was 6. The loss of time from accidents in 1926 was estimated as follows:

	Lost days
154 fatalities, at 6,000 lost days each	924,000
15 permanent total disabilities, at 6,000 lost days each	90,000
416 permanent partial disabilities, at 800 lost days each	332,800
2,318 temporary disabilities of more than 14 days, at 30 lost days each	69,540
10,452 temporary disabilities of 1 to 14 days, at 4 lost days each	41,808
Total, 13,355 injuries	1,458,148

SUMMARY OF QUARRY STATISTICS

Tables 42 to 49 summarize accident and labor data for the quarry industry in the United States for the three half decades 1911 to 1925 and for the years 1925 and 1926. The figures have been classified by States, so that the situation in any given State may readily be seen. Table 50 presents similar data for the United States as a whole for each of the chief kinds of quarries for each year since 1917.

TABLE 42.—*All quarries: Average number of men employed, by States, during the years ended December 31, 1911 to 1926*

State	In and about quarry					In outside works					Total				
	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926
Alabama	5,727	6,436	6,878	1,168	1,226	2,740	2,303	3,061	659	718	8,467	8,739	9,939	1,827	1,944
Arkansas	1,873	1,251	1,131	194	209	534	268	387	75	72	2,407	1,519	1,518	269	281
California	14,415	8,161	11,756	3,110	1,884	4,893	9,273	15,453	2,965	3,374	19,308	17,434	27,209	6,075	5,258
Colorado	3,635	2,296	3,146	530	399	1,407	1,217	1,776	382	423	5,042	3,513	4,922	912	822
Connecticut	5,424	2,614	2,933	659	585	2,158	842	887	285	179	7,582	3,456	3,820	944	764
Georgia	6,978	3,869	6,638	1,179	1,226	2,609	3,093	6,228	1,683	1,778	9,587	6,962	12,866	2,862	3,004
Illinois	15,790	11,260	12,624	2,724	2,512	5,486	5,883	7,788	2,148	1,780	21,276	17,143	20,412	4,872	4,292
Indiana	16,940	12,593	15,908	2,907	2,547	7,778	7,187	9,611	2,550	3,029	24,718	19,780	25,519	5,457	5,576
Iowa	4,733	2,962	2,315	433	475	1,892	2,982	2,529	837	1,024	6,625	5,944	4,844	1,270	1,499
Kansas	6,338	3,517	3,054	543	469	3,029	3,184	3,802	756	628	9,367	6,701	6,856	1,299	1,097
Kentucky	9,452	6,051	5,234	929	900	2,014	832	1,309	202	250	11,466	6,883	6,543	1,131	1,150
Maine	5,915	3,744	5,453	931	867	4,283	3,553	3,777	756	775	10,198	7,297	9,230	1,687	1,642
Maryland	7,390	6,156	4,083	696	685	3,651	4,049	3,210	734	713	11,041	10,205	7,293	1,430	1,398
Massachusetts	11,547	8,443	8,292	1,351	1,428	7,103	4,085	5,829	1,284	1,179	18,650	12,528	14,121	2,635	2,607
Michigan	4,974	5,523	5,706	1,137	1,213	3,127	2,571	5,107	1,054	1,132	8,101	8,094	10,813	2,191	2,345
Minnesota	6,792	4,632	4,180	761	679	3,395	2,896	2,868	673	533	10,187	7,528	7,048	1,434	1,212
Missouri	15,226	10,239	11,833	2,352	2,492	5,499	4,171	5,595	1,149	921	20,725	14,410	17,428	3,501	3,413
New Hampshire	3,198	2,598	2,524	494	420	2,638	1,415	1,127	298	311	5,836	4,013	3,651	792	731
New Jersey	11,684	7,045	6,112	1,062	1,218	3,920	2,985	3,234	659	653	15,604	10,030	9,346	1,721	1,871
New Mexico	1,300	1,189	1,111	73	131	290	208	257	25	118	1,590	1,397	1,368	98	249
New York	22,261	14,113	13,227	2,436	2,626	6,014	7,669	7,555	1,954	1,822	28,275	21,782	20,782	4,390	4,448
North Carolina	4,869	4,336	5,137	959	1,000	1,348	1,842	1,968	446	724	6,217	6,178	7,105	1,405	1,724
Ohio	28,462	18,705	19,089	4,147	3,974	10,096	7,511	11,102	2,473	2,993	38,558	26,216	30,191	6,620	6,967
Oklahoma	2,596	2,612	2,890	718	526	891	2,031	1,749	373	310	3,487	4,643	4,639	1,091	836
Pennsylvania	75,209	55,842	51,374	10,188	9,716	31,100	32,346	30,428	7,950	7,804	106,309	88,188	81,802	18,138	17,520
Rhode Island	1,998	1,290	1,092	188	202	2,203	1,076	573	52	43	4,201	2,366	1,665	240	245
Tennessee	9,823	6,074	7,123	1,343	1,562	3,083	1,515	3,577	913	562	12,906	7,589	10,700	2,256	2,124
Texas	4,826	3,469	4,082	756	895	2,256	3,654	5,284	1,088	892	7,082	7,123	9,366	1,844	1,787
Utah	1,602	1,216	1,635	368	404	608	529	794	162	190	2,210	1,745	2,429	530	594
Vermont	15,888	11,795	12,106	2,477	2,728	6,816	10,404	9,423	2,126	2,286	22,704	22,199	21,529	4,603	5,014
Virginia	8,627	6,979	6,858	1,399	1,388	4,330	2,323	3,209	882	1,291	12,957	9,302	10,067	2,281	2,679
Washington	5,686	1,993	1,140	211	198	2,039	1,005	813	342	249	7,725	2,998	1,953	553	447
West Virginia	6,399	5,785	6,094	1,319	1,364	2,425	2,432	2,708	614	578	8,824	8,217	8,802	1,933	1,942
Wisconsin	11,012	9,232	7,486	1,390	1,256	5,646	2,926	2,924	641	551	16,658	12,158	10,410	2,031	1,807
Not segregated	9,985	7,254	6,113	1,092	1,216	3,138	1,878	2,536	458	641	13,123	9,132	8,649	1,550	1,857
Total	368,574	261,274	266,357	52,224	50,620	150,439	142,138	168,478	39,648	40,526	519,013	403,412	434,835	91,872	91,146

TABLE 43.—*All quarries: Number of 300-day workers employed, by States, during the years ended December 31, 1911 to 1926*

State	In and about quarry					In outside works					Total				
	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926
Alabama		5,498	6,136	1,103	1,176		2,290	3,071	722	761	7,558	7,788	9,207	1,825	1,937
Arkansas		878	797	147	129		240	316	72	75	1,623	1,118	1,113	219	204
California		7,691	10,819	2,927	1,733		9,511	17,283	3,202	3,728	16,987	17,202	28,102	6,129	5,461
Colorado		2,089	2,590	482	349		1,163	1,677	367	411	4,791	3,252	4,267	849	760
Connecticut		2,148	2,319	477	484		774	762	236	165	6,088	2,922	3,081	713	649
Georgia		3,254	5,985	1,114	1,051		2,962	6,035	1,635	1,832	7,434	6,216	12,020	2,749	2,883
Illinois		9,113	10,149	2,127	2,039		5,595	7,609	2,272	1,787	16,464	14,708	17,758	4,399	3,826
Indiana		9,781	14,846	2,567	1,619		6,315	9,131	2,597	2,089	19,761	16,096	23,977	5,164	3,708
Iowa		2,206	1,751	285	332		3,069	2,433	830	1,009	5,769	5,275	4,184	1,115	1,341
Kansas		2,724	2,238	364	356		2,873	3,711	753	642	5,985	5,597	5,949	1,117	998
Kentucky		3,876	3,504	624	627		607	904	124	200	7,250	4,483	4,408	748	827
Maine		3,159	4,417	831	720		3,363	3,850	793	791	8,319	6,522	8,267	1,624	1,511
Maryland		5,342	3,308	581	596		3,831	3,334	793	712	9,010	9,173	6,642	1,374	1,308
Massachusetts		6,608	6,629	1,091	1,184		3,433	5,283	1,210	1,104	15,199	10,041	11,912	2,301	2,288
Michigan		4,675	4,329	896	949		2,146	4,667	1,014	1,007	6,226	6,821	8,996	1,910	1,956
Minnesota		3,555	3,313	631	559		2,017	2,322	595	481	7,753	5,572	5,635	1,226	1,040
Missouri		8,991	10,303	1,993	1,921		4,046	5,599	1,197	885	16,006	13,037	15,902	3,190	2,806
New Hampshire		1,971	1,934	418	356		1,128	904	266	290	4,571	3,099	2,838	684	646
New Jersey		5,377	4,879	832	1,002		2,373	3,068	654	669	11,922	7,750	7,947	1,486	1,671
New Mexico		621	567	36	102		105	109	11	106	1,090	726	676	47	208
New York		10,599	9,433	1,813	2,078		6,470	6,276	1,658	1,702	21,012	17,069	15,709	3,471	3,780
North Carolina		3,678	4,262	769	802		1,614	1,752	416	696	5,074	5,292	6,014	1,185	1,498
Ohio		15,839	16,089	3,682	3,491		6,524	10,089	2,332	3,053	31,243	22,363	26,178	6,014	6,544
Oklahoma		2,103	2,391	613	452		1,897	1,809	367	314	3,070	4,000	4,200	980	766
Pennsylvania		48,036	42,180	8,653	8,653		31,060	29,071	7,978	7,892	87,790	79,096	71,251	16,631	16,545
Rhode Island		1,136	925	171	183		1,061	487	48	42	3,623	2,197	1,412	219	225
Tennessee		4,870	6,264	1,196	1,404		1,379	3,542	987	576	10,319	6,249	9,806	2,183	1,980
Texas		3,141	3,482	686	782		3,608	5,482	1,143	983	5,415	6,749	8,964	1,829	1,765
Utah		1,116	1,215	273	335		526	724	137	205	1,847	1,642	1,939	410	540
Vermont		10,770	11,117	2,308	2,628		10,484	9,206	2,133	2,310	20,921	21,254	20,323	4,441	4,938
Virginia		5,831	5,799	1,200	1,295		2,174	2,926	862	1,314	10,679	8,005	8,725	2,062	2,609
Washington		1,541	1,008	190	160		811	771	351	229	6,228	2,352	1,779	541	389
West Virginia		5,242	5,007	1,225	1,180		2,224	2,458	630	570	7,172	7,466	7,465	1,855	1,750
Wisconsin		7,344	6,118	1,111	1,009		2,530	2,457	525	481	12,340	9,874	8,575	1,636	1,490
Not segregated		5,660	4,762	847	972		1,484	1,902	314	542	9,490	7,144	6,664	1,161	1,514
Total		216,463	220,865	44,263	42,708		131,687	161,020	39,224	39,653	416,029	348,150	381,885	83,487	82,361

[1] Not segregated prior to 1915.

TABLE 44.—*All quarries: Days of labor performed during the years ended December 31, 1911 to 1926*

State	In and about quarry					In outside works					Total				
	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926
Alabama	----------	1,649,493	1,840,905	330,999	352,778	----------	687,062	921,351	216,615	228,303	2,267,310	2,336,555	2,762,256	547,614	581,081
Arkansas	----------	263,376	238,795	44,056	38,888	----------	72,021	94,752	21,502	22,430	486,659	335,397	333,547	65,558	61,318
California	----------	2,307,322	3,245,305	878,097	519,892	----------	2,853,372	5,184,884	960,451	1,118,380	5,096,185	5,160,694	8,430,189	1,838,548	1,638,272
Colorado	----------	626,819	776,912	144,564	104,495	----------	348,625	503,245	110,163	123,364	1,437,476	975,444	1,280,157	254,727	227,859
Connecticut	----------	644,316	695,987	143,089	145,224	----------	232,438	228,794	70,832	49,362	1,826,369	876,754	924,781	213,921	194,586
Georgia	----------	976,309	1,795,431	334,092	315,172	----------	888,318	1,810,876	490,640	549,670	2,230,349	1,864,627	3,606,307	824,732	864,842
Illinois	----------	2,733,553	3,044,518	638,115	611,822	----------	1,679,006	2,282,502	681,532	536,064	4,939,079	4,412,559	5,327,020	1,319,647	1,147,886
Indiana	----------	2,934,522	4,453,762	769,994	485,650	----------	1,894,186	2,739,414	779,247	626,629	5,928,295	4,828,708	7,193,176	1,549,241	1,112,279
Iowa	----------	662,327	525,164	85,485	99,720	----------	920,133	729,815	248,979	302,523	1,730,474	1,582,460	1,254,979	334,464	402,243
Kansas	----------	817,528	671,654	109,314	106,737	----------	861,605	1,113,309	225,848	192,736	1,795,233	1,679,133	1,784,963	335,162	299,473
Kentucky	----------	1,162,535	1,050,938	187,070	188,163	----------	182,344	271,803	37,376	60,010	2,175,068	1,344,879	1,322,741	224,446	248,173
Maine	----------	947,245	1,325,611	249,447	215,969	----------	1,009,297	1,154,901	237,858	237,258	2,495,691	1,956,542	2,480,512	487,305	453,227
Maryland	----------	1,662,926	992,172	174,355	178,810	----------	1,149,009	1,000,238	237,761	213,692	2,703,131	2,751,935	1,992,410	412,116	392,502
Massachusetts	----------	1,982,680	1,988,813	327,172	355,221	----------	1,029,945	1,584,657	363,072	331,149	4,559,916	3,012,625	3,573,470	690,244	686,370
Michigan	----------	1,402,252	1,298,534	268,740	284,759	----------	644,137	1,400,338	304,391	302,089	1,867,321	2,046,389	2,698,872	573,131	586,848
Minnesota	----------	1,066,497	993,830	189,420	167,788	----------	604,955	696,701	178,395	144,251	2,325,962	1,671,452	1,690,531	367,815	312,039
Missouri	----------	2,697,591	3,090,729	567,831	576,262	----------	1,213,596	1,679,786	359,048	265,453	4,801,792	3,911,187	4,770,515	956,882	841,715
New Hampshire	----------	591,349	580,292	125,347	106,964	----------	338,307	271,186	79,737	86,964	1,371,443	929,656	851,478	205,084	193,928
New Jersey	----------	1,613,608	1,463,918	249,421	300,633	----------	711,518	920,115	196,267	200,804	3,576,664	2,325,126	2,384,033	445,688	501,437
New Mexico	----------	186,557	169,815	10,708	30,713	----------	31,404	32,760	3,430	31,819	326,945	217,961	202,575	14,138	62,532
New York	----------	3,179,664	2,830,140	544,010	623,276	----------	1,941,085	1,882,629	497,278	510,601	6,303,884	5,120,749	4,712,769	1,041,288	1,133,877
North Carolina	----------	1,103,653	1,278,287	230,803	240,722	----------	483,915	525,844	124,732	208,732	1,522,250	1,587,568	1,804,131	355,535	449,454
Ohio	----------	4,751,760	4,826,935	1,104,767	1,047,317	----------	1,956,986	3,026,501	699,545	915,891	9,372,836	6,708,746	7,853,436	1,804,312	1,963,208
Oklahoma	----------	630,827	717,510	183,875	135,533	----------	569,086	542,453	110,177	94,335	920,927	1,199,913	1,259,963	294,052	229,868
Pennsylvania	----------	14,410,963	12,654,140	2,595,938	2,595,881	----------	9,318,017	8,720,955	2,393,248	2,367,572	26,336,515	23,728,980	21,375,095	4,989,186	4,963,453
Rhode Island	----------	340,876	277,753	51,360	54,880	----------	318,332	145,759	14,288	12,684	1,087,245	659,208	423,512	65,648	67,564
Tennessee	----------	1,461,164	1,879,507	358,861	420,983	----------	413,682	1,062,753	296,118	172,905	3,095,628	1,874,846	2,942,260	654,979	593,888
Texas	----------	942,118	1,044,464	205,666	234,684	----------	1,082,686	1,644,781	342,965	294,813	1,624,350	2,024,804	2,689,245	548,631	529,497
Utah	----------	334,924	364,417	81,969	100,434	----------	157,573	217,135	41,132	61,460	554,451	492,497	581,552	123,101	161,894
Vermont	----------	3,230,397	3,334,836	692,281	788,410	----------	3,145,479	2,761,897	640,070	693,078	6,276,274	6,375,876	6,096,733	1,332,351	1,481,488
Virginia	----------	1,749,801	1,740,022	360,076	388,327	----------	651,734	877,625	258,446	394,318	3,203,526	2,401,535	2,617,647	618,522	782,645
Washington	----------	462,532	302,527	57,066	48,118	----------	243,244	231,030	105,133	68,698	1,868,173	705,776	533,557	162,199	116,816
West Virginia	----------	1,572,297	1,502,222	367,524	354,034	----------	667,279	737,497	188,960	170,887	2,151,681	2,239,576	2,239,719	556,484	524,921
Wisconsin	----------	2,202,949	1,835,480	333,449	302,605	----------	759,139	737,011	157,485	144,492	3,702,429	2,962,088	2,572,491	490,934	447,097
Not segregated	----------	1,696,419	1,428,072	253,951	291,523	----------	446,331	570,863	94,319	162,597	2,847,224	2,142,750	1,998,935	348,270	454,120
Total	----------	64,939,149	66,259,397	13,278,915	12,812,387	----------	39,505,846	48,306,160	11,767,040	11,896,013	124,808,755	104,444,995	114,565,557	25,045,955	24,708,400

[1] Not segregated prior to 1915.

TABLE 45.—*All quarries: Average number of days quarries were operated, by States, during the years ended December 31, 1911 to 1926*

State	In and about quarry					In outside works					Total				
	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926
Alabama		256	268	283	288		298	301	329	318	268	267	278	300	299
Arkansas		211	211	227	186		269	245	287	312	202	221	220	244	218
California		283	276	282	276		308	336	324	331	264	296	310	303	312
Colorado		273	247	273	262		286	283	283	292	235	278	260	279	277
Connecticut		246	237	217	248		276	258	249	276	241	254	242	227	255
Georgia		252	270	283	257		287	291	292	309	233	268	280	288	288
Illinois		243	191	234	244		285	293	317	301	232	257	261	271	267
Indiana		233	280	265	191		264	285	306	207	240	244	282	284	199
Iowa		224	227	197	210		309	289	297	295	261	266	259	263	268
Kansas		232	220	201	228		271	293	299	307	192	251	260	258	273
Kentucky		192	201	201	209		219	208	185	240	190	195	202	198	216
Maine		253	243	268	249		284	306	315	306	245	268	269	289	276
Maryland		260	243	251	261		284	312	324	300	245	270	273	288	281
Massachusetts		235	240	242	249		252	272	283	281	244	240	253	262	263
Michigan		254	228	236	235		251	274	289	267	231	253	250	262	250
Minnesota		230	238	249	247		209	243	265	271	228	222	240	256	257
Missouri		263	261	254	231		291	300	312	288	232	271	274	273	247
New Hampshire		228	230	254	255		239	241	268	280	235	232	233	259	265
New Jersey		229	240	235	247		238	285	298	308	229	232	255	259	268
New Mexico		157	153	147	234		151	127	137	270	206	156	148	144	251
New York		225	214	223	237		253	249	254	280	223	235	227	237	255
North Carolina		255	249	241	241		263	267	280	288	245	257	254	253	261
Ohio		254	253	266	264		261	273	283	306	243	256	260	273	282
Oklahoma		242	248	256	258		280	310	295	304	264	258	272	270	275
Pennsylvania		258	246	255	267		288	287	301	303	248	269	261	275	283
Rhode Island		264	254	273	272		296	254	275	295	259	279	254	274	276
Tennessee		241	264	267	270		273	297	324	308	240	247	275	290	280
Texas		272	256	272	262		296	311	315	331	229	284	287	298	296
Utah		275	223	223	249		298	273	254	323	251	282	239	232	273
Vermont		274	275	279	289		302	293	301	303	276	287	283	289	295
Virginia		251	254	257	280		281	273	293	305	247	258	260	271	292
Washington		232	265	270	243		242	284	307	276	242	235	273	293	261
West Virginia		272	247	279	260		274	272	308	296	244	273	254	288	270
Wisconsin		239	245	240	241		259	252	246	262	222	244	247	242	247
Not segregated		234	234	233	240		238	225	206	254	217	235	231	225	245
Total		249	249	254	253		278	287	297	294	240	259	263	273	271

[1] Not segregated prior to 1915.

TABLE 46.—*All quarries: Number of fatalities, by States, during the years ended December 31, 1911 to 1926*

State	In and about quarry					In outside works					Total				
	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926
Alabama	10	7	7	2	6	1	5	6		1	11	12	13	2	7
Arkansas	1	4	3			3					4	4	3		0
California	60	42	43	13	8	6	20	24	4	9	66	62	67	17	17
Colorado	9	6	1	1		3	3	4		1	12	9	5	1	1
Connecticut	12	4	6	1			4	2			12	8	8	1	0
Georgia	5	2	5	1	1		3	1			5	5	6	1	1
Illinois	35	30	19	3	9	8	15	11	1	2	43	45	30	4	11
Indiana	16	16	23	5	1	7	8	10	4	4	23	24	33	9	5
Iowa	8	4	2	1	3	2	3	2			10	7	4	1	3
Kansas	8	6	1		2	6	10	6	2	1	14	16	7	2	3
Kentucky	11	9	9	1	2	9	1	3		1	20	10	12	3	3
Maine	14	4	8	2	1		4	1			14	8	9	2	1
Maryland	20	16	12	4	1	9	6	6	3	1	29	22	18	7	2
Massachusetts	20	22	10	1	5	10	9	2		2	30	31	12	1	7
Michigan	8	14	14	3	3	13	8	14	2	2	21	22	28	5	5
Minnesota	7	9	6			4	4	2			11	13	8		
Missouri	31	12	13	3	3	5	3	6	1		36	15	19	4	3
New Hampshire	1	4	5	2		1	1				2	5	5	2	
New Jersey	18	12	9	1	1	5	9	2			23	21	11	1	1
New Mexico	7	1				1		1			8	1	1		
New York	44	16	35	11	4	1	21	10	1	3	45	37	45	12	7
North Carolina	4	2	14	1	5	1	2	4	1		5	4	18	2	5
Ohio	38	29	31	8	5	16	10	22	5	7	54	39	53	13	12
Oklahoma	2	7	3		1		6				2	13	3		1
Pennsylvania	153	119	81	17	19	40	38	44	14	5	193	157	125	31	24
Rhode Island	7	1	1		1						7	1	1		1
Tennessee	14	10	20	4	5	2	1	8	4	1	16	11	28	8	6
Texas	9	11	10	5	3	7	11	6		1	16	22	16	5	4
Utah	3	2	2			2	1	1			5	3	3		
Vermont	50	19	25	2	9	6	9	7	1	2	56	28	32	3	11
Virginia	16	14	15		6	6	4	3	1		22	18	18	1	6
Washington	30	5	6	1	2	3	1	1			33	6	7	1	2
West Virginia	13	15	3			6	2	3	2		19	17	6	2	
Wisconsin	22	9	5	1	1	3	2	2			25	11	7	1	1
Not segregated	18	21	21	7	3	2	2			1	20	23	21	7	4
Total	724	504	468	101	110	188	226	214	48	44	912	730	682	149	154

TABLE 47.—*All quarries: Number of injuries, by States, during the years ended December 31, 1911 to 1926*

State	In and about quarry					In outside works					Total				
	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926
Alabama	422	678	895	152	194	70	320	869	85	60	492	998	1,764	237	254
Arkansas	58	60	45	14	15	13	22	6	2	1	71	82	51	16	16
California	1,574	1,442	2,527	513	363	389	2,164	2,559	439	488	1,963	3,606	5,086	952	851
Colorado	452	295	393	93	69	84	108	115	26	35	536	403	508	119	104
Connecticut	387	292	472	112	122	45	169	197	49	41	432	461	669	161	163
Georgia	222	135	862	247	180	67	144	789	153	252	289	279	1,651	400	432
Illinois	1,989	1,775	2,428	470	380	609	944	1,089	194	198	2,598	2,719	3,517	664	578
Indiana	1,408	1,603	2,570	534	285	856	1,203	1,431	321	163	2,264	2,806	4,001	855	448
Iowa	418	310	426	58	69	247	601	242	4	116	665	911	668	62	185
Kansas	542	466	339	54	36	74	808	1,075	110	52	616	1,274	1,414	164	88
Kentucky	401	460	744	165	162	43	75	93	18	32	444	535	837	183	194
Maine	169	301	660	127	134	42	316	536	116	124	211	617	1,196	243	258
Maryland	570	893	576	174	123	219	919	382	87	22	789	1,812	958	261	145
Massachusetts	1,391	1,349	1,716	421	329	372	658	1,611	365	395	1,763	2,007	3,327	786	724
Michigan	583	836	1,056	170	163	416	729	1,530	261	168	999	1,565	2,586	431	331
Minnesota	546	633	812	198	198	162	511	893	206	65	708	1,144	1,705	404	263
Missouri	1,593	1,457	2,055	467	347	249	817	773	130	108	1,842	2,274	2,828	597	455
New Hampshire	144	146	400	131	49	78	89	257	53	92	222	235	657	184	141
New Jersey	1,141	918	1,024	170	205	255	582	636	76	55	1,396	1,500	1,660	246	260
New Mexico	170	60	53	3	17	9	14	5		16	179	74	58	3	33
New York	1,840	1,618	2,082	466	515	203	1,103	1,283	222	208	2,043	2,721	3,365	688	723
North Carolina	341	159	182	61	104	32	97	181	133	48	373	256	363	194	152
Ohio	2,331	2,394	2,626	578	572	935	1,678	1,834	495	555	3,266	4,072	4,460	1,073	1,127
Oklahoma	302	302	388	110	99	32	183	107	48	37	334	485	495	158	136
Pennsylvania	5,098	8,749	7,289	1,539	1,492	841	5,331	4,068	967	963	5,939	14,080	11,357	2,506	2,455
Rhode Island	72	129	176	43	40	22	66	33	12	5	94	195	209	55	45
Tennessee	450	377	814	135	281	55	150	596	216	49	505	527	1,410	351	330
Texas	469	500	813	194	170	423	545	888	142	93	892	1,045	1,701	336	263
Utah	171	222	348	80	61	85	106	93	24	33	256	328	441	104	94
Vermont	1,477	1,463	1,515	393	375	424	1,255	966	208	265	1,901	2,718	2,481	601	640
Virginia	338	456	750	190	217	86	174	192	51	92	424	630	942	241	309
Washington	599	251	255	50	49	47	65	85	34	38	646	316	340	84	87
West Virginia	430	648	522	128	132	93	276	200	60	52	523	924	722	188	184
Wisconsin	653	849	1,225	232	278	120	595	789	177	209	773	1,444	2,014	409	487
Not segregated	651	587	608	160	181	89	174	187	49	65	740	761	795	209	246
Total	29,402	32,813	39,646	8,632	8,006	7,786	22,991	26,590	5,533	5,195	37,188	55,804	66,236	14,165	13,201

TABLE 48.—*All quarries: Fatalities per thousand 300-day workers employed, by States, during the years ended December 31, 1911 to 1926*

State	In and about quarry					In outside works					Total				
	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926
Alabama		1.27	1.14	1.81	5.10		2.18	1.95		1.31	1.46	1.54	1.41	1.10	3.61
Arkansas		4.56	3.76								2.46	3.58	2.70		
California		5.46	3.97	4.44	4.62		2.10	1.39	1.25	2.41	3.89	3.60	2.38	2.77	3.11
Colorado		2.87	.39	2.07			2.58	2.39		2.43	2.50	2.77	1.17	1.18	1.32
Connecticut		1.86	2.59	2.10			5.17	2.62			1.97	2.74	2.60	1.40	
Georgia		.61	.84	.90	.95		1.01	1.66			.67	.80	.50	.36	.35
Illinois		3.29	1.87	1.41	4.41		2.68	1.45	.44	1.12	2.61	3.06	1.69	.91	2.88
Indiana		1.64	1.55	1.95	.62		1.27	1.10	1.54	1.91	1.16	1.49	1.38	1.74	1.35
Iowa		1.81	1.14	3.51	9.04		.98	.82			1.73	1.33	.96	.90	2.24
Kansas		2.20	.45		5.62		3.48	1.62	2.66	1.56	2.34	2.86	1.18	1.79	3.01
Kentucky		2.32	2.57	1.60	3.19		1.65	3.32	16.13	5.00	2.76	2.23	2.72	4.01	3.63
Maine		1.27	1.81	2.41	1.39		1.19	.26			1.68	1.23	1.09	1.23	.66
Maryland		3.00	3.63	6.88	1.68		1.57	1.80	3.78	1.40	3.22	2.40	2.71	5.09	1.53
Massachusetts		3.33	1.51	.92	4.22		2.62	.38		1.81	1.97	3.09	1.01	.43	3.06
Michigan		2.99	3.23	3.35	3.16		3.73	3.00	1.97	1.99	3.37	3.23	3.11	2.62	2.56
Minnesota		2.53	1.81				1.98	.86			1.42	2.33	1.42		
Missouri		1.33	1.26	1.51	1.56		.74	1.07	.84		2.25	1.15	1.19	1.25	1.07
New Hampshire		2.03	2.59	4.78			.89				.44	1.61	1.76	2.92	
New Jersey		2.23	1.84	1.20	1.00		3.79	.65			1.93	2.71	1.38	.67	.60
New Mexico		1.61						9.17			7.34	1.38	1.48		
New York		1.51	3.71	6.07	1.92		3.25	1.59	.60	1.76	2.14	2.17	2.86	3.46	1.85
North Carolina		.54	3.59	1.30	6.23		1.24	2.28	2.40		.99	.76	2.99	1.69	3.34
Ohio		1.83	1.93	2.17	1.43		1.53	2.18	2.14	2.29	1.73	1.74	2.02	2.16	1.83
Oklahoma		3.33	1.25		2.21		3.16				.65	3.25	.71		1.31
Pennsylvania		2.48	1.92	1.96	2.20		1.22	1.51	1.75	.63	2.20	1.98	1.75	1.86	1.45
Rhode Island		.88	1.08		5.46						1.93	.45	.71		4.44
Tennessee		2.05	3.19	3.34	3.56		.73	2.26	4.05	1.74	1.55	1.76	2.86	3.66	3.03
Texas		3.50	2.87	7.29	3.84		3.05	1.09		1.02	2.95	3.26	1.78	2.73	2.27
Utah		1.79	1.65				1.90	1.38			2.71	1.83	1.55		
Vermont		1.76	2.25	.87	3.42		.86	.76	.47	.87	2.68	1.32	1.57	.68	2.23
Virginia		2.40	2.59		4.63		1.84	1.03	1.16		2.06	2.25	2.06	.48	2.30
Washington		3.24	5.95	5.26	12.50		1.23	1.30			5.30	2.55	3.93	1.85	5.14
West Virginia		2.86	.60				.90	1.22	3.17		2.65	2.28	.80	1.08	
Wisconsin		1.23	.82	.90	.99		.79	.81			2.03	1.11	.82	.61	.67
Not segregated		3.71	4.41	8.26	3.09		1.35			1.85	2.11	3.22	3.15	6.03	2.64
Total		2.33	2.12	2.28	2.58		1.72	1.33	1.22	1.11	2.19	2.10	1.79	1.78	1.87

[1] Not segregated prior to 1915.

TABLE 49.—*All quarries: Injuries per thousand 300-day workers employed, by States, during the years ended December 31, 1911 to 1926*

State	In and about quarry					In outside works					Total				
	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915 [1]	Total, 1916–1920	Total, 1921–1925	1925	1926	Total, 1911–1915	Total, 1916–1920	Total, 1921–1925	1925	1926
Alabama		123.32	145.86	137.81	164.97		139.74	282.97	117.73	78.84	65.10	128.15	191.59	129.86	131.13
Arkansas		68.34	56.46	95.24	116.28		91.67	18.99	27.78	13.33	43.75	73.35	45.82	73.06	78.43
California		187.49	233.57	175.26	209.46		227.53	148.06	137.10	130.90	115.56	209.63	180.98	155.33	155.83
Colorado		141.22	151.74	192.95	197.71		92.86	68.57	70.84	85.16	111.88	123.92	119.05	140.16	136.84
Connecticut		135.94	203.54	234.80	252.07		218.35	258.53	207.63	248.48	70.96	157.77	217.14	225.81	251.16
Georgia		41.49	144.03	221.72	171.27		48.62	130.74	93.58	137.55	38.88	44.88	137.35	145.51	149.84
Illinois		194.78	239.24	220.97	186.37		168.72	143.12	85.39	110.80	157.80	184.87	198.05	150.94	151.07
Indiana		163.89	173.11	208.02	176.03		190.50	156.72	123.60	78.03	114.57	174.33	166.87	165.57	120.82
Iowa		140.53	243.29	203.51	207.83		195.83	99.47	4.82	114.97	115.27	172.70	159.66	55.61	137.96
Kansas		171.07	151.47	148.35	101.12		281.24	289.68	146.08	81.00	102.92	227.62	237.69	146.82	88.18
Kentucky		118.68	212.33	264.42	258.37		123.56	102.88	145.16	160.00	61.24	119.34	189.88	244.65	234.58
Maine		95.28	149.42	152.83	186.11		93.96	139.22	146.28	156.76	25.36	94.60	144.67	149.63	170.75
Maryland		167.17	174.12	299.48	206.38		239.89	114.58	109.71	30.90	87.57	197.54	144.23	189.96	110.86
Massachusetts		204.15	258.86	385.88	277.87		191.67	304.94	301.65	357.79	115.99	199.88	279.30	341.59	316.43
Michigan		178.82	243.94	189.73	171.76		339.70	327.83	257.40	166.83	160.46	229.44	287.46	225.65	169.22
Minnesota		178.06	245.10	313.79	354.20		253.35	384.58	346.22	135.14	91.32	205.31	302.57	329.53	252.88
Missouri		162.05	199.46	234.32	180.64		201.93	138.06	108.60	122.03	115.08	174.43	177.84	187.15	162.15
New Hampshire		74.07	206.83	313.40	137.64		78.90	284.29	199.25	317.24	48.57	75.83	231.50	269.01	218.27
New Jersey		170.73	209.88	204.33	204.59		245.26	207.30	116.21	82.21	117.09	193.55	208.88	165.55	155.60
New Mexico		96.62	93.47	83.33	166.67		133.33	45.87		150.94	164.22	101.93	85.80	63.83	158.65
New York		152.66	220.71	257.03	247.83		170.48	204.43	133.90	122.21	97.23	159.41	214.21	198.21	191.27
North Carolina		43.23	42.70	79.32	129.68		60.10	103.31	319.71	68.97	73.51	48.37	60.36	163.71	101.47
Ohio		151.15	163.22	156.98	163.85		257.20	181.78	212.26	181.79	104.54	182.09	170.37	178.42	172.22
Oklahoma		143.60	162.28	179.45	219.03		96.47	59.15	130.79	117.83	108.79	121.25	117.86	161.22	177.55
Pennsylvania		182.13	172.81	177.86	172.43		171.64	139.93	121.21	122.02	67.65	178.01	159.39	150.68	148.38
Rhode Island		113.56	190.27	251.46	218.58		62.21	67.76	250.00	119.05	25.95	88.76	148.02	251.14	200.00
Tennessee		77.41	129.95	112.88	200.14		108.77	168.27	218.84	85.07	48.94	84.33	143.79	160.79	166.67
Texas		159.18	233.49	282.80	217.39		151.05	161.98	124.23	94.61	164.73	154.84	189.76	183.71	149.01
Utah		198.92	286.42	293.04	182.09		201.52	128.45	175.18	160.98	138.60	199.76	227.44	253.66	174.07
Vermont		135.84	136.28	170.28	143.69		119.71	104.93	97.52	114.72	90.87	127.88	122.08	135.33	129.61
Virginia		78.20	129.33	158.33	167.57		80.04	65.62	59.16	70.02	39.70	78.70	107.97	116.88	118.44
Washington		162.88	252.98	263.16	306.25		80.15	110.25	96.87	165.94	103.73	134.35	191.12	155.27	223.65
West Virginia		123.62	104.25	104.49	111.86		124.10	81.37	95.24	91.23	72.92	123.76	96.72	101.35	105.14
Wisconsin		115.60	209.23	208.82	275.52		235.18	321.12	337.14	434.51	62.64	146.24	234.87	250.00	326.85
Not segregated		103.71	127.68	188.90	186.21		117.25	98.32	156.05	119.93	77.98	106.52	119.30	180.02	162.48
Total		151.59	179.50	195.02	187.46		174.59	165.13	141.06	131.01	89.39	160.29	173.44	169.67	160.28

[1] Not segregated prior to 1915.

TABLE 50.—*All quarries: Accident and labor data, by kinds of quarries, during the years ended December 31, 1917 to 1926*

Year	Men employed			Days of labor performed			Average days active			Number of 300-day workers			Number killed			Number injured			Killed per thousand 300-day workers			Injured per thousand 300-day workers		
	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside work	Total
CEMENT ROCK																								
1917	3,945	6,280	10,225	1,098,401	2,009,367	3,107,768	278	320	304	3,661	6,698	10,359	15	16	31	1,261	1,616	2,877	4.10	2.39	2.99	344.44	241.27	277.73
1918	3,011	4,893	7,904	829,227	1,410,999	2,240,226	275	288	283	2,764	4,703	7,467	8	8	16	856	926	1,782	2.89	1.70	2.14	309.70	196.90	238.65
1919	3,413	6,033	9,446	938,158	1,773,213	2,711,371	275	294	287	3,127	5,911	9,038	14	10	24	881	1,212	2,093	4.48	1.69	2.66	281.74	205.04	231.58
1920	3,981	9,270	13,251	1,231,903	3,017,582	4,249,485	309	326	321	4,106	10,059	14,165	21	18	39	875	1,710	2,585	5.11	1.79	2.75	213.10	170.00	182.49
1921	3,432	7,383	10,815	958,773	2,179,016	3,137,789	279	295	290	3,196	7,263	10,459	7	13	20	741	1,492	2,233	2.19	1.79	1.91	231.85	205.42	213.50
1922	3,623	8,637	12,260	1,071,540	2,756,151	3,827,691	296	319	312	3,572	9,187	12,759	11	18	29	873	1,565	2,438	3.08	1.96	2.27	244.40	170.35	191.08
1923	3,996	9,382	13,378	1,301,013	3,189,709	4,490,722	326	340	336	4,337	10,632	14,969	10	15	25	1,133	2,066	3,199	2.31	1.41	1.67	261.24	194.32	213.71
1924	4,198	8,321	12,519	1,339,876	2,768,211	4,108,087	319	333	328	4,466	9,228	13,694	14	17	31	888	1,428	2,316	3.13	1.84	2.26	198.84	154.75	169.13
1925	4,547	16,252	20,799	1,388,020	5,356,168	6,744,188	305	330	324	4,627	17,854	22,481	16	24	40	827	1,501	2,328	3.46	1.34	1.78	178.73	84.07	103.55
1926	4,850	18,146	22,996	1,474,164	5,853,993	7,328,157	304	323	319	4,914	19,513	24,427	10	27	37	608	1,486	2,094	2.04	1.38	1.51	123.73	76.15	85.72
GRANITE																								
1917	9,857	5,534	15,391	2,382,222	1,502,752	3,884,974	242	272	252	7,941	5,009	12,950	16	4	20	1,129	1,328	2,457	2.01	.80	1.54	142.17	265.12	189.73
1918	5,490	2,419	7,909	1,339,200	520,955	1,860,155	244	215	235	4,464	1,736	6,200	7	6	13	471	209	680	1.57	3.46	2.10	105.51	120.39	109.68
1919	7,380	3,086	10,466	1,857,231	791,589	2,648,820	252	257	253	6,190	2,639	8,829	12	4	16	793	308	1,101	1.94	1.52	1.81	128.11	116.71	124.70
1920	9,369	3,366	12,735	2,295,241	903,832	3,199,073	245	269	251	7,651	3,013	10,664	21	1	22	879	513	1,392	2.74	.33	2.06	114.89	170.26	130.53
1921	7,105	2,374	9,479	1,571,842	531,012	2,102,854	221	224	222	5,240	1,770	7,010	15	3	18	556	384	940	2.86	1.69	2.57	106.11	216.95	134.09
1922	6,320	2,636	8,956	1,456,402	655,123	2,111,525	230	249	236	4,854	2,184	7,038	9	1	10	564	472	1,036	1.85	.46	1.42	116.19	216.12	147.20
1923	8,369	3,289	11,658	2,101,299	883,543	2,984,842	251	269	256	7,005	2,945	9,950	9	----	9	1,107	664	1,771	1.28	----	.90	158.03	225.47	177.99
1924	8,841	3,312	12,153	2,221,693	811,564	3,033,257	251	245	250	7,406	2,705	10,111	11	1	12	1,218	761	1,979	1.49	.37	1.19	164.46	281.33	195.73
1925	8,247	3,773	12,020	2,108,846	1,011,005	3,119,851	256	268	260	7,029	3,370	10,399	10	----	10	1,230	876	2,106	1.42	----	.96	174.99	259.94	202.52
1926	6,688	3,924	10,612	1,620,793	1,069,351	2,690,144	242	273	254	5,402	3,565	8,967	19	1	20	972	688	1,660	3.52	.28	2.23	179.93	192.99	185.12
LIMESTONE																								
1917	29,148	9,734	38,882	7,294,340	2,605,243	9,899,583	250	268	255	24,315	8,684	32,999	45	14	59	3,696	2,096	5,792	1.85	1.61	1.79	152.00	241.36	175.52
1918	26,341	8,532	34,873	6,721,445	2,316,675	9,038,120	255	272	259	22,405	7,722	30,127	37	17	54	3,126	1,132	4,258	1.65	2.20	1.79	139.52	146.59	141.34
1919	27,248	12,606	39,854	6,710,518	3,205,977	9,916,495	246	254	249	22,368	10,687	33,055	50	15	65	3,052	1,379	4,431	2.24	1.40	1.97	136.44	129.04	134.05
1920	29,226	13,925	43,151	7,343,112	3,811,541	11,154,653	251	274	259	24,477	12,705	37,182	74	22	96	3,590	1,731	5,321	3.02	1.73	2.58	146.67	136.25	143.11
1921	26,887	12,664	39,551	5,728,317	3,091,496	8,819,813	213	244	223	19,094	10,305	29,399	41	17	58	3,309	1,939	5,248	2.15	1.65	1.97	173.30	188.16	178.51

1922	26,668	13,293	39,961	6,407,780	3,710,537	10,118,317	240	279	253	21,359	12,369	33,728	45	18	63	4,058	1,936	5,994	2.11	1.46	1.87	189.99	156.52	177.72
1923	31,009	15,316	46,325	8,134,406	4,410,996	12,545,402	262	288	271	27,115	14,703	41,818	55	23	78	4,776	2,304	7,080	2.03	1.56	1.87	176.14	156.70	169.31
1924	31,969	16,422	48,391	8,170,034	4,655,597	12,825,631	256	283	265	27,233	15,519	42,752	54	16	70	4,869	2,552	7,421	1.98	1.03	1.64	178.79	164.44	173.58
1925	27,391	13,034	40,425	6,793,719	3,618,655	10,412,374	248	278	258	22,646	12,062	34,708	43	18	61	4,530	2,185	6,715	1.90	1.49	1.76	200.04	181.15	193.47
1926	26,532	12,507	39,039	6,572,902	3,311,158	9,884,060	248	265	253	21,910	11,037	32,947	55	14	69	4,544	2,067	6,611	2.51	1.27	2.09	207.39	187.28	200.66
MARBLE																								
1917	1,659	1,960	3,619	450,839	599,981	1,050,820	272	306	290	1,503	2,000	3,503	2	----	2	146	205	351	1.33	----	.57	97.14	102.50	100.20
1918	1,024	2,390	3,414	266,432	715,982	982,414	260	300	288	888	2,387	3,275	2	5	7	56	134	190	2.25	2.09	2.14	63.06	56.14	58.02
1919	1,238	2,768	4,006	333,412	842,464	1,175,876	269	304	294	1,112	2,808	3,920	2	----	2	78	217	295	1.80	----	.51	70.14	77.28	75.26
1920	1,635	2,803	4,438	452,645	851,907	1,304,552	277	304	294	1,509	2,840	4,349	----	4	4	132	268	400	----	1.41	.92	87.48	94.37	91.98
1921	2,138	2,411	4,549	568,944	638,523	1,207,467	266	265	265	1,897	2,128	4,025	5	1	6	170	236	406	2.64	.47	1.49	89.62	110.90	100.87
1922	2,268	2,535	4,803	646,753	741,155	1,387,908	285	292	289	2,156	2,470	4,626	2	----	2	238	353	591	.93	----	.43	110.39	142.92	127.76
1923	2,542	2,809	5,351	695,807	840,745	1,536,552	274	299	287	2,319	2,803	5,122	2	1	3	246	409	655	.86	.36	.59	106.08	145.92	127.88
1924	2,486	3,278	5,764	716,361	998,898	1,715,259	288	305	298	2,388	3,329	5,717	3	4	7	329	425	754	1.26	1.20	1.22	137.77	127.67	131.89
1925	2,334	3,078	5,412	684,826	925,690	1,610,516	293	301	298	2,283	3,086	5,369	2	1	3	269	354	623	.88	.32	.56	117.83	114.71	116.04
1926	2,359	3,098	5,457	672,579	947,444	1,620,023	285	306	297	2,242	3,158	5,400	7	2	9	359	423	782	3.12	.63	1.67	160.12	133.95	144.81
SANDSTONE AND BLUESTONE																								
1917	3,141	1,695	4,836	714,834	501,527	1,216,361	225	301	252	2,383	1,671	4,054	2	2	4	317	165	482	.84	1.20	.99	133.03	98.74	118.89
1918	3,635	4,901	8,536	951,411	1,445,805	2,397,216	262	295	281	3,171	4,820	7,991	13	6	19	511	672	1,183	4.10	1.24	2.38	161.15	139.42	148.04
1919	2,667	963	3,630	574,834	211,895	786,729	216	220	217	1,916	706	2,622	2	----	2	244	102	346	1.04	----	.76	127.35	144.48	131.96
1920	3,465	1,001	4,466	819,657	242,504	1,062,161	237	242	238	2,732	808	3,540	2	----	2	281	75	356	.73	----	.56	102.86	92.82	100.56
1921	3,090	838	3,928	550,953	167,357	718,310	178	200	183	1,836	558	2,394	1	2	3	293	81	374	.54	3.58	1.25	159.59	145.16	156.22
1922	3,140	1,165	4,305	733,962	270,626	1,004,588	234	232	233	2,447	902	3,349	3	1	4	243	94	337	1.23	1.11	1.19	99.31	104.21	100.63
1923	3,680	1,292	4,972	936,605	314,434	1,251,039	255	243	252	3,122	1,048	4,170	2	----	2	384	114	498	.64	----	.48	123.00	108.78	119.42
1924	4,279	1,151	5,430	1,010,366	267,066	1,277,432	236	232	235	3,368	890	4,258	5	3	8	546	174	720	1.48	3.37	1.88	162.11	195.51	169.09
1925	3,844	1,123	4,967	910,891	265,015	1,175,906	237	236	237	3,036	883	3,919	10	3	13	525	260	785	3.29	3.40	3.32	172.92	294.45	200.31
1926	3,915	1,003	4,918	921,187	240,343	1,161,530	235	240	236	3,071	801	3,872	4	----	4	439	187	626	1.30	----	1.03	142.95	233.46	161.67
SLATE																								
1917	3,434	1,193	4,627	831,254	317,367	1,148,621	242	266	248	2,771	1,058	3,829	4	1	5	291	138	429	1.44	.95	1.31	105.02	130.43	112.04
1918	2,024	666	2,690	488,389	175,152	663,541	241	263	247	1,628	584	2,212	6	1	7	143	70	213	3.69	1.71	3.16	87.84	119.86	96.29
1919	2,316	1,057	3,373	579,167	264,404	843,571	250	250	250	1,931	881	2,812	3	2	5	214	63	277	1.55	2.27	1.78	110.82	71.51	98.51
1920	2,597	899	3,496	765,329	243,915	1,009,244	295	271	289	2,551	813	3,364	5	----	5	224	140	364	1.96	----	1.49	87.81	172.20	108.20
1921	2,695	869	3,564	626,096	228,300	854,396	232	263	240	2,087	761	2,848	3	1	4	280	105	385	1.44	1.31	1.40	134.16	137.98	135.18
1922	2,841	1,100	3,941	743,865	304,166	1,048,031	262	277	266	2,479	1,014	3,493	9	2	11	295	150	445	3.63	1.97	3.15	119.00	147.93	127.40
1923	3,231	1,098	4,329	835,658	289,099	1,124,757	259	263	260	2,785	964	3,749	8	----	8	406	153	559	2.87	----	2.13	145.78	158.71	149.11
1924	3,158	956	4,114	798,222	263,093	1,061,315	253	275	258	2,661	877	3,538	2	----	2	415	151	566	.75	----	.57	155.96	172.18	159.98
1925	2,832	1,135	3,967	732,905	305,641	1,038,546	259	269	262	2,443	1,019	3,462	8	1	9	419	166	585	3.27	.98	2.60	171.51	162.90	168.98
1926	3,196	1,108	4,304	857,517	291,817	1,149,334	268	263	267	2,858	973	3,831	8	----	8	518	182	700	2.80	----	2.09	181.25	187.05	182.72

TABLE 50.—*All quarries: Accident and labor data, by kinds of quarries, during the years ended December 31, 1917 to 1926*—Continued

Year	Men employed			Days of labor performed			Average days active			Number of 300-day workers			Number killed			Number injured			Killed per thousand 300-day workers			Injured per thousand 300-day workers		
	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total	In and about quarry	In outside works	Total
TRAP ROCK																								
1917	3,620	1,090	4,710	862,883	286,347	1,149,230	238	263	244	2,876	955	3,831	7	3	10	566	288	854	2.43	3.14	2.61	196.80	301.57	222.92
1918	2,557	449	3,006	516,452	87,380	603,832	202	195	201	1,722	291	2,013	8	1	9	330	83	413	4.65	3.44	4.47	191.64	285.22	205.17
1919	3,540	1,190	4,730	790,147	265,299	1,055,446	223	223	223	2,634	884	3,518	7	2	9	498	158	656	2.66	2.26	2.56	189.07	178.73	186.47
1920	3,369	1,582	4,951	777,262	370,218	1,147,480	231	234	232	2,591	1,234	3,825	5	5	10	388	411	799	1.93	4.05	2.61	149.75	333.06	208.89
1921	3,945	1,354	5,299	819,616	327,302	1,146,918	208	242	216	2,732	1,091	3,823	8	3	11	680	199	879	2.93	2.75	2.83	248.90	182.40	229.92
1922	3,667	1,188	4,855	876,152	284,126	1,160,278	239	239	239	2,921	947	3,868	13	----	13	778	220	998	4.45	----	3.36	266.35	232.31	258.01
1923	4,361	2,081	6,442	1,062,903	549,642	1,612,545	244	264	250	3,543	1,832	5,375	13	5	18	894	334	1,228	3.67	2.73	3.35	252.33	182.31	228.47
1924	4,195	1,676	5,871	895,244	411,633	1,306,877	213	246	223	2,984	1,372	4,356	7	1	8	725	296	1,021	2.35	.73	1.84	242.96	215.74	234.39
1925	3,029	1,253	4,282	659,708	284,866	944,574	218	227	221	2,199	950	3,149	12	1	13	832	191	1,023	5.46	1.05	4.13	378.35	201.05	324.87
1926	3,080	740	3,820	693,245	181,907	875,152	225	246	229	2,311	606	2,917	7	----	7	566	162	728	3.03	----	2.40	244.92	267.33	249.57
TOTAL QUARRIES																								
1917	54,804	27,486	82,290	13,634,773	7,822,584	21,457,357	249	285	261	45,449	26,076	71,525	91	40	131	7,406	5,836	13,242	2.00	1.53	1.83	162.95	223.81	185.14
1918	44,082	24,250	68,332	11,112,556	6,672,948	17,785,504	252	275	260	37,042	22,243	59,285	81	44	125	5,493	3,226	8,719	2.19	1.98	2.11	148.29	145.03	147.07
1919	47,802	27,703	75,505	11,783,467	7,354,841	19,138,308	247	265	253	39,278	24,516	63,794	90	33	123	5,760	3,439	9,199	2.29	1.35	1.93	146.65	140.28	144.20
1920	53,642	32,846	86,488	13,685,149	9,441,499	23,126,648	255	287	267	45,617	31,472	77,089	128	50	178	6,369	4,848	11,217	2.81	1.59	2.31	139.62	154.04	145.51
1921	49,292	27,893	77,185	10,824,541	7,163,006	17,987,547	220	257	233	36,082	23,876	59,958	80	40	120	6,029	4,436	10,465	2.22	1.68	2.00	167.09	185.79	174.54
1922	48,527	30,554	79,081	11,936,454	8,721,884	20,658,338	246	285	261	39,788	29,073	68,861	92	40	132	7,049	4,790	11,839	2.31	1.38	1.92	177.16	164.76	171.93
1923	57,188	35,267	92,455	15,067,691	10,478,168	25,545,859	263	297	276	50,226	34,927	85,153	99	44	143	8,946	6,044	14,990	1.97	1.26	1.68	178.11	173.05	176.04
1924	59,126	35,116	94,242	15,151,796	10,176,062	25,327,858	256	290	269	50,506	33,920	84,426	96	42	138	8,990	5,787	14,777	1.90	1.24	1.63	178.00	170.61	175.03
1925	52,224	39,648	91,872	13,278,915	11,767,040	25,045,955	254	297	273	44,263	39,224	83,487	101	48	149	8,632	5,533	14,165	2.28	1.22	1.78	195.02	141.06	169.67
1926	50,620	40,526	91,146	12,812,387	11,896,013	24,708,400	253	294	271	42,708	39,653	82,361	110	44	154	8,006	5,195	13,201	2.58	1.11	1.87	187.46	131.01	160.28

QUARRY AND MINE ACCIDENTS COMPARED

Table 51 presents comparative figures on accidents and employees at quarries, metal mines, and coal mines. The figures show that fatality rates for quarries are uniformly lower than for metal mines or coal mines, and that those for metal mines are lower (except in 1917) than those for coal mines for any given period of exposure to hazard. The importance of giving due consideration to the period of exposure is indicated by a comparison of the death rates calculated on the actual number of days the plants were in operation, with the death rates based upon a uniform year of 300 working days. In coal mines, for example, the fatality rates based on actual days worked are much lower than those calculated on the 300-day basis. This result is explained by the fact that the actual working time for the coal-mining industry has always averaged less than 300 days; hence, the death rate is raised when placed on a 300-day basis to make it comparable with the rates for other industries. The same result is true for quarries but to a less degree. On the other hand, the two sets of death rates for metal mines do not differ widely; the actual average working time for metal mines is usually very close to 300 days, just a little less than 300. Death rates for different industries are not comparable unless the period of exposure is expressed in some common denominator. In the Bureau of Mines statistics the common denominator adopted is the number of man days or man hours worked.

TABLE 51.—*Quarries, metal mines, and coal mines: Comparative statement of fatality rates based on actual number of men employed and the equivalent in 300-day workers, by years, 1911 to 1926*

Year	Quarries					Metal mines				
	Number employed		Killed	Number killed per thousand employed		Number employed		Killed	Number killed per thousand employed	
	Actual number	Equivalent in 300-day workers		Actual time basis	300-day basis	Actual number	Equivalent in 300-day workers		Actual time basis	300-day basis
1911	110,954	84,417	188	1.69	2.23	165,979	156,089	695	4.19	4.45
1912	113,105	93,837	213	1.88	2.27	169,199	161,662	661	3.91	4.09
1913	106,278	87,141	183	1.72	2.10	191,276	183,593	683	3.57	3.72
1914	87,936	68,187	180	2.05	2.64	158,115	142,619	559	3.54	3.92
1915	100,740	82,447	148	1.47	1.80	152,118	141,997	553	3.64	3.89
1916	90,797	76,457	173	1.91	2.26	204,685	192,455	697	3.41	3.62
1917	82,290	71,525	131	1.59	1.83	200,579	192,085	852	4.25	4.44
1918	68,332	59,285	125	1.83	2.11	182,606	181,006	646	3.54	3.57
1919	75,505	63,794	123	1.63	1.93	145,262	134,871	468	3.22	3.47
1920	86,488	77,089	178	2.06	2.31	136,583	134,540	425	3.11	3.16
1921	77,185	59,958	120	1.55	2.00	93,929	74,510	230	2.45	3.09
1922	79,081	68,861	132	1.67	1.92	105,697	97,138	344	3.25	3.54
1923	92,455	85,153	143	1.55	1.68	123,279	121,866	367	2.98	3.01
1924	94,242	84,426	138	1.46	1.63	123,128	119,113	418	3.39	3.51
1925	91,872	83,487	149	1.62	1.78	126,713	123,908	371	2.93	2.99
1926	91,146	82,361	154	1.69	1.87	127,726	123,776	430	3.37	3.47

TABLE 51.—*Quarries, metal mines, and coal mines: Comparative statement of fatality rates based on actual number of men employed and the equivalent in 300-day workers, by years, 1911 to 1926*—Continued

Year	Coal mines					Total quarries and mines				
	Number employed		Killed	Number killed per thousand employed		Number employed		Killed	Number killed per thousand employed	
	Actual number	Equivalent in 300-day workers		Actual time basis	300-day basis	Actual number	Equivalent in 300-day workers		Actual time basis	300-day basis
1911	728,348	534,122	2,656	3.65	4.97	1,005,281	774,628	3,539	3.52	4.57
1912	722,662	541,997	2,419	3.35	4.46	1,004,966	797,496	3,293	3.28	4.13
1913	747,644	593,131	2,785	3.73	4.70	1,045,198	863,865	3,651	3.49	4.23
1914	763,185	526,598	2,454	3.22	4.66	1,009,236	737,404	3,193	3.16	4.33
1915	734,008	511,598	2,269	3.09	4.44	986,866	736,042	2,970	3.01	4.04
1916	720,971	565,766	2,226	3.09	3.93	1,016,453	834,678	3,096	3.05	3.71
1917	757,317	634,666	2,696	3.56	4.25	1,040,186	898,276	3,679	3.54	4.10
1918	762,426	654,973	2,580	3.38	3.94	1,013,364	895,264	3,351	3.31	3.74
1919	776,569	542,217	2,317	2.98	4.27	997,336	740,882	2,908	2.92	3.93
1920	784,621	601,283	2,271	2.89	3.78	1,007,692	812,912	2,874	2.85	3.54
1921	823,253	474,529	1,994	2.41	4.20	994,367	608,997	2,344	2.36	3.85
1922	844,807	405,056	1,979	2.34	4.89	1,029,585	571,055	2,455	2.38	4.30
1923	862,536	560,646	2,458	2.86	4.38	1,078,270	767,665	2,968	2.75	3.87
1924	779,613	499,896	2,396	3.07	4.79	996,983	703,435	2,952	2.96	4.20
1925	748,805	480,227	2,234	2.98	4.65	967,390	687,622	2,754	2.85	4.01
1926	759,033	559,426	2,519	3.32	4.50	977,905	765,563	3,103	3.17	4.05

TABLE 52.—*Accident rates in different branches of mineral industries in 1926, compared on a 300-day basis (length of shift not considered)*

Branch of mineral industry	Average days active	Men employed		Man-shifts	Killed	Injured	Number killed or injured per thousand 300-day workers	
		Actual number	Equivalent in 300-day workers (calculated)				Killed	Injured
Coal mines	221	759,033	559,426	167,827,732	2,519	(1)	4.50	.....
All metal mines	291	127,823	123,870	37,160,978	430	30,350	3.47	245.01
Copper mines	321	32,723	35,040	10,511,974	121	10,102	3.45	288.30
Gold, silver, and miscellaneous mines	292	33,940	32,982	9,894,645	108	9,878	3.27	299.50
Iron mines	276	33,158	30,479	9,143,849	129	4,082	4.23	133.93
Lead and zinc mines (Mississippi Valley)	265	14,479	12,771	3,831,191	39	3,885	3.05	304.20
Nonmetallic mineral mines	279	13,523	12,598	3,779,319	33	2,403	2.62	190.74
All quarries (including outside works)	271	91,146	82,361	24,708,400	154	13,201	1.87	160.28
Cement-rock quarries	319	22,996	24,427	7,328,157	37	2,094	1.51	85.72
Granite quarries	254	10,612	8,967	2,690,144	20	1,660	2.23	185.12
Limestone quarries	253	39,039	32,947	9,884,060	69	6,611	2.09	200.66
Marble quarries	297	5,457	5,400	1,620,023	9	782	1.67	144.81
Sandstone and bluestone quarries	236	4,918	3,872	1,161,530	4	626	1.03	161.67
Slate quarries	267	4,304	3,831	1,149,334	8	700	2.09	182.72
Trap-rock quarries	229	3,820	2,917	875,152	7	728	2.40	249.57
All quarries (excluding outside works)	253	50,620	42,708	12,812,387	110	8,006	2.58	187.46
All quarries (outside works only)	294	40,526	39,653	11,896,013	44	5,195	1.11	131.01
Metallurgical plants	341	57,726	65,687	19,706,098	48	7,279	.73	110.81
Ore-dressing plants	313	16,685	17,385	5,215,376	13	2,294	.75	131.95
Smelters	357	24,399	29,049	8,714,596	20	3,181	.69	109.50
Auxiliary works	347	16,642	19,253	5,776,126	15	1,804	.78	93.70
All coke ovens	315	23,115	24,288	7,286,605	51	1,922	2.10	79.13
Bee-hive coke ovens	220	6,605	4,847	1,454,243	6	645	1.24	133.07
By-product coke ovens	353	16,510	19,441	5,832,362	45	1,277	2.31	65.69
Total, 1926	242	1,058,843	855,632	256,689,813	3,202	52,752	3.74	[2] 178.09
Total, 1925	222	1,049,579	777,896	233,368,875	2,826	58,704	3.63	197.21

[1] Not available.

[2] Exclusive of coal.

TABLE 53.—*Quarries, metal mines, and coal mines: Chief causes of fatalities, showing percentage due to each cause, by years, 1917 to 1926*

	Cause of death								
	Falls of overburden, roof, quarry material, ore, or coal	Explosives	Haulage and handling rock, ore, or coal	Falls of persons	Electricity	Machinery	Gas and dust explosions	Other causes	Total
1917									
Quarries	18.32	16.03	24.43	11.45	1.52	15.27	.....	12.98	100
Metal mines	26.17	9.27	10.33	13.15	2.23	2.00	.....	36.85	100
Coal mines	45.63	4.08	22.17	.78	3.56	2.41	13.35	8.02	100
1918									
Quarries	14.40	13.60	24.80	12.00	3.20	14.40	.....	17.60	100
Metal mines	29.72	13.78	13.00	12.85	3.87	3.25	.....	23.53	100
Coal mines	50.16	5.23	24.19	.81	3.99	2.21	5.00	8.41	100
1919									
Quarries	12.19	19.51	25.20	6.51	4.07	16.25	.....	16.27	100
Metal mines	38.46	10.26	10.90	16.02	3.42	4.27	.....	16.67	100
Coal mines	47.66	8.86	20.44	.86	3.36	2.07	8.22	8.53	100
1920									
Quarries	18.54	20.23	25.84	7.30	3.93	11.80	.....	12.36	100
Metal mines	33.41	13.41	14.11	10.59	4.24	4.24	.....	20.00	100
Coal mines	49.91	5.77	21.40	1.19	4.09	2.73	7.04	7.87	100
1921									
Quarries	16.67	14.17	17.50	9.17	7.50	15.83	.....	19.16	100
Metal mines	31.30	10.00	10.00	17.39	1.74	2.61	.....	26.96	100
Coal mines	51.38	7.12	19.35	.90	4.86	1.70	6.32	8.37	100
1922									
Quarries	18.94	27.27	12.88	5.30	4.55	18.94	.....	12.12	100
Metal mines	30.52	8.72	11.63	13.95	2.04	3.20	.....	29.94	100
Coal mines	45.77	4.68	19.91	.71	4.18	2.07	15.68	7.00	100
1923									
Quarries	21.68	8.39	23.08	11.19	.70	14.68	.....	20.28	100
Metal mines	30.25	11.44	17.44	13.62	3.27	3.27	.....	20.71	100
Coal mines	47.40	4.67	19.21	.90	3.37	1.99	15.11	7.35	100
1924									
Quarries	18.84	11.60	18.12	11.59	3.62	15.22	.....	21.01	100
Metal mines	31.34	12.44	15.79	10.53	3.11	2.15	.....	24.64	100
Coal mines	44.32	4.17	17.53	.63	4.05	1.55	22.37	5.38	100
1925									
Quarries	22.82	13.43	16.78	10.07	4.02	18.12	.....	14.76	100
Metal mines	31.26	14.02	16.18	12.12	5.39	2.16	.....	18.87	100
Coal mines	48.34	4.57	17.95	.67	4.48	2.01	15.44	6.54	100
1926									
Quarries	20.78	14.94	17.53	5.84	7.14	12.99	.....	20.78	100
Metal mines	29.30	11.39	10.48	11.39	4.88	1.39	.....	31.17	100
Coal mines	48.19	3.85	19.17	.52	4.45	1.39	16.75	5.68	100

TABLE 54.—*United States: Number of men killed per thousand 300-day workers employed in mineral industries*

	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Coal mines	4.25	3.94	4.27	3.78	4.20	4.90	4.39	4.79	4.65	4.50
All metal mines	4.44	3.57	3.47	3.16	3.09	3.54	3.01	3.51	2.99	3.47
Copper mines	5.88	3.45	3.54	3.43	3.70	3.00	3.11	3.55	2.94	3.45
Gold and miscellaneous metal mines	4.03	4.27	4.41	4.20	3.29	5.35	3.93	4.99	3.83	3.27
Iron mines	3.54	3.45	3.09	2.34	3.04	3.00	2.38	2.95	2.54	4.23
Lead and zinc mines (Mississippi Valley)	4.09	3.58	4.13	3.27	2.58	2.64	2.73	2.76	3.32	3.05
Nonmetallic mineral mines	2.48	1.67	1.65	2.89	1.98	2.39	2.67	1.94	1.71	2.62
All quarries (including outside works)	1.83	2.11	1.93	2.31	2.00	1.92	1.68	1.63	1.78	1.87
Cement-rock quarries	2.99	2.14	2.66	2.75	1.91	2.27	1.67	2.26	1.78	1.51
Granite quarries	1.54	2.10	1.81	2.06	2.57	1.42	.90	1.19	.96	2.23
Limestone quarries	1.79	1.79	1.97	2.58	1.97	1.87	1.87	1.64	1.76	2.09
Marble quarries	.57	2.14	.51	.92	1.49	.43	.59	1.22	.56	1.67
Sandstone and bluestone quarries	.99	2.38	.76	.56	1.25	1.19	.48	1.88	3.32	1.03
Slate quarries	1.31	3.16	1.78	1.49	1.40	3.15	2.13	.57	2.60	2.09
Trap-rock quarries	2.61	4.47	2.56	2.61	2.88	3.36	3.35	1.84	4.13	2.40
All quarries (excluding outside works)	2.00	2.19	2.29	2.81	2.22	2.31	1.97	1.90	2.28	2.58
All quarries (outside works only)	1.53	1.98	1.34	1.59	1.68	1.38	1.26	1.24	1.22	1.11
Metallurgical plants:										
Ore-dressing plants	1.93	1.55	1.48	1.25	.50	1.09	1.62	1.24	1.00	.75
Smelters	1.05	.92	1.09	.66	.99	.77	.64	.55	.64	.69
Auxiliary works	.94	.85	.31	1.08	1.08	1.21	.94	1.08	.41	.78
All coke ovens	2.14	2.06	1.92	1.64	1.23	1.59	1.76	1.16	1.16	2.10
Beehive coke ovens	1.30	1.16	.92	1.09	1.76	1.66	1.68	.75	.78	1.24
By-products coke ovens	3.13	2.84	2.55	1.92	1.09	1.57	1.79	1.26	1.27	2.31

TABLE 55.—*United States: Number of men injured per thousand 300-day workers employed in mineral industries*

	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Coal mines [1]										
All metal mines	240.97	237.09	233.60	242.02	249.69	268.48	275.41	278.04	283.53	245.01
Copper mines	313.35	322.12	309.60	323.20	317.53	320.78	349.09	347.82	350.62	288.30
Gold and miscellaneous metal mines	172.51	185.18	191.29	204.82	225.46	260.29	298.87	297.80	307.42	299.50
Iron mines	227.54	185.45	202.35	200.49	210.91	177.44	150.23	151.01	159.43	133.93
Lead and zinc mines (Mississippi Valley)	272.99	319.54	292.28	327.97	379.67	464.23	495.65	464.16	468.07	304.20
Nonmetallic mineral mines	123.60	104.69	139.27	161.88	215.47	247.51	212.47	178.74	165.40	190.74
All quarries (including outside works)	185.14	147.07	144.20	145.51	174.54	171.93	176.04	175.03	169.67	160.28
Cement-rock quarries	277.73	238.65	231.58	182.49	213.50	191.08	213.71	169.13	103.55	85.72
Granite quarries	189.73	109.68	124.70	130.53	134.09	147.20	177.99	195.73	202.52	185.12
Limestone quarries	175.52	141.34	134.05	143.11	178.51	177.72	169.31	173.58	193.47	200.66
Marble quarries	100.20	58.02	75.26	91.98	100.87	127.76	127.88	131.89	116.04	144.81
Sandstone and bluestone quarries	118.89	148.04	131.96	100.56	156.22	100.63	119.42	169.09	200.31	161.67
Slate quarries	112.04	96.29	98.51	108.20	135.18	127.40	149.11	159.98	168.98	182.72
Trap-rock quarries	222.92	205.17	186.47	208.89	229.92	258.01	228.47	234.39	324.87	249.57
All quarries (excluding outside works)	162.95	148.29	146.65	139.62	167.09	177.16	178.11	178.00	195.02	187.46
All quarries (outside works only)	223.81	145.03	140.28	154.04	185.79	164.76	173.05	170.61	141.06	131.01
Metallurgical plants:										
Ore-dressing plants	121.12	139.54	122.21	156.07	151.05	179.51	172.44	156.03	130.66	131.95
Smelters	152.88	148.40	141.46	136.37	149.89	143.71	130.71	112.65	113.83	109.50
Auxiliary works	169.33	139.63	101.29	113.92	138.54	120.26	132.37	137.43	107.96	93.70
All coke ovens	188.59	219.64	145.66	114.13	133.62	93.77	101.18	79.54	70.51	79.13
Beehive coke ovens	94.43	131.11	125.96	102.54	118.52	98.28	122.48	113.54	96.89	133.07
By-products coke ovens	300.06	296.06	158.33	120.04	137.50	92.15	92.95	71.33	63.34	65.69

[1] Injury rates not available.

EXPLOSIVES USED BY QUARRIES AND NONMETALLIC MINERAL MINES

In 1926 companies engaged in the manufacture of explosives furnished the Bureau of Mines reports that showed the amount of explosives sold for use in quarries and nonmetallic mineral mines. The figures are largely representative of the consumption of explosives by the quarry industry, as the amount used at nonmetallic mineral mines is relatively small. As sales and consumption do not differ greatly in volume, the figures may be accepted as an indication of the quantities actually used. The manufacturers' reports showed sales of nearly 83,000,000 pounds of explosives, of which 92 per cent was high explosives and the remainder was black blasting powder and permissible explosives. Permissible explosives are high explosives that have passed certain tests prescribed by the Bureau of Mines. They are used almost entirely in coal mines, but small quantities find their way into other mines and quarries.

The figures in Table 56 show the quantity of explosives sold in 1926 for use in quarries and nonmetallic mines in each State. The largest quantities, of course, were used in Pennsylvania, Ohio, New York, Illinois, Michigan, Florida, California, and other States in which quarrying or nonmetallic mineral mining ranks as an important industry.

TABLE 56.—*Pounds of explosives used by quarries and nonmetallic mineral mines during the year ended December 31, 1926*

State	Black blasting powder	High explosives other than permissible	Permissible explosives	State	Black blasting powder	High explosives other than permissible	Permissible explosives
Alabama	147,150	1,427,775	41,200	Nevada	95,750	260,400	
Alaska		132,200		New Hampshire	10,350	59,675	
Arizona	10,000	396,250		New Jersey	3,025	826,525	
Arkansas	4,075	316,947		New Mexico	250	14,550	
California	69,775	3,231,370		New York	336,550	6,801,537	7,000
Colorado	201,825	552,830	25,100	North Carolina	95,050	1,313,525	
Connecticut	8,100	589,150		North Dakota	250	25	
Delaware	850	23,150		Ohio	488,675	7,711,245	1,750
Florida	830,000	3,941,542		Oklahoma	56,775	1,119,100	
Georgia	143,750	529,950	2,500	Oregon	17,250	150,000	
Idaho	43,650	155,534		Pennsylvania	1,012,975	16,349,227	135,075
Illinois	133,125	5,257,075	6,750	Rhode Island	2,650	6,700	
Indiana	128,825	1,735,255	28,675	South Carolina	24,675	336,450	
Iowa	30,850	1,367,575	3,550	South Dakota	3,500	149,820	
Kansas	76,450	1,299,738		Tennessee	118,600	1,007,025	18,200
Kentucky	275,425	1,324,350	54,500	Texas	330,600	2,320,670	32,500
Louisiana	1,250	1,120,850	48,300	Utah	47,000	219,650	5,000
Maine	32,700	249,925		Vermont	133,775	282,050	
Maryland	16,550	1,022,690	9,000	Virginia	78,925	1,765,900	90,700
Massachusetts	25,150	523,900		Washington	47,325	410,850	
Michigan	13,250	3,994,000	1,000	West Virginia	173,300	2,027,742	19,200
Minnesota	73,775	268,925		Wisconsin	54,200	1,142,685	3,200
Mississippi	50,625	78,995		Wyoming	52,500	59,100	100
Missouri	313,975	2,164,553	48,000				
Montana	72,900	110,550		Total	5,909,475	76,185,760	581,300
Nebraska	21,500	36,230					

NATIONAL SAFETY COMPETITION

A national contest to establish the lowest accident rate was conducted by the Bureau of Mines in 1926. A similar contest had been conducted in 1925. The contest, known as the National Safety Competition, was participated in by nearly 300 mines and quarries, 257 of which continued in the contest until the close of the year. Each quarry or open-pit mine employed at least 25 men inside the pit; each underground mine employed at least 50 men underground. The relative standing of the companies was determined, however, on the basis of reports of accidents and man hours worked inside the mine or quarry and also at surface shops and yards connected with operations underground or in the quarry pit or open-pit mine. The contestants were rated according to their accident-severity rates; that is, according to the number of days which injured employees lost from accidents in proportion to total number of man hours worked by all employees at the plant. The contest did not cover coke ovens, metallurgical plants, limekilns, or cement plants; it did, however, include coarse crushing at stone quarries but not fine crushing or pulverizing.

Five bronze trophies, known as "Sentinels of safety," were awarded—one to the underground anthracite mine, one to the underground bituminous coal mine, one to the underground metal mine, one to the underground nonmetallic mineral mine, and one to the quarry or open-pit mine establishing the lowest accident-severity rate in their respective groups. Excellent safety records were established by some of the companies. For example, out of 118 quarries or open-pit mines that participated in the contest, 14 were operated without a lost-time accident and 67 others had accident-severity rates of less than one day lost per thousand man-hours worked.

The trophy for establishing the best safety record in the quarry and open-pit mine group was awarded to Nos. 5 and 6 quarry at Martinsburg, W. Va. This quarry was operated by the North American Cement Corporation. Its record showed 264,318 man-hours of exposure in 1926 without a lost-time accident.

Honorable mention was awarded to the four quarries having the next best safety record. These quarries were West Coplay quarry at West Coplay, Pa., operated by Lehigh Portland Cement Co.; Birmingham quarry at Birmingham, Ala., operated by Lehigh Portland Cement Co.; Louisville quarry at Speed, Ind., operated by Louisville Cement Co.; and Genoa quarry at Genoa, Ohio, operated by U. S. Gypsum Co.

PUBLICATIONS ON ACCIDENT STATISTICS

A limited supply of the following publications of the Bureau of Mines has been printed. Requests for publications should be addressed to the Section of Publications, Bureau of Mines, Washington, D. C.

The Bureau of Mines issues a list showing all its publications available for free distribution as well as those obtainable only by purchase from the Superintendent of Documents, Government Printing Office. Interested persons should apply to the Section of Publications, Bureau of Mines, for a copy of the latest list.

PUBLICATIONS AVAILABLE FOR FREE DISTRIBUTION

BULLETIN 246. Quarry accidents in the United States during the calendar year 1923, by W. W. Adams. 1925. 76 pp.

BULLETIN 248. Metal-mine accidents in the United States during the calendar year 1923, by W. W. Adams. 1925. 90 pp.

BULLETIN 263. Quarry accidents in the United States during the calendar year 1923, by W. W. Adams. 1926. 76 pp.

BULLETIN 264. Metal-mine accidents in the United States, 1924, by W. W. Adams. 1926. 98 pp.

BULLETIN 275. Coal-mine fatalities in the United States, 1925, by W. W. Adams. 1926. 129 pp.

BULLETIN 282. Metal-mine accidents in the United States during the calendar year 1925, by W. W. Adams. 1927. 120 pp.

BULLETIN 286. Quarry accidents in the United States during the calendar year 1925, by W. W. Adams. 1927. 98 pp.

TECHNICAL PAPER 339. Coal-mine fatalities in the United States, 1922, by W. W. Adams. 1923. 97 pp.

TECHNICAL PAPER 388. Coke-oven accidents in the United States during the calendar year 1924, by W. W. Adams. 1925. 38 pp.

TECHNICAL PAPER 395. Accidents at the metallurgical works in the United States during the calendar year 1924, by W. W. Adams. 1926. 37 pp.

TECHNICAL PAPER 400. Accidents due to explosives in the metal mines of the Southwest, as shown by records in Arizona, by E. D. Gardner. 1926. 28 pp.

TECHNICAL PAPER 406. Production of explosives in the United States during the calendar year 1925, with notes on mine accidents due to explosives, by W. W. Adams. 1926. 39 pp.

TECHNICAL PAPER 408. Coke-oven accidents in the United States during the calendar year 1925, by W. W. Adams. 1926. 39 pp.

TECHNICAL PAPER 412. Accidents at metallurgical works in the United States during the calendar year 1925, by W. W. Adams. 1927. 39 pp.

TECHNICAL PAPER 430. Accidents at metallurgical works in the United States during the calendar year 1926, by W. W. Adams. 1928. 38 pp.

PUBLICATIONS THAT MAY BE OBTAINED ONLY THROUGH THE SUPERINTENDENT OF DOCUMENTS

BULLETIN 69. Coal-mine accidents in the United States and foreign countries, compiled by F. W. Horton. 1913. 102 pp., 3 pls., 40 figs. 25 cents.

BULLETIN 115. Coal-mine fatalities in the United States, 1870–1914, with statistics of coal production, labor, and mining methods, by States and calendar year, compiled by A. H. Fay. 1916. 370 pp., 3 pls., 13 figs. 40 cents.

BULLETIN 241. Coal-mine fatalities in the United States during the calendar year 1923, by W. W. Adams. 1924. 88 pp. 10 cents.

BULLETIN 251. Coal-mine fatalities in the United States, 1924, by W. W. Adams. 1925. 95 pp. 15 cents.

TECHNICAL PAPER 327. Accidents at metallurgical works in the United States during the calendar year 1921, by W. W. Adams. 1923. 31 pp. 5 cents.

TECHNICAL PAPER 329. Quarry accidents in the United States during the calendar year 1921, by W. W. Adams. 1923. 90 pp. 10 cents.

TECHNICAL PAPER 331. Metal-mine accidents in the United States during the calendar year 1921, by W. W. Adams. 1923. 96 pp. 10 cents.

TECHNICAL PAPER 350. Accidents at metallurgical works in the United States during the calendar year 1922, by W. W. Adams. 1923. 31 pp. 5 cents.

TECHNICAL PAPER 353. Quarry accidents in the United States during the calendar year 1923, by W. W. Adams. 1924. 61 pp. 10 cents.

TECHNICAL PAPER 354. Metal-mine accidents in the United States during the calendar year 1922, by W. W. Adams. 1924. 72 pp. 10 cents.

TECHNICAL PAPER 371. Coke-oven accidents in the United States during the calendar year 1924, by W. W. Adams. 1925. 35 pp. 5 cents.

TECHNICAL PAPER 374. Accidents at metallurgical works in the United States during the calendar year 1923, by W. W. Adams. 1925. 31 pp. 5 cents.