

UNITED STATES DEPARTMENT OF THE INTERIOR

HAROLD L. ICKES, Secretary

BUREAU OF MINES

R. R. SAYERS, Director

COLORADO SCHOOL OF MINES LIBRARY



—
Bulletin 458
—

QUARRY ACCIDENTS

IN THE

UNITED STATES

DURING THE CALENDAR YEAR

1942

BY

WILLIAM W. ADAMS and VIRGINIA E. WRENN



UNITED STATES

GOVERNMENT PRINTING OFFICE

WASHINGTON : 1944

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 15 cents

CONTENTS

	<i>Page</i>
Introduction	1
Acknowledgments	4
Scope of statistics.....	4
Classification of quarries.....	5
Classification of injuries.....	5
Definition of accident rates.....	5
Accidents at different kinds of quarries.....	24
Dimension-stone and non-dimension-stone quarries.....	44
Nonfatal-injury rates from 7 main causes of accidents inside open-quarrying operations in the 10 leading quarrying States.....	59
Comparative severity of injuries.....	60
Ratio of injuries to fatalities.....	60
Underground quarries.....	61
Plants operated without fatal accidents.....	63
Size of quarry and length of shift inside the quarries, and accident rates based thereon.....	64
Long-time trend of accident rates in the quarry industry.....	78
Noncommercial quarries.....	83
Form of questionnaire.....	87

ILLUSTRATIONS

Fig.

1. Accident-frequency rates per million man-hours of employment in the quarrying and related industries in the United States, 1911-42.....79
2. Questionnaire sent to plants in quarrying and related industries; face
3. Questionnaire sent to plants in quarrying and related industries; reverse

QUARRY ACCIDENTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1942¹

By WILLIAM W. ADAMS² AND VIRGINIA E. WRENN³

INTRODUCTION

The quarrying and related industries of the United States made a large gain in employment (man-hours of work) in 1942 with a somewhat smaller number of men employed than in 1941. This was accomplished chiefly by increasing the number of workdays per man and also by increasing the length of the workday. In spite of the greater volume of work performed, the industry had a more favorable accident-frequency rate in 1942 than in the previous year.

Accident and employment reports from operating companies showed that the industry employed 84,270 men for an average of 271 days per man in 1942, with a volume of work of almost 181 million man-hours. The average workshift comprised 7.93 hours, and the number of man-shifts worked totaled nearly 23 million. Injuries from accidents in and about the quarries and plants caused disability to 6,461 employees, 112 of whom died as a result of their injuries, including 28 employees whose lives were lost in a single disaster. The accident-frequency rate in the industry was 35.73 per million man-hours worked, comparing favorably with a rate of 40.11 for the previous year. However, the figure for 1942 included a death rate of 0.62 per million man-hours which, because of the disaster referred to, was considerably higher than the fatality rate of 0.44 for 1941. Had the disaster not occurred, the fatality rate for the industry for 1942 would have been 0.46. The major disaster in which 28 lives were lost occurred on March 26 at the Sandts Eddy quarry of the Lehigh Portland Cement Co. near Easton, Pa.

A tabulation of reports covering States employing 1,000 or more men revealed that, of the 27 States represented, 6 had no fatal accidents. The 6 States, in order of their volume of employment, were: Texas, West Virginia, Georgia, Kansas, North Carolina, and New Jersey. Of the States in which fatal accidents occurred, Michigan and Ohio had the lowest rates—0.12 and 0.21, respectively. Of the same list of States, Michigan also had the lowest nonfatal-injury rate—9.46—followed by West Virginia, Iowa, Georgia, and Ohio, in the order named.

Due to the major disaster, explosives was the largest single cause of fatal accidents in the quarries proper, followed by haul-

¹ Work on manuscript completed April 1944.

² Supervising statistician, employment statistics section, Bureau of Mines.

³ Employment statistics section, Bureau of Mines.

age, falls or slides of rock or overburden, machinery, electricity, and falls of persons. Omitting the major disaster, haulage would have been the principal cause. Outside the quarries, machinery was the leading cause of fatal accidents, followed by haulage and falls of persons. The chief causes of nonfatal accidents at open quarries were handling materials, flying objects, falls of persons, and falls or slides of rock or overburden. Handling rock while loading at working face or chute and drilling were the chief causes of accidents in the underground quarries. As in open quarries, handling materials caused the largest number of nonfatal injuries at plants operated in connection with quarries. Machinery and falls of persons also caused numerous nonfatal lost-time injuries.

Although in the canvass of employment and accidents in the quarry industry of the United States the Bureau of Mines does not request figures showing the number of days lost from accidents, an estimate may be made of the accident-severity rate from information obtained from the records of plants which participated in the National Safety Competition, a yearly safety contest conducted by the Bureau of Mines. The estimated severity rate of 5.80 per thousand man-hours of exposure for 1942 is arrived at by applying a time-charge of 6,000 days to each of the 112 fatalities and 10 permanent total disabilities that occurred during 1942, a charge of 1,021 days to each of the 140 permanent partial disabilities, and a charge of 28 days to each of the 6,199 temporary lost-time injuries reported for 1942. The applied charges for deaths and permanent total disabilities are standard charges for such classes of industrial injuries. The charges for permanent partial disabilities represent the average charge per injury as shown by special studies of accidents at quarries that have participated in the National Safety Competition during the 3 years 1940 to 1942. The charges for temporary lost-time injuries are likewise averages derived from the contest records for the 3-year period 1940-42. The charge for each case of permanent partial disability reported by companies enrolled in the yearly safety contests is made with due consideration to the nature of injury and part of body affected. The average days lost per temporary injury is likewise obtained from the records covering a similar class of injuries in the competition and includes all calendar days on which the injured employees were disabled.

Had the major disaster causing 28 deaths not occurred, the estimated severity rate for the quarry and related industries for 1942 would have been 4.87.

TABLE 1.—Relative standing of States having 1,000 or more men employed at quarries, including outside works, classified according to number of men employed, and fatality and injury rates per million man-hours of employment during the year ended December 31, 1942

Relative standing	State	Number of men employed	Relative standing	State	Fatality rates	Relative standing	State	Injury rates
1	Pennsylvania	13,844	1	Texas		1	Michigan	9.46
2	Ohio	6,275	2	West Virginia		2	West Virginia	15.87
3	Missouri	4,719	3	Georgia		3	Iowa	17.95
4	Illinois	4,310	4	Kansas		4	Georgia	20.49
5	New York	4,275	5	North Carolina		5	Ohio	21.74
6	California	4,189	6	New Jersey		6	Alabama	22.79
7	Indiana	3,755	7	Michigan	0.12	7	New York	25.91
8	Michigan	3,557	8	Ohio	.21	8	Pennsylvania	26.82
9	Virginia	3,348	9	Virginia	.27	9	Maryland	31.64
10	Tennessee	2,900	10	Tennessee	.32	10	Kansas	31.91
11	Alabama	2,632	11	Wisconsin	.40	11	Indiana	33.62
12	Texas	2,371	12	Oklahoma	.43	12	Illinois	37.66
13	Kansas	2,094	13	Maryland	.43	13	Texas	38.12
14	West Virginia	2,087	14	Minnesota	.43	14	California	40.30
15	Georgia	1,942	15	Missouri	.44	15	New Jersey	41.53
16	Iowa	1,883	16	Washington	.45	16	Florida	42.56
17	Kentucky	1,744	17	Massachusetts	.47	17	Missouri	43.98
18	Vermont	1,695	18	Indiana	.54	18	Oklahoma	44.40
19	Florida	1,619	19	California	.69	19	North Carolina	44.77
20	Wisconsin	1,459	20	New York	.73	20	Massachusetts	45.12
21	New Jersey	1,217	21	Illinois	.76	21	Vermont	46.04
22	North Carolina	1,212	22	Vermont	.79	22	Kentucky	49.36
23	Minnesota	1,136	23	Iowa	.79	23	Minnesota	49.77
24	Massachusetts	1,081	24	Alabama	.80	24	Tennessee	49.88
25	Maryland	1,079	25	Pennsylvania	1.19	25	Washington	50.71
26	Washington	1,069	26	Florida	1.20	26	Virginia	52.22
27	Oklahoma	1,019	27	Kentucky	1.39	27	Wisconsin	75.68
	United States, total	84,270		United States, average	.62		United States, average	35.11

TABLE 2.—Percentage by which each State's accident-frequency rate (deaths and injuries) per million man-hours of employment in quarrying and related industries decreased or increased in 1942 compared with 1941¹

State	Number of accidents per million man-hours in 1942	Change compared with 1941, percent	State	Number of accidents per million man-hours in 1942	Change compared with 1941, percent
West Virginia	15.87	-49.1	North Carolina	44.77	-7.5
Alabama	23.59	-42.9	Pennsylvania	28.01	-6.3
Georgia	20.49	-24.9	Tennessee	50.20	-5.8
Maryland	32.07	-27.5	Washington	51.16	-5.4
Missouri	44.42	-23.5	Texas	38.12	-3.7
Kansas	31.91	-21.2	Massachusetts	45.59	-1.8
Vermont	46.83	-19.4	Illinois	38.42	-0.6
Michigan	9.58	-14.8	Wisconsin	76.08	+1.8
Virginia	52.49	-12.9	New Jersey	41.53	+2.6
Indiana	34.16	-12.4	Florida	43.76	+3.6
Ohio	21.95	-12.3	Oklahoma	44.83	+9.5
Kentucky	50.75	-11.2	Minnesota	50.20	+23.4
California	40.99	-9.5	Iowa	18.74	-24.4
New York	26.64	-8.5			
			United States, average	35.73	-10.9

¹ States listed are those covered by table 1.

TABLE 3.—*Accident-frequency rates per million man-hours of employment in the quarrying industry in the United States, 1941 and 1942*

Kind of quarry	At quarries			At outside works			Total		
	1941	1942	Per- cent change in 1942	1941	1942	Per- cent change in 1942	1941	1942	Per- cent change in 1942
Cement rock ¹	16.33	21.36	+30.8	10.37	10.33	-0.4	11.15	11.72	+5.1
Granite.....	61.17	53.40	-12.7	35.04	30.66	-12.5	49.95	43.51	-12.9
Limestone.....	65.77	54.51	-17.1	41.24	41.40	+ .4	56.60	49.56	-12.4
Limestone (chief product, lime).....	84.36	69.97	-17.1	48.58	42.60	-12.3	61.97	52.82	-14.8
Marble.....	54.85	46.69	-14.9	43.05	36.56	-15.1	46.33	39.00	-15.8
Sandstone.....	69.19	64.15	-7.3	40.06	51.19	+27.8	60.10	59.68	- .7
Slate.....	65.13	72.83	+11.8	52.69	76.04	+44.3	57.39	74.89	+30.5
Trap rock.....	77.93	76.98	-1.2	54.80	38.57	-29.6	69.07	60.32	-12.7
Total.....	62.14	54.07	-13.0	26.43	24.90	-5.8	40.11	35.73	-10.9

¹ Includes limestone or other stone used in the manufacture of cement.

ACKNOWLEDGMENTS

The Bureau of Mines gratefully acknowledges the cooperation of the quarry operators throughout the United States, whose voluntary reports of accidents and employment form the basis of the tables in this bulletin.

SCOPE OF STATISTICS

The tables in this bulletin have been compiled by the Bureau of Mines from reports received directly from operators of stone quarries, and they represent all phases of the quarrying industry except sand, gravel, and clay. The total figures are based upon returns representing 2,159 quarries that were active all or part of the year. The figures also cover crushing and screening, rock dressing, and the manufacture of cement and lime, insofar as those operations are conducted by the quarry companies.

The Bureau of Mines is authorized to collect data on accidents at mines and quarries, but there is no Federal law that compels operators to supply such data; hence the reports received from operators are voluntary responses to the Bureau's requests for information. Although the figures presented herein may not be complete for the entire industry, every effort has been exerted 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 States—a fact extremely significant in view of the lack of uniformity among the States as regards classes of plants covered by State laws, classes of accidents covered by State reports, and other factors that tend to make impracticable or impossible comparison of the accident experience of one State with that of another or comprehension of the relative importance of the various causes of accidents in the industry as a whole.

CLASSIFICATION OF QUARRIES

The quarries covered by this report have been classified according to the kind of rock produced, as follows: Cement rock (including other stone used in making cement), limestone, marble, sandstone, slate, trap rock, and granite. Separate statistical tables are presented for each group and for all groups combined. As already stated, the figures do not cover clay, sand, and gravel pits.

CLASSIFICATION OF INJURIES

From 1915 to 1929 the Bureau's statistics of accidents at quarries divided all injuries into five classes, as follows: (1) Fatalities, (2) permanent total disabilities, (3) permanent partial disabilities, (4) temporary disabilities lasting more than 14 days, and (5) temporary disabilities lasting more than the remainder of the day on which the accident occurred but not exceeding 14 days. Beginning with 1930, classes (4) and (5) were consolidated under the general class of temporary injuries.

Figures covering accidents at quarries for the 5-year period 1938-42 are given in table 34, page 61.

DEFINITION OF ACCIDENT RATES

All accident rates shown in this publication, except where otherwise stated, have been calculated upon the basis of a million man-hours of employment or exposure to risk.

QUARRY ACCIDENTS IN THE UNITED STATES, 1942

TABLE 4.—All quarries: Number of active quarries, men employed, and man-days, during the year ended December 31, 1942

State	Number of active quarries ¹	Men employed						Man-days of employment						Total				
		At quarry			At outside works			At quarry			At outside works							
		Open quarry	Underground quarry	Crusher	Rock-dressing plant	Granules and flour plant	Cement mill	Lime-kiln	Miscellaneous	Total	Open quarry	Underground quarry	Crusher		Rock-dressing plant	Granules and flour plant	Cement mill	Lime-kiln	Miscellaneous	Total
Alabama	30	879	108	232	99	975	152	187	2,632	257,616	31,806	63,832	25,612		326,405	51,591	55,004	811,866
Arizona	8	135		36	5			18	228	28,208		8,614				13,545	6,080	56,447
Arkansas	17	161		45	31	71	62	353	37,962	39,530		9,530	350	630	25,915	22,447	97,084	
California	102	1,223	106	407	31	2,091	82	246	4,189	302,189	34,018	114,698	7,609	900	720,865	28,536	69,072	1,271,887
Colorado	29	273	10	15	17	174	15	35	539	82,289	1,906	4,321	3,839		57,082	5,475	9,387	144,609
Connecticut	25	207		15	15		3	36	336	95,461		20,760	3,400		57,325	5,323	9,842	91,396
Florida	35	790		437	40	228	17	107	1,619	227,728	4,805	123,336	5,600	6,360	90,716	4,800	14,196	432,399
Georgia	27	792	29	231	501	272	16	69	1,942	207,040		61,251	129,178	6,360	14,972		37	518,305
I Idaho	9	158		50	34			1	263	11,928	4,170	4,170						31,107
Illinois	119	2,037	168	892	4	964	55	200	4,310	454,764	43,767	207,781	500		336,256	17,578	56,104	1,116,760
Indiana	99	1,219	6	415	733	1,350	19	13	3,755	242,264	1,362	91,953	156,428		428,756	6,955	3,694	933,322
Iowa	81	609	33	231	331	996		14	1,883	130,500	9,878	47,434			276,444		4,098	470,374
Kansas	48	656	112	302	69	8	8	117	2,094	119,436	31,778	67,788	18,704		265,239		28,077	529,022
Kentucky	68	874	188	458	209	35	38	15	1,744	181,842	49,241	100,743	32,820		62,082		4,509	494,417
Maine	17	220	70	91	130	2	2	85	7,700	44,090	19,660	25,225	80	25,105	32,196	10,778	10,816	473,585
Maryland	37	423	3	128	29	322	29	109	1,079	99,259	420	29,137	830	4,701	112,514		7,583	301,939
Massachusetts	39	464		174	239	116	79	109	1,081	88,960		43,968	61,453		448,447	24,984	27,894	560,646
Michigan	31	1,052	601	401	601	1,394	47	453	3,557	277,696		165,033	114,719	2,180	448,447	14,692	122,561	1,630,629
Minnesota	40	330		108	455	4	37	5	1,136	69,472	165,171	19,337	2,996	1,040	330,300	17,109	1,500	283,870
Missouri	119	1,845	581	542	16	3,089	407	236	4,719	364,135		137,264	2,996	762	22,995		1,460	1,190,066
Montana	11	63		9	2			4	152	13,551		3,054	536		22,995		1,068	45,099
Nebraska	7	114		16	16	217		3	372	34,316		8,816		7,193	74,158		1,068	129,871
New Hampshire	9	62		36	56				154	9,215		7,681	11,461					25,357
New Jersey	34	554		180	18	363	14	106	1,217	106,501		38,086			35,232	4,387	28,432	212,678
New York	108	1,583	26	678	18	1,563	59	305	4,275	348,427	6,020	132,673	2,831	12,349	484,378	19,307	63,027	1,068,982
North Carolina	24	664		342	176	43	6	24	1,212	158,670		81,521	42,453		1,960	6,408	290,782	
Ohio	149	2,210	215	950	314	1,325	767	494	6,275	589,927	59,415	237,383	78,398		447,423	263,016	152,302	1,817,864
Oklahoma	25	455		117	81	330	26	10	1,019	119,969		31,904	23,824		105,704	9,480	3,605	295,376
Oregon	25	204		142	596	210		9	568	34,662		17,719		21,431	150,784	4,472	3,404	119,564
Pennsylvania	315	4,034	993	1,391	12	4,534	559	1,668	13,844	1,014,911	277,639	350,558	144,865		1,507,894	190,113	486,157	3,963,548
Rhode Island	7	66		12	45			3	18	216		15,194	13,318				387	50,519
South Carolina	17	335	14	167	2			9	527	20,314	3,036	47,972	61					147,179
South Dakota	17	202		66	40	99	3	67	410	448.0		11,041	10,913		36,135	750	104,326	108,669
Tennessee	78	979	187	315	269	1,144	315	246	2,900	232,416	51,977	76,057	58,002	1,248	246,830	32,579	17,477	783,533
Texas	37	551		217	86	1,194	97	246	6,700	161,638		67,688	15,663		415,547		82,002	779,015
Utah	16	98		25	25	130	12	22	287	23,386		6,845			43,442		2,662	82,250

QUARRY ACCIDENTS IN THE UNITED STATES, 1942

Vermont.....	37	687	51	45	748	35	92	57	1,695	157,750	14,750	14,650	215,278	10,500	27,598	16,729	457,185
Virginia.....	92	1,622	25	687	144	32	331	324	3,348	413,606	8,706	142,648	25,384	9,031	102,633	87,432	601,833
Washington.....	33	356	.....	116	8	.....	47	47	1,069	83,959	.....	22,657	1,708	.....	10,692	10,692	283,599
West Virginia.....	35	726	255	272	17	.....	145	365	2,087	180,388	75,607	73,911	2,177	.....	51,481	112,007	607,683
Wisconsin.....	98	779	.....	273	156	14	8	93	1,439	154,015	.....	41,444	36,269	3,416	19,424	19,959	303,887
Wyoming.....	7	79	28	23	.....	.....	134	1	265	11,465	7,257	5,835	.....	.....	48,240	19,250	73,047
Other States ¹	8	85	.....	49	.....	.....	215	1	389	21,063	.....	11,907	.....	.....	11,801	51	95,835
Total.....	2,159	30,838	3,210	11,531	5,141	381	23,608	3,708	84,270	7,307,794	902,017	2,786,879	1,246,679	106,846	7,620,667	1,651,211	22,807,586

¹ Includes a small number of mills or other plants not operated in connection with quarries.
² Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

QUARRY ACCIDENTS IN THE UNITED STATES, 1942

TABLE 5.—All quarries: Number of man-hours and average days active, by States, during the year ended December 31, 1942

State	Man-hours of employment										Average days of employment per man			Average hours of employment per man per day		
	At quarry		At outside works						Total	At quarry	Total	At quarry	At outside works	Total		
	Open quarry	Under-ground quarry	Crusher	Rock-dressing plant	Granules and flour plant	Cement mill	Limekiln	Miscellaneous								
Alabama.....	2,040,653	254,445	514,591	204,806	.....	2,437,902	381,483	440,754	6,274,724	293	318	308	7.93	7.62	7.78
Arizona.....	215,252	.....	69,180	.....	.....	441,432	108,380	48,640	441,432	209	304	248	7.63	8.01	7.62
Arkansas.....	307,177	.....	80,099	.....	5,172	207,230	182,312	.....	784,880	236	308	275	8.00	8.08	8.08
California.....	2,324,854	270,561	807,800	60,807	7,200	5,786,697	229,311	546,548	10,123,838	253	320	305	7.72	7.09	7.08	
Colorado.....	451,923	14,200	33,759	30,708	.....	430,504	43,800	75,096	1,099,990	227	314	268	7.56	7.88	7.82
Connecticut.....	461,064	.....	168,158	27,000	.....	.....	7,464	81,027	1,744,713	273	271	272	8.17	8.32	8.15
Florida.....	2,169,780	.....	1,173,883	44,800	.....	458,602	41,463	270,602	4,150,130	288	271	270	8.53	8.39	8.40
Georgia.....	1,796,371	38,439	561,657	1,050,059	50,880	738,778	38,400	128,376	4,392,060	258	273	267	8.66	8.33	8.48	
Idaho.....	92,105	.....	32,105	.....	.....	119,776	.....	206	244,282	75	183	118	7.72	7.93	7.85
Illinois.....	3,208,250	350,146	1,660,553	4,000	.....	2,096,459	139,711	453,226	7,012,245	227	292	292	7.14	7.74	7.69
Indiana.....	2,053,075	10,806	797,055	1,250,295	.....	3,163,583	41,711	29,723	7,347,298	197	276	250	8.51	7.77	7.82
Iowa.....	1,146,243	82,456	442,379	.....	.....	2,982,693	.....	33,712	3,787,583	219	266	266	8.56	7.79	8.05
Kansas.....	1,012,569	281,231	623,334	164,400	.....	1,936,096	.....	223,500	4,932,120	107	285	253	8.30	8.14	8.06
Kentucky.....	1,658,142	432,296	909,101	.....	.....	546,318	.....	89,545	3,616,472	223	275	232	8.07	8.34	8.32
Maine.....	356,075	157,280	203,261	278,040	203,800	257,567	86,222	.....	1,429,402	220	273	251	8.30	7.37	7.70
Maryland.....	843,909	3,360	337,474	492,425	.....	721,208	64,684	250,486	2,338,758	234	310	281	8.56	8.14	8.19
Massachusetts.....	817,489	.....	327,661	.....	.....	.....	199,888	242,880	2,127,764	213	262	241	8.26	7.37	7.79
Michigan.....	2,405,528	.....	1,344,663	17,440	37,600	3,586,922	123,100	980,833	8,455,187	264	301	290	8.05	8.04	8.20
Minnesota.....	585,441	.....	182,493	917,750	10,400	2,379,204	105,712	12,000	2,330,782	211	268	250	8.57	8.14	8.21
Missouri.....	2,789,046	1,324,788	1,105,153	21,668	6,096	183,960	944,188	456,906	6,027,036	218	288	252	7.77	7.44	7.69	
Montana.....	107,735	.....	24,432	4,288	.....	183,960	28,024	11,680	360,110	303	324	297	8.01	7.39	7.99
Nebraska.....	276,723	.....	32,577	.....	98,268	469,320	.....	9,494	886,412	302	325	325	8.02	7.06	7.33
New Hampshire.....	83,968	.....	76,226	91,688	.....	.....	.....	.....	251,982	149	208	184	9.11	8.78	8.69
New Jersey.....	809,600	.....	329,559	.....	.....	281,855	35,096	235,540	1,781,952	169	160	171	8.50	8.31	8.28
New York.....	2,893,771	48,160	1,126,163	22,358	114,463	3,436,289	135,183	453,101	8,950,518	220	268	250	8.20	7.57	7.73	
North Carolina.....	1,369,848	.....	725,304	339,474	.....	.....	11,640	5,605,687	2,601,518	220	241	240	8.05	8.00	8.00
Ohio.....	4,796,357	476,675	1,963,992	628,002	.....	3,527,086	1,979,759	1,165,925	14,537,935	268	304	240	8.12	7.93	8.00
Oklahoma.....	630,990	.....	250,996	199,542	.....	853,637	71,560	29,474	2,242,069	204	311	270	7.81	8.01	7.93
Oregon.....	292,901	.....	149,219	.....	.....	507,181	25,632	3,776	2,076,709	257	333	303	8.55	7.69	7.19
Pennsylvania.....	8,392,418	2,230,102	2,964,052	1,176,257	200,372	10,933,243	1,266,594	3,847,051	31,454,332	200	243	268	8.22	7.05	7.84	
Rhode Island.....	162,296	24,288	121,552	106,541	.....	.....	3,096	36,560	1,002,725	227	230	233	7.79	8.10	8.09
South Carolina.....	812,181	30,385	435,782	.....	.....	216,810	.....	.....	1,702,748	272	283	279	8.20	7.46	8.05
South Dakota.....	634,641	397,069	634,641	471,615	9,984	1,816,660	822,728	138,576	6,170,296	293	283	253	8.20	7.72	7.91	
Tennessee.....	1,278,375	.....	556,160	123,387	.....	3,100,632	231,241	612,593	5,002,589	327	337	327	7.91	7.92	7.92
Texas.....	1,658,877	.....	54,446	.....	.....	326,671	20,572	45,983	6,634,666	239	311	287	7.80	7.62	7.72
Vermont.....	1,274,663	120,336	120,526	1,722,054	126,000	.....	239,869	197,732	3,801,200	240	291	270	8.09	8.45	8.31

Virginia.....	3,511,544	66,750	1,275,189	293,072	71,986	647,561	820,475	700,150	7,296,727	256	276	266	8.47	7.92	8.18
Washington.....	1,870,546	150,917	480,017	13,241	.....	1,084,085	171,847	87,928	2,508,674	236	263	267	7.36	7.63	7.75
West Virginia.....	1,478,044	510,668	629,306	17,416	.....	629,781	417,458	824,088	5,550,553	230	230	231	7.43	7.40	7.47
Wisconsin.....	1,276,934	364,705	477,705	290,879	27,333	234,708	150,812	18,288	2,497,446	198	220	208	8.23	8.14	8.22
Wyoming.....	97,630	58,060	47,703	.....	.....	434,168	.....	2,250	689,518	175	244	276	8.32	8.91	8.76
Other States ¹	168,138	.....	97,664	.....	.....	408,588	94,586	409	709,583	243	246	247	7.96	8.03	8.02
Total.....	59,949,779	7,202,591	23,674,624	10,048,375	987,062	56,589,797	9,265,814	13,087,491	180,835,533	241	291	271	8.18	7.79	7.93

¹ Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

10 QUARRY ACCIDENTS IN THE UNITED STATES, 1942

TABLE 6.—All quarries: Fatalities and injuries and rates per million man-hours, by States, during the year ended December 31, 1942

State	Number killed				Number injured					Widows	Orphans	Rates per million man-hours						
	Open quarry	Underground quarry	Shaft or slope	Outside works	Total	Open quarry	Underground quarry	Shaft or slope	Outside works			Total	Killed			Injured		
													At quarry	At outside works	Total	At quarry	At outside works	Total
Alabama.....	5				5	90	5	2	46	143	1	5	2.18	0.80	42.26	11.56	22.79	
Arizona.....						16			18	34					74.33	79.58	77.02	
Arkansas.....	1				1	39			49	88	1	13	3.26	1.27	126.96	102.57	112.12	
California.....	7				7	157	23		228	408	2	32	2.70	.69	69.35	30.29	40.30	
Colorado.....	1				1	27			11	38	1	3	2.15	.91	57.92	17.35	34.55	
Connecticut.....						26			13	39					56.39	45.83	52.37	
Florida.....	4			1	5	90			87	177	2	21	1.84	0.50	41.48	43.73	42.56	
Georgia.....						35	3		52	90					20.71	20.33	20.49	
Idaho.....						6			3	9					65.14	19.71	36.84	
Illinois.....	3			3	6	161	22		115	298	3	3	.84	.69	51.43	26.41	37.66	
Indiana.....	3			1	4	99			148	247	3	3	1.45	.19	54.97	28.01	33.62	
Iowa.....	3				3	47	3		18	68			2.44	.79	40.69	7.03	17.95	
Kansas.....						65	20		51	136					65.70	17.18	31.91	
Kentucky.....	2	1		2	5	117	23	1	37	178	3	8	1.42	1.34	66.81	24.73	49.36	
Maine.....	1			1	2	17	14		39	70	1	1	1.94	1.10	1.41	60.28	42.96	49.22
Maryland.....	1				1	51			23	74			1.18	.43	60.19	15.42	31.64	
Massachusetts.....	1				1	50			46	96			1.22	.47	61.16	35.11	45.12	
Michigan.....				1	1	44			36	80				.17	12	18.31	5.95	9.46
Minnesota.....	1				1	45			71	116	1	1	1.71	.43	76.87	40.68	49.77	
Missouri.....	1	1		2	4	190	74		133	397	4	3	.49	.41	44.64	17.07	43.98	
Montana.....				1	1	11			4	15				3.96	2.78	102.10	15.85	41.65
Nebraska.....	1			1	2	10			6	16	1	2	3.61	1.64	2.26	36.14	9.84	18.05
New Hampshire.....						3			9	12					35.73	53.17	47.62	
New Jersey.....						43			31	74					47.78	35.15	41.53	
New York.....	3			3	6	112	2		100	214	4	5	1.02	.56	.73	38.75	18.81	25.91
North Carolina.....						70			42	112					51.10	37.10	44.77	
Ohio.....	2			1	3	156	15		145	316	2	1	.36	.11	.21	32.43	15.65	21.74
Oklahoma.....				1	1	41			63	104	1			.71	.43	43.78	44.82	44.40
Oregon.....						34			49	83					116.08	71.45	84.81	
Pennsylvania.....	32			5	37	428	63	1	341	833	25	42	3.01	.24	1.19	48.32	16.68	26.82
Rhode Island.....				1	1	27	3		18	48	1			3.73	2.20	160.79	67.23	105.65
South Carolina.....	5				5	88			4	94	2	1	5.93	3.84	106.82	8.69	72.15	
South Dakota.....						32			14	46					87.06	34.52	59.50	
Tennessee.....				2	2	105	40		157	308	2	3		.51	.32	66.23	49.32	49.88
Texas.....						109			116	225					85.26	25.09	38.12	
Utah.....						23			27	49					118.36	60.16	77.21	
Vermont.....	2	1			3	63	12		100	175	2	5	2.15	.79	53.76	41.56	46.04	
Virginia.....	2				2	229	9		143	381			.56	.27	66.51	38.40	52.22	
Washington.....				1	1	52			60	112	1			.65	.45	77.55	39.01	50.71
West Virginia.....						39	7		26	72					23.13	10.20	15.87	
Wisconsin.....				1	1	113			76	189				.82	.40	88.49	62.27	75.68
Wyoming.....						14	7		41	62					134.88	84.69	96.90	
Other States ¹						17			6	23					101.11	9.98	29.89	
Total.....	81	3		28	112	3,190	353	4	2,802	6,349	63	91	1.25	.25	.62	52.82	24.65	35.11

¹ Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 7.—Hours of employment per man per year worked at various places in quarries, 1942

State	Average hours of employment per man per year								Total
	At quarry		At outside works					Miscellaneous	
	Open quarry	Under-ground quarry	Crusher	Rock-dressing plant	Gran-ules and flour plant	Cement mill	Lime-kiln		
Alabama.....	2,322	2,356	2,218	2,070		2,500	2,510	2,357	2,384
Arizona.....	1,594		1,922				2,778	2,702	1,936
Arkansas.....	1,908		1,780	560	575	2,920	2,941		2,223
California.....	1,901	2,552	2,206	1,963	2,400	2,767	2,796	2,222	2,417
Colorado.....	1,655	1,420	2,251	1,806		2,589	2,920	2,146	2,041
Connecticut.....	2,227		2,242	1,800			2,488	2,251	2,216
Florida.....	2,747		2,686	1,120		2,011	2,439	2,529	2,569
Georgia.....	2,268	1,325	2,431	2,096	1,590	2,679	2,400	1,861	2,262
Idaho.....	583		642			2,218		296	929
Illinois.....	1,575	2,216	1,862	1,000		2,175	2,540	2,266	1,836
Indiana.....	1,684	1,816	1,923	1,706		2,343	2,195	2,287	1,957
Iowa.....	1,882	2,499	1,915			2,091		2,408	2,011
Kansas.....	1,544	2,511	2,064	2,383		2,335		1,911	2,035
Kentucky.....	1,897	2,406	1,985			2,614		2,703	2,068
Maine.....	1,623	2,247	2,234	2,139		2,220	2,463	2,178	2,032
Maryland.....	1,995	1,120	1,958	320	2,398	2,240	2,231	2,879	2,168
Massachusetts.....	1,762		1,940	2,060		2,351	2,530	2,228	1,968
Michigan.....	2,284		2,237		1,744	2,573	2,619	2,165	2,377
Minnesota.....	1,774		1,690	2,017	2,600	2,624	2,857	2,400	2,052
Missouri.....	1,512	2,280	2,039	1,348	2,032	2,185	2,320	1,936	1,913
Montana.....	1,710		2,715	2,144		2,920	2,548	2,920	2,369
Nebraska.....	2,427		2,036		4,468	2,163		3,165	2,383
New Hampshire.....	1,354		2,120	1,637					1,636
New Jersey.....	1,624		1,831			776	2,507	2,222	1,464
New York.....	1,828	1,852	1,661	1,242	2,663	2,199	2,291	1,584	1,932
North Carolina.....	2,063		2,121	1,929			1,940	2,320	2,064
Ohio.....	2,170	2,217	2,067	2,000		2,662	2,581	2,360	2,317
Oklahoma.....	2,058		2,145	2,463		2,587	2,752	2,987	2,298
Oregon.....	1,436		1,051			2,415	2,848	1,259	1,723
Pennsylvania.....	2,080	2,246	2,152	1,974	2,904	2,411	2,302	2,306	2,244
Rhode Island.....	2,459	2,024	2,701	1,490			1,032	2,031	2,103
South Carolina.....	2,424	2,170	2,609	244				2,660	2,472
South Dakota.....	1,820		1,440	2,193		2,190	2,000		1,886
Tennessee.....	1,923	2,123	2,015	1,632	2,496	2,442	2,612	2,068	2,129
Texas.....	2,320		2,563	1,870		2,597	2,384	2,490	2,489
Utah.....	1,897		2,178			2,513	1,723	2,136	2,211
Vermont.....	1,911	2,360	2,678	2,302	3,600		2,607	3,469	2,243
Virginia.....	2,165	2,670	2,172	1,410	2,250	2,288	2,479	2,161	2,179
Washington.....	1,884		1,560	1,668		2,282	2,565	1,871	2,066
West Virginia.....	2,027	2,003	2,314	1,024		2,072	2,877	2,340	2,174
Wisconsin.....	1,639		1,356	1,865	1,952	2,762	2,658	1,570	1,712
Wyoming.....	1,236	2,074	2,074			3,240		2,256	2,414
Other States ¹	1,978		1,993			1,900	2,425	409	1,978
Total.....	1,944	2,244	2,053	1,955	2,591	2,397	2,507	2,236	2,146

¹ Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 9.—All quarries: Injuries, by causes and States, during the year ended December 31, 1942

State	Open quarry										Underground quarry																
	Falls or slides of rock or overburden	Handling materials	Hand tools	Explosives	Hausage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Total	Fall of rock from roof or wall	Handling rock while loading at working face or chute	Hand tools	Explosives	Hausage	Falling down chute, winze, or rock from chute or pocket	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)	
Alabama	10	34	2	2	5	6		16	2	6	5			1	3	90					2			1			
Arizona	1	5	3	3	2	5		1	1	3	1			1	2	39											
Arkansas	23	27	11	4	17	15	3	16	2	12	14			2	11	157		15	1			1					
California	2	13	3	2	2	2	3	1	1	1	3			1	1	27											
Colorado		8	2	2	2	5	3	1	1	1	2			2	1	26											
Connecticut	3	23	11	3	10	7	1	13	1	1	8			1	5	90								3			
Florida	4	11	1	2	4	4	1	1	1	5	5			2	5	35											
Georgia	2	2	2	2	2	2	2	2	2	2	2			2	2	6					2	1					2
Idaho	22	30	8	5	24	22	2	10	17	7	17			3	11	161		7	5		2	1					
Illinois	4	22	7	3	10	12	4	9	1	4	9			1	13	99											
Indiana	4	4	9	3	4	4	2	9	1	4	5			1	1	47					1						
Iowa	4	9	3	3	4	4	2	9	1	6	6			1	4	47											
Kansas	8	20	6	3	7	13	5	11	1	1	10			3	8	65		1									
Kentucky	4	8	3	3	2	3	2	3	2	6	10			3	2	17											
Maine	1	1	7	2	2	2	2	2	2	1	2			2	2	5											
Maryland	3	11	2	9	6	6	1	14	2	3	3			2	3	51											
Massachusetts	3	14	5	5	6	6	2	2	2	3	2			2	7	50											
Michigan	1	12	3	1	2	8	1	5	3	3	3			1	8	44											
Minnesota	1	16	6	2	1	4	3	4	1	9	2			1	4	45											
Missouri	18	58	2	2	2	26	3	40	1	3	20			1	8	190		6	4		8	6		14			5
Montana	2	5	1	1	1	2	1	2	2	2	2			2	2	10											
Nebraska	2	1	1	1	1	1	1	4	2	2	2			1	1	11											
New Hampshire	1	1	1	1	1	1	1	3	3	8	7			2	2	43											
New Jersey	2	4	6	4	1	9	5	3	3	7	6			1	2	3											
New York	9	25	14	2	7	18	3	8	3	4	7			1	7	112											
North Carolina	8	12	4	3	7	7	6	14	3	7	6			1	6	70											
Ohio	7	23	10	6	22	29	6	9	1	10	17			3	20	156		1			7	1		1			
Oklahoma	2	5	6	2	3	2	1	9	1	4	5			1	1	41								1			4

Oregon.....	8	10	8	2	1	2	4	3	3	3	3	1	3	5	9	34	1	6	34	9	3	1	7	1	15	4			
Pennsylvania.....	46	122	39	1	34	19	34	3	12	34	6	24	426	9	34	24	36	228	3,190	38	84	28	1	43	11	60	1	20	
Rhode Island.....	4	17	1	4	1	1	8	3	17	4	3	1	1	1	1	13	1	1	88	1	1	1	1	1	1	1	1	1	
South Carolina.....	10	13	1	1	2	6	6	2	24	10	2	3	39	2	8	105	2	17	105	2	17	5	12	1	6	6	6	6	
South Dakota.....	18	23	2	1	7	10	7	18	3	7	1	3	14	2	9	109	2	9	109	2	17	5	12	1	6	6	6	6	
Tennessee.....	4	21	7	2	14	13	11	3	11	14	2	1	14	2	9	109	2	9	109	2	17	5	12	1	6	6	6	6	
Texas.....	4	21	7	2	14	13	11	3	11	14	2	1	14	2	9	109	2	9	109	2	17	5	12	1	6	6	6	6	
Utah.....	4	8	4	2	6	5	2	1	2	3	1	1	2	2	7	63	7	7	63	2	5	5	2	5	1	1	1	1	
Vermont.....	5	19	8	2	6	5	2	1	2	3	1	1	2	2	7	63	7	7	63	2	5	5	2	5	1	1	1	1	
Virginia.....	33	58	11	4	20	26	7	40	7	8	2	13	220	3	13	220	3	13	220	3	3	3	3	3	3	3	3	3	3
Washington.....	3	20	9	1	4	7	9	5	2	1	1	1	30	3	1	52	1	1	52	3	3	3	3	3	3	3	3	3	3
West Virginia.....	6	9	2	1	4	6	5	2	2	2	2	2	3	3	2	12	1	12	12	3	3	3	3	3	3	3	3	3	3
Wisconsin.....	12	34	4	4	8	11	2	14	7	5	7	7	13	5	7	113	12	12	113	3	3	3	3	3	3	3	3	3	3
Wyoming.....	4	5	1	1	1	4	2	1	2	1	2	2	14	1	2	14	2	2	14	6	6	6	6	6	6	6	6	6	6
Other States ¹	2	5	1	1	1	4	1	1	2	1	2	1	17	1	2	17	2	2	17	6	6	6	6	6	6	6	6	6	6
Total.....	312	805	207	73	222	358	91	381	21	193	256	7	36	228	3,190	38	84	28	1	43	11	60	1	20	1	20	1	20	

¹ Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 9.—All quarries: Injuries, by causes and States, during the year ended December 31, 1942—Continued

State	Underground quarry—Continued						Shaft or slope						At outside works										Grand total							
	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Pulling objects (rocks, timbers, etc.)	Flying objects		Handling materials	Burns	Other causes	Total			
Alabama								17	18	19	20	21	22	2	6	17	4						3	3	3	3	3	1	46	
Arizona															2	2	6	2					2	2	3	3	3	3	1	18
Arkansas																2	6	2					1	4	16	15	4	6	1	34
California																14	28	16	1				22	42	16	40	228	15	47	
Colorado																3	4	2					1	2	2	2	2	2	2	88
Connecticut																3	1	2					2	2	4	2	1	1	1	38
Florida																9	8	5	5				10	18	5	17	87	5	113	
Georgia																9	11	1	2				7	8	3	3	17	5	39	
Idaho																9	11	1	2				1	8	3	3	17	5	177	
Illinois																12	37	11					4	12	7	12	7	12	7	90
Indiana																11	21	21					25	32	3	23	11	12	247	
Iowa																5	4	1					2	2	3	3	1	3	115	
Kansas																2	11	2	1				4	6	10	2	1	7	208	
Kentucky																1	21	21					2	2	3	3	3	3	247	
Louisiana																2	4	1					3	5	6	3	1	5	148	
Maine																1	2	1	1				4	3	5	3	1	7	136	
Maryland																1	0	4					4	9	1	6	2	3	51	
Massachusetts																1	3	2	2				4	9	1	6	2	3	39	
Michigan																3	4	1	1				5	12	3	2	5	2	74	
Minnesota																4	4	3	1				5	2	18	4	1	5	96	
Missouri																4	3	1	1				6	7	1	6	4	4	46	
Montana																11	30	7	2				32	7	2	2	2	2	71	
Nebraska																2	10	7	2				10	6	21	18	18	2	116	
Nevada																11	30	7	2				10	6	21	18	18	2	397	
New Hampshire																1	1	1					1	1	1	1	1	1	4	
New Jersey																2	6	3	1				1	4	5	5	2	3	9	
New York																9	10	8	8				5	5	5	2	3	3	81	
North Carolina																10	12	8	2				11	6	14	9	8	100		
Ohio																11	13	8	2				3	6	7	2	3	4	112	
Oklahoma																11	20	8	2				1	15	11	15	8	37	145	
																3	5	3	1				6	4	25	9	9	4	163	

Oregon.....						4	9	2				3	5	8	1	12	49	83	
Pennsylvania.....				1	34	37	18	2	1	53	22	27	77	16	54	341	833		
Rhode Island.....							2		1	1	4	1	1			2	18	43	
South Carolina.....															2	4		94	
South Dakota.....																	14	40	
Tennessee.....					2	4	3						1		2	25	137	225	
Texas.....					9	31	8	1	2	14	9	11	6	11	10	16	17	49	
Utah.....					5	31	9	4	2	4	2	2	5	4	2	27	100	175	
Vermont.....					2	17	6	1	1	13	11	8	30	2	9	10	143	381	
Virginia.....					18	12	17	1	2	9	12	11	35	10	16	2	60	112	
Washington.....					1	5	3		2	3	3	5	14	2	14	3	20	72	
West Virginia.....					3	5	2		2	3	2	2	3	3	1		76	189	
Wisconsin.....					7	9	3	1	1	4	7	5	20	2	13	70	62	23	
Wyoming.....					1	1	2		1	1	6	11	11	2		6			
Other States ¹					1														
Total.....	2	1	17	46	353	1	118	428	187	24	28	320	222	266	500	226	403	2,802	6,349

¹ Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 10.—All quarries: Accidents by States and severity of injury, during the year ended December 31, 1942

State	Killed	Injured				Grand total
		Perma- nent total ¹	Perma- nent partial ²	Tempo- rary ³	Total non- fatal	
Alabama.....	5		5	138	143	148
Arizona.....			1	33	34	34
Arkansas.....	1		1	87	88	89
California.....	7		9	399	408	415
Colorado.....	1		1	37	38	39
Connecticut.....		1		38	39	39
Florida.....	5		1	176	177	182
Georgia.....		1	4	85	90	90
Idaho.....				9	9	9
Illinois.....	6		7	291	298	304
Indiana.....	4		2	245	247	251
Iowa.....	3		4	64	68	71
Kansas.....		1	1	134	136	136
Kentucky.....	5		3	175	178	183
Maine.....	2	1		69	70	72
Maryland.....	1			74	74	75
Massachusetts.....	1		2	94	96	97
Michigan.....	1	1	3	76	80	81
Minnesota.....	1		2	114	116	117
Missouri.....	4		10	387	397	401
Montana.....	1		1	14	15	16
Nebraska.....	2		2	14	16	18
New Hampshire.....				12	12	12
New Jersey.....			4	70	74	74
New York.....	6		13	201	214	220
North Carolina.....			2	110	112	112
Ohio.....	3	1	8	307	316	319
Oklahoma.....	1		2	102	104	105
Oregon.....				83	83	83
Pennsylvania.....	37	2	15	816	833	870
Rhode Island.....	1			48	48	49
South Carolina.....	5		2	92	94	99
South Dakota.....				46	46	46
Tennessee.....	2	1	4	303	308	310
Texas.....	7		7	218	225	225
Utah.....			1	48	49	49
Vermont.....	3		2	173	175	178
Virginia.....	2		14	367	381	383
Washington.....	1		1	111	112	113
West Virginia.....			3	69	72	72
Wisconsin.....	1	1	1	187	189	190
Wyoming.....				62	62	62
Other States ⁴			2	21	23	23
Total.....	112	10	140	6,199	6,349	6,461

¹ Permanent total disability: Loss of both legs or arms, 1 leg and 1 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 1 foot, leg, hand, or 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.

³ Disability for more than remainder of day of accident.

⁴ Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 11.—All quarries: Accidents, by causes and severity of injury, during the year ended December 31, 1942

State	Killed	Injured			Grand total	
		Perma- nent total ¹	Perma- nent partial ²	Tempo- rary ³		Total non- fatal
OPEN QUARRY						
1. Falls or slides of rock or overburden...	9	2	6	304	312	321
2. Handling materials:						
(a) Handling rock at face.....	1	1	2	609	612	613
(b) Handling other materials.....			1	192	193	193
3. Hand tools.....			5	202	207	207
4. Explosives:						
(a) Transportation.....				3	3	3
(b) Charging.....						
(c) Drilling into old holes.....		2	2	14	18	18
(d) Striking in loose rock.....	1			3	3	4
(e) Thawing.....						
(f) Caps, detonators, etc.....			1	2	3	3
(g) Unguarded shots.....						
(h) Returned too soon.....				1	1	1
(i) Premature Shots.....	4		2	10	12	16
(j) Delayed blast.....				3	3	3
(k) Miscellaneous.....	30		3	27	30	60
5. Haulage:						
(a) Hand and animal.....		1		28	29	29
(b) Mechanical.....	9		1	99	100	109
(c) Railway cars and locomotives.....	2	1	1	91	93	95
6. Falls of persons:						
(a) Falling into quarry from surface benches or face.....	3		1	61	62	65
(b) Falling from hoists, derricks, ladders, etc.....	1		2	72	74	75
(c) Miscellaneous.....	1			222	222	223
7. Falling objects (other than 1 and 2)...	4	1	5	85	91	95
8. Flying objects:						
(a) From sledging.....			12	225	237	237
(b) Others.....			2	142	144	144
9. Electricity:						
(a) Direct contact with trolley wire.....				1	1	1
(b) Bar or tool striking trolley wire.....				1	1	1
(c) Contact with motor.....	1			3	3	4
(d) Others.....	4		1	15	16	20
10. Drilling and channeling (by machine or hand).....		1	6	186	193	193
11. Machinery:						
(a) Hoisting cables and attachments.....	1	1	2	35	38	39
(b) Guys, cranes, derricks, and attachments.....	1		1	30	31	32
(c) Pumps and hoisting engines.....				7	7	7
(d) Power shovels.....	1		5	71	76	77
(e) Other machinery.....	3		3	101	104	107
12. Stepping on nail.....				7	7	7
13. Boiler and air-tank explosions.....						
14. Burns.....	2			36	36	38
15. Other causes.....	3		2	226	228	231
Total, at open quarry.....	81	10	66	3,114	3,190	3,271
UNDERGROUND						
1. Fall of rock from roof or wall.....	1			38	38	39
2. Handling rock while loading at working face or chute.....			2	82	84	84
3. Hand tools.....				28	28	28
4. Explosives.....			1		1	1
5. Haulage.....	1		3	40	43	44
6. Falling down chute, winze, raise, or stope.....				11	11	11
7. Run of rock from chute or pocket.....				1	1	1
8. Drilling.....				60	60	60
9. Electricity.....				1	1	1

¹ Permanent total disability: Loss of both legs or arms, 1 leg and 1 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 1 foot, leg, hand, or 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.

³ Disability for more than remainder of day of accident.

TABLE 11.—All quarries: Accidents, by causes and severity of injury, during the year ended December 31, 1942—Continued

Cause	Killed	Injured			Grand total	
		Perma- nent total ¹	Perma- nent partial ²	Tempo- rary ³		Total non- fatal
UNDERGROUND—Continued						
10. Machinery (other than locomotives or drills).....			1	19	20	20
11. Mine fires.....						
12. Suffocation from natural gases.....				2	2	2
13. Inrush of water.....						
14. Stepping on nail.....				1	1	1
15. Handling materials (other than rock).....				17	17	17
16. Other causes.....	1			46	46	47
Total, at underground quarry.....	3		7	346	353	356
SHAFT OR SLOPE						
17. Falling down shaft or slope.....				1	1	1
18. Objects falling down shaft or slope.....						
19. Breaking of cables.....						
20. Overwinding.....						
21. Cage, skip, or bucket.....				2	2	2
22. Other causes.....				1	1	1
Total, in shaft or slope.....				4	4	4
OUTSIDE WORKS						
1. Haulage:						
(a) Hand and animal.....				49	49	49
(b) Mechanical.....	1	3		72	75	76
(c) Railway cars and locomotives.....	5	6		68	74	79
2. Machinery:						
(a) Hoisting cables and attachments.....			3	37	40	40
(b) Guys, cranes, derricks, and attachments.....	2		6	27	33	35
(c) Pumps and hoisting engines.....				10	10	10
(d) Crushers.....			5	63	68	68
(e) Other machinery.....	6	23		254	277	283
3. Hand tools.....	1		2	18	187	188
4. Stepping on nail.....				24	24	24
5. Electricity:						
(a) Direct contact with trolley wire.....	1					1
(b) Bar or tool striking trolley wire.....				2	2	2
(c) Contact with motor.....				2	2	2
(d) Others.....	1			24	24	25
6. Falls of persons.....	6		4	316	320	326
7. Falling objects (rocks, timbers, etc.).....	2		1	221	222	224
8. Flying objects:						
(a) From sledging.....			1	79	80	80
(b) From crushing.....				23	23	23
(c) Others.....			1	162	163	163
9. Handling materials:						
(a) Handling rock by hand.....			3	223	226	226
(b) Handling other materials.....	2		3	271	274	276
10. Burns.....			2	224	226	226
11. Other causes.....	1		4	399	403	404
Total, at outside works.....	28		67	2,735	2,802	2,830
Grand total.....	112	10	140	6,199	6,349	6,461

TABLE 12.—All quarries: Causes of fatalities and injuries, showing percentage due to each cause and corresponding rates per million man-hours, during the year ended December 31, 1942

Cause of accident	Fatalities				Nonfatal injuries			
	Percent of—		Per million man-hours		Percent of—		Per million man-hours	
	Grand total	Class total	Grand total	Class total	Grand total	Class total	Grand total	Class total
	1	2	3	4	5	6	7	8
Open quarry:								
1. Falls or slides of rock or overburden.....	8.04	11.11	0.050	0.150	4.92	9.78	1.725	5.204
2. Handling materials.....	.89	1.24	.005	.017	12.68	25.21	4.461	13.428
3. Hand tools.....					3.26	6.49	1.145	3.453
4. Explosives.....	31.25	43.21	.194	.584	1.15	2.29	.401	1.218
5. Haulage.....	9.82	13.58	.061	.184	3.50	6.96	1.237	3.703
6. Falls of persons.....	4.46	6.17	.028	.083	5.64	11.22	1.980	5.972
7. Falling objects (other than 1 and 2).....	3.57	4.94	.022	.067	1.43	2.85	.503	1.518
8. Flying objects.....					6.00	11.94	2.107	6.355
9. Electricity.....	4.46	6.17	.028	.083	.33	.66	.116	.350
10. Drilling and channeling (by machine or hand).....					3.04	6.05	1.067	3.219
11. Machinery.....	5.36	7.41	.033	.100	4.03	8.02	1.416	4.270
12. Stepping on nail.....					.11	.22	.039	.117
13. Boiler and air-tank explosions.....								
14. Burns.....	1.79	2.47	.011	.033	.57	1.13	.199	.601
15. Other causes.....	2.68	3.70	.016	.050	3.59	7.15	1.261	3.803
Total.....	72.32	100.00	.448	1.351	50.25	100.00	17.640	53.211
Underground quarry:								
1. Fall of rock from roof or wall.....	.89	33.33	.005	.139	.60	10.64	.210	5.276
2. Handling rock while loading at working face or chute.....					1.32	23.53	.465	11.662
3. Hand tools.....					.44	7.84	.155	3.887
4. Explosives.....					.01	.28	.005	.139
5. Haulage.....	.89	33.33	.005	.139	.68	12.05	.258	5.970
6. Falling down chute, winze, raise, or slope.....					.17	3.08	.061	1.527
7. Run of rock from chute or pocket.....					.01	.28	.005	.139
8. Drilling.....					.95	16.81	.332	8.330
9. Electricity.....					.01	.28	.005	.139
10. Machinery (other than locomotive or drills).....					.32	5.60	.111	2.777
11. Mine fires.....								
12. Suffocation from natural gases.....					.03	.56	.011	.278
13. Inrush of water.....								
14. Stepping on nail.....					.01	.28	.005	.139
15. Handling materials (other than rock).....					.27	4.76	.094	2.360
16. Other causes.....	.89	33.33	.005	.139	.73	12.89	.254	6.387
Total underground (excluding shaft).....	2.68	100.00	.016	.417	5.56	98.88	1.952	49.010
Shaft or slope:								
17. Falling down shaft or slope.....					.01	.28	.005	.139
18. Objects falling down shaft or slope.....								
19. Breaking of cables.....								
20. Overwinding.....								
21. Cage, skip, or bucket.....					.03	.56	.011	.278
22. Other causes.....					.01	.28	.005	.139
Total shaft.....					.06	1.12	.022	.555
At outside works:								
1. Haulage.....	5.36	21.43	.033	.053	3.12	7.07	1.095	1.741
2. Machinery.....	7.14	28.57	.044	.070	6.74	15.28	2.367	3.765
3. Hand tools.....	.89	3.57	.005	.009	2.94	6.67	1.034	1.645
4. Stepping on nail.....					.38	.86	.133	.211
5. Electricity.....	1.79	7.14	.011	.018	.44	1.00	.155	.246
6. Falls of persons.....	5.36	21.43	.033	.052	5.04	11.42	1.769	2.815
7. Falling objects (rocks, timbers, etc.).....	1.79	7.14	.011	.018	3.50	7.92	1.228	1.953
8. Flying objects.....					4.19	9.49	1.471	2.340
9. Handling materials.....	1.79	7.14	.011	.018	7.87	17.84	2.765	4.398
10. Burns.....					3.56	8.07	1.250	1.988
11. Other causes.....	.89	3.57	.005	.008	6.35	14.38	2.228	3.545
Total.....	25.00	100.00	.155	.246	44.13	100.00	15.495	24.647
Grand total.....	100.00		.619		100.00		35.109	

ACCIDENTS AT DIFFERENT KINDS OF QUARRIES

Cement rock.—Employment in the cement industry in 1942 increased compared with 1941. The 30,235 men employed represented a gain of nearly 5 percent and the 71 million man-hours worked showed an even greater increase—10 percent. The average number of days of employment per man in 1942 was 314, which was 12 days more per employee than in 1941.

This increase in employment was accompanied by an increased accident-frequency rate. Unfortunately the cement industry experienced a major disaster during 1942 in which 28 men lost their lives in an explosion of dynamite in a Pennsylvania quarry. As a result, the fatality rate for the industry was 0.65 per million man-hours compared with a rate of 0.22 in 1941. Forty-six men were killed in 1942, including those lost in the major disaster. In all, 787 men were nonfatally injured by accidents, the resulting injury rate being 11.07 per million man-hours.

Granite.—The number of men employed at granite quarries and related plants in the United States reached a lower point in 1942 than was ever previously recorded since information was first collected in 1911. Only 6,307 men were employed. The men worked 12,526,881 man-hours and averaged 237 days per man. The drop in employment was caused by a decrease in the number of active plants, as the average employee worked 3 more days in 1942 than in 1941.

Fourteen men were killed, and 531 were injured by accidents. The number of fatalities rose sharply over the 8 fatal accidents in 1941. Thirteen of the fatal accidents in 1942 occurred in open quarries, and the chief causes of these fatalities were falls or slides of rock or overburden, machinery, and explosives. The fatality rate for 1942 was 1.12 per million man-hours of employment. The chief causes of nonfatal injuries in the open quarries were handling materials, drilling, and falls of persons. Outside the quarries the principal causes of accidents were flying objects and handling materials. The nonfatal-injury rate in 1942 was 42.39, a decrease from the rate of 49.40 in 1941.

Limestone.—Man-hours of employment in quarries and related plants producing limestone for various uses (except cement and lime) increased 10 percent in 1942 when compared with 1941. The number of employees increased slightly. Man-hours of work increased because the plants were in operation for a larger number of days in 1942, the average employee having 13 more days of work in 1942 than he had in 1941. Pennsylvania, Illinois, and Indiana, in the order named, had the largest number of employees in the limestone industry. Employment, expressed in man-hours, reached a total of nearly 52 million man-hours.

Thirty men were killed by accidents in 1942, the same number as in 1941. Haulage was the chief single cause of fatal accidents inside the quarries (both open and underground), accounting for 7 of the 22 fatalities in the quarries proper. This cause was followed in numerical importance by falls or slides of rock or overburden and falling objects. At works outside the quarries, machinery caused 4 of the 8 deaths reported in 1942. A total of 2,530 nonfatal injuries was shown by the reports for 1942; of this num-

ber 1,580 occurred at open quarries, 151 in underground quarries (including shaft and slope), and 799 at the crushers, rock-dressing plants, and on miscellaneous work. At the open quarries, handling materials, followed by flying objects, were the two chief causes of injuries. In underground quarries the chief causes were drilling and handling rock while loading at working face or chute. Machinery and handling materials were the main causes of non-fatal accidents at the outside works. These accidents at limestone operations in 1942 resulted in a fatality rate of 0.58 and a non-fatal-injury rate of 48.98 per million man-hours of employment.

Limestone (chief product, lime).—Employment at quarries producing limestone for the manufacture of lime (figures include the operation of the kilns), when expressed in terms of man-hours of employment, showed a 1-percent increase in 1942 over 1941. The number of men employed, however, dropped nearly 6 percent. As the quarries and kilns operated 10 days more per man in 1942 than in 1941, the number of man-hours increased despite the decrease of 600 in the number of men employed. The 10,656 employees worked a total of 25,634,542 man-hours in 1942. The average employee worked 306 days or 2,406 hours in 1942.

Both fatal and nonfatal accidents decreased in number in 1942 when compared with 1941. Twelve men were killed and 1,342 were injured compared with 17 and 1,551, respectively, in 1941. These accidents resulted in a fatality rate of 0.47 and a nonfatal-injury rate of 52.35. No one cause was outstanding as the chief cause of the fatal accidents. In the open quarries, handling materials was the chief cause of nonfatal injuries. At the outside works, which include the kilns, burns were the principal cause of nonfatal injuries.

Marble.—Employment at marble quarries and related plants continued to decrease in 1942, both as to the number of employees and the number of man-hours worked. The number of men employed declined 18 percent, or from 2,693 in 1941 to 2,205 in 1942. The men worked a total of 4,435,623 man-hours and averaged 247 days per employee, which was 7 days more than in 1941. Fortunately, the decline in employment was accompanied by a 16-percent decrease in the accident-frequency rate (including both fatal and nonfatal injuries). Two men were killed, and 171 men suffered nonfatal lost-time injuries. These accidents resulted in a fatality rate of 0.45 and a nonfatal-injury rate of 38.55. In 1941 no fatal accident occurred and the nonfatal-accident rate was 46.33 per million man-hours of exposure to occupational risk.

Sandstone.—The number of men employed and the number of man-hours of exposure to occupational hazards at sandstone quarries and related plants in 1942 decreased when compared with the previous year's totals. The 2,840 employees worked an average of 232 days per man; this, expressed in man-hours of work done, was 5,378,769—a decrease of nearly 8 percent from 1941. Of the 2,840 men employed, 1,946 worked at plants producing non-dimension stone and 849 at plants producing dimension stone; the others worked at plants that did not report how their product was prepared. Pennsylvania and Ohio employed the largest number of men. Accidents at the quarries and related plants resulted in the death of 1 employee and in nonfatal lost-time injuries to 320.

The fatality rate was 0.19 and the injury rate 59.49. Corresponding rates for 1941 were 0.34 and 59.76, respectively.

Slate.—The volume of employment in the slate industry decreased considerably when compared with 1941. Both the number of men employed and the number of man-hours of employment decreased approximately 20 percent. A total of 2,284 men was employed in the quarries and related plants, working a total of 4,487,024 man-hours. The slate industry was the only branch of the entire quarrying industry which operated fewer days in 1942 than in 1941. The plants operated 231 days per man, whereas 244 days per man were shown by reports for 1941. Unfortunately, the frequency of accidents did not decrease along with the decrease in employment. The actual number of accidents showed only a very small increase, but the large decline in man-hours of work resulted in a rate of 74.89 per million man-hours compared with 57.39 in 1941. Two men were killed and 334 injured in 1942. Pennsylvania employed nearly half of the men working in the slate industry in 1942.

Trap rock.—Employment in the trap-rock quarrying industry increased in 1942, although the increase was small. The number of men increased from 3,029 to 3,114, or 3 percent; the man-hours increased from 5.3 million to 5.6 million, or 6 percent. New Jersey employed more men than any other State. The average employee worked 212 days, or 1,805 hours. Five men were killed, all inside the quarries; three of the deaths were caused by explosives, and one each by haulage and machinery. Accidents caused nonfatal lost-time injuries to 334 men. The accidents resulted in a fatality rate of 0.89 and a nonfatal-injury rate of 59.43. The fatality rate rose slightly over the figure of 0.76 in 1941, but the injury rate was a substantial reduction from the rate of 68.31 in 1941. The chief causes of nonfatal accidents in the quarries were handling materials, falls of persons, and machinery. At the outside plants operated in connection with the quarries, handling materials was the largest single cause of accidents.

TABLE 13.—All quarries. Men employed, man-days, man-hours of employment, and number killed and injured, by kind of quarry, during the year ended December 31, 1942

Kind of quarry	Num-ber of quar-ries ¹	Men employed			Man-days of employment			Average hours of em-ployment per man per day			Man-hours of employment		
		At quarry works		Total	At quarry works		Total	At quarry works		Total	At quarry works		Total
		At quarry works	At outside works	Total	At quarry works	At outside works	Total	At quarry works	At outside works	Total	At quarry works	At outside works	Total
Cement rock ²	178	4,173	26,062	30,235	1,158,355	8,333,083	9,491,418	7.72	7.46	7.49	8,943,375	62,158,099	71,101,474
Granite.....	235	3,670	2,637	6,307	849,785	648,046	1,497,831	8.33	8.41	8.36	7,079,803	5,447,078	12,526,881
Limestone.....	1,119	16,891	9,738	26,629	3,854,763	2,311,125	6,165,888	8.34	8.44	8.38	32,156,691	19,494,778	51,651,468
Limestone (chief product, lime).....	221	4,081	6,575	10,656	1,213,647	2,047,451	3,261,098	7.89	7.84	7.86	9,576,218	16,058,324	25,634,542
Marble.....	44	603	1,572	2,205	127,935	415,927	543,862	8.37	8.09	8.16	1,070,773	3,364,850	4,435,623
Sandstone.....	151	1,905	2,840	4,745	436,667	223,612	660,279	8.07	8.30	8.15	3,522,899	1,855,870	5,378,769
Slate.....	71	888	1,936	2,824	193,788	334,560	528,348	8.36	8.57	8.49	1,620,168	2,866,856	4,487,024
Trap rock.....	140	1,807	1,307	3,114	374,891	283,971	658,862	8.49	8.58	8.53	3,182,443	2,437,309	5,619,752
Total.....	2,159	34,048	50,222	84,270	8,209,811	14,597,775	22,807,586	8.18	7.79	7.93	67,152,370	113,683,163	180,835,533

Kind of quarry	Average days of em-ployment per man			Average hours per man per year			Number killed			Number injured			Rates per million man-hours					
	At quarry works		Total	At quarry works		Total	At quarry works		Total	At quarry works		Total	At quarry works		Total			
	At quarry works	At outside works	Total	At quarry works	At outside works	Total	At quarry works	At outside works	Total	At quarry works	At outside works	Total	At quarry works	At outside works	Total			
Cement rock ²	278	320	314	2,143	2,285	2,352	32	14	46	159	623	787	3.58	0.23	0.65	17.78	10.10	11.07
Granite.....	232	246	237	1,929	2,066	1,986	13	1	14	365	166	531	1.84	.18	1.12	51.56	30.48	42.39
Limestone.....	228	311	237	1,904	2,002	1,940	22	8	30	1,731	799	2,530	1.68	.41	.58	53.83	40.99	48.98
Limestone (chief product, lime).....	297	311	306	2,347	2,442	2,406	8	4	12	662	680	1,342	.84	.25	.47	69.13	42.35	52.35
Marble.....	202	265	247	1,692	2,140	2,012	1	1	2	49	122	171	.93	.30	.45	45.76	36.26	38.55
Sandstone.....	229	239	232	1,849	1,985	1,894	1	1	2	225	95	320	.28	.19	.23	63.87	51.19	59.49
Slate.....	218	240	231	1,825	2,054	1,965	2	.....	2	116	218	334	1.23	.....	1.45	71.60	76.04	74.44
Trap rock.....	207	217	212	1,761	1,865	1,805	5	.....	5	240	94	334	1.57	.....	.89	75.41	38.57	59.43
Total.....	241	291	271	1,972	2,264	2,146	84	28	112	3,547	2,802	6,349	1.25	.25	.62	52.82	24.65	35.11

¹ Includes a small number of mills or other plants not operated in connection with quarries.

² Includes limestone or other stone used in the manufacture of cement.

TABLE 14.—All quarries: Fatalities and injuries, by causes and kind of quarry, during the year ended December 31, 1942

Kind of quarry	Open quarry													Underground quarry													
	Falls or slides of rock or overburden	Handling materials	Hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channel- ing (by machine or hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Total	Fall of rock from roof or wall	Handling rock while loading at working face or chute	Hand tools	Explosives	Haulage	Falling down chute, slope, raise, or chute or pocket	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)	
Killed:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9	10		
Cement rock ¹				29	1	1		1			3					32											
Granite.....	3	1		2	1	2	3		1							13				1							
Limestone.....	3			1	6	1			2		1					21											
Limestone (chief product, lime)	1															7											
Marble.....																											
Sandstone.....																1											
Slate.....	1						1				1					2											
Trap rock.....				3	1											5											
Total.....	9	1	35	11	5	5	4	5	5	6	6	6	2	3	81	1	1	1	1	1	1	1	1	1	1	1	1
Injured:	33	25	3	5	17	15	3	9	2	16	11					141	5	2	3	3	3	5	5	1			
Cement rock ¹	30	24	13	37	22	40	9	36	1	47	31					41	1	7	13	13	3	1	1	1			
Granite.....	138	373	91	119	174	174	53	221	13	67	146	5				117	27	7	7	7	3	1	28	1			
Limestone.....	60	182	29	6	44	49	11	64	1	21	20	1				4	46	13	1	26	7	14	14	10			
Limestone (chief product, lime)	1	12														2	2	5				2	2	1			
Marble.....	20	67	2	3	8	28	5	23	3	9	8					13	4	2	1	1	1	8	8	2			
Sandstone.....	18	30	9	1	21	1	1	6	3	3	1					5	7	1	1	1	1	2	2	1			
Slate.....	22	48	25	7	11	29	8	17	4	24	27	1				14	3	5	5	5	5	2	2	2			
Trap rock.....																5	7	1	1	1	1	1	1	1			
Total.....	312	805	207	73	222	358	91	381	21	193	256	7				228	36	28	43	43	11	1	60	1		20	

¹ Includes limestone or other stone used in the manufacture of cement.

TABLE 14.—All quarries: Fatalities and injuries, by causes and kind of quarry, during the year ended December 31, 1942—Continued

Kind of quarry	Underground quarry—Continued							Shaft or slope							At outside works										Total	Grand total	
	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns			Other causes
Killed:	11	12	13	14	15	16		17	18	19	20	21	22		1	2	3	4	5	6	7	8	9	10	11		
Cement rock ¹															4	2			1	5	1		1				14
Granite.....																											1
Limestone.....					1										1	4	1		1	1							8
Limestone (chief product, lime).....															1	2											4
Marble.....						1																			1		1
Sandstone.....																											2
Slate.....																											1
Trap rock.....																											2
Total.....						1		3						6	8	1			2	6	2		2			1	28
Injured:															35	91	31		9	103	57	61	86	49	176		628
Cement rock ¹					1	1	18								6	22	11	5	1	15	12	45	31	2	16		166
Granite.....							3								2	14	7	6	9	75	56	83	132	34	116		799
Limestone.....	2			1	13	30	148							3	62	149	77	6	4	71	49	31	103	138	94	68	2,530
Limestone (chief product, lime).....					2	13	144	1						1	56	94	36	4	4	51	31	6	39	54	122	1,342	
Marble.....							10								9	26	5	2	2	10	12	6	39	54	122	171	
Sandstone.....							10								5	16	7	1	2	6	13	10	12	11	23	320	
Slate.....							20								14	20	13	5	1	27	19	21	72	1	25	218	
Trap rock.....							2								14	10	7	1	1	13	4	9	25	2	9	94	
Total.....	2			1	17	46	353	1					2	1	198	428	187	24	28	320	222	266	500	226	403	2,802	6,389

¹ Includes limestone or other stone used in the manufacture of cement.

36 QUARRY ACCIDENTS IN THE UNITED STATES, 1942

TABLE 16.—Cement-rock, marble, slate, and trap-rock quarries: Men employed and man-days, by States, during the year ended December 31, 1942

State	Number of quarries ¹	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Cement rock: ²										
Alabama.....	11	253	1,041	1,294	75,491	343,333	418,824	298	330	324
California.....	13	352	2,330	2,682	111,898	789,523	901,421	318	339	336
Illinois.....	5	106	1,006	1,112	31,610	349,172	380,782	298	347	342
Indiana.....	4	89	1,382	1,471	24,181	448,361	472,542	272	324	321
Iowa.....	5	132	1,056	1,188	31,334	290,794	322,128	237	275	271
Kansas.....	8	197	983	1,180	56,396	307,092	363,488	286	312	308
Michigan.....	11	89	1,820	1,909	20,762	561,853	582,615	233	309	305
Missouri.....	6	253	1,144	1,397	65,634	346,055	411,689	259	302	295
New York.....	14	299	1,729	2,028	72,921	527,794	600,715	244	305	296
Ohio.....	11	264	1,428	1,692	71,131	477,865	548,996	269	335	324
Pennsylvania.....	28	783	4,905	5,694	224,714	1,616,104	1,840,818	285	329	323
Tennessee.....	7	197	788	985	58,608	261,617	320,225	298	332	325
Texas.....	11	132	1,437	1,569	40,499	435,799	536,238	307	345	342
Virginia.....	3	105	339	444	29,776	119,032	148,768	283	351	335
Washington.....	6	100	519	619	23,785	145,462	178,247	238	298	288
West Virginia.....	3	214	437	651	64,396	143,192	207,588	301	328	319
Other States ³	32	602	3,718	4,320	155,239	1,101,035	1,256,274	258	296	291
Total.....	178	4,173	26,062	30,235	1,158,335	8,333,083	9,491,418	278	320	314
Marble:										
Missouri.....	4	101	24	125	21,822	4,583	26,405	216	191	211
Tennessee.....	13	237	302	539	40,537	60,981	101,518	171	202	188
Other States ⁴	27	295	1,246	1,541	65,576	350,363	415,939	222	281	270
Total.....	44	633	1,572	2,205	127,935	415,927	543,862	202	265	247
Slate:										
New York.....	10	58	42	100	12,324	10,589	22,913	212	252	229
Pennsylvania.....	24	414	695	1,109	92,955	174,063	267,018	225	250	241
Vermont.....	22	197	156	353	37,838	37,695	75,533	192	242	214
Virginia.....	6	68	196	264	12,838	37,501	50,359	189	191	191
Other States ⁵	9	151	307	458	37,813	74,712	112,525	250	243	246
Total.....	71	888	1,396	2,284	193,788	334,560	528,348	218	240	231
Trap rock:										
California.....	16	135	160	295	35,033	45,151	80,184	260	282	272
Connecticut.....	15	150	73	223	43,643	19,224	62,867	291	263	282
Maryland.....	6	93	42	135	20,142	9,785	29,927	217	233	222
Massachusetts.....	14	234	123	357	47,762	25,327	73,089	204	206	205
New Jersey.....	25	422	217	639	86,971	47,940	134,911	206	221	211
New York.....	3	69	97	166	16,495	20,358	36,853	239	210	222
Oregon.....	18	126	118	244	13,294	14,105	27,399	106	120	112
Pennsylvania.....	16	150	140	290	34,007	34,327	69,234	233	245	239
Virginia.....	3	51	18	69	12,972	4,352	17,324	254	242	251
Washington.....	9	72	65	137	13,920	9,221	23,141	193	142	169
Other States ⁶	15	305	254	559	49,752	54,181	103,933	163	213	186
Total.....	140	1,807	1,307	3,114	374,891	283,971	658,862	207	217	212

¹ Includes a small number of mills or other plants not operated in connection with quarries.

² Includes limestone or other stone used in the manufacture of cement.

³ Includes Arkansas, Colorado, Florida, Georgia, Idaho, Kentucky, Louisiana, Maine, Maryland, Minnesota, Montana, Nebraska, New Jersey, Oklahoma, Oregon, South Dakota, Utah, Wisconsin, and Wyoming.

⁴ Includes Alabama, Arkansas, California, Colorado, Georgia, Maryland, Massachusetts, New York, North Carolina, Pennsylvania, Texas, Utah, Vermont, Virginia, and Washington.

⁵ Includes Arkansas, California, Colorado, Georgia, Maine, and Maryland.

⁶ Includes Arizona, Idaho, Maine, Michigan, Minnesota, New Hampshire, North Carolina, Rhode Island, Texas, and Wisconsin.

TABLE 17.—Cement-rock, marble, slate, and trap-rock quarries: Man-hours and number killed and injured, by States, during the year ended December 31, 1942

State	Man-hours of employment			Number killed			Number injured			Widows	Orphans
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total		
Cement rock: ¹											
Alabama	592,313	2,574,840	3,167,153	1	1	2	10	11	21		
California	905,317	6,342,757	7,248,074	1	1	2	22	145	167		2
Illinois	205,771	2,179,005	2,384,776					4	4		
Indiana	188,867	3,245,601	3,434,468		1	1		12	13	1	2
Iowa	245,631	2,202,907	2,448,538					2	11	13	
Kansas	451,301	2,309,595	2,760,896					9	8		
Michigan	160,444	4,486,461	4,646,905					2	25	27	
Missouri	487,950	2,499,102	2,987,052		2	2		2	17	19	1
New York	568,270	3,765,981	4,334,251		1	1		9	35	44	
Ohio	553,790	3,767,121	4,320,911					1	16	17	
Pennsylvania	1,750,069	11,795,121	13,545,190	29	4	33	25	57	82	23	41
Tennessee	471,787	1,935,204	2,406,991		2	2		7	25	32	3
Texas	300,116	3,690,876	3,990,992					1	57	58	
Virginia	229,462	777,757	1,007,219					5	7	12	
Washington	185,161	1,162,207	1,347,368		1	1	14	29	43	1	
West Virginia	415,526	916,273	1,331,799					7	4	11	
Other States ²	1,231,600	8,507,591	9,739,191	1	3	4	42	165	207	3	2
Total	8,943,375	62,158,099	71,101,474	32	14	46	159	628	787	33	51
Marble:											
Missouri	212,332	38,914	251,246				18	3	21		
Tennessee	329,860	491,494	821,354				5	21	26		
Other States ³	528,581	2,834,442	3,363,023	1	1	2	26	98	124		
Total	1,070,773	3,364,850	4,435,623	1	1	2	49	122	171		
Slate:											
New York	98,591	84,713	183,304				11	3	14		
Pennsylvania	788,706	1,451,928	2,240,634	2	2	4	62	126	188	1	
Vermont	314,748	405,077	719,825				17	29	46		
Virginia	104,664	299,746	404,410				6	16	22		
Other States ⁴	313,459	625,392	938,851				20	44	64		
Total	1,620,168	2,866,856	4,487,024	2	2	4	116	218	334	1	
Trap rock:											
California	281,934	364,458	646,392	4	4	8	49	25	74		
Connecticut	360,431	162,951	523,382				17	5	22		
Maryland	187,606	88,399	269,005	1	1	2	12	2	14		
Massachusetts	404,992	212,916	617,908				23	6	29		
New Jersey	741,805	414,850	1,156,655				39	14	53		
New York	132,046	163,044	295,090				5	2	7		
Oregon	113,884	121,438	235,322				12	16	28		
Pennsylvania	326,875	337,896	664,771				19	5	24		
Virginia	116,730	39,156	155,886				9	2	11		
Washington	111,282	75,671	186,953				7	1	8		
Other States ⁵	411,858	456,530	868,388				48	16	64		
Total	3,182,443	2,437,309	5,619,752	5	5	10	240	94	334		

¹ Includes limestone or other stone used in the manufacture of cement.

² Includes Arkansas, Colorado, Florida, Georgia, Idaho, Kentucky, Louisiana, Maine, Maryland, Minnesota, Montana, Nebraska, New Jersey, Oklahoma, Oregon, South Dakota, Utah, Wisconsin, and Wyoming.

³ Includes Alabama, Arkansas, California, Colorado, Georgia, Maryland, Massachusetts, New York, North Carolina, Pennsylvania, Texas, Utah, Vermont, Virginia, and Washington.

⁴ Includes Arkansas, California, Colorado, Georgia, Maine, and Maryland.

⁵ Includes Arizona, Idaho, Maine, Michigan, Minnesota, New Hampshire, North Carolina, Rhode Island, Texas, and Wisconsin.

38 QUARRY ACCIDENTS IN THE UNITED STATES, 1942

TABLE 18.—Granite quarries: Men employed and man-days, by States, during the year ended December 31, 1942

State	Number of quarries ¹	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
California.....	38	614	153	767	128,506	39,231	167,737	209	256	219
Georgia.....	18	544	325	869	143,243	85,206	228,449	263	262	263
Maine.....	8	128	37	165	16,813	5,579	22,392	131	151	136
Maryland.....	8	88	11	99	22,394	1,534	23,928	254	139	242
Massachusetts.....	13	98	239	337	18,574	59,618	78,192	190	249	232
Minnesota.....	21	134	435	569	30,315	109,656	139,971	226	252	246
New Hampshire.....	6	45	67	112	3,815	11,582	15,397	85	173	137
New York.....	4	40	40	80	7,658	6,805	14,463	191	170	181
North Carolina.....	18	559	421	980	133,527	100,313	233,840	239	238	239
Oklahoma.....	9	100	96	196	22,426	26,374	48,800	224	275	249
Pennsylvania.....	16	114	41	155	22,205	8,522	30,727	195	208	198
Rhode Island.....	5	51	89	140	14,803	17,516	32,319	290	197	231
South Carolina.....	7	259	164	423	72,638	46,897	119,535	280	286	283
South Dakota.....	6	75	38	113	18,726	10,570	29,296	250	278	259
Texas.....	6	39	36	75	8,618	9,518	18,136	221	264	242
Vermont.....	5	378	49	427	93,510	11,694	105,204	247	239	246
Virginia.....	9	203	120	323	53,322	32,054	85,376	263	267	264
Wisconsin.....	11	102	161	263	22,486	36,095	58,581	220	224	223
Other States ²	27	99	115	214	16,206	29,282	45,488	164	255	213
Total.....	235	3,670	2,637	6,307	849,785	648,046	1,497,831	232	246	237

¹ Includes a small number of mills or other plants not operated in connection with quarries.

² Includes Colorado, Connecticut, Delaware, Kansas, Missouri, Montana, New Jersey, and Washington.

TABLE 19.—Granite quarries: Man-hours and number killed and injured, by States, during the year ended December 31, 1942

State	Man-hours of employment			Number killed			Number injured			Wid-ows	Or-phans
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total		
California.....	923,066	273,616	1,196,682	2		2	55	21	76	2	1
Georgia.....	1,269,400	753,331	2,022,731				16	4	20		
Maine.....	134,508	44,630	179,138	1		1	1		1		
Maryland.....	186,783	13,236	200,019				17		17		
Massachusetts.....	147,921	476,945	624,866				6	11	17		
Minnesota.....	242,628	877,250	1,119,878	1		1	4	42	46	1	1
New Hampshire.....	29,968	92,414	122,382				3	6	9		
New York.....	61,264	54,390	115,654	1		1	4		4	1	2
North Carolina.....	1,158,164	866,497	2,024,661				40	25	65		
Oklahoma.....	165,873	214,842	380,715				6	6	12		
Pennsylvania.....	191,350	71,084	262,434				25	4	29		
Rhode Island.....	118,208	140,125	258,333		1	1	7	10	17	1	
South Carolina.....	650,658	430,965	1,081,623	5		5	71	2	73	2	1
South Dakota.....	146,118	84,973	231,091				7		7		
Texas.....	74,436	82,870	157,306				8		8		
Vermont.....	747,774	93,555	841,329	2		2	29		29	2	5
Virginia.....	520,981	336,904	857,885	1		1	33	3	36		
Wisconsin.....	178,470	288,763	467,233				19	18	37		
Other States ¹	132,233	250,688	382,921				14	14	28		
Total.....	7,079,803	5,447,078	12,526,881	13	1	14	365	166	531	10	10

¹ Includes Colorado, Connecticut, Delaware, Kansas, Missouri, Montana, New Jersey, and Washington.

TABLE 20.—Limestone quarries: Men employed and man-days, by States, during the year ended December 31, 1942

State	Number of quarries ¹	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Alabama	9	420	183	603	116,418	49,178	165,596	277	269	275
Arkansas	9	48	21	69	7,514	3,501	11,015	157	167	160
California	13	78	47	125	18,535	12,827	31,362	238	273	251
Colorado	8	110	23	133	23,803	5,060	28,863	216	220	217
Florida	31	724	541	1,265	210,515	150,781	361,296	291	279	286
Georgia	3	46	42	88	14,036	12,542	26,578	305	299	302
Illinois	104	1,974	953	2,927	441,692	224,834	666,526	224	236	228
Indiana	93	1,105	1,124	2,229	206,130	240,704	446,834	187	214	200
Iowa	76	510	185	695	109,044	39,202	148,246	214	212	213
Kansas	37	558	260	818	91,775	45,535	137,310	164	175	168
Kentucky	66	1,013	468	1,481	223,489	103,872	327,361	221	222	221
Maryland	3	73	126	199	16,544	36,880	53,424	227	293	268
Massachusetts	3	27	34	61	7,747	10,051	17,798	287	296	292
Michigan	14	935	624	1,559	249,961	173,313	423,274	267	278	272
Minnesota	13	116	118	234	21,189	33,016	44,205	183	195	189
Missouri	96	1,597	427	2,024	306,237	101,971	408,208	192	239	202
Nebraska	7	87	27	114	25,795	7,686	33,481	296	285	294
New York	52	1,031	659	1,690	227,055	118,588	345,643	220	180	205
North Carolina	4	84	72	156	20,982	19,904	40,886	250	276	262
Ohio	106	1,087	770	1,857	253,336	179,547	432,883	233	233	233
Oklahoma	12	265	83	348	69,102	22,867	91,969	261	276	264
Pennsylvania	133	2,061	1,506	3,567	524,801	403,626	928,427	255	268	260
Tennessee	41	448	225	673	103,393	51,806	155,199	231	250	231
Texas	11	299	183	482	92,295	53,939	146,234	309	295	303
Utah	7	54	13	67	10,649	2,929	13,578	197	225	203
Virginia	41	802	462	1,264	197,021	102,197	299,218	246	221	237
Washington	7	59	11	70	12,867	2,414	15,281	218	219	218
West Virginia	16	407	176	583	95,976	44,193	140,169	236	251	240
Wisconsin	66	456	237	693	69,057	34,170	103,227	151	144	149
Wyoming	6	93	20	113	16,622	4,885	21,507	179	244	190
Other States ²	27	324	118	442	71,183	29,097	100,280	220	247	227
Total	1,119	16,891	9,738	26,629	3,854,763	2,311,125	6,165,888	228	237	232

¹ Includes a small number of mills or other plants not operated in connection with quarries.
² Includes Arizona, Connecticut, Idaho, Louisiana, Maine, Mississippi, Montana, New Mexico, New Jersey, Oregon, South Carolina, South Dakota, and Vermont.

TABLE 21.—Limestone quarries: Man-hours and number killed and injured, by States, during the year ended December 31, 1942

State	Man-hours of employment			Number killed			Number injured			Wid-ows	Or-phans
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total		
Alabama	936,848	408,435	1,345,283	2	.....	2	22	6	28	.....	.....
Arkansas	60,122	28,007	88,129	.....	.....	.....	7	2	9	.....	.....
California	147,234	102,089	249,323	.....	.....	.....	21	6	27	.....	.....
Colorado	192,242	40,482	232,724	1	.....	1	24	.....	24	1	3
Florida	2,033,700	1,401,314	3,435,014	4	1	5	81	76	157	2	2
Georgia	119,231	106,835	226,066	.....	.....	.....	9	4	13	.....	.....
Illinois	3,150,542	1,823,174	4,973,716	3	3	6	168	84	252	3	3
Indiana	1,788,067	1,982,513	3,770,580	3	.....	3	98	135	233	2	1
Iowa	983,168	355,877	1,339,045	3	.....	3	48	7	55	.....	.....
Kansas	812,751	421,285	1,234,036	.....	.....	.....	67	17	84	.....	.....
Kentucky	1,993,421	937,935	2,931,356	3	1	4	141	37	178	2	8
Maryland	144,974	311,628	456,602	.....	.....	.....	8	.....	8	.....	.....
Massachusetts	61,954	80,406	142,360	.....	.....	.....	7	7	14	.....	.....
Michigan	2,186,300	1,418,797	3,605,097	.....	.....	.....	40	7	47	.....	.....
Minnesota	203,290	212,456	415,746	.....	.....	.....	31	11	42	.....	.....
Missouri	2,471,933	842,418	3,314,351	.....	.....	.....	150	40	190	.....	.....
Nebraska	212,819	103,100	315,919	.....	.....	.....	10	1	11	.....	.....
New York	1,925,043	1,001,916	2,926,959	1	1	2	76	42	118	2	3
North Carolina	172,774	166,858	339,632	.....	.....	.....	26	7	33	.....	.....
Ohio	2,091,327	1,501,030	3,592,357	1	1	2	76	30	106	1	1
Oklahoma	549,281	183,129	732,410	.....	.....	.....	19	8	27	.....	.....
Pennsylvania	4,286,934	3,309,162	7,596,096	.....	.....	.....	175	67	242	.....	.....
Tennessee	909,056	442,778	1,351,834	.....	.....	.....	74	44	118	.....	.....
Texas	758,862	463,169	1,222,031	.....	.....	.....	91	42	133	.....	.....
Utah	84,594	23,132	107,726	.....	.....	.....	6	1	7	.....	.....
Virginia	1,686,494	867,283	2,553,777	1	.....	1	108	66	174	.....	.....
Washington	105,888	16,897	122,785	.....	.....	.....	16	3	19	.....	.....
West Virginia	782,535	362,932	1,145,467	.....	.....	.....	18	8	26	.....	.....
Wisconsin	596,437	308,645	905,082	.....	1	1	51	23	74	.....	.....
Wyoming	138,899	40,359	179,258	.....	.....	.....	18	8	26	.....	.....
Other States ¹	569,971	230,736	800,707	.....	.....	.....	45	10	55	.....	.....
Total	32,156,691	19,494,777	51,651,468	22	8	30	1,731	799	2,530	13	21

¹ Includes Arizona, Connecticut, Idaho, Louisiana, Maine, Mississippi, Montana, New Mexico, New Jersey, Oregon, South Carolina, South Dakota, and Vermont.

TABLE 22.—Limestone (chief product, lime) quarries: Men employed and man-days, by States, during the year ended December 31, 1942

State	Number of quarries ¹	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At out-side works	Total	At quarry	At out-side works	Total	At quarry	At out-side works	Total
Alabama	7	237	284	521	78,875	94,607	173,482	333	333	333
Arizona	3	34	64	98	11,455	22,260	33,715	337	348	344
Arkansas	3	68	75	143	23,614	27,192	50,806	347	363	355
California	7	85	119	204	25,860	40,455	66,315	304	340	325
Florida	3	30	60	90	8,284	16,465	24,749	276	274	275
Illinois	8	96	142	238	24,740	43,535	68,275	258	307	287
Maryland	7	74	52	126	15,654	13,262	28,916	212	255	229
Massachusetts	6	59	179	238	15,881	54,537	70,418	269	305	296
Michigan	4	18	50	68	5,426	15,580	21,006	301	312	309
Missouri	10	433	694	1,127	130,429	207,235	337,664	301	299	300
New York	6	13	63	76	2,475	20,645	23,120	190	328	304
Ohio	19	847	1,334	2,181	266,596	431,476	698,072	315	323	320
Pennsylvania	44	713	1,328	2,041	208,937	388,338	597,275	293	292	293
Tennessee	12	243	401	644	66,324	125,685	192,009	273	313	298
Texas	6	63	140	203	15,358	47,745	63,103	244	341	311
Vermont	4	38	109	147	11,243	32,540	43,783	296	290	298
Virginia	23	401	542	943	113,164	169,644	282,838	282	313	300
Washington	3	101	93	194	30,230	28,692	58,922	299	309	304
West Virginia	5	171	333	504	54,911	111,141	166,052	321	334	329
Wisconsin	10	75	107	182	21,985	31,719	53,704	293	296	295
Other States ²	31	282	406	688	82,176	124,698	206,874	291	307	301
Total	221	4,081	6,575	10,656	1,213,647	2,047,451	3,261,098	297	311	306

¹ Includes a small number of kilns or other plants not operated in connection with quarries.

² Includes Colorado, Connecticut, Georgia, Indiana, Maine, Minnesota, Montana, Nevada, New Jersey, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, and Utah.

TABLE 23.—Limestone (chief product, lime) quarries: Man-hours and number killed and injured, by States, during the year ended December 31, 1942

State	Man-hours of employment			Number killed			Number injured			Wid-ows	Or-phans
	At quarry	At out-side works	Total	At quarry	At out-side works	Total	At quarry	At out-side works	Total		
Alabama	616,833	713,743	1,330,576	2		2	58	25	83	1	5
Arizona	83,690	178,080	258,770				5	17	22		
Arkansas	190,732	220,820	411,552	1		1	32	47	79	1	1
California	205,865	324,663	530,528				22	25	47		
Florida	64,646	129,434	194,080				9	10	19		
Illinois	197,931	346,506	544,437				15	27	42		
Maryland	132,343	117,705	250,048				10	6	16		
Massachusetts	130,656	441,987	572,643	1		1	13	21	34		
Michigan	43,408	130,204	173,612		1	1	1	4	5		
Missouri	899,986	1,525,281	2,425,267	2		2	90	68	158		2
New York	19,800	150,515	170,315				1	16	17		
Ohio	2,157,675	3,358,766	5,516,441				78	70	148		
Pennsylvania	1,782,977	3,082,820	4,865,797	1	1	2	75	69	144	1	1
Tennessee	509,853	989,367	1,499,220				63	64	127		
Texas	110,462	340,162	450,624				7	16	23		
Vermont	90,395	283,515	373,910				11	11	22		
Virginia	893,355	1,356,688	2,249,943				77	42	119		
Washington	241,842	229,544	471,386				15	19	34		
West Virginia	383,112	922,862	1,305,974				3	5	8		
Wisconsin	169,379	235,374	404,753				17	30	47		
Other States ¹	654,278	980,388	1,634,666		2	2	60	88	148		
Total	9,576,218	16,058,324	25,634,542	8	4	12	662	680	1,342	6	9

¹ Includes Colorado, Connecticut, Georgia, Indiana, Maine, Minnesota, Montana, Nevada, New Jersey, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, and Utah.

TABLE 24.—Sandstone quarries: Men employed and man-days, by States, during the year ended December 31, 1942

State	Number of quarries ¹	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
California.....	9	46	40	86	12,601	11,552	24,153	274	289	281
Colorado.....	6	104	2	106	26,181	327	26,508	252	164	250
New York.....	18	93	11	104	13,635	1,896	15,531	147	172	149
Ohio.....	13	227	318	545	58,279	79,634	137,913	257	250	253
Pennsylvania.....	53	784	202	986	183,661	46,018	229,679	234	228	233
South Dakota.....	5	83	47	130	17,821	7,344	25,165	215	156	194
Tennessee.....	3	41	18	59	7,431	4,421	11,852	181	246	201
West Virginia.....	11	192	157	349	50,712	43,142	93,854	264	275	269
Wisconsin.....	8	122	25	147	34,551	6,860	41,411	283	274	282
Other States ²	25	213	115	328	31,795	22,418	54,213	149	195	165
Total.....	151	1,905	935	2,840	436,667	223,612	660,279	229	239	232

¹ Includes a small number of mills or other plants not operated in connection with quarries.
² Includes Alabama, Arizona, Arkansas, Connecticut, Illinois, Kansas, Maryland, Massachusetts, Minnesota, Missouri, Oregon, Vermont, Virginia, and Washington.

TABLE 25.—Sandstone quarries: Man-hours and number of killed and injured, by States, during the year ended December 31, 1942

State	Man-hours of employment			Number killed			Number injured			Wid-ows	Or-phans
	At quarry	At outside works	Total	At quar-ry	At out-side works	Total	At quar-ry	At out-side works	Total		
California.....	102,473	97,415	199,888				9	5	14		
Colorado.....	165,412	2,613	168,025								
New York.....	118,077	18,828	136,905	1		1	7	1	8		
Ohio.....	470,240	637,890	1,108,130				16	29	45		
Pennsylvania.....	1,492,649	389,558	1,882,207				111	13	124		
South Dakota.....	155,600	65,712	221,312				23	7	30		
Tennessee.....	59,446	35,361	94,807				2	3	5		
West Virginia.....	407,539	345,754	753,293				18	9	27		
Wisconsin.....	285,153	55,317	340,470				19	1	20		
Other States ¹	266,310	207,422	473,732				20	27	47		
Total.....	3,522,899	1,855,870	5,378,769	1		1	225	95	320		

¹ Includes Alabama, Arizona, Arkansas, Connecticut, Illinois, Kansas, Maryland, Massachusetts, Minnesota, Missouri, Oregon, Vermont, Virginia, and Washington.

15. Handling materials (other than rock).....	3.18	.88	.....	3.85	3.37	4.74	1.22	7.65	6.90	11.96	.....	9.76	4.15	.....
16. Other causes.....	2.39	.88	41.17	7.05	7.79	6.77	7.92	.....	.....	.....	.....	8.30	.....	.....
Total, at underground quarry.....	16.60	15.47	123.52	45.84	38.67	79.93	88.29	45.88	75.88	23.93	75.18	53.70	82.99	125.98
SHAFT OR SLOPE														
17. Falling down shaft or slope.....	.....	.....	.....	.....	.....	.....	.61	.....	.....	.....	.....	.....	.....	.....
18. Objects falling down shaft or slope.....	.....	.....	.....	.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19. Breaking of cables.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20. Overwinding.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21. Cage, skip, or bucket.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
22. Other causes.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, in shaft or slope.....	.....	.....	.....	.32	.....	.....	.61	.....	.....	.....	.....	.....	.....	.....
Total, underground (including shaft).....	16.60	15.47	41.17	46.16	39.44	79.93	88.90	45.88	75.88	23.93	75.18	53.70	82.99	125.98
OUTSIDE WORKS														
1. Haulage.....	.52	.63	64	2.17	3.23	3.79	3.55	.54	1.78	1.10	2.69	1.71	4.88	4.94
2. Machinery.....	1.64	1.50	4.80	8.74	7.85	6.57	5.98	4.01	7.73	7.68	8.62	4.84	6.98	11.36
3. Hand tools.....	.....	.....	2.72	4.63	4.00	2.08	2.24	2.41	1.49	2.74	3.77	7.98	4.53	1.48
4. Stepping on nail.....	.05	.....	16	.57	.31	.44	.25	.27	.59	1.65	.54	.57	1.74	.....
5. Electricity.....	.34	.16	16	.63	.51	.25	.25	.27	.59	1.65	1.08	.57	1.74	.99
6. Falls of persons.....	2.05	1.74	1.92	4.28	3.90	4.93	4.42	2.67	2.97	1.65	3.23	3.13	9.42	5.92
7. Falling objects (rocks, timbers, etc.).....	2.96	.93	2.40	3.03	2.87	4.11	3.05	4.81	3.57	6.04	7.01	4.56	6.63	2.47
8. Flying objects.....	.96	.98	10.40	8.26	5.31	4.26	1.93	5.88	1.78	8.23	5.39	3.42	7.33	4.44
9. Handling materials.....	1.48	1.40	5.44	5.69	6.63	6.77	10.11	6.48	20.32	11.59	7.98	23.35	25.11	11.36
10. Burns.....	.60	.79	80	.37	1.31	1.74	9.10	8.59	.....	.....	.....	.....	.....	.....
11. Other causes.....	1.16	1.70	5.60	3.94	5.95	4.67	5.85	1.87	4.46	2.74	12.39	2.56	8.72	11.36
Total, at outside works.....	10.37	10.33	35.05	41.24	41.40	48.58	42.59	43.05	36.55	40.06	51.19	52.69	76.04	54.81
Grand total.....	11.15	11.72	49.95	56.60	49.56	61.97	52.82	46.33	39.00	60.10	59.68	57.39	74.88	69.07

¹ Includes limestone or other stone used in the manufacture of cement.

DIMENSION-STONE AND NON-DIMENSION-STONE QUARRIES

Operators of the quarries, in their reports to the Bureau of Mines, show the use for which the stone is produced. With this information as a basis, the reports are classified by the Bureau into three major groups: (1) Non-dimension stone, which includes all stone used for the manufacture of cement or lime, road building, flux, agricultural purposes, or for other purposes where the stone is used in unshaped or irregular form; (2) dimension stone, which includes all stone that is cut or shaped for building or monumental purposes; (3) all other and not stated, which includes all stone covered by reports that do not show the class of work in which the stone is to be used.

Eighty-eight percent of the men employed in the quarrying industry in 1942 worked at plants producing non-dimension stone. On the other hand, 11 percent of the employees worked at dimension-stone plants. Only 1 percent of the men were employed at plants that failed to indicate the use to which the stone was to be put. For the past few years the percentage of men employed at non-dimension-stone plants has increased, while a steady decline is noted in the employees of dimension-stone plants. In 1938, 80 percent of all men in the quarrying industry of the United States were employed in non-dimension-stone plants. At the end of a 5-year period, in 1942, this figure had risen to 88 percent. Dimension-stone plants, which employed 18 percent of the men in 1938, employed only 11 percent of the total in 1942. Employment at plants that have failed to report the use to which the stone was to be put have in the past 5 years employed approximately 2 percent of the men.

Accidents at open quarries that produced dimension stone were caused chiefly by handling materials, falls of persons, and flying objects. At the sawing and finishing plants operated in connection with the dimension-stone quarries, handling materials was the outstanding cause of accidents. The 1942 accident rate at dimension-stone plants was 50.86 per million man-hours worked compared with 52.60 in 1941. Non-dimension-stone plants usually have a more favorable rate than dimension-stone plants, largely owing to the fact that the cement industry alone, which has consistently maintained low accident-frequency rates, usually accounts for a large portion of the man-hours worked in the non-dimension-stone group; in 1942 it accounted for 71 million of the total of 163 million man-hours worked by the group. The accident-frequency rate for cement mills and quarries in 1942 was 11.72 per million hours. Omitting the accident experience of the cement industry, the accident-frequency rate for the non-dimension-stone industry was 51.59, and this was very close to the rate of 50.86 for the dimension-stone industry. The principal cause of accidents in non-dimension-stone quarries was handling materials. Machinery was the leading cause of accidents at cement mills and other "outside" works that were operated in connection with these quarries. The accident rate at non-dimension-stone operations in 1942 was 34.15.

States employing the greatest number of men in dimension-stone plants were Vermont, Indiana, and Pennsylvania. In the non-dimension-stone industry, Pennsylvania, Ohio, Missouri, and New York were the largest States upon the basis of the number of men employed.

TABLE 27.—*Dimension-stone and non-dimension-stone quarries: Men employed and man-days, by kind of quarry, during the year ended December 31, 1942*

Kind of quarry	Men employed			Man-days of employment			Average days of employment per man		
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Dimension stone:									
Granite.....	1,561	1,571	3,132	358,037	386,454	744,491	229	246	238
Limestone.....	471	866	1,337	65,298	184,041	249,339	139	213	186
Marble.....	482	1,470	1,952	95,211	391,165	486,376	198	266	249
Sandstone.....	485	364	849	98,887	88,185	187,072	204	242	220
Slate.....	646	925	1,571	131,777	209,383	341,160	204	226	217
Trap rock.....	4	.....	4	840	.....	840	210	.....	210
Total.....	3,649	5,196	8,845	750,050	1,259,228	2,009,278	206	242	227
Non-dimension stone:									
Cement rock ¹	4,173	26,062	30,235	1,158,335	8,333,083	9,491,418	278	320	314
Granite.....	2,002	970	2,972	467,458	239,140	706,598	233	247	238
Limestone.....	16,031	8,831	24,862	3,724,324	2,118,793	5,843,117	232	240	235
Limestone (chief pro uct, lime)	4,081	6,575	10,656	1,213,647	2,047,451	3,261,098	297	311	306
Marble.....	49	68	117	9,195	19,103	28,298	188	281	242
Sandstone.....	1,285	561	1,946	328,675	132,584	461,259	237	236	237
Slate.....	156	303	459	34,923	73,409	108,332	224	242	236
Trap rock.....	1,802	1,306	3,108	373,851	283,606	657,457	207	217	212
Total.....	29,679	44,676	74,355	7,310,478	13,247,169	20,557,577	246	297	276
All other and not stated:									
Granite.....	107	96	203	24,290	22,452	46,742	227	234	230
Limestone.....	389	41	430	65,141	8,291	73,432	167	202	171
Marble.....	102	34	136	23,529	5,659	29,188	231	166	215
Sandstone.....	35	10	45	9,105	2,843	11,948	260	284	266
Slate.....	86	168	254	27,088	51,768	78,856	315	308	310
Trap rock.....	1	1	2	200	365	565	200	365	283
Total.....	720	350	1,070	149,353	91,378	240,731	207	261	225
Grand total.....	34,048	50,222	84,270	8,209,811	14,597,775	22,875,586	241	291	271

¹ Includes limestone or other stone used in the manufacture of cement.

