

FILE NAME: State Industrial Hygiene Surveys (SIHS)

DATE: 1939

DOC#: SIHS002

DOCUMENT DESCRIPTION: Illinois Industrial Hygiene Survey

STATE OF ILLINOIS
HENRY HORNER, Governor

DEPARTMENT OF PUBLIC HEALTH
A. C. BAXTER, M. D., Director

EVALUATION OF THE INDUSTRIAL HYGIENE PROBLEMS OF ILLINOIS

Prepared by
DIVISION OF INDUSTRIAL HYGIENE

MILTON H. KRONENBERG, M. D., Chief of Division
ALFRED N. SETTERLIND, Chemist and Editor of Survey
KENNETH M. MORSE, Engineer in Charge of Survey
ELIZABETH KEATING, Chief Tabulator

1800 West Fillmore Street
Chicago, Illinois
1939

Workers exp.
to asbestos
in
chemical,
iron/steel,
other metals
industries
[Table 12]
paints + varnishes [Table 23]
auto & factory
accessories,
Car & RR
shops
heavy machinery
[Table 117]
Furniture
[Table 174]
elec. machinery
lamps, rubber,
scientific instruments
[Table 220]
sci. instruments
workshops had
for exhaust
ventilation
[Table 248]

TABLE 12—PERCENT OF TOTAL EXPOSURE TO SPECIFIED MATERIALS IN EACH INDUSTRY OF SERVICE GROUP

Materials	Number of exposures and percent of total exposures to specified materials																													
	All surveyed industries	Extraction of minerals	Chemicals and allied industries	Cigars and tobacco	Clay, glass, and stone	Clothing manufacture	Food and allied industries	Iron and steel	Metals other than iron and steel	Leather	Lumber	Paper, printing and allied industries	Textile manufacture	Miscellaneous manufacturing industries	Personal service															
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Number of workers in surveyed plants.....	303,251	6,777	17,950	500	11,305	13,244	23,988	97,879	33,154	10,271	15,254	20,751	6,925	38,352	6,901															
Total number of exposures.....	380,906	16,959	33,762	410	17,344	4,152	25,211	135,947	51,610	8,059	14,049	25,112	5,704	40,154	3,033															
Percent of total exposures.....	100	4.5	8.8	0.1	4.6	1.1	6.6	35.6	13.5	2.1	3.7	6.6	1.5	10.5	0.8															
Organic dusts.....	40,337	26	3363	8.3	197	0.5	826	2.1	3342	8.3	4538	11.2	7004	17.3	2602	6.4	1763	4.4	6759	16.7	1529	3.8	3167	7.9	5077	12.6	144	0.4		
Other metals.....	36,918	135	0.4	1797	4.9	3	0	603	1.6	5	0	162	0.4	21866	59.3	8107	22.0	87	0.2	414	1.1	882	2.4	24	0	2818	7.6	15	0	
Dermatitis.....	35,958	16	0	1083	3.0	164	0.5	198	0.6	0	0	6602	18.4	18278	50.8	5432	15.1	160	0.4	293	0.8	119	0.3	53	0	13542	9.9	18	0	
Silicate dusts.....	28,773	763	2.7	833	2.9	2	0	3785	13.2	63	0.2	347	1.2	15791	54.8	8133	11.1	155	0.5	429	1.5	339	1.2	55	0.2	2928	10.1	104	0.3	
Silica dusts.....	19,725	291	1.5	555	2.8	0	0	2112	10.7	3	0	31	0.1	12957	65.6	2752	13.9	2	0	173	0.9	24	0.1	1	0	823	4.2	1	0	
Other gases.....	19,197	4401	22.9	1685	8.8	7	0	666	3.5	91	0.5	1327	6.9	6894	35.9	2343	12.2	194	1.0	115	0.6	527	2.7	65	0.3	755	3.9	127	0.7	
Organic solvents.....	18,250	6	0	2822	15.4	7	0	234	1.3	90	0.5	211	1.1	4839	26.5	1537	8.4	575	3.2	854	4.7	4536	24.9	134	0.7	7180	12.0	225	1.2	
Petroleum.....	18,212	129	0.7	1861	10.2	11	0	992	5.4	87	0.5	563	3.1	7818	42.8	2161	11.9	233	1.3	544	3.0	558	3.2	121	0.7	7308	16.9	68	0.2	
Carbon monoxide.....	17,590	4380	24.9	470	2.7	1	0	613	3.5	47	0.3	907	5.2	8294	47.2	2011	11.4	2	0	421	2.0	817	1.8	18	0.1	374	2.1	116	0.6	
Lead.....	17,254	7	0	1330	7.7	3	0	334	1.9	5	0	137	0.8	3721	21.6	4624	26.8	50	0.3	282	1.6	2835	16.8	83	0.5	3328	22.2	16	0	
Non-siliceous dusts.....	15,776	98	0.6	923	5.8	2	0	1571	10.0	39	0.2	41	0.3	7497	47.5	2753	17.5	25	0.1	212	1.2	135	0.9	7	0	2473	15.7	0	0	
Alkalies.....	11,795	10	0	2412	20.4	1	0	1477	12.5	20	0.2	899	7.6	2639	22.4	1739	14.7	365	3.1	127	1.0	49	4.2	121	1.0	1096	9.3	413	3.5	
Alcohols, esters and ethers.....	9,679	0	0	1214	12.6	0	0	105	1.1	11	0.1	2148	22.2	1318	13.6	634	6.5	267	2.8	121	1.0	107	1.2	29	0.3	1835	18.9	124	1.3	
Coal dust, bituminous.....	8,956	5531	62.2	602	6.7	1	0	203	2.3	40	0.4	345	3.9	917	10.3	654	7.3	66	0.7	127	1.4	110	1.2	38	0.4	189	2.1	93	1.0	
Oil.....	8,080	0	0	1388	17.2	5	0	108	1.3	19	0.2	537	6.6	3627	45.0	739	9.2	470	5.8	340	4.2	183	2.2	40	0.5	620	7.7	4	0	
Acids, Mineral.....	7,968	10	0.1	1495	18.8	1	0	127	1.6	5	0	211	2.6	2143	26.8	2018	25.2	200	2.5	107	1.3	666	8.7	79	1.0	889	11.2	17	0.2	
Infection.....	6,772	82	1.2	221	3.3	0	0	164	2.4	213	3.1	3542	52.4	178	2.6	1	0	671	9.9	167	2.5	42	0.6	93	1.4	599	8.8	799	11.8	
Ink.....	5,749	0	0	378	6.6	5	0	23	0.4	17	0.3	27	0.5	138	2.4	243	4.2	71	1.2	52	0.9	9414	76.8	28	0	6	342	5.9	10	0.2
Lacquer.....	5,253	7	0.1	758	14.4	0	0	53	1.0	9	0.2	47	0.9	964	18.4	535	10.2	226	4.3	940	17.9	233	4.4	0	0	1476	28.1	5	0	
Paint.....	4,387	15	0.3	680	15.5	0	0	106	2.4	1	0	66	1.5	2061	47.0	341	7.8	23	0.5	252	5.7	262	6.0	74	1.7	496	11.3	10	0.2	
Chromium.....	4,310	3	0	499	11.6	0	0	128	3.0	0	0	4	0.1	588	13.7	1029	23.8	671	15.6	46	1.1	599	13.9	392	9.1	351	8.1	0	0	
Coal tar products.....	3,992	0	0	836	20.9	0	0	412	10.3	0	0	168	4.2	695	17.4	203	5.1	55	1.4	164	4.1	396	9.9	0	0	1056	26.5	7	0.2	
Antimony.....	3,891	0	0	67	1.7	0	0	11	0.3	1	0	7	0.2	270	6.8	615	15.8	0	0	13	0.3	2689	69.2	2	0	216	5.6	0	0	
Dyes.....	3,706	0	0	570	15.4	1	0	14	0.4	13	0.3	112	3.0	45	1.2	17	0.5	756	20.4	441	11.9	525	14.2	860	23.2	278	7.5	74	2.0	
Other salts.....	3,385	46	1.4	818	24.2	0	0	102	3.0	2	0	940	27.7	233	6.9	250	7.4	281	8.3	6	0.2	496	14.6	47	1.4	149	4.4	15	0.4	
Aldehydes.....	3,077	0	0	257	8.3	0	0	4	0.1	1	0	609	19.8	1621	52.7	197	6.4	28	0.9	2	0	35	1.1	36	1.2	284	9.2	3	0.1	
Cyanides.....	2,370	2	0	24	1.0	0	0	2	0	3	0.1	6	0.3	807	34.1	1007	42.4	1	0	42	1.8	187	7.9	11	0.5	277	11.8	1	0	
Acids, Organic.....	1,859	0	0	296	16.0	0	0	56	3.0	5	0.3	290	15.6	62	3.4	172	9.8	258	14.0	5	0.3	463	25.0	48	2.6	50	1.3	148	8.0	
Fluorides.....	1,770	266	15.0	230	13.0	0	0	318	18.4	0	0	26	1.5	131	7.5	482	27.8	14	0.8	0	0	51	2.9	0	0	247	14.0	54	3.3	
Sulphur Dioxide.....	1,729	0	0	689	39.9	0	0	318	18.4	0	0	26	1.5	131	7.5	482	27.8	14	0.8	0	0	51	2.9	0	0	247	14.0	54	3.3	
Halogenated hydrocarbons.....	1,567	0	0	254	16.2	0	0	10	0.6	17	1.1	8	0.5	417	26.6	313	20.0	29	1.9	40	2.5	52	3.6	1	0	288	18.4	133	8.8	
Sulphur.....	1,556	0	0	631	40.5	0	0	18	1.1	0	0	4	0.2	125	8.0	201	13.0	101	6.5	14	0.9	123	7.9	32	2.1	306	19.7	1	0	
Cadmium.....	1,523	0	0	114	7.5	0	0	38	2.5	0	0	0	0	191	12.6	1044	68.5	0	0	0	0	8	0.5	0	0	128	8.4	0	0	
Nitrogen Oxides.....	1,453	685	47.2	41	2.8	0	0	7	0.5	1	0	0	0	98	6.8	333	22.9	0	0	0	0	112	7.7	0	0	153	10.5	1	0	
Asbestos.....	1,436	0	0	159	11.1	0	0	1149	79.9	0	0	0	0	59	4.1	43	3.2	5	0.4	0	0	0	0	1	0	24	1.7	0	0	
Chemicals.....	1,121	10	0.9	519	46.3	0	0	60	5.4	0	0	106	9.5	190	17.0	137	12.2	0	0	0	0	38	3.8	0	0	87	8.8	3	0.3	
Manganese.....	990	0	0	142	14.3	0	0	282	28.5	0	0	0	0	270	27.3	168	17.0	0	0	0	0	0	0	0	0	0	0	0	0	
Medicinals.....	816	0	0	804	98.5	0	0	0	0	0	0	12	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Arsenic.....	758	0	0	44	5.8	0	0	224	29.6	0	0	0	0	4	0.5	266	35.1	160	21.1	0	0	0	0	0	0	0	60	7.9	0	0
Chlorine.....	755	0	0	183	24.2	0	0	0	0	0	0	162	21.4	31	4.1	12	1.6	1	0	2	0.3	11	1.5	41	5.4	38	5.0	274	36	
Ammonia.....	428	0	0	234	54.6	0	0	0	0	0	0	0	0	2	0.5	0	0	37	8.7	0	0	0	0	0	0	152	35.5	3	0	
Coal dust, anthracite.....	275	0	0	0	0	0	0	1	0.4	0	0	1	0.4	3	1.1	204	74.1	0	0	0	0	0	0	1	0.4	65	23.5	0	0	
Selenium.....	325	0	0	0	0	0	0	189	58.2	0	0	0	0	0	0	135	41.5	0	0	0	0	0	0	0	0	1	0.3	0	0	
Hydrogen Sulphide.....	296	0	0	186	62.8	0	0	0	0	0	0	30	10.1	7	2.4	9	3.0	57	19.3	0	0	0	0	0	0	7	2.4	0	0	
Mercury.....	293	0	0	67	22.9	0	0	1	0.3	0	0	3	1.0	0	0	11	3.8	0	0	0	0	89	30.4	0	0	122	41.6	0	0	
Accelerators.....	214	0	0	0	0	0	0	2	0.9	0	0	0	0	15	7.0	2	0.9	0	0	0	0	0	0	0	0	195	91.2	0	0	
Anilines.....	197	0	0	123	62.3	0	0	0	0	2	1.0	0	0	1	0.5	0	0	0	0	2	1.0	50	25.2	0	0	19	10.0	0	0	
Radioactive material.....	93	0	0	90	96.8	0	0	3	3.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Phosphorus.....	89	0	0	14	15.8	0	0	0	0	0	0	0	0	9	10.1	14	15.8	0	0	0	0	0	0	0	0	52	58.3	0	0	

* Denotes less than 0.05%.

TABLE 17—ESTIMATED NUMBER OF WORKERS EXPOSED TO SPECIFIED MATERIALS IN THE ENTIRE INDUSTRIES OF ILLINOIS

Materials	Number of workers exposed to specified materials														
	All surveyed industries	Extraction of minerals	Chemical and allied industries	Cigars and tobacco	Clay, glass and stone	Clothing manufacture	Food and allied industries	Iron and steel	Metals other than iron and steel	Leather	Lumber	Paper, printing and allied industries	Textile manufacturing	Misc. manufacturing industries	Personal service
Total number of workers (U. S. census).....	1,147,379	64,310	42,957	3,022	26,751	61,395	90,165	447,855	38,761	24,327	42,312	80,985	14,005	175,227	34,717
Number of workers surveyed.....	303,251	6,777	17,950	500	11,305	13,244	23,988	97,879	33,154	10,271	15,254	20,751	6,925	38,352	6,901
Estimated exposed workers in entire industry.....	697,310	61,790	31,600	1,760	18,000	16,800	64,500	296,000	24,300	5,520	24,400	41,900	7,690	95,900	7,150
Estimated total exposures in entire industry.....	1,353,432	161,370	80,616	2,480	39,350	19,253	94,797	548,467	60,251	19,083	38,984	98,329	12,640	162,619	15,264
Other metals.....	134,843	1,285	4,290	18	1,376	23	609	100,000	9,470	206	1,150	3,440	51	12,850	75
Organic dusts.....	117,591	247	8,040	1,190	1,880	15,500	17,100	32,000	3,040	4,170	18,750	5,950	6,680	2,320	724
Silicate dusts.....	112,107	7,250	1,987	12	8,620	292	1,310	72,000	3,720	807	1,190	1,320	116	13,400	523
Other gases.....	94,189	41,900	4,030	42	1,520	422	4,970	31,500	2,740	400	319	2,060	137	3,450	639
Carbon monoxide.....	91,686	41,700	1,123	6	1,400	218	3,410	37,800	2,350	5	117	1,235	38	1,700	584
Silica dusts.....	75,674	2,760	1,325	0	4,800	14	110	59,100	3,220	5	480	93	2	3,760	5
Petroleum.....	67,563	1,225	4,440	66	2,280	403	2,120	35,700	2,520	552	1,510	2,180	255	14,000	332
Organic solvents.....	65,333	57	6,750	42	533	417	785	22,100	1,785	1,362	2,370	17,700	282	10,000	1,130
Coal dust, bituminous.....	63,683	53,000	1,435	6	464	185	1,300	4,180	764	156	352	429	80	864	468
Dermatitis.....	61,741	152	2,590	990	450	0	24,800	8,350	6,350	379	813	465	112	16,200	90
Non-siliceous dusts.....	56,844	932	2,200	12	3,460	181	515	34,200	3,220	60	588	526	15	11,300	0
Lead.....	56,645	66	3,180	18	760	23	515	17,000	5,380	118	780	11,050	175	17,500	80
Alkalies.....	37,188	95	5,760	6	3,350	92	3,380	12,050	2,030	864	311	1,915	255	5,000	2,080
Alcohols, esters and ethers.....	32,718	0	2,900	0	239	51	8,100	6,020	740	633	2,850	3,770	61	6,730	624
Oil.....	28,834	0	3,320	30	245	88	2,020	16,550	863	1,115	945	714	84	2,840	20
Ink.....	26,962	0	907	30	52	79	101	6,320	284	168	144	17,200	59	1,665	53
Infection.....	25,962	780	529	0	373	990	13,300	815	1	1,590	464	164	196	2,740	4,020
Acids, mineral.....	24,620	95	3,580	6	289	23	795	9,800	2,350	473	297	2,600	167	4,060	85
Lacquer.....	19,691	66	1,810	0	121	42	177	4,400	625	535	2,610	910	0	8,370	25
Paint.....	16,237	142	1,623	0	241	4	248	9,330	399	54	700	1,020	156	2,265	55
Coal tar products.....	13,949	0	1,990	0	925	0	632	3,180	237	130	455	1,545	0	4,820	35
Antimony.....	13,695	0	160	0	25	4	26	1,235	718	0	36	10,500	4	987	0
Aldehydes.....	12,146	0	615	0	9	4	2,290	7,400	230	66	5	136	76	1,300	15
Chromium.....	11,894	28	1,190	0	291	0	15	2,690	1,190	1,590	128	2,340	827	1,605	0
Other salts.....	10,959	437	1,913	0	232	9	3,540	1,065	292	665	16	1,935	100	680	75
Dyes.....	10,622	0	1,360	6	32	60	422	205	20	1,790	1,225	2,050	1,815	1,270	372
Nitrogen oxides.....	8,666	6,510	98	0	16	4	0	448	389	0	61	436	0	699	5
Fluorides.....	7,676	2,530	550	0	29	0	130	2,420	394	0	22	199	0	1,130	272
Cyanides.....	7,116	18	57	0	4	14	22	3,680	1,170	2	117	729	23	1,275	5
Acids, organic.....	5,976	0	708	0	128	23	1,090	284	205	611	14	1,810	103	256	744
Halogenated hydrocarbons.....	5,392	0	607	0	23	79	30	1,900	366	69	111	219	4	1,815	669
Sulphur.....	5,206	0	1,505	0	41	0	15	572	235	239	39	480	675	1,400	5
Sulphur dioxide.....	3,967	0	1,635	0	724	0	98	599	562	33	0	8	2	261	45
Asbestos.....	3,425	0	380	0	2,610	0	0	270	50	0	5	0	0	110	0
Chemicals.....	3,328	95	1,240	0	137	0	398	867	180	12	0	0	0	366	0
Chlorine.....	3,278	0	438	0	0	0	609	142	14	2	5	429	86	585	1,380
Cadmium.....	3,064	0	272	0	86	0	0	875	1,215	0	0	0	0	398	15
Manganese.....	2,983	0	349	0	642	0	0	1,235	196	0	0	148	0	0	0
Medicinals.....	1,963	0	1,918	0	0	0	45	0	0	0	0	0	0	0	0
Arsenic.....	1,606	0	105	0	518	0	0	18	311	379	0	0	0	274	0
Amines.....	1,367	0	560	0	0	0	0	9	0	88	0	0	0	695	15
Mercury.....	1,090	0	180	0	2	0	11	0	13	0	0	347	0	557	0
Accelerators.....	965	0	0	0	4	0	0	68	2	0	0	0	0	891	0
Coal dust, anthracite.....	920	0	0	0	2	0	4	13	238	0	0	0	0	297	0
Hydrogen sulphide.....	764	0	445	0	0	0	110	32	10	135	0	0	0	32	0
Anilines.....	594	0	294	0	0	9	0	4	0	0	5	195	0	87	0
Selenium.....	591	0	0	0	430	0	0	0	157	0	0	0	0	4	0
Phosphorus.....	328	0	33	0	0	0	0	41	16	0	0	0	0	238	0
Radioactive material.....	222	0	215	0	7	0	0	0	0	0	0	0	0	0	0

The perfume and cosmetic industry was the largest employer of women workers. Of these 966 workers, 53.0 per cent averaged 2.7 exposures to specified materials, esters and ethers, and oils. It was found that 10.0 per cent of the workers used to record exposures, occurred in the perfume and cosmetic industry. For exposures of the chief occupations in the perfume and cosmetic industry, the most common control measures have been the use of respirators were found to be the most common control measures.

Materials	All chemical and allied industries in survey	Number and percent of workers																				
		Charcoal and coke works		Explosives ammunition and fireworks		Fertilizer factories		Gas works		Paints and varnish		Petroleum refineries		Rayon (Viscose)		Soap factories		Baking powder, etc.		Bakings, confectionery, etc.		Ca paper rib ink
Total number of workers.....	17,950	403		879		250		86		1,878		1,391		680		895		3,066		50		
Number of plants.....	289	2		7		5		2		66		6		2		14		4		5		
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No.	
Acids, organic.....	296 1.7			3				7													17	
Acids, mineral.....	1495 8.3			26	3.0			50	2.9												6	
Aldehydes.....	257 1.4	6	1.5	7	0.8			98	5.2												16	
Alkalies.....	2412 13.4	6	1.5	23	2.6			104	41.6	1	1.2										41	
Anilines.....	234 1.3							55	2.9												10	
Amines.....	234 1.3							4														
Chemicals.....	519 2.9	6	1.5	14	1.6	3	1.2	48	2.6			38	2.7	13	1.9	14	1.6				17	
Coal tar products.....	836 4.7	97	24.0	20	2.3			15	17.4	140	7.4	11	0.8			6	0.7				17	
Cyanides.....	24			1	*			5	*			2	*								5	
Asbestos.....	159 0.9							118	6.3	23	1.7											
Coal dust, bituminous.....	602 3.4	208	51.6					13	0.7	2	*					14	1.6				8	
Silica dust.....	555 3.1			3	*			174	9.3	129	9.3			1	*	79	8.8				5	
Silicate dust.....	833 4.6	38	9.4	7	0.8			130	6.9	97	6.9					51	5.7				20	
Non-siliceous dust.....	923 5.1	20	4.9	10	1.1	184	73.6	290	15.4	25	1.8										31	
Organic dust.....	3363 18.8	221	54.9	81	9.2	75	30.0	271	14.4	14	1.0					52	5.8	1525	49.7		100	
Dye.....	570 3.2							101	5.4			3	*			17	1.9				183	
Dermatitis.....	1083 6.1	13	3.2	291	33.2	2	0.8	11	0.6	38	2.7			86	12.6	69	7.7	346	11.3			
Dye.....	230 1.3					5	2.0											3	*			
Carbon monoxide.....	470 2.6	129	32.0	15	1.7	1		23	26.8	39	2.0	139	10.0	4	0.6	10	1.1	2	*		4	
Hydrogen sulphide.....	186 1.0							8	9.3	8	*			113	16.6			24	0.8			
Sulphur dioxide.....	689 3.8					4	1.6	2	2.3	8	*			92	13.5			413	13.4			
Other gases.....	1685 9.4	196	48.7	15	1.7	71	28.4	25	29.1	36	1.9	907	65.1	6	0.9	10	1.1	27	0.9		4	
Chlorine.....	183 1.0							4	*							8	0.9	19	0.6			
Arsenic.....	44																					
Chromium.....	499 2.8			5	0.6			320	17.0									1	*		119	
Cadmium.....	114 0.6							89	4.7												2	
Mercury.....	67 0.4			21	2.4			78	4.2												8	
Manganese.....	142 0.8			4	0.5																	
Lead.....	1330 7.4	3	0.7	15	1.7			621	33.1	235	16.9			2	*	28	3.1	114	3.7		143	
Radioactive material.....	90 0.5																					
Antimony.....	67 0.4			21	2.4			5	*							2	*	2	*		4	
Other metals.....	1797 10.0	15	3.7	37	4.2	3	1.2	416	22.2	107	7.7			1	*	11	1.2	74	2.4		78	
Nitrogen oxides.....	41																					
Infection.....	221															3	*					
Alcohols, esters and ether.....	1214 6.8			73	8.3		2	252	13.4			189	13.6			10	1.1	49	1.6		19	
Halogenated hydrocarbons.....	254 1.4			27	3.0			11	0.6							3	*				42	
Ink.....	379 2.1			2	*	6	2.4									10	1.1				284	
Lacquer.....	758 4.2	2	0.5	8	0.9			372	19.9	19	1.4							45	1.4		79	
Medicinals.....	804 4.5																					
Oil.....	1388 7.7							380	20.2	20	1.4											
Organic solvents.....	2822 15.7	94	23.2	2	*			917	48.9	921	66.1			14	2.6	18	2.0	290	9.4		119	
Petroleum.....	1861 10.4	29	7.2	67	7.6	4	1.6	2	1.2							18	2.0	69	2.2		301	
Paint.....	680 3.8	1	*					456	24.3	28	2.0					4	0.5	71	2.3		1	
Phosphorus.....	14			10	1.1																	
Other salts.....	818 4.6			20	2.3	221	88.4	7	8.1	50	2.7					46	5.1	95	3.1		5	
Sulphur.....	631 3.5			23	2.6			257	13.7	223	16.0			2	*						29	

The material on this page was copied from the collection of the National Library of Medicine by a third party and may be protected by U.S. Copyright law.

TABLE 23—CHEMICAL AND ALLIED INDUSTRY—EXPOSURE TO SPECIFIED MATERIALS

TABLE 23—CHEMICAL AND ALLIED INDUSTRY—EXPOSURE TO SPECIFIED AGENCIES																																							
Number and percent of workers exposed																																							
Explosives ammunition and fireworks		Fertilizer factories		Gas works		Paints and varnish		Petroleum refineries		Rayon (Viscose)		Soap factories		Baking powder, etc.		Blackings, stains, etc.		Carbon paper, inked ribbons, ink, etc.		Chemicals, dyes, etc.		Gases compressed except gas works		Cleaning, polishing solutions		Drugs and patent medicine		Glue, paste, mucilage, etc.		Greases, tallow, etc.		Oils, (not including petroleum products)		Cosmetics, perfumes, etc.		Others			
879		250		86		1,878		1,391		680		895		3,066		50		673		2,768		96		337		1,160		288		267		286		966		1,571			
7		5		2		66		6		2		14		4		5		24		24		9		14		22		14		9		10		23		27			
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
3	*					7	*	389	20.8	96	14.1	25	2.8	62	2.1	9	18.0	17	2.5	46	1.7	5	1.5	47	4.0	5	1.9	12	4.2	38	3.9	45	2.7	45	2.7	45	2.7		
26	3.0			10	4.0	5	5.8	98	5.2	9	0.7	1	0.1	5	0.2	6	0.9	6	0.9	18	0.7	4	1.2	14	1.2	9	3.4	17	5.9	13	1.4	42	2.7	42	2.7	42	2.7		
23	2.6			104	41.6	1	1.2	65	3.5	261	18.7	28	4.1	482	54.0	119	3.9	4	8.0	41	6.1	33	12.2	103	30.6	113	9.8	21	7.8	35	12.2	134	13.9	155	10.0	87	5.5		
						56	2.9	4	0.3	2	0.3	2	0.2	1	0.1	10	1.5	33	1.2	6	0.2	6	1.7	9	0.8	14	5.4	7	2.7	10	1.0	3	0.3	155	10.0	87	5.5		
				110	44.1	1	1.2	4	0.3	38	2.7	13	1.9	109	3.5	9	18.0	17	2.5	99	3.6	56	16.6	40	3.5	14	5.2	8	3.1	15	5.3	17	1.8	38	3.4	3	0.3		
14	1.6			3	1.2	15	17.4	140	7.4	11	0.8	6	0.7	20	0.7	17	34.0	17	2.5	141	5.1	7	1.5	55	4.7	20	7.5	8	2.8	29	3.0	250	15.9	1	0.1				
20	2.3							118	6.3	2	0.1	1	0.1	4	0.4	1	2.0	8	1.2	116	4.2	1	0.3	16	1.4	13	4.9	25	9.7	16	1.6	3	0.3	31	2.0				
						21	24.2	118	6.3	2	0.1	1	0.1	114	3.7	1	2.0	5	0.7	49	1.8	12	3.6	27	2.3	14	5.2	34	13.2	22	7.7	125	12.9	71	4.5				
8	0.9					3	3.5	130	6.9	97	6.9	1	0.1	75	2.4	15	30.0	31	4.6	165	6.0	12	3.6	30	2.6	15	5.6	8	3.1	7	2.5	39	4.0	72	4.6				
10	1.1			184	73.6			290	15.4	25	1.8	6	0.9	52	5.8	1625	49.7	5	10.0	100	15.0	105	3.8	75	22.2	266	22.9	76	28.3	45	17.5	118	41.3	121	12.5				
81	9.2			75	30.0			271	14.4	14	1.0	3	0.4	17	1.9	3	6.0	183	27.2	34	1.2	10	2.9	84	7.7	25	9.3	9	3.5	6	2.1	20	2.1	36	2.3				
291	33.2			2	0.8	1	1.2	11	0.6	38	2.7	86	12.6	69	7.7	346	11.3	2	4.0	185	6.7	1	0.3	1	0.1	1	0.4	5	2.0	2	0.7	22	2.3	10	0.6				
				5	2.0			39	2.0	159	10.0	4	0.6	10	1.1	2	4.0	4	0.6	166	6.0	52	14.3	78	23.2	18	1.6	7	2.4	8	0.8	40	5	5	0.3				
15	1.7			1	1.2	23	26.8	8	0.3	92	6.5	113	16.6	24	0.8	1	2.0	4	0.6	178	6.5	93	3.3	13	3.0	40	3.5	1	0.4	7	2.4	8	0.8	40	5				
				4	1.6	2	2.3	8	0.3	907	65.1	6	0.9	413	13.4	1	2.0	4	0.6	166	6.0	52	14.3	78	23.2	18	1.6	7	2.4	8	0.8	40	5	5	0.3				
18	1.7			71	28.4	25	29.1	36	4			10	0.9	19	0.6	1	2.0	4	0.6	178	6.5	93	3.3	13	3.0	40	3.5	1	0.4	7	2.4	8	0.8	40	5				
												8	0.9	1	0.1					166	6.0	52	14.3	78	23.2	18	1.6	7	2.4	8	0.8	40	5	5	0.3				
5	0.6							320	17.0	89	6.4	1	0.1	1	0.1	119	17.7	4	0.6	12	0.4	1	0.3	5	0.4	1	0.4	1	0.4	1	0.4	11	1.1	21	1.3				
								89	4.7					2	0.2			2	0.2	49	1.8	12	3.6	26	2.2	4	1.5	1	0.4	1	0.4	14	1.4	31	2.0				
21	2.4							78	4.2					143	21.3			8	1.2	121	4.3	1	0.3	8	0.7			1	0.4			6	0.6	31	2.0				
15	1.7			2	2.3			621	33.1	235	16.9	2	0.3	114	3.7			4	0.6	121	4.3	1	0.3	8	0.7			1	0.4			1	0.4	6	0.6				
								5	0.3					1	0.1			4	0.6	121	4.3	1	0.3	8	0.7			1	0.4			1	0.4	6	0.6				
21	2.4			3	1.2	5	5.8	416	22.2	107	7.7	1	0.1	74	2.4	6	12.0	78	11.6	821	29.8	7	7.8	16	4.8	59	5.0	1	0.4	3	1.0	83	8.6	13	0.8				
37	4.2							22	2.2					3	0.3			49	1.6	4	0.6	1	0.3	54	4.7	23	8.6	115	44.8	*	*	263	26.2	26	1.6				
78	8.3			2	0.8			252	13.4	189	13.6	10	1.1	49	1.6	4	16.32.0	19	2.8	15	0.5	2	2.0	72	21.4	54	4.7	23	8.6	115	44.8	*	*	263	26.2				
27	3.0			2	2.3			13	0.6			3	0.6	18	0.6	5	10.0	42	6.3	69	2.6	3	3.1	13	3.0	20	7.8	17	5.9			6	0.6	51	3.2				
8	0.9			6	2.4			24	1.3			10	1.1	45	1.4	5	10.0	79	11.7	5	0.6	1	0.3	46	13.6	42	3.6	13	4.9	40	15.6	147	51.4	151	15.6				
								372	19.9	19	1.4			1	0.1			1	0.1	45	1.4	5	10.0	79	11.7	5	0.6	1	0.3	46	13.6	42	3.6	147	51.4				
														290	9.4	26	52.3	119	17.7	4	0.6	1	0.3	46	13.6	42	3.6	13	4.9	40	15.6	147	51.4	151	15.6				
2	0.2							917	48.9	921	66.1	14	2.6	18	2.0	14	28.0	301	44.8	133	4.8	3	3.1	94	27.8	125	10.8	13	4.9	8	3.1	20	7.0	11	1.1				
67	7.6			4	1.6			90	4.8	1028	74.0			103	3.6	9	18.0	71	10.5	70	2.5	5	5.2	108	30.6	27	2.3	11	4.1	45	17.5	30	10.5	103	10.7				
20	2.3							456	24.3	28	2.0			71	2.3			1	0.1	70	2.5	8	8.3	2	0.6			2	0.8			9	0.8			22	2.1		
														95	3.1			5	0.8	266	9.7	6	1.8	62	5.3	5	1.9	22	8.6	4	1.5			4	0.4				
10	1.1			7	8.1			50	2.7	223	16.0	2	0.3	46	5.1			29	4.3	88	3.2			3	1.1											9	0		
23	2.6			221	88.4			257	13.7																											4			

Number of Workers in Survey.....	1878
Number of Workers Exposed.....	1423
Percent of Workers Exposed.....	75.9%
Number of Exposures per Person Exposed.....	4.2

[illegible]

TABLE 33—PERCENT OF WORKERS EXPOSED TO SPECIFIED MATERIALS HAVING INDICATED TYPE OF HAZARD CONTROL—PAINT, VARNISH AND LACQUER INDUSTRY

[illegible]

The material on this page was copied from the collection of the National Library of Medicine and may be protected by U.S.

utilization and positive general measures of control measures in this

the industry was represented 84.3 per cent were exposed, to specified materials. The dusts. It was found that measures, occurred in this industry, chief occupations in this industry measures have been applied. factors were found to be the industry.

represented by 714 workers in exposed, and each exposed The major exposures were that 23 of the 49 specified industry. Table 72 reveals industry. Table 73 reveals applied. Local exhaust of control measure in this

hail and roofing material Of these 1,643 workers, averaged 2.2 exposures to dust, petroleum and coal materials, used to record the major exposures of the extent to which ventilation, local exhaust prevalent types of control

the industry was represented workers, 72.5 per cent exposures to specified materials. It was found measures, occurred in this chief occupations in this measures have been found to be the most

ding wheel, sandpaper nine plants. Of these 1 worker averaged 3.1 ere non-siliceous and 1 of the 49 specified try. Table 78 reveals ry. Table 79 reveals local exhaust ventilation types of control meas-

TABLE 61—CLAY, GLASS AND STONE INDUSTRIES—EXPOSURES TO SPECIFIED MATERIALS

Materials	All clay, glass and stone industries in survey		Number and percent of workers exposed																	
			Brick, tile and terra cotta		Glass		Lime, cement and artificial stone		Marble and stone yard		Pottery		Ashpalt and roof material		Asbestos products		Grinding wheels, sandpaper, etc.		Other	
			No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Total number of workers.....	11,305		1,192		4,263		510		337		714		1,643		2,215		139		292	
Number of plants.....	105		22		12		11		34		16		25		17		9		9	
Acids, organic.....	56	0.5	13	1.1	2	*			37	11.0							4	2.8		
Acids, mineral.....	127	1.1	1	*	57	1.3	16	3.1			7	1.0	18	1.1	20	0.9	2	1.4	6	2.1
Accelerators.....	2	*																		
Aldehydes.....	4	*			1	*														
Alkalies.....	1,477	13.1	20	1.7	20.0		148	29.0	2	0.6	26	3.6	21	1.3	375	16.9	25	18.0	11	3.7
Chemicals.....	60	0.5	1	*	2	*	16	3.1					18	1.1	17	0.8			6	2.1
Coal tar products.....	412	3.6									22	3.1	358	21.8	6	*	26	18.7		
Cyanides.....	2	*			1	*							1	*						
Asbestos.....	1,149	10.2											97	5.9	1,048	47.3			4	1.4
Coal dust, bituminous.....	203	1.8	114	9.6	7	*	11	2.2	3	0.9	13	1.8	34	2.1	12	0.5	1	0.7	8	2.7
Coal dust, anthracite.....	1	*	1	*																
Silica dust.....	2,112	17.9	456	38.2	759	17.8	83	16.3	150	44.06	184	25.8	101	6.2	216	9.8	26	18.7	137	46.9
Silicate dust.....	3,785	33.5	683	57.2	985	23.1	234	45.8	118	35.0	407	57.1	654	39.7	509	23.0	39	28.1	156	53.5
Non-siliceous dust.....	1,571	13.9	104	8.7	518	12.1	145	28.4	196	58.2	152	21.3	125	7.6	202	9.1	57	41.0	72	24.6
Organic dust.....	826	7.3	71	5.9	171	4.0	28	5.5	5	1.5	32	4.5	187	11.4	275	12.4	10	7.2	47	16.1
Dye.....	14	*	7	0.6					2	0.6	5	0.7								
Dermatitis.....	198	1.8	2	*	67	1.6	8	1.6	2	0.6	20	2.8	19	1.2	76	3.4	4	2.9		
Fluorides.....	13	*	7	0.6	6	*														
Carbon monoxide.....	613	5.4	68	5.7	406	9.5	26	5.1	6	1.8	45	6.3	38	2.3	7	*	17	12.2		
Sulphur dioxide.....	318	2.8	30	2.5	280	6.6							8	0.5						
Other gases.....	666	5.9	92	7.7	416	9.8	9	1.8	4	1.2	51	7.2	47	2.9	29	1.3	17	12.2	1	*
Arsenic.....	224	2.0			224	5.3														
Chromium.....	128	1.1	11	0.9	3	*					43	6.0	62	3.8	9	*				
Cadmium.....	38	*			38	0.9														
Mercury.....	1	*																		
Manganese.....	282	2.5	7	0.6	208	4.9					60	8.4			7	*				
Lead.....	334	3.0	36	3.0	58	1.4	6	1.2	9	2.7	80	11.2	70	4.3	66	3.0	9	6.5		
Radioactive material.....	3	*			3	*														
Antimony.....	11	*	7	0.6			1	*					3	*						
Selenium.....	189	1.7			189	4.4														
Other metals.....	603	5.3	57	4.8	197	4.6	11	2.2	29	8.6	86	12.0	83	5.0	100	4.5	35	25.2	5	1.7
Nitrogen oxides.....	7	*	1	*	4	*											2	1.4		
Infection.....	164	1.5	1	*									163	9.9						
Alcohols, esters and ether.....	105	1.0	1	*	47	1.1	13	2.6			35	5.0	6	*	3	*				
Halogenated hydrocarbons.....	10	*											7	*	3	*				
Ink.....	23	*			10	*							8	0.5	5	*				
Lacquer.....	53	0.5	1	*			13	2.6	3	0.9	21	2.9			2	*			5	1.7
Oil.....	108	1.0	9	0.8	18	*					34	4.8	24	1.5	7	*	16	11.5		
Organic solvents.....	234	2.1	13	1.1	69	1.6	13	2.6	4	1.2	19	2.7	72	4.4	33	1.5	1	0.7	10	3.4
Petroleum.....	992	8.8	28	2.8	230	5.4	44	8.6	3	0.9	45	6.3	474	28.8	137	6.2	15	10.8	16	5.5
Paint.....	106	0.9	5	*	36	0.9	2	*			13	1.8	2	*	17	0.8	9	6.5	22	7.5
Other salts.....	102	0.9	6	0.5	48	1.1					36	5.1			11	0.5			1	*
Sulphur.....	18	*													16	0.7	2	1.4		

*—Denotes less than 1/2 of 1%.

Chlorine	31	*	-	-	12	5.0	5.0	13.1	10.4	190	4.1	2	2.5	43	10.3	589	5.6	61	6.2	761	3.9	1336	6.5	1093	15.5	
Arsenic	4	*	-	-	-	-	-	-	-	3	*	-	-	-	-	-	-	-	-	12	-	-	-	-	-	
Chromium	588	0.6	131	0.9	27	*	-	-	-	13	*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	
Cadmium	191	*	5	*	3	*	-	-	-	-	-	-	-	-	-	-	-	-	-	169	0.9	176	0.9	21	*	
Manganese	270	*	2	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	122	0.6	49	*	6	*	
Lead	3721	3.8	367	2.5	278	2.6	54	7.4	239	0.9	4	-	-	-	-	-	-	-	-	29	-	78	*	-	-	
Antimony	270	*	6	*	1	-	3	-	1	-	-	-	-	-	-	-	-	-	-	84	0.8	-	-	-	-	
Other metals	21866	22.4	3777	26.2	2169	20.5	148	20.2	1226	2.9	529	11.1	36	45.7	5	1.2	199	1.9	18	1.5	651	3.3	1113	5.4	245	3.5
Nitrogen oxides	98	*	2	*	2	*	-	-	-	-	6	-	-	-	-	-	8	*	-	-	2748	14.1	201	1.0	7	-
Infectious	178	*	-	-	2	-	4	0.6	8	-	3	-	-	-	-	-	3843	36.5	242	24.4	36	-	5502	26.9	1540	22.0
Alcohols, esters and ether	1378	1.4	155	1.1	225	2.1	68	9.3	-	-	105	2.2	-	-	-	-	-	-	-	66	-	37	-	10	-	
Halogenated hydrocarbons	417	*	12	*	109	1.0	1	-	-	-	127	2.7	-	-	3	0.7	54	0.5	1	*	420	2.2	239	1.2	26	*
Ink	138	*	46	*	51	0.5	68	9.3	13	-	41	0.9	-	-	-	-	5	*	-	-	154	0.8	69	-	26	*
Lacquer	964	1.0	-	-	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	74	-	52	-	4	*	
Oil	3627	3.7	332	2.3	326	3.1	22	3.0	135	1.6	126	2.6	-	-	19	4.6	33	*	5	0.5	302	1.6	271	1.3	30	*
Organic solvents	4839	4.9	1012	7.0	673	6.4	208	28.4	85	1.0	274	5.8	8	10.1	43	10.3	796	7.6	6	0.6	872	4.5	904	4.4	107	1.6
Petroleum	7818	8.0	524	3.6	1050	9.9	266	36.4	552	6.6	808	17.0	5	6.3	5	1.2	261	2.5	60	6.1	1038	5.3	938	4.6	239	3.4
Paint	2061	2.2	151	1.1	324	3.1	26	3.6	40	0.5	185	3.9	37	46.9	43	10.3	319	3.0	129	13.0	2216	11.4	1295	6.3	649	9.3
Phosphorus	9	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48	0.5	34	3.4	4	-	49	2.3	240	3.5
Other salts	233	*	11	*	26	*	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	82	*	-	-	
Sulphur	125	*	10	*	16	*	-	-	-	-	-	-	-	-	1	-	-	-	-	41	-	39	*	2	-	

*—Denotes less than $\frac{1}{2}$ of 1%

TABLE 117—IRON AND STEEL, MACHINERY AND VEHICLE INDUSTRY—EXPOSURES TO SPECIFIC MATERIAL

Materials	All iron and steel industries in survey	Number and percentage of total exposures to the specified materials																							
		Agricultural implements		Automobile and factory accessories		Auto repair shops		Blast furnaces		Car and railroad shops		Ship and boat building		Carriages and wagons		Founderies		Machine shops		Small machinery, implements, instruments		Heavy machinery		Other	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Total number of workers	97,879	14,434		10,600		733		8,385		4,763		79		417		10,521		991		19,508		20,470		6,978	
Number of exposures	135,347	19,573		14,894		1,590		7,178		4,966		146		394		24,407		1,424		23,438		29,435		7,902	
Acids, organic	62	3	4.8					10	16.1	21	33.9									21	33.9	5	8.1	2	3.2
Acids, mineral	2,143	163	7.6	165	7.7	19	0.9	530	24.6	118	5.5					65	3.2	3	0.1	536	25.0	375	17.5	169	7.9
Accelerators	15																			14	98.3			1	6.7
Aldehydes	1,621	457	28.2	139	8.6			16	1.0	33	2.0					227	14.0	5	0.4	288	17.8	329	20.3	124	7.5
Alkalies	2,639	124	4.7	277	10.5	79	3.0	775	29.4	262	9.9			3	0.2	94	3.6	2	0.1	551	20.9	270	10.2	205	7.7
Anilines	1	1	100.0																						
Amines	2																								
Chemicals	190	34	17.9	8	4.2			40	21.1	5	2.6									43	22.6	17	9.0	12	6.3
Coal tar products	605	149	21.4	159	22.9	6	0.9	7	1.0	57	8.2					31	16.3			156	22.4	137	19.7	17	2.5
Cyanides	907	25	3.1	73	9.0			6	0.7	8	1.0					8	1.0	20	2.5	361	44.8	203	25.1	103	12.8
Asbestos	59			19	32.2					21	35.6											19	32.2		
Coal dust, bituminous	917	53	5.8	12	1.4			198	21.6	76	8.3	22	2.4	3	0.3	210	22.9	6	0.7	107	11.7	193	21.0	37	3.9
Coal dust, anthracite	3	6	100.0																						
Silica dust	12,957	1585	12.2	1107	8.6	2	*	133	1.6	765	1.3					6451	49.8	1	*	1137	8.8	2332	18.0	44	0.2
Silicate dust	15,791	2054	13.0	1504	9.6	24	0.2	454	2.9	272	1.7	1	*	8	0.1	6560	41.6	74	0.5	1666	10.6	2962	18.7	212	1.0
Non-siliceous dust	7,497	1235	16.5	713	9.5	39	0.5	154	2.1	20	0.3			3	0.1	1671	22.3	77	1.0	1234	16.5	1977	26.4	374	4.8
Organic dust	7,004	730	10.0	1062	15.2	34	0.5	122	1.7	22	3.2	29	0.4	66	0.9	1280	18.3	77	0.4	1411	20.2	1834	26.2	188	2.6
Dye	45	6	13.3					2	4.4											17	37.8	18	40.1		
Dermatitis	18,278	3583	19.6	1650	9.0	28	0.2	332	1.8	245	1.3					752	4.1	612	3.4	5020	27.5	4798	26.2	1224	6.7
Fluorides	529	2	0.4	1	0.2			244	46.3	30	5.7					70	13.2			65	12.3	69	13.0	48	8.9
Carbon monoxide	8,294	1602	19.4	2088	25.2	395	4.8	803	9.7	162	2.0	2	*	38	0.5	712	8.6	41	0.5	537	6.5	1018	12.3	3	10.4
Hydrogen sulphide	7							7	100.0																
Sulphur dioxide	131							24	18.3	86	65.6									7	5.3	14	10.8		
Other gases	6,894	1231	17.9	619	9.0	96	1.4	867	12.6	196	2.9	2	*	43	0.6	589	8.6	61	0.9	761	11.0	1336	19.4	1093	15.6
Chlorine	31			12	38.7			4	12.9	4										12	38.7	3	9.7		
Arsenic	4							3	75.0	1										1	25.0				
Chromium	588	131	22.3	27	4.6			13	2.2	29	4.9					21	3.6	1	0.2	169	28.8	176	30.0	21	3.4
Cadmium	191	5	2.6	3	1.6											6	3.1			122	63.9	49	25.7	6	3.1
Manganese	270	2	0.7					73	27.0	4	1.5					84	31.1			29	10.8	78	28.9		
Lead	3,721	357	9.6	278	7.5	54	1.5	239	6.4	529	14.2	36	1.0	5	0.1	199	5.3	15	0.4	651	17.5	1113	30.0	245	6.5
Antimony	270	6	2.2	1	0.4	3	1.1	1	0.4	6	2.2					8	3.0			37	13.7	201	74.4	7	2.6
Other metals	21,866	3777	17.3	2169	9.9	148	0.7	1226	5.6	593	2.7	4	*	74	0.3	3843	17.6	242	1.1	2748	12.6	5502	25.2	1540	6.9
Nitrogen oxides	98	2	2.0	2	2.0			8	8.2	3	3.1									36	36.7	37	36.8	10	11.2
Infection	178									105	59.0														
Alcohols, esters and ether	1,318	155	11.8	225	17.1	68	5.2			127	9.6					54	4.1	1	0.6	66	37.0				
Halogenated hydrocarbons	417	12	2.9	109	26.1	1	0.2			41	9.8					5	1.2			420	31.9	239	18.2	26	1.8
Ink	138							4	2.9											154	36.9	69	16.6	26	6.3
Lacquer	964	46	4.8	51	5.3	68	7.1	13	1.4	126	13.1			19	2.0	33	3.4			74	53.6	52	37.7	4	2.9
Oil	3,627	332	9.2	326	9.0			135	3.7	126	3.5			1	*	796	22.0			802	31.3	271	28.1	30	3.0
Organic solvents	4,839	1012	20.9	673	13.9	208	4.3	85	1.8	274	5.7					261	5.4	60	1.2	1038	21.4	938	19.4	239	4.9
Petroleum	7,818	524	6.7	1050	13.4	266	3.4	552	7.1	808	10.3	5	0.1	43	0.9	319	4.1	129	1.8	2216	28.3	1295	16.6	649	8.1
Paint	2,061	151	7.3	324	15.7	26	1.3	40	1.9	185	9.0	37	1.8	43	2.1	48	2.3	34	1.7	454	22.1	479	33.3	240	1.5
Phosphorus	9																			9	100.0				
Other salts	233	11	4.7	26	11.2			67	28.7											41	17.6	82	35.2	2	0.9
Sulphur	125	10	8.0	16	12.8					3	2.4					4	1.7			55	44.0	39	31.2	1	0.8

*—Denotes less than 0.1%

TABLE 139—METAL INDUSTRIES (EXCEPT IRON AND STEEL)—EXPOSURES TO SPECIFIC METALS

Materials	Number and percent of workers exposed									
	All metal industries in survey	Brass mills, screens and weather strips	Clock and watch factories	Copper factories	Gold and silver	Jewelry	Lead and zinc	Tinware, enamelware	Aluminum	Metal specialties and novelties
	No.	%	No.	%	No.	%	No.	%	No.	%
Total number of workers.....	33,154	5,302	3,471	607	50	221	5,291	6,142	666	5,267
Number of plants.....	411	66	7	6	4	6	57	44	16	80
Other										
Electroplating										
Other										
Acids, organic.....	172	0.5	16	0.5	4	8.0	108	2.0	4	0.6
Acids, mineral.....	2018	6.1	62	1.8	4	8.0	257	4.9	4	0.6
Aldehydes.....	2	0.0	4	0.0	0	0.0	0	0.0	0	0.0
Alkalis.....	197	0.6	39	0.7	0	0.0	41	0.8	0	0.0
Alkylates.....	1739	5.3	178	3.4	19	38.1	115	2.2	27	4.4
Chlorides.....	137	0.4	6	0.5	2	4.0	56	1.1	4	0.6
Chloroalkanes.....	203	0.6	5	0.0	3	6.0	21	0.4	2	0.3
Coal tar products.....	1007	3.0	49	1.4	2	4.0	23	0.4	0	0.0
Cyanides.....	43	0.1	10	0.3	0	0.0	10	0.2	0	0.0
Fluorides.....	654	2.0	16	0.5	0	0.0	547	10.4	4	0.6
Coal dust bituminous.....	204	0.6	3	0.0	2	4.0	201	3.8	0	0.0
Coal dust anthracite.....	2752	8.3	92	2.7	2	4.0	134	2.5	153	23.0
Silica dust.....	3183	9.6	804	15.2	9	18.0	231	4.4	203	3.8
Silicates dust.....	2753	8.3	551	10.4	14	28.0	502	9.6	310	5.9
Non-siliceous dust.....	2602	7.9	478	9.0	14	28.0	356	6.7	105	1.8
Organic dust.....	17	0.0	1	0.0	0	0.0	0	0.0	0	0.0
Dye.....	5432	16.4	890	13.7	2	4.0	566	10.7	137	2.6
Fluorides.....	337	1.0	23	0.7	1	2.0	198	3.8	14	0.2
Carbon monoxide.....	2011	6.1	303	5.7	0	0.0	1056	20.0	81	1.7
Hydrogen sulphide.....	482	1.5	11	0.3	0	0.0	422	8.0	87	1.3
Sulphur dioxide.....	2343	7.1	6	0.0	1	2.0	995	18.8	1	0.0
Chlorine.....	266	0.8	15	0.4	0	0.0	222	4.2	0	0.0
Arsenic.....	1029	3.1	141	2.7	0	0.0	58	1.1	169	3.2
Chromium.....	1044	3.2	16	0.5	0	0.0	562	10.6	160	3.0
Cadmium.....	11	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Mercury.....	168	0.5	10	0.3	0	0.0	156	2.9	0	0.0
Manganese.....	4624	13.9	894	16.8	0	0.0	1893	35.9	676	11.0
Lead.....	615	1.9	20	0.6	0	0.0	346	6.6	1	0.0
Antimony.....	135	0.4	0	0.0	0	0.0	0	0.0	0	0.0
Other metals.....	8107	24.4	1517	28.6	31	62.0	2063	39.1	386	7.3
Nitrogen oxides.....	333	1.0	24	0.5	2	4.0	45	0.9	0	0.0
Infection.....	634	1.9	33	0.6	8	16.0	22	0.4	3	0.5
Alcohol, esters and ethers.....	313	0.9	53	1.0	2	4.0	15	0.3	25	0.5
Halogenated hydrocarbons.....	243	0.7	11	0.2	0	0.0	106	2.0	1	0.0
Ink.....	535	1.6	37	0.7	3	6.0	70	1.3	8	0.1
Lacquer.....	739	2.2	215	4.1	0	0.0	161	3.0	144	2.7
Oil.....	1537	4.6	91	1.7	8	16.0	27	0.5	15	0.2
Organic solvents.....	2161	6.5	463	8.7	15	30.0	32	0.6	141	2.6
Petroleum.....	341	1.0	21	0.4	0	0.0	253	4.8	8	0.1
Faint.....	250	0.8	14	0.3	0	0.0	10	0.2	2	0.0
Phosphorus.....	201	0.6	6	0.1	0	0.0	1	0.0	27	0.4
Other salts.....										
Sulphur.....										

*—Denotes less than 1/2 of 1%

TABLE 174—LUMBER AND FURNITURE INDUSTRIES—EXPOSURES TO SPECIFIED MATERIALS

TABLE 174—LUMBER AND FURNITURE INDUSTRIES—EXPOSURES TO SPECIFIED MATERIALS															
SPECIFIED MATERIALS					All lumber and furniture industries in survey	Number and percentage of total exposures to the specified materials									
						Furniture		Caskets		Piano, organs, etc.		Planing and milling		Other wood-working	
workers exposed					15,254	9,008		1,032		1,733		341		3,140	
					14,049	8,487		1,149		1,178		229		3,006	
Total number of workers.....															
Total number of exposures.....															
						No.	%	No.	%	No.	%	No.	%	No.	%
3	341		3,140		5	2	40.0			1	20.0			2	40.0
1	10		91		107	24	22.4	67	62.7	3	2.8	4	3.7	9	8.4
	No.	%	No.	%	112	1	50.0		50.0					22	19.6
					2	36	32.2	45	40.1	5	4.5	4	3.6	1	50.0
*					2	1	50.0							72	43.8
*	4	1.2	2	*	164	34	20.8	13	7.9	2	1.3	43	26.2	3	7.2
*	4	1.2	22	0.7	42	12	28.6	21	50.0	4	9.5	2	4.7		
*	43	12.6	72	2.3	2	2	100.0	10	7.9	13	10.2	3	2.4	42	33.0
*	2	0.6	3	*	127	59	46.5	50	28.9	54	31.2			7	4.1
8					173	62	35.8	19	4.4	87	20.3	5	1.2	77	17.9
0					429	241	56.2	54	25.4	20	9.4			32	15.2
2					212	106	50.0	54	25.4	518	7.7	145	2.1	1530	22.6
8	145	42.5	1530	48.7	6,759	4330	64.1	236	3.5	50	11.3			71	16.2
9					441	316	71.6	4	0.9	12	4.1			24	8.2
7					293	190	64.8	67	22.9						
*					8	8	100.0							22	52.3
9					42	13	31.0	2	4.8	5	11.9			25	21.8
*					115	66	57.4	8	6.9	16	13.9			2	100.0
1					2									2	4.4
*					46	29	63.0	15	32.6	3	1.0			53	18.9
0					281	32	11.4	13	100.0						
1	2	0.6	98	3.1	13			119	28.8	37	9.0	2	0.5	98	23.7
*					414	158	38.0	22	100.0						
9					22			167	100.0						
*					1,027	654	63.7	68	6.6	87	8.5	2	0.2	216	21.0
1					40	11	27.5	2	5.0					27	67.5
*					52	10	19.2	1	1.9	4	7.7	3	5.8	34	65.4
0					940	592	63.0	52	5.5	88	9.4	2	0.2	206	21.9
1	2	0.6	98	3.1	340	259	76.3	7	2.0	26	7.6	3	0.9	45	13.2
*					854	570	66.7	14	1.6	59	6.9	4	0.7	208	24.4
0					544	381	70.0	32	5.9	81	14.9	4	0.7	46	8.5
*					252	118	46.7	1	0.4	3	1.2	1	0.4	129	51.3
1					6	2	33.3					3	50.0	1	16.7
1					14	1	7.2	13	92.8						

TABLE 175—PERCENT OF WORKERS EXPOSED TO SPECIFIED MATERIALS HAVING INDICATED TYPE OF HAZARD CONTROL—LUMBER AND FURNITURE INDUSTRIES

TYPE OF HAZARDOUS MATERIAL		Percent of exposed workers having specified control								
Materials	Number of exposures	Positive ventilation	Negative ventilation	Local exhaust	Isolation	Wet method	Gas masks	Respirators	Pressure helmets	Other
All specified materials	14,049	0.8	1.6	36.7	0.2	1.6		1.5		1.8
Organic dust	6,759	1.0	1.3	49.4		0.3		0.4		0.3
Alcohols, esters and ether	1,027	0.7	1.1	47.2	0.1			3.1		0.3
Lacquer	940	0.8	2.1	49.5	0.1			7.2		0.4
Organic solvents	854		1.3	15.3				0.9		3.8
Petroleum	544		1.1	2.6				3.4		0.6
Dye	441	4.1	0.2	21.5	0.9	0.2		0.2		3.2
Silicate dust	429	0.5		9.8		32.1		4.1		4.8
Other metals	414	0.5	2.4	34.5	0.7	3.1				1.2
Oil	340	1.5	0.3	1.5						15.0
Dermatitis	293		1.7					1.1		1.1
Lead	281			2.5				4.4		4.8
Paint	252	0.4	2.0	20.6		9.9		1.9		
Non-siliceous dust	212		2.9	45.2	0.6	13.3		0.6		
Silica dust	173	1.2		50.8						
Infection	167			25.6				3.7		7.6
Coal tar products	164	0.6				3.9				0.9
Coal dust, bituminous	127		8.7	4.2	7.0			7.0		23.0
Other gases	115		10.7	16.0	9.8					21.5
Alkalies	112	0.9	7.5	8.4	3.7					
Acids, mineral	107									13.0
Ink	52		13.0	63.0						23.8
Chromium	46		23.8	26.2						
Cyanide	42									7.5
Halogenated hydrocarbons	40		10.0		5.0					
Carbon monoxide	42	4.8	19.1	69.1						71.5
Nitrogen oxides	22		2.7							
Sulphur	14			7.7						
Antimony	13		25.0	25.0						
Fluorides	8									
Other salts	6									
Acids, organic	5	20.0		50.0						
Aldehydes	2									
Anilines	2									
Asbestos	2									
Chlorine	2									

and these aged rod-
a 49
able
able
was
eva-

re-
ere
als.
um.
oc-
as-
en-
in-

e-
re
ls.
id
is
n
n
n

1

TABLE 220—MISCELLANEOUS MANUFACTURING INDUSTRIES—EXPOSURES TO SPECIFIED MATERIALS

The material on this page was copied from the collection of the National Library of Medicine by a third party and may be protected by U.S. Copyright law

TABLE 247—MAJOR EXPOSURES OF THE CHIEF OCCUPATIONS IN THE SCIENTIFIC INSTRUMENT MANUFACTURING INDUSTRY

Number of Workers in Survey.....1842
 Number of Workers Exposed.....968
 Percent of Workers Exposed.....52.4%
 Number of Exposures per Person Exposed.....1.7

Occupation	Dermatitis producers	Other metals	Lead	Organic dust	Petroleum	Silicate dust	Non-siliceous dust	Other organic solvents	Alcohols, esters and ethers	Lacquer	Alkalies
Number of workers exposed.....	298	145	133	124	118	110	90	79	70	60	45
Percent of workers exposed.....	16.2	7.9	7.2	6.7	6.4	6.0	4.9	4.3	3.8	3.7	2.4
Machine press operators, (machine hands).....	•	•			•		•				
Tool and die makers.....	•	•		•	•	•	•				
Grinders and polishers.....	•	•				•	•				
Grinders (metal).....	•	•									
Lathe operators.....	•	•						•			
Lathe operators, sprayers.....	•	•							•	•	
Welders.....		•	•		•				•	•	
Assemblers.....			•							•	
Molders.....			•							•	
Sheet metal workers (tinsmiths).....			•								
Coil winders.....			•								
Shippers, packers.....											
Carpenters (cabinet makers) (pattern makers).....											
Banders.....											
Grinders.....											

TABLE 248—PERCENT OF WORKERS EXPOSED TO SPECIFIED MATERIALS HAVING INDICATED TYPE OF HAZARD CONTROL—SCIENTIFIC INSTRUMENT INDUSTRY

Materials	Number of exposures	Percent of exposed workers having specified control								
		Positive ventilation	Negative ventilation	Local exhaust	Isolation	Wet method	Gas masks	Respirators	Pressure helmets	Other
All specified materials	1,604	4.2	5.8	26.4	0.2	11.1	-----	5.7	-----	3.4
Dermatitis	298	4.7	6.7	-----	-----	-----	-----	-----	-----	1.3
Other metals	145	2.1	6.2	36.6	-----	30.4	-----	5.5	-----	4.2
Lead	133	2.3	7.5	18.8	-----	-----	-----	0.8	-----	1.5
Organic dust	124	-----	-----	51.6	-----	2.4	-----	-----	-----	4.0
Petroleum	118	11.8	-----	6.8	-----	-----	-----	-----	-----	12.7
Silicate dust	110	-0.9	-----	9.1	2.7	76.0	-----	-----	-----	-----
Non-siliceous dust	90	-----	7.8	49.0	-----	41.0	-----	8.9	-----	-----
Organic solvents	79	10.1	8.9	36.7	-----	-----	-----	17.7	-----	1.3
Alcohols, esters and ether	70	7.2	5.7	61.5	-----	-----	-----	30.0	-----	-----
Lacquer	69	5.8	11.6	68.2	-----	-----	-----	34.8	-----	-----
Alkalies	45	2.2	-----	6.7	-----	-----	-----	-----	-----	8.9
Acids, mineral	43	-----	21.0	23.2	-----	-----	-----	-----	-----	21.0
Silica dust	34	-----	-----	70.5	-----	29.4	-----	-----	-----	-----
Other gases	32	-----	12.5	12.5	-----	-----	-----	-----	-----	-----
Mercury	26	-----	23.0	-----	-----	-----	-----	-----	-----	-----
Halogenated hydrocarbons	18	-----	-----	-----	-----	-----	-----	-----	-----	-----
Oil	18	-----	16.7	27.8	-----	-----	-----	-----	-----	-----
Paint	18	5.6	-----	22.2	-----	-----	-----	-----	-----	-----
Coal tar products	17	17.6	-----	17.6	-----	-----	-----	-----	-----	11.7
Cyanide	16	-----	-----	18.7	-----	-----	-----	-----	-----	-----
Fluorides	15	-----	20.0	33.3	-----	-----	-----	-----	-----	-----
Chemicals	14	7.1	-----	-----	-----	-----	-----	-----	-----	-----
Carbon monoxide	14	-----	7.1	21.4	-----	-----	-----	91.0	-----	-----
Dye	11	-----	-----	91.0	-----	-----	-----	-----	-----	33.3
Asbestos	9	-----	-----	100.0	-----	-----	-----	-----	-----	-----
Chromium	9	11.1	-----	77.7	-----	-----	-----	55.5	-----	-----
Ink	9	44.4	-----	55.5	-----	-----	-----	-----	-----	-----
Nitrogen oxides	7	-----	28.5	57.0	-----	-----	-----	-----	-----	-----
Coal dust bituminous	6	16.7	-----	-----	-----	-----	-----	-----	-----	33.3
Cadmium	3	-----	-----	33.3	-----	-----	-----	-----	-----	100.0
Aldehydes	2	100.0	-----	-----	-----	-----	-----	-----	-----	-----

TABLE 249—MAJOR EXPOSURES IN PLASTIC MOLDING AND

Number of Workers in Survey.....
 Number of Workers Exposed.....
 Percent of Workers Exposed.....
 Number of Exposures per Person Exposed.....

Occupation	Coal tar products	Organic dust	Alkalies
Number of workers exposed.....	481	306	1
Percent of workers exposed.....	39.2	24.9	0.1
Fabricators.....	•		
Molders (machine-press).....	•		
Mechanics (machine hands).....	•	•	
Buffers, polishers, finishers.....	•		
Saturators.....	•		
Mixers.....		•	
Weighers.....		•	
Laborers.....		•	
Trimmers, cutters.....		•	
Cleaners and wrappers.....		•	
Die and tool makers.....		•	
Sheet metal workers.....		•	

TABLE 250—PERCENT OF WORKERS EXPOSED TO SPECIFIED MATERIALS HAVING INDICATED TYPE OF HAZARD CONTROL—PLASTIC MOLDING AND

Materials	Number of exposures	Positive ventilation	Negative ventilation
All specified materials.....	1,558		18.7
Coal tar products.....	481		2.9
Organic dust.....	306		4.2
Petroleum.....	189		
Aldehydes.....	118		
Silicate dust.....	95		
Silica dust.....	80		
Coal dust anthracite.....	63		
Dermatitis.....	59		7.1
Other metals.....	53		
Non-siliceous dust.....	23		
Acids, mineral.....	21		
Alcohols, esters and ethers.....	19		8.3
Lacquer.....	12		
Paint.....	9		
Oil.....	7		57.2
Organic solvents.....	7		
Dye.....	6		
Coal dust, bituminous.....	6		
Halogenated hydrocarbons.....	2		
Alkalies.....	1		
Cyanide.....	1		