American Journal of Industrial Medicine 24:413–425 (1993)

Job Tasks, Potential Exposures, and Health Risks of Laborers Employed in the Construction Industry

G. Burkhart, MD, P.A. Schulte, PhD, C. Robinson, PhD, W.K. Sieber, PhD, P. Vossenas, MPH, and K. Ringen, DrPH

Construction laborers have some of the highest death rates of any occupation in the United States. There has been very little systematic research focused exclusively on "laborers" as opposed to other workers in the construction industry. We reviewed the English language literature and various data bases describing the occupational tasks, exposures, and work-related health risks of construction laborers. The sources of information included 1) occupational mortality surveillance data collected by the states of California and Washington and the National Institute for Occupational Safety and Health (NIOSH); 2) National Occupational Exposure Survey; 3) national fatality data; 4) cancer registry data; and 5) case reports of specific causes of morbidity. While the literature reported that construction laborers have increased risk for mesothelioma, on-the-job trauma, acute lead poisoning, musculoskeletal injury, and dermatitis, the work relatedness of excess risks for all-cause mortality, cirrhosis, cerebrovascular disease, chronic obstructive pulmonary disease, ischemic heart disease, and leukemia is less clear. Furthermore, while laborers are known to be potentially exposed to asbestos, noise, and lead, and the NIOSH Job Exposure Matrix describes other potential hazardous exposures, little research has characterized other possible exposures and no research has been found that describes the exposures associated with specific job tasks. More advanced study designs are needed that include a better understanding of the job tasks and exposures to construction laborers, in order to evaluate specific exposure-disease relationships and to develop intervention programs aimed at reducing the rate of work-related diseases.

Key words: laborer, construction, sand hog, hauler, unskilled trades, occupational hazards, noise, OSHA exemptions, fatal injuries, eczema, black mortality, no-collar workers

INTRODUCTION

Currently, there are approximately 5 million workers employed in the construction and demolition of buildings, highways, sewers, utilities, pipelines, tunnels, shipyards, and power plants, i.e., the construction industry. Construction workers can be grouped broadly into manual laborers and the skilled laborers; the latter group

Food and Drug Administration (G.B.), Rockville, M.D.
National Institute for Occupational Safety and Health, Cincinnati, OH (P.A.S., C.R., W.K.S.).
International Labor Rights Education and Research Foundation, Washington, DC (P.V.).
Center to Protect Workers' Rights, Washington, DC (K.R.).
Address reprint requests to Dr. P.A. Schulte, National Institute for Occupational Safety and Health, 4676 Columbia Parkway, MS-R42, Cincinnati, OH 45226.
Accepted for publication November 13, 1992.

TABLE I. Job Subclassifications of Construction Laborers*

Aggregate weighmen	Flagmen	Rubbing of concrete
Asbestos removal	Flaremen	Salamander heat
Asphalt kettlemen	Form liners and tampers	Sandblaster pot tender
Asphalt saw operators	Form oilers	Sandblaster, nozzlemen
Asphalt takers	Form setters	Sandblasting
Asphalt tampers	Gas service men	Sawmen and trimmers
Batch dumpmen on levers	Gravel box men	Scaffold men
Blade grade operators	Gunnite nozzlemen	Scaffold work
Bottom men sewer	Gypsum handlers	Servicing of all vibrators
Brick setters	Handling/conveying creosote	Shoring and bracing
Carpenter tender	Handling creosote	Signal man
Carrying reinforcement rods	Hod carriers	Skip men
Caulkers and yarners	Hoppermen	Slip form men on elevator
Cement dumpers	Hot tar and kettlemen	Small boat motorized man
Cement handlers	Housemovers	Striking off concrete
Center steel men	Jackhammer man	String men
Chain saw operator	Laying of steel mesh	Swampers, crane, tractor
Chip spreaders	Lead and leadite burners	Tending all types heaters
Compressed air workers	Machine cleaners	Tile & pipe layers
Concrete chippers and grinders	Mason tender	Tool room man
Concrete form strippers	Mat weaver	Top man
Concrete puddlers	Mixing asphalt emulsion	Track layers, railroad
Concrete saw operator	Monorail track layer	Tree trimmers/toppers
Cutters and burners	Mortar men	Truck helpers
Debris cleaning and cleaning	Motorized concrete buggyman	Tunnel & shaft miners
Deck hands on boats	Muckers	Unskilled laborers
Dirt spotters	Pile driver tender	Watchmen, guards
Dismantlers	Pipe wrapping machine man	Water distributors
Drain and tile layers	Plasterers tenders	Windlass man
Drillers	Power tool operator	Woods men
Dynamite shooters	Rip rap stone layer	Wreckers-torch men
Expansion joints	River underwater work	
Explosive handlers	Rock dust handlers	
Fiber optics	Rod and chain man	

*Job subclassifications used by the Laborers International Union of Northern America. Construction laborers were identified using code 869 [BOC, 1982].

includes painters, plasterers, carpenters, plumbers, electrical workers, structural iron workers, roofers, and others. Construction laborers, the focus of this manuscript, perform manual labor job tasks such as those identified in Table I.

The Bureau of Labor Statistics estimates that of the 5 million construction workers, 681,000 are laborers [North Carolina DOL, 1991]. Approximately 340,000 manual construction laborers are active members in the Laborers International Union of North America (LIUNA), making it the largest union of construction laborers in the United States. Construction laborers are also represented by the American Federation of State, County and Municipal Employees Union, the Service Employees' International Union, the Teamsters, and a few others.

It was our purpose to identify reports on job tasks, exposures, and health risks to laborers employed in the construction industry. We searched the English language literature within the following data bases: Toxline and Medline, both maintained by the U.S. National Library of Medicine; HSEline, maintained by the U.K. Health and Safety Executive; and the NIOSHTIC data base, maintained by the National Institute for Occupational Safety and Health (NIOSH). Most of the citations in these data bases are from early 1966 forward. We utilized the search terms, ''construction,'' ''laborer,'' ''worker,'' ''sand-hog,'' ''dynamite blaster,'' ''hauler,'' ''concrete finisher and pounder,'' and attempted to constrain the review to laborers employed in the construction industry. We also utilized the job task classification information from LIUNA to characterize the broad range of laborers' work.

CONSTRUCTION LABORER JOB TASKS AND EXPOSURES

In contrast to the construction ''skilled'' trades such as carpenters and painters, laborers are workers who perform a variety of job tasks, as reflected by Table I which lists the subclassifications used by the local unions of LIUNA to dispatch laborers to a construction site. Because of the varied work experience, laborers could be expected to have many occupational exposures. The hypothesis that laborers are exposed to many physical and chemical agents is supported, in part, by potential exposure data collected by NIOSH. Utilizing exposure data derived from the National Occupational Exposure Survey, NIOSH has developed a Job Exposure Matrix (JEM) which estimates the number of workers in specific occupations who are potentially exposed to hazardous physical and chemical agents [Sieber et al., 1991; NIOSH, 1988, 1990 a, b]. The JEM indicates that construction laborers may be exposed at the job site to asbestos, inorganic lead, solvents, carbon monoxide, continuous noise, and many other agents. A list of these exposures and the estimated number of workers exposed is shown in Table II. The JEM does not include quantitative measures of levels of exposure to hazardous agents.

Actual exposure data collected at construction sites confirm that laborers are exposed to excessive levels of lead [Marino et al., 1987; CDC, 1989; Tepper et al., 1992]. Construction work, specifically, has been exempted from the revised Occupational Safety and Health Administration (OSHA) occupational lead standard (29 CFR Section 1910.1025) and as a result, reports of high lead exposure and acute lead poisoning in construction workers are not uncommon [Marino et al., 1987; CDC, 1989], although laborers are rarely surveyed. Asbestos exposure and noise-induced hearing loss are both problems throughout the construction industry [Sprince et al., 1985; Michaels and Zoloth, 1988; CDC, 1988; Steiner, 1990]. Asbestos exposure appears to occur during the demolition of existing structures and during construction or installation of insulation materials.

Despite the examples cited above regarding the exposure of laborers to asbestos, lead, and noise, little research has characterized the extent of these and other likely exposures. Also, no exposure data have been published that address more specific issues such as the variation in exposures by type of construction, among construction sites, or among job tasks.

The scarcity of information characterizing occupational exposures is paralleled by a general lack of information regarding the job tasks performed by laborers. While there is a (relatively) large number of potential job tasks which could be performed by individual laborers over time (Table I), little characterization of these tasks has occurred. For example, it would be informative to know if and how job selection

TABLE II. Potential Exposures of Construction Laborers*

Potential exposure	Estimated number of employees exposed
Products of combustion-diesel fuels	128,399
Segmental vibration	110,711
Calcium carbonate	109,721
Continuous noise	107,881
Sand	91,887
Titanium Oxide (TiO_2)	84,443
Products of combustion-gasoline (leaded)	83,408
Concrete	82,445
Silica	75,237
Cement-Portland	72,663
Toluene	72,439
Limestone	67,357
Woods	65,964
Diesel fuel No. 2	54,766
Xylene	52,870
Iron Oxide (FE_2O_3)	52,541
Asphalt	51,370
Butanone, 2-	49,042
Gasoline-leaded	48,538
Petroleum distillates, hydrotreated heavy napthenic	41,009
Calcium sulfate	39,882
Oil, motor	39,468
Adhesive, synthetic resin	36,343
Gypsum	36,038
Calcium oxide	34,599
Products of combustion-jet fuel and unleaded gasoline	34,539
Calcium chloride	34,499
Sealants	33,375
Hydrochloric acid	33,242
Calcium hydroxide	32,953
Curing agent	32,315
Carbon dioxide	28,483
Oil, NEC**	27,759
Kaolin	26,641
Caulking compound	25,567
Waterless hand cleaner	23,973
Inorganic lead	23,121
Nitrilotriethanol, 2,2′,2″−	20,825
Propylene glycol	20,630
Acetone	20,215
Vermiculite	19,194
Abrasive, grinding	19,172
Lubricants	18,889
Aluminum silicate	18,022
Ethylene glycol	17,798
Oleic acid	17,266
Plaster of paris	15,840
Grease	14,792
Asbestos	14,457
White mineral oil	14,221
Cleaning compound	14,086
Paint	12,795

(continued)

TABLE II. Potential Exposures of Construction Laborers (Continued)*

Potential exposure	Estimated number of employees exposed
Petroleum resins	12,406
Coating, NEC	11,614
Welding rod ARW	11,044
Naphtha	10,502
Tall oil	9,615
Carbon monoxide	7,151
Elevated temperature	5,860
Mold release agents	5,732
Perlite	5,584
Chlorinated paraffin	4,461
Nitrogen oxide	3,337
Diesel fuel No. 1	3,064
Hardener	2,225
Calcium peroxide	2,193
Oil, lube	1,707
Steel	1,616
Calcium aluminum ferrite	862
Gasoline, lead content unknown	592
Polysulfide polymer	467

*Derived from the Job Exposure Matrix utilizing data from the National Occupational Exposure Survey conducted by NIOSH between 1981 and 1983 [NIOSH, 1988, 1990a, b]. Construction laborers were identified using code 869 [BOC, 1982].
**NEC, not elsewhere classified.

factors, such as worker training, required skill for a specific task, the inherent risk of a task, and pay differentials between tasks, might influence the specific job tasks performed by individual laborers. We suspect that laborers working with explosives, excavating tunnels, or working below the surface of a body of water may tend to "specialize" at that particular task. Whether or not specialization or job selection occurs, evaluating the variation in occupational exposures and health outcomes among job tasks is of value. We attempted to verify the presence of selection factors by reviewing the LIUNA record system, but neither LIUNA nor its local unions record or track specific job tasks performed by each laborer at construction sites. To date, we have not investigated this issue in other union organizations or in subcontractor records, nor have we surveyed a representative sample of construction laborers.

In addition to the paucity of research characterizing job tasks and exposures among laborers, little research is available to characterize either the general health or the occupational risks faced by laborers employed in the construction industry. In contrast to the skilled trades workers for which some epidemiologic studies have been completed [Matanoski et al., 1986; Stockwell and Matanoski, 1985; NIOSH, 1986; Robinson et al., 1992], only descriptive reports of injuries [Peterson and Milham, 1980; Milham, 1983; CDOH, 1987; Singleton and Beaumont, 1989] and no analytical studies for construction *laborers* have been published in the English language literature. The following discussion reviews the scientific literature and some compiled data bases pertaining to the health status of construction laborers. The following

TABLE III. Proportionate Mortality Ratios (PMRs) for Selected Causes of Death in Male Construction Laborers: NIOSH Occupation Coded Mortality Surveillance Data 1984–1986*

	White		Blacks	
Underlying cause of death[a]	PMRs	No. of deaths	PMRs	No. of deaths
Tuberculosis (10–18, 137)	1.88[c]	(12)	1.41	(17)
Lip, oral cavity, pharynx cancer (140–149)	1.30[c]	(61)	1.02	(37)
Lung cancer (162)	1.13[c]	(894)	0.97	(328)
Mental disorders (290–319)	1.28[c]	(108)	1.24[c]	(88)
Pneumonia and influenza	1.14[c]	(276)	1.06	(119)
Chronic obstructive pulmonary disease (490–519)	1.33	(583)	1.22	(130)
Chronic liver disease & cirrhosis (571, 5,721–5,728)	1.33[c]	(211)	0.98	(72)
Falls (880–888, 9,290–9,291)	1.38[c]	(84)	1.46[c]	(32)
Submersion and suffocation (910–915)	1.71[c]	(97)	1.21	(35)
Homicide (960–969)	1.75[c]	(216)	1.27[c]	(276)
Alcohol associated diseases[b] (291, 303, 3,050, 3,575, 4,255, 5,353, 7,903, 5,710–13, 8,600, 8,601)	1.63[c]	(182)	1.26[c]	(124)

*U.S. Census Occupation Code 869 [BOC, 1982]. Analyses based on occupation-coded death certificate data for 1984–86 provided to the National Institute for Occupational Safety and Health, by 19 U.S. states for evaluation and follow-up. Occupational coding was supported by the National Institute for Occupational Safety and Health, the National Cancer Institute, and the National Center for Health Statistics. The 19 states that contributed their data include Colorado, Georgia, Indiana, Kansas, Kentucky, Maine, Missouri, Nebraska, Nevada, New Hampshire, New Mexico, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Utah, Vermont, and Wisconsin.

[a]Code of the International Classification of Diseases, Ninth Revision, 1977.

[b]Causes of death attributed by the National Center for Health Statistics to alcohol-induced mortality include alcoholic psychoses, alcohol dependence syndrome, nondependent abuse of alcohol, alcoholic polyneuropathy, alcoholic cardiomyopathy, alcoholic gastritis, chronic liver disease and cirrhosis specified as alcoholic, excessive blood level of alcohol and accidental poisoning by alcohol, not elsewhere classified. These causes exclude accidents, homicides, and other causes indirectly related to alcohol use. Source: Monthly Vital Statistics Report 40 (8)(S)2:9, 49, 1992.

[c]PMR significant at $p \leq .05$.

four sources of data were used: 1) occupational mortality surveillance data collected by certain states and NIOSH; 2) national fatality data; 3) cancer registries, and 4) case reports of specific causes of morbidity.

HEALTH STATUS AND OCCUPATIONAL RISKS

Two states which have coded occupation on their mortality data are California and Washington [Peterson and Milham, 1980; Singleton and Beaumont, 1989]. Proportionate mortality of laborers residing in either of these states at the time of their death revealed statistically increased mortality from accidents, cirrhosis, and lung cancer [Peterson and Milham, 1980; Milham, 1983]. Occupation on the death certificate is the "usual" or lifetime occupation of the decedent. Additionally, NIOSH has collected mortality data from death certificates for 876,731 decedents, age 20 and over, from 19 states: Colorado, Georgia, Indiana, Kansas, Kentucky, Maine, Missouri, Nebraska, Nevada, New Hampshire, New Mexico, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Utah, Vermont, and Wisconsin. The deaths included 560,370 white males and 69,564 black males. Table III displays selected proportionate mortality ratios (PMRs) for laborers employed in the construction industry from the NIOSH occupational mortality surveillance data for the years 1984–1986 [Robinson et al., 1993]. Expected deaths were generated utilizing the age-gender-race specific proportional mortality in the general population of the 19 states. Since information regarding nonoccupational risk factors was not available, the PMRs presented in Table III were not adjusted for smoking, alcohol consumption, or socioeconomic status (SES). While the data are specific to construction laborers (occupational census code 869) [BOC, 1982], we do not know the degree of misclassification for occupation as entered upon the death certificates [Schade and Swanson, 1988].

Findings from analysis of the NIOSH data confirm the California and Washington state reports of statistically significant increased proportionate mortality from fatal injuries due to falls or to submersion or suffocation in both white and black construction laborers and significantly increased proportionate mortality from lung cancer and cirrhosis in whites. Additional significantly elevated PMRs identified in the NIOSH data included mental disorders and alcohol associated diseases in both whites and blacks. Tuberculosis, pneumonia, and cancer of the lip and oral cavity were increased in whites. Four deaths due to mesothelioma occurred, although they are not listed in Table III.

Since the NIOSH data are subject to the limitations of PMR methodology i.e., they do not measure risk directly [Breslow and Day, 1987], it is useful to examine standardized mortality ratio (SMR) data. The "California Occupational Mortality Study 1979–81" (COMS) is the only U.S. study we could identify which may provide SMR data for construction laborers [CDOH, 1987]. In order to calculate an SMR, California death certificates for the years 1979–1981 were linked to the 1980 U.S. Census of California. Age standardized SMRs were calculated for each occupational grouping by race and gender. Construction laborers were included in the occupational grouping, "other construction workers," along with tile setters, carpet and drywall installers, glaziers, insulation workers, and structural metal workers. The proportion of construction laborers in this grouping was not stated in the COMS report, making it difficult to determine the specificity of the findings for construction laborers. Because of the uncertain generalizability of the COMS findings to construction laborers, the COMS findings should be viewed with caution. Additionally, the COMS data are limited because the mortality file is truncated at age 64 and, as pointed out in a disclaimer in the COMS report, ". . . This study will be unable to consider diseases associated with long term exposure or latency which are generally not evident until after age 64." Another problem with the COMS is that, in generating SMRs, it uses a different occupational definition for the worker deaths (usual occupation) than for the population at risk, since the census uses current occupation.

The all-cause SMR for "other construction workers" in the COMS was approximately three times that found in the lowest risk occupations when unadjusted for smoking, alcohol consumption, and socioeconomic status (SES). Information regarding nonoccupational risk factors was not available for the COMS cohort, but when levels of smoking and alcohol consumption in the National Health Interview Survey (NHIS) population and SES data from the census were used to indirectly adjust for these three factors in the COMS population, the adjusted all-cause SMR for "other construction workers" remained approximately twice that found in the lowest risk occupations [Singleton and Beaumont, 1989]. The adjustment using NHIS data was

TABLE IV. SMRs for White Male "Other Construction Workers" in California, 1979–1981*

	Unadjusted		Adjusted[a]	
	SMR	CI	SMR	CI
All-cause	1.72	1.66,1.79	1.22	1.18,1.27
Ischemic heart disease	1.16	1.03,1.29	1.00	0.89,1.12
Other circulatory system disease	1.36	1.15,1.60	0.97	0.82,1.14
Cancer of other digestive system	1.57	1.17,1.60	1.22	0.92,1.60
Cancer of trachea and lung	1.63	1.39,1.91	1.09	0.93,1.28
Cancer of urinary system	1.67	1.02,2.58	1.54	0.94,2.37
Cancer of other sites	1.35	1.04,1.74	1.06	0.81,1.36
Cerebrovascular disease	1.80	1.39,2.28	1.30	1.01,1.65
Chronic obstructive pulmonary disease	2.30	1.71,3.03	1.20	0.89,1.58
Cirrhosis	2.36	2.05,2.70	1.25	1.08,1.47
Diseases of the urinary system	2.60	1.48,4.22	1.75	1.00,2.85
Falls and machinery accidents	2.15	1.61,2.81	1.63	1.22,2.14
Other accidents	2.03	1.87,2.19	1.39	1.29,1.51
Suicide	1.72	1.49,1.98	1.18	1.02,1.36
All other causes	2.13	1.95,2.31	1.32	1.21,1.44

*CI = 95% confidence interval.
[a]Adjusted for smoking, alcohol consumption, and SES.

merely for exploratory purposes, and has not been validated. Nonetheless, nonoccupational risk factors appear to explain some of the excess all-cause mortality, but a proportion which may be attributable to occupational factors remains.

Tables IV and V list the statistically increased unadjusted and adjusted SMRs for "other construction workers" in the COMS, respectively, for white and black males. The unadjusted SMRs confirm the earlier California, Washington State, and NIOSH findings of increased mortality from cirrhosis, lung cancer, and accidents in both white and black male construction laborers as well as the increased mortality from chronic obstructive pulmonary disease in the NIOSH PMR data. When the NHIS data were used to indirectly adjust for smoking, alcohol consumption, and SES (Tables IV, V), the SMRs for cerebrovascular disease, cirrhosis, falls, and machinery accidents remained statistically increased in both races. Additionally, among whites (Table IV), increased adjusted SMRs were found for suicide and other accidents, while in blacks (Table V), statistically increased adjusted SMRs were seen for "other" circulatory diseases (includes rheumatic heart disease and arteriosclerosis), urinary system diseases (includes nephritis), ischemic heart disease (IHD), and cancer of "other" digestive organs (includes esophageal, rectal, and hepatic cancers). The SMRs that remain statistically significant after adjustment for nonoccupational risk factors suggest that their increase may be related to other factors including those associated with occupation. Since information regarding cardiovascular risk factors was not available for the COMS population, it was not possible to determine whether the increase in mortality from cerebrovascular disease and ischemic heart disease is the result of occupational factors. The NIOSH PMR data did not show any excesses of these two diseases.

There are several differences between the COMS and the NIOSH PMR data which could explain the discrepancies in their respective findings described above. First, it is likely that the NIOSH PMR data are more specific for construction laborers

TABLE V. SMRs for Black Male "Other Construction Workers" in California, 1979–1981*

	Unadjusted		Adjusted[a]	
	SMR	CI	SMR	CI
All cause	2.60	2.41,2.80	1.57	1.46,1.69
HRCD[b]	2.04	1.28,3.09	1.41	0.89,2.14
Ischemic heart disease	2.26	1.80,2.80	1.67	1.33,2.07
Other circulatory disease	2.44	1.90,3.09	1.56	1.21,1.98
Cancer of other digestive organs	3.46	2.40,4.84	2.06	1.43,2.88
Cancer of trachea and lung	2.23	1.67,2.92	1.26	0.94,1.65
Cancer of lymph tissues	3.51	1.68,6.45	1.96	0.94,3.61
Cancer of other sites	2.53	1.52,3.95	1.36	0.82,2.12
Cerebrovascular disease	2.78	1.90,3.92	1.62	1.11,2.29
Chronic obstructive pulmonary disease	2.32	1.15,4.14	1.48	0.74,2.65
Cirrhosis	3.38	2.54,4.41	1.69	1.27,2.21
Diseases of the urinary system	4.50	2.05,8.55	2.52	1.15,4.78
Falls and machinery accidents	4.76	2.53,8.14	2.00	1.06,3.41
Other accidents	2.23	1.67,2.90	1.25	0.94,1.63
All other causes	2.99	2.60,3.42	1.71	1.49,1.96

*CI = 95% confidence interval.
[a]Adjusted for smoking, alcohol consumption, and SES.
[b]HRCD = Hypertensive related cardiovascular disease.

than the COMS, since other occupational groups were included with construction laborers in the COMS. Second, the COMS selected an internal referent group that was employed as a comparison population, while expected deaths for the NIOSH analysis were based upon the general population. It may be that construction laborers have increased mortality from IHD and cerebrovascular disease when compared to other employed workers, but not compared to the general population. Third, it is possible the two study populations are not comparable since different states were involved. Finally, the difference in findings may reflect the differences in PMR and SMR methodology. For example, if the all-cause mortality rate was greater in construction laborers than in the general population, then PMRs of laborers based upon proportionate mortality in the general population could underestimate the cause-specific SMRs [Wong and Decouflé, 1982; Decouflé et al., 1980]. This is one of the inherent limitations of PMRs and could result in lower and potentially non-significant PMRs for certain causes. Like the NIOSH and COMS findings, studies of cancer incidence or cancer mortality in construction laborers that used data from cancer registries have also revealed an increased rate of lung cancer [Kraus et al., 1982; Malker et al., 1987; Coggem et al., 1986]. Furthermore, those studies have confirmed the suspicion that mesothelioma is increased in the construction industry in general, and specifically in construction laborers. Esophageal cancer and leukemia have also been shown to be increased in construction laborers [Coggem et al., 1986; Morton and Marjanovic, 1984]. Interestingly, a cohort mortality study of state highway transit workers, who may have similar exposures to laborers at road construction sites, found an increased SMR for leukemia (SMR = 425), as well as urological cancer (SMR = 292) [Bender et al., 1989]. The investigators were unable to relate any specific exposure(s) to these two outcomes.

Finally, the prevalence of occupational dermatoses (e.g., eczema) may be increased in the construction industry [Coenvaads et al., 1984; Mathias and Morrison, 1988; Wahlberg, 1969]. According to the Bureau of Labor Statistics Annual Survey of Occupational Injuries and Illnesses, the construction industry has the third highest rate of occupational skin diseases, behind agricultural and manufacturing workers [U.S. DOL, 1986]. Laborers appear to be at particular risk for eczema [Wahlberg, 1969].

FATAL INJURIES

The finding of an increased mortality from fatalities in the COMS and NIOSH data is not unexpected, since the construction industry, in general, has higher occupational fatality rates when compared to most other industries [DOL, 1985; Buskin and Paulozzi, 1987]. More specifically, construction laborers had the third highest rate of traumatic occupational fatality from 1980 through 1985, estimated at 15 fatalities per 100,000 laborers [DHHS, 1989]. Higher rates were observed for transport workers and farmers who had estimated fatality rates of 24 and 22 per 100,000, respectively [DHHS, 1989]. Laborers appear to be at increased risk of occupational fatality from electrocution [NIOSH, 1987], excavation cave-ins [Stanevich and Middleton, 1988], and confined space incidents [Pettit et al., 1984]. The Bureau of Labor Statistics has also described nonfatal occupational injuries specifically in construction laborers for 1 month in 1983 [U.S. DOL, 1986]. Those findings indicated that 25% of the injuries occurred as a result of falling objects, and that 38% of all injuries occurred among construction laborers who had been with the same contractor less than 1 year. One study that evaluated the effectiveness of safety helmets found that 80% of head injuries were the result of falling objects and that helmets do reduce the severity of an injury [HSC, 1979]. Laborers have increased rates of accidental amputations [Olson and Gerberich, 1986; Harner, 1988] and the highest rate of foot injuries [Anon, 1984].

Because of the physical demands of a laborer, it would be expected that musculoskeletal injuries and disability would be increased in laborers. Several studies suggest that laborers do have increased rates of disability from injury to the musculoskeletal system, particularly of the back and wrist (repetitive trauma) compared to other occupational groups [DOL, 1985; Jensen, 1983]. An analysis of social security disability benefit allowances for construction workers (1975–1976), not elsewhere classified, showed high PMRs for osteoarthritis, other and unspecified arthritis, displacement of intervertebral disc and accidents, poisoning, and violence [Fischbach et al., 1986].

SUMMARY

Overall, few studies have addressed the job tasks, exposures and health risks among construction laborers; therefore, the number of specific conclusions that can be supported from the literature are limited. The scant literature that does exist indicates that construction laborers face a wide range of hazardous exposures and show widespread adverse health effects. The intermittent and decentralized nature of construction have made studies of construction laborers difficult and, in part, account for the paucity of data on health risks. Laborers perform many job tasks which are associated with a variety of possible exposures. Construction laborers are at increased health risk from exposure to asbestos, lead, noise, and cement; however, little research has evaluated these and other possible exposures. Further research is needed to define the exposures associated with specific job tasks, between different types of construction, and to evaluate whether laborers elect to perform certain job tasks. To aid in the conduct of such research, a method to track the work performed by laborers is necessary. One solution would be for each local union that represents laborers to record job task histories and specific construction sites where their members worked.

Mesothelioma, work-related injuries, acute lead poisoning, musculoskeletal injury, noise-induced hearing loss, and dermatitis are clearly related to occupational factors. However, due to the limited generalizability of the literature and the absence of analytical studies, conclusions regarding the exposures responsible for the increased causes of morbidity and mortality are not forthcoming. In order to confirm and develop specific hypotheses regarding disease excesses in construction laborers, descriptive studies of mortality and morbidity that are specific for the subgroups of construction laborers, and control for nonoccupational risk factors, are necessary. Additionally, research designs are needed which can identify effective intervention strategies for occupational trauma.

Many of the diseases identified for construction laborers also appear to have a nonoccupational component to their etiology. There is a need for research that accounts for both occupational and nonoccupational risk factors.

In conclusion, there is a need for more research on construction laborers—a group that has so far escaped attention sufficient for data gathering. This will require application of creative strategies to assess exposures and health effects and link them together.

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