

## SURVEILLANCE AND SPECIAL POPULATION STUDIES

### CONSTRUCTION SAFETY RESEARCH DEVELOPMENT

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**PURPOSE:** Focus future construction safety research on high-risk sectors to address the industry's most pressing injury problems.

**RESEARCH SUMMARY:** The construction industry is consistently among the industry sectors of the U.S. economy with the highest rate of fatal and nonfatal injuries. In 1996, the Bureau of Labor Statistics reported 1,047 fatal injuries and 492,500 OSHA-recordable injuries in the construction industry, of which 227,400 involved lost or restricted work days.

Over the past decade, NIOSH has developed surveillance systems for fatal and nonfatal injuries; conducted injury analyses in construction; conducted field investigations and reported on construction workers killed in falls, electrocutions, confined spaces, and machinery incidents; established model construction safety and health programs in three states; and initiated the assessment and redesign of several manual materials-handling tasks. Using this information, Division of Safety Research (DSR) will focus on construction research on high-risk sectors of the construction industry to address the industry's most pressing injury problems. Traditional research techniques (e.g., literature review, data analysis, and field evaluations) will be integrated with information obtained from collaborations with internal and external partners to identify and prioritize injury research needs.

Research initiated under this project covers a variety of construction topics, including estimating the working lifetime risk of fatal occupational injury by occupation and cause of death, developing a guide of worker injury prevention measures for highway work zones, assessing the feasibility of surveying industry trade association members regarding work-related injuries, evaluating the efficacy of toolbox talks, analyzing the stability of scaffolding used for fall arrest anchorage, and evaluating work zone interventions.

Through analysis of the construction industry, this project will provide guidance to DSR research staff for identifying new research projects; provide coordination between DSR, other construction safety research organizations, federal regulatory agencies, and the NIOSH Construction Steering Committee; and expand dissemination of construction research needs and results to the research and construction communities.

**KEYWORDS:** Work organization, injuries

#### RECENT CITATIONS:

Sweeney, M.H. et al. 2000. Health consequences of working in construction. Ch. 10 in *Construction Safety and Health Management*, R.J. Coble, J. Hinze, and T.C. Haupt, eds. Upper Saddle River, NJ: Prentice-Hall.

Chen, G-X., and D.E. Fosbroke. 1998. Work-related fatal injury risk of construction workers by occupation and cause of death. *Human and Ecological Risk Assessment*, v. 4, no. 6, pp. 1371-1390.

# HAZARD PREVENTION IN SELECTED CONSTRUCTION SPECIALTY TRADES

**RESEARCHER:** Thomas Lentz

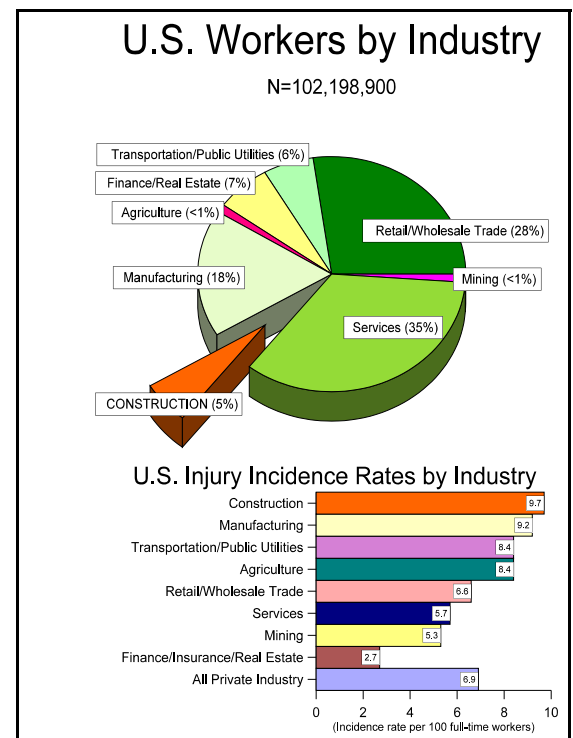
**AFFILIATION:** Education and Information Division  
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**PURPOSE:** Identify and characterize injuries and related causes in construction specialty trades; survey small and large construction firms to identify hazards, training needs, and other measures of safety awareness; and develop forums and materials for creating awareness of hazards in construction specialty trades and intervention and injury prevention strategies.

**RESEARCH SUMMARY:** Of all major industry divisions in 1996, the construction industry experienced the highest rate for nonfatal injuries (9.7 cases per 100 full-time workers) with the highest rates among employers having 11 to 49 workers (11.3 cases per 100 full-time workers). Among the specialty trades, the highest rates were found for plumbing, heating, and air conditioning; electrical work; roofing, siding, and sheet metal work; and miscellaneous special trade contractors. Employees in the construction trades work predominantly for nonunionized small businesses, with a majority (56%) of private sector work performed in residential construction.

The high injury rates within the construction specialty trades will be addressed through three main objectives: (1) Compilation of data on injuries, fatalities, and related hazards in the plumbing, electrical, roofing, and miscellaneous specialty trade industries; (2) identification, review, and evaluation of the effectiveness of regional and national surveillance and intervention programs targeting specific hazards and recommended safe practices in the selected trades; and (3) promotion of hazard and safe practices awareness through presentations to other state and federal agencies at professional conferences; to labor, management, and contractors' groups; and in professional journals and trade publications.

Information will be collected on the nature and magnitude of hazards and related injuries in plumbing, heating, and air conditioning; electrical work; roofing, siding, and sheet metal work; and miscellaneous specialty trade contractors. NIOSH resources (i.e., health hazard evaluations, fatality assessment and control evaluation reports), OSHA accident investigation reports, and Bureau of Labor Statistics data will be used to obtain information on hazards specific to these industries. Data from nonconventional surveillance and intervention programs will also be utilized, such as the OSHA construction accident reduction emphasis program in Florida. Because the construction specialty trades are largely comprised of small contractors, this program will address challenges associated with small businesses. Through a partnership with the Rinker School of Building Construction, University of Florida at Gainesville, surveys of safety programs and work practices for small and large construction firms will be conducted. Data from these surveys will



be used to identify differences, if any, between safety practices and related hazards for small and large construction contractors.

**KEYWORDS:** Injury prevention, information

## RECENT CITATIONS:

Lentz, T.J., and J. Hinze. 2002. Surveys of occupational safety and health priorities in selected small and large construction firms. Presentation at World Conference on Injury Prevention and Control, Montréal, Quebec, Canada, May 12-15, 2002.

Lentz, T.J., J. Hinze, T. Harrison, R. Medlock, and T. Broderick. 2000. Surveillance and intervention programs targeting injuries in the construction industry. Roundtable session, National Occupational Injury Research Symposium, Pittsburgh, PA, Oct. 17-19, 2000.

# FEASIBILITY STUDY OF RESPIRATOR SURVEILLANCE IN THE CONSTRUCTION INDUSTRY

**KEYWORDS:** Respirators, surveillance

**RESEARCHER:** Bryan Doney

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**PURPOSE:** Identify methods for conducting surveillance of respirator use and programs within the construction industry in collaboration with workers and companies.

**RESEARCH SUMMARY:** OSHA has estimated that approximately 18% of the 4.4 million workers in the construction industries wear respirators, representing 33% of the 600,000 construction companies. During October 1997 through September 1998, OSHA issued 427 citations for respirator regulation violations within the construction industry.

This project resulted from observations at a January 1999 meeting of New Jersey highway construction contractors in which the contractors voiced frustration over the conflicts between hiring temporary construction workers from union hiring halls and the OSHA respirator regulatory requirements for fit-testing. It seemed evident that neither the companies nor OSHA were completely comfortable with the feasibility of establishing and administering efficient respirator fitting programs within this sector of the construction industry.

A pilot study was developed to identify feasible mechanisms for surveillance of respirator use within the construction industry. Six focus group meetings were conducted with contractor members of the Society for Protective Coatings (SSPC) from May through November 2000. The meetings allowed NIOSH to learn more about previously reported difficulties with respirator use. The participants conducted abrasive blasting and coatings experiments with different types of respirators, from those using filtering facepieces to those using supplied air. Barriers to respirator protection were categorized as administrative, engineering, medical, and personal. Participants reported that respirators were primarily used for lead, paint vapors, carbon monoxide, oxygen deficiency, acid gas, arsenic, hydrogen sulfide, asbestos, silica, and welding fumes.

Three additional focus groups were held with construction company representatives with the cooperation of the American Road and Transportation Builders Association (ARTBA) in September 2001 through March 2002. Two additional focus groups are planned. A proposal to conduct four focus groups with workers in the road building industry in FY03 has been submitted.

# ADULT BLOOD LEAD EPIDEMIOLOGY AND SURVEILLANCE AND RESEARCH PROGRAM (ABLES)

**RESEARCHER:** Robert Roscoe

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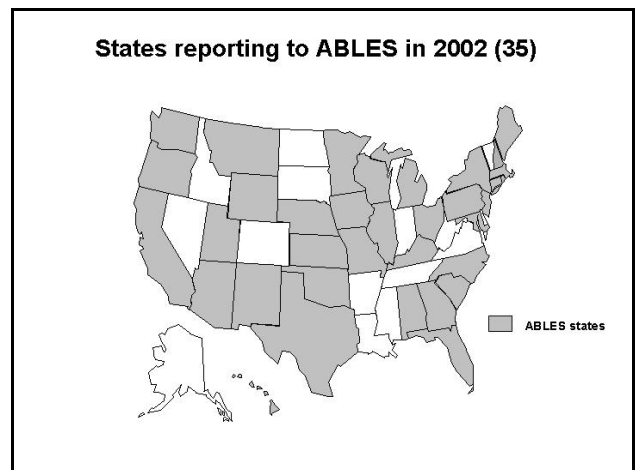
**PURPOSE:** Assist states in reducing the number of workers having blood lead concentrations of 25 micrograms per deciliter or more to zero.

**RESEARCH SUMMARY:** During 2001, 9,943 adults with blood lead levels of 25 micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ) or higher were identified by Adult Blood Lead Epidemiology and Surveillance (ABLES) programs in 23 of 25 collaborating states. Extrapolated to the entire United States, this figure indicates that about 15,500 adults had blood lead levels of 25  $\mu\text{g}/\text{dL}$  or more.

ABLES is a surveillance program for tracking and preventing elevated blood lead levels among U.S. adults. ABLES data provide the public health community with essential information for setting priorities for in-depth research, intervention, and information dissemination. Reports cover all lead-exposed adults, with about 33% of the reports involving construction workers. Cases identified through ABLES surveillance are frequently referred by state officials to state and federal occupational safety agencies for consultation or enforcement and are used by these officials to target high-risk industries and occupations for interventions and prevention, including bridge repair, home remodeling, residential painting, furniture restoration, and plastics compounding.

In 2002, increased funding allowed the ABLES program to expand to 35 states and collect individual data on age, gender, and industry (but no personal identifiers) rather than aggregate data. These types of data will be more useful to ABLES customers such as OSHA, HUD, and the U.S. Dept. of Transportation.

Typical state-level ABLES interventions include (1) conducting follow-up interviews with physicians, employers, and workers, (2) investigating work sites, (3) providing technical assistance, (4) providing referrals for consultation or enforcement, and (5) developing and disseminating educational materials and outreach programs. NIOSH partners in various lead-reducing initiatives include OSHA (National Emphasis Program on lead), the former Lead Industries Association, Inc. (voluntarily lowering lead exposures), the Center to Protect Workers' Rights, AFL-CIO (training workers about lead safety in construction), and the Council of State and Territorial Epidemiologists (encouraging surveillance on adult exposures to lead in all states). Over the next 3 to 5 years, ABLES plans include improving data standardization,



improving the analysis of trends and magnitude of adult lead exposure, and research to better describe effective intervention programs.

**KEYWORDS:** Lead, surveillance, intervention

## RECENT CITATIONS:

Roscoe, R.J., W. Ball, J.J. Curran et al. 2002. Adult blood lead epidemiology and surveillance-United States 1998-2001. *Morbidity and Mortality Weekly Report Surveillance Summaries*, Dec. 13. V. 51, no. SS-11, 10 pp.

Scholz, P.F., B.L. Materna, D. Harrington, and C. Uratsu. 2002. Residential and commercial painters' exposure to lead during surface preparation. *American Industrial Hygiene Association Journal*, v. 63, pp. 22-28.

Materna, B.L., D. Harrington, P. Scholz, S.F. Payne, H.A. Stubbs, K. Hipkins, E. Merideth, L. Kirsch, G. Lomax, P. Coyle, and C. Uratsu. 2002. Results of an intervention to improve lead safety among painting contractors and their employees. *American Journal of Industrial Medicine*, v. 41, pp. 119-130.

# NATIONAL SURVEILLANCE OF NONFATAL OCCUPATIONAL INJURIES USING NEISS

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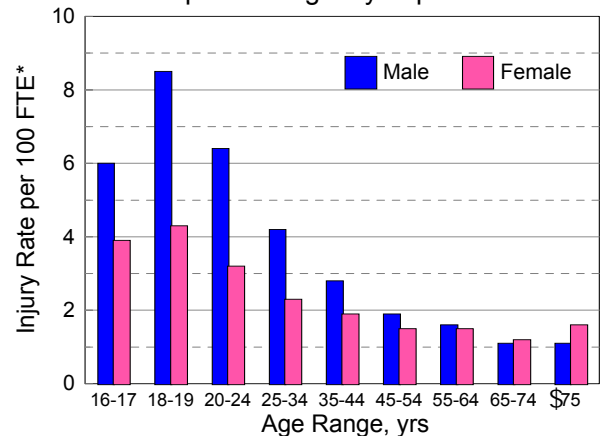
**PURPOSE:** Collect nationally representative surveillance data on nonfatal occupational injuries in a timely manner by sampling hospital emergency rooms with the National Electronic Injury Surveillance System (NEISS).

**RESEARCH SUMMARY:** National surveillance of occupational injuries is an essential prerequisite to the NIOSH mission of developing measures to prevent such injuries. While NIOSH has an effective surveillance system for fatal occupational injuries, nonfatal injury surveillance for the entire U.S. workforce was not established until July 1995. Based on the National Electronic Injury Surveillance System (NEISS), we estimate that about 3.6 million workers are treated annually in emergency rooms for occupational injuries.

NEISS is used to identify and characterize the work-related injury burden in the United States, direct research and intervention efforts, and influence occupational safety and health policy. Using NEISS, demographic information about an injured worker, industry narratives, and a description of the injury event are collected. National estimates of all work-related traumatic injuries can be made, as well as estimates for injuries to special populations (e.g., children, women, African-Americans), industries (e.g., construction), and types of injuries (e.g., eye injuries). Detailed telephone follow-up investigations provide additional information on injury circumstances, worker characteristics, safety precautions, and injury perceptions. The potential for gleaning injury risk information from the NEISS telephone investigations is virtually unlimited.

The use of NEISS as an injury surveillance tool is cost effective because the surveillance system is already established and maintained by the Consumer Products Safety Commission. The NEISS data are collected from hospital emergency department records. Work-related injury case data for all workers are transferred to NIOSH on a monthly basis. Hospitals participating in NEISS were selected from a stratified probability sample of all hospitals in the United States and its territories. Each work-related NEISS record contains information on the characteristics of the victim (e.g., age, sex, race), the injury or illness (e.g., diagnosis, body part injured), source of injury, injury event, and a narrative description.

Estimated rates for work-related injuries treated in hospital emergency departments



\*Work hours-based FTE

**KEYWORDS:** Surveillance, traumatic injuries, special populations

## RECENT CITATIONS:

*Morbidity and Mortality Weekly Report*. 2001. Nonfatal occupational injuries treated in hospital emergency departments—United States, 1998. V. 50, no. 16, pp. 313-317.

Jackson, L.L. 2001. Nonfatal occupational injuries and illnesses treated in hospital emergency departments in the United States. *Injury Prevention*, v. 7, Supplement I, pp. i21-i26.



# SURVEILLANCE OF NONFATAL WORK-RELATED INJURIES IN ALASKA

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**PURPOSE:** Support and continue to develop the Alaska Trauma Registry (ATR) so it will become a model trauma registry surveillance system for nonfatal work-related injuries in Alaska.

**RESEARCH SUMMARY:** From 1980 through 1989, Alaska had a work-related fatality rate five times greater than the United States as a whole. The arctic and subarctic environments of Alaska provide a very hazardous work setting, exacerbated by great distances, seasonal darkness, cold, and high winds. The Alaska Trauma Registry (ATR) includes information from 1991 through 1999 for 39,143 injuries that required hospitalization; 3,951 (10%) of these injuries were classified as nonfatal work-related injuries. Logging (23/1000 per year) and construction (7/1000 per year) led the industry categories with the highest injury rates. The construction industry also had the highest total number of injuries (740) for the 9-year period.

Surveillance data of nonfatal, work-related injuries can come from various sources. Originally designed for quality control of state trauma programs, trauma registries contain many fields of information useful for injury surveillance: demographics, geographic information, disability, medical cost, payment source, cause of injury, discharge diagnosis, and severity scoring.

Information for the ATR is abstracted from medical record charts from all 23 hospitals in Alaska and sent to the Alaska Department of Health and Social Services to be compiled into the ATR database. Analysis of the trend data and identification of hazardous processes will lead to assessment and implementation of injury prevention strategies targeted to high-risk areas, such as commercial fishing (including aquaculture and diving), seafood processing, logging, aviation, and construction. Specifically, information from the ATR will be used to—

- Reduce morbidity resulting from work-related injuries in Alaska by providing data that would allow the development of appropriate prevention strategies,
- Facilitate comparisons of state, federal, and international data on work-related injuries that permit trend analyses,
- Improve awareness of nonfatal work-related injury as a significant health problem,
- Assist in the evaluation of work-related injury-prevention strategies, and
- Facilitate research for preventing nonfatal work-related injuries.

To help focus on work-related injuries, additional information will be gathered using comprehensive and mutually exclusive industry and occupation codes. Training includes recognition, recording, and use of work-related information



for data collectors and hospital staff. Collaboration with external partners will focus on injury prevention, trend analysis, and worker awareness training.

**KEYWORDS:** Traumatic injuries, surveillance, injury prevention

## RECENT CITATIONS:

Conway, G.A., J.M. Lincoln, B.J. Husberg, J.M. Manwaring, D.M. Bensyl, and D.M. Choromanski. 2001. Alaska's model program for occupational injury prevention: Applying surveillance for effective public health practice. *International Journal of Circumpolar Health*, v. 60, pp. 714-726.

Conway, G.A., and B.J. Husberg. 1999. Cold-related nonfatal injuries in Alaska. *American Journal of Industrial Medicine, Supplement 1*, Sept., pp. 39-41,

Husberg, B.J., G.A. Conway, M. Moore, and M. Johnson. 1998. Surveillance for nonfatal work-related injuries in Alaska, 1991-1995. *American Journal of Industrial Medicine*, v. 34, pp. 493-498.

# **SURVEY OF SMALL-TO-MEDIUM-SIZED CONSTRUCTION COMPANIES: COMMITMENT TO SAFETY AND HEALTH**

**KEYWORDS:** Construction safety, survey, small business

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**CONSORTIUM:** Construction Safety Alliance

**PURPOSE:** Develop a survey instrument to collect safety-related data from owners of smaller (that is, fewer than 100 employees) construction companies.

**RESEARCH SUMMARY:** Much of the previous construction-related safety research has focused on the unionized sector and on large construction companies. While this work has been extremely valuable in terms of identifying some of the major construction hazards and safety- and health-related issues, it may be limited because approximately 80% of the construction workforce are not members of a union and 75% work for companies with fewer than 100 employees. In 2000, a telephone survey instrument was designed to measure the commitment of small-to-medium-sized companies to worksite health and safety. A pilot study using this survey was conducted with a small number of open-shop highway construction contractors. Findings indicated that while most (although not all) companies did provide safety training to their workers, very little, if any, evaluation of the effectiveness of the training was done.

The goal of the current study is to continue learning more about the status of health and safety issues by collecting data from a national sample of small-to-medium-sized contractors in other sectors of the industry. To date, focus groups and interviews have been held with local contractors representative of the target population. They were asked to review the survey instrument and make comments. All comments have been incorporated into the current version. The survey is being redesigned so that it can be self-administered or completed via the Web.

A list of over 9,000 contractors meeting the specific criteria of size and type has been purchased from Dun and Bradstreet. The Association of General Contractors (a trade association for small, medium, and large contractors) has indicated that it is interested in working with the principal investigator to cross-reference its membership to the Dun and Bradstreet list and possibly sending a support letter (or e-mail) to the final sample of randomly selected contractors.

Findings from this study should provide health and safety practitioners and members of the construction industry with a more realistic picture of the commitment of small-to-medium-sized, open-shop contractors to health and safety.

# RESEARCH ON YOUNG WORKER SAFETY AND HEALTH RISKS IN CONSTRUCTION

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**PURPOSE:** Examine the work patterns, practices, and injury experiences among young workers in the construction industry in North Carolina. Examine the knowledge and attitudes of parents and employers of teen construction workers with regard to teen work practices, injury risk, training, and supervision.

**RESEARCH SUMMARY:** U.S. Department of Labor statistics for 1994-1998 show that young construction workers faced risks of fatalities per hour worked twice the risks of all construction workers aged 25-44. However, youth labor is complex, and youth labor in construction is especially complex because of the structure of the industry (many small-scale firms), the composition of the labor force (growth of Latino workers), and the way work is done (seasonal and multiple activities). No single data set or methodology can capture the complexity of the problem or the diversity of the labor force.

Accordingly, our project involves multiple studies that use both quantitative and qualitative data collection methods and includes collaboration among universities, nonprofit organizations, and state agencies. One study includes two telephone surveys of teen construction workers who worked during the summers of 2000 (n = 123) and 2001 (n = 187) (completed), a mail survey of employers of teens who worked during summer of 2001 (on-going), and a telephone survey with parents of the same cohort of teen construction workers interviewed in 2001 (currently underway). Work permits were used as the sampling frame for all these surveys. A second study focused on young Latino construction workers and involved face-to-face interviews with 50 workers. Both quantitative and qualitative data were collected. A third study involved secondary data analyses of injuries among teen construction workers in the home building industry in North Carolina. This study was completed and the findings were published in a journal article.

The teen telephone surveys have revealed that a significant number of teens were engaged in hazardous tasks prohibited by North Carolina child labor laws. For example, in 2001, 23% of the teen sample worked on power-driven lifting equipment, 16% operated heavy equipment such as graders or excavators, and 35% used power saws.

Results will be interpreted, and findings will be disseminated at a meeting with various stakeholders so that recommendations for injury prevention can be developed.



**KEYWORDS:** Young workers, hazard identification, construction safety

## RECENT CITATIONS:

Bowling, J.M., C.W. Runyan, M.D. Schulman, and J.A. Dal Santo. 2001. Use of work permits for targeted studies and surveillance of high risk low incidence teenage occupations. Presentation at American Public Health Association Conference, Atlanta, GA, Oct. 2001.

Lipscomb, H.J., and L. Li. 2001. Injuries among teens employed in the homebuilding industry in North Carolina. *Injury Prevention*, v. 7, pp. 205-209.

Treiber, L., M.D. Schulman, C.W. Runyan, J.M. Bowling, J.A. Dal Santo, and H. Lipscomb. 2001. A descriptive study of young workers' experiences in construction. Presentation at American Public Health Association Conference, Atlanta, GA, Oct. 2001.





# WORKER AND WORKSITE FACTORS IN DENVER INTERNATIONAL AIRPORT CONSTRUCTION INJURY

**RESEARCHER:** Judith Glazner

**AFFILIATION:** University of Colorado  
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**PURPOSE:** Develop methods for cataloguing and coding data appearing in injury incident descriptions found in standard First Reports of Injury (FRI) and Accident Investigation Reports (AIR) and link these data with existing coded administrative data. Analyze the linked data to identify and quantify factors contributing to injury.

**RESEARCH SUMMARY:** Construction workers not only have high rates of work-related injuries, but they are among the most likely workers to experience serious injuries. The combination of information from injury reports with an administrative database containing claims, demographic data, and hours worked will provide a rich source for describing injuries and the factors contributing to them. The utility of these data will then be evaluated to test specific hypotheses about factors differentially associated with different types of injury as well as different levels of injury severity. The data will also be used to determine direct costs of injury for high-risk groups of workers and for specific factors contributing to injury.

Study aims will be accomplished by coding and analyzing data from standardized FRI's and AIR's linked with an administrative database from construction of the Denver International Airport. This database contains information on over 4,600 workers' compensation claims, payroll and demographic data on 32,081 workers who worked over 31 million hours on the airport, and company characteristics for 769 contractors.

The results should allow identification of the causes of work-related injuries and provide information useful for focusing specific prevention efforts on the more costly risk factors in the construction industry. In addition, the methods developed should have applicability to data from other occupational groups.

**KEYWORDS:** Surveillance, injuries, risk factors

## RECENT CITATIONS:

Lowery, J.T., J.A. Borgerding, B. Zhen, J.E. Glazner, J. Bondy, and K. Kreiss. 1998. Risk factors for injury among construction workers at Denver International Airport. *American Journal of Industrial Medicine*, v. 34, no. 2, pp. 113-120.

# **SOCIAL/ECONOMIC IMPACT OF INJURY/ILLNESS IN CAREER ROOFERS**

**KEYWORDS:** Roofers, social impacts, economic impacts

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**AFFILIATION:** MedStar Research Institute  
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**PURPOSE:** Develop a credible measure of the amount of disability, disability retirement, early retirement, and job change caused by injury, illness, and musculoskeletal disease among roofers.

**RESEARCH SUMMARY:** Standard, well-developed instruments and techniques will be used to survey union construction workers at the time they leave their trade and 1 year later. Questions will include reason for leaving, nature of injury or illness if present, functional limitations at the time of leaving and after 1 year, and the social and economic consequences of their decisions. This study will focus on three groups of roofers: (1) those who leave the trade at any time in their careers before retiring, (2) those who take early retirement; and (3) those who apply for disability retirement. A comparable group of roofers who continue to work will be interviewed also. Specifically we will—

- Determine what proportion of roofers leave the union before retirement age, retire early, or apply for disability retirement because of a work-related injury, work-related disease, or chronic medical condition;
- Determine what proportion of roofers who continue to work in the trade have chronic symptoms from a work-related injury, work-related disease, or chronic medical condition;
- Describe the social and economic impact of a work-related injury, illness, or premature retirement caused by a medical condition;
- Evaluate changes in the social and economic status over time in roofers who leave the union, retire early, or take disability retirement;
- Assess and describe the impact of work-related conditions and aging on the ability of roofers to remain employed in their trade.

# ECONOMIC IMPACT OF OCCUPATIONAL INJURY AND ILLNESS

**KEYWORDS:** Injury and illness, cost, workers' compensation, self-employment

**RESEARCHER:** Sue Dong

**AFFILIATION:** Center to Protect Workers' Rights  
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**PURPOSE:** Estimate costs to workers not covered by workers' compensation and understand the economic impact of injury and illness on construction workers, especially self-employed workers.

**RESEARCH SUMMARY:** The more than 194,000 annual lost-workday injuries and illnesses in construction result in considerable economic costs to workers, their families, employers, and society, yet little research has been done on describing and measuring these costs. Currently, information on the costs of injuries and illnesses derives mainly from workers' compensation, but workers' compensation does not address all costs, nor does it cover all workers. For example, little information has been available on more than 2 million self-employed workers in the construction industry.

This project is expected to (1) quantify costs of occupational injury and illness and the burden on construction workers and their families, especially the costs incurred by workers not typically addressed in existing approaches to the problem, (2) determine who pays the costs of occupational injury, illness, and disability according to workforce characteristics, and (3) estimate the costs of leading injuries and illnesses in construction. The Medical Expenditure Panel Survey (MEPS) and the National Health Interview Survey (NHIS) will be linked together for this study.

The initial investigation of the data sets has been done. Variables related to work-related injuries and medical expenditures selected from the Medical Condition File and Full-Year Consolidated Data File have been merged. Because of constraints under the confidentiality guidelines of the Agency for Healthcare Research and Quality (AHRQ) (the agency sponsoring the survey), some MEPS data cannot be released to the public. An application for using this confidential data has been submitted and approved. Currently, the linkage file—1996 NHIS/1997 MEPS Public Use Person Record Linkage—has been obtained and will be used to link MEPS and NHIS for the data analysis.

# TRENDS OF CONSTRUCTION INDUSTRY AND WORKFORCE

**RESEARCHER:** Sue Dong

**AFFILIATION:** Center to Protect Workers' Rights  
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**PURPOSE:** Characterize the construction industry and its workers and provide background information for construction safety and health research.

**RESEARCH SUMMARY:** As described in the National Occupational Research Agenda, work organization is influenced by factors such as economic conditions, technological changes, demographic trends, and changing corporate and employment practices. These trends may adversely affect work organization and may result in, for example, increased work load demands, longer and more varied work shifts, and job insecurity. However, the actual effects of these trends on the conditions of work and on the well-being of workers have received little study.

This project is designed to characterize the construction industry and workers, to observe the changes and trends, and to study the effects of these trends on the conditions of construction work and on the safety and health of construction workers. The project addresses wide issues using data from various sources, including the Bureau of Labor Statistics, Census Bureau, Dun and Bradstreet, and the Internal Revenue Service. This project will help people better understand the construction industry, its workers, and related issues.

The major findings have been compiled into the third edition of *The Construction Chart Book—The U.S. Construction Industry and Its Workers* and will be posted on CPWR's Website and eLCOSH—the Electronic Library of Construction Occupational Safety and Health.

**KEYWORDS:** Workers, employment, job tenure, demographics, education, training, hours worked, overtime, technology, wage, income, unionization, benefits

## RECENT CITATIONS:

Dong, X. 2002. Diversity in the workplace: Trends and their safety and health implications. In *Power Through Partnerships: 12th Annual Construction Safety and Health Conference, Proceedings* (May 21-23, 2002, Rosemont, IL).

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Grob, H., X. Dong, E. Pollack, S. Schneider, and J. Seegal. 1997. *The Construction Chart Book, The U.S. Construction Industry and Its Workers*, 1st ed. Washington DC: The Center to Protect Workers' Rights.

# WORKPLACE SAFETY AND HEALTH OF HISPANIC CONSTRUCTION WORKERS

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**PURPOSE:** Examine the trends in the Hispanic construction workforce and analyze the characteristics and relative risks for occupational injuries of Hispanic construction workers.

**RESEARCH SUMMARY:** In recent years, the Hispanic population has dramatically increased in the United States. Construction has become the sector of the workforce with the highest percentage of Hispanic workers outside of agriculture, more than tripling during the last two decades. At the same time, the incidence of occupational injuries among this group are increasing, indicating that the safety and health needs of Hispanics require special attention.

Injury (both fatal and nonfatal) and demographic (occupation, education, age, and other) data on Hispanic workers in construction will be collected, as well as information on the risk of workplace injuries. The findings will help policy makers and those concerned with safety and health in the construction industry better understand the issues of Hispanic construction workers. The statistical analysis will be based on data from Current Population Surveys, the Census of Fatal Occupational Injuries, and the Survey of Occupational Injuries and Illnesses.

Initial findings show that compared with nonHispanic construction workers, Hispanic construction workers (1) are much younger, mostly noncitizens, less educated, less unionized, and earn less wages, (2) are mostly employed as unskilled or semiskilled workers with few managers or professionals, and (3) have higher fatality rates and lower nonfatal injury and illness rates. Given that both fatal and nonfatal rates should be proportional to exposures to risk, nonfatal injuries and illnesses may be underreported among Hispanic workers. Additional research is needed to evaluate factors that place Hispanic construction workers at higher risk and to evaluate the effectiveness of public health interventions targeted to eliminate this disparity.

**KEYWORDS:** Hispanic workers, demographics, work-related injury, fatality, safety and health

## RECENT CITATIONS:

Dong, X., and J. Platner. 2002. Workplace safety and health of Hispanic construction workers. In *Power Through Partnerships: 12th Annual Construction Safety and Health Conference, Proceedings* (May 21-23, 2002, Rosemont, IL).

Dong, X., and J. Platner. 2002. Occupational fatalities in Hispanic construction workers. Presentation at 130th Public Health Association meeting, Philadelphia, PA.



# ANTHROPOMETRY OF CONSTRUCTION AND AGRICULTURE POPULATION

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**PURPOSE:** Study the human form to (1) collect data on human sizes in three dimensions for better design of workplaces and personal protective equipment, (2) elucidate the interaction between the human shape and anthropometric design decisions for complex systems, and (3) provide fundamental information for human modeling to evaluate strategies for preventing traumatic injuries.

**RESEARCH SUMMARY:** Many of the anthropometric data available regarding the fit or design of personal protective equipment (PPE) are two-dimensional and out of date. Reliable information on sizing for civilians, women, and minorities is limited. PPE's that are physically incompatible with workers' body shapes are not likely to provide the level of protection and comfort required to permit them to work productively.

A state-of-the-art whole-body laser scanner is being used to collect human images and create a database. The scanner uses low-power laser light reflected from the surface of the skin to generate a highly accurate image of the human form. The first study on fall protection harness sizing was completed using 98 subjects. A multivariate accommodation analysis has identified 15 representative body models for the "standard size" harness design. These models can serve as a useful population to test harness design until a larger survey of the nation's construction workers can be done. Data from 96 subjects have been collected for the study on tractor cabs. A technical report on anthropometric criteria for the design of farm tractor cabs will be available next year. The research team continues to work with partners to develop theories for quantifying three-dimensional human shapes and sizing information for PPE designs.

The specific outputs from this project will be (1) an anthropometric guide to aid users in the selection of the appropriately sized fall-protection harnesses, (2) a sizing system for the design of fall-protection harnesses, and (3) anthropometric criteria for the design of farm tractor cabs to increase the safety of farm tractor operation.



**KEYWORDS:** Protective equipment, fit-sizing, fall protection