tion (11%) were the most frequently noted injury circumstances.

While the overall demographic characteristics, diagnoses, and injury circumstances are interesting, it is the more detailed injury descriptions, by trade, that are more useful for thinking about injury prevention. To illustrate this, we will present data on injury patterns among workers from four specific trades: carpenters; electricians; ironworkers; and plumbers and pipefitters. Together, these trades represent 43% of the injured construction workers in our case series. Highlights of the results follow:

Lacerations were the most frequent injury for each of the trades except for ironworkers, and for all trades combined. For ironworkers, sprains, strains, and muscle pain was the most frequent injury category, especially to the back and ankle or foot.

Among carpenters and plumbers, lacerations were most often caused by pieces of metal or unspecified metal objects. Power saws, drills, nail guns, and screw guns were also frequently associated with carpenters' lacerations. In contrast, electricians most often sustained lacerations while fixing or changing light fixtures, while ironworkers were most frequently cut by tie wire.

Ironworkers experienced a higher proportion of falls than any other trade examined in this study. Slips/trips (many while walking on rebar) were the most frequent type of fall sustained by ironworkers. In contrast, among plumbers, electricians, and all trades combined, falls from ladders represented the most significant fall hazards.

These and other differences in injury patterns allow us to discern specific risk factors for construction work injuries, and to suggest prevention measures that might be implemented on a trade-specific and task-specific basis.

A Tool for Planning and Monitoring Construction Site Safety
Gambatese JA, Hinze JW

Ensuring safety on the construction site involves careful planning and implementation of safe practices and procedures. Project safety planning involves anticipating safety hazards and applying effective safety measures to the job at hand in order to minimize or eliminate the hazards. Effective safety planning relies on one's knowledge of construction processes and procedures and the applicable safety regulations. Safety planning is enhanced when assistance is provided in determining the safety regulations applicable to each construction process and procedure. Following the safety planning effort, successful implementation of safety measures requires periodic inspections of the jobsite to ensure the safety plan is in place and safety regulations are met. While safety inspections are a valuable means of maintaining a safe jobsite, the complexity associated with many construction projects can cause some hazards to be overlooked. Many construction firms utilize safety checklists to assist in performing safety inspections.

A computer program has been developed to assist in planning and monitoring construction site safety practices and conditions. The program includes a database of construction safety checklists that address various general requirements, work phases, temporary structures, and construction materials. Instead of creating generic checklists, the program allows the checklists to be modified to match the specific jobsite characteristics. The checklists related to specific work phases can be useful in planning and scheduling safety measures before construction begins. During construction, the checklists can prove useful for jobsite inspections by safety personnel, safety committees, and others involved in monitoring safety conditions on a jobsite. In addition, the checklists also provide valuable information that is useful in safety training.

Mortality Patterns Among the International Brotherhood of Electrical Workers, 1982-87—Robinson CF, Petersen M, Palu S

This study evaluated the mortality of 31,068 members of the U.S. Electrical Workers' Union who worked in the construction industry and died 1982-1987. Age-adjusted proportionate mortality ratios (PMRs) and proportionate cancer mortality ratios (PCMRs) were computed using the U.S. age-, gender-, and race-specific proportional mortality for the years of the study. For white male electrical workers, significantly raised mortality was observed for lung cancer (PMR=117), mesothelioma (PMR=356), melanoma skin cancer (PMR=123), cancer of prostate (PMR=107) leukemia (PMR=115, tumors of eye, brain and central nervous system (PMR=136), diseases of the blood forming organs (PMR=141), asbestosis (PMR=248), electrocutions (PMR=1145), and all fatal injuries (PMR=116). When proportionate cancer mortality analysis was used, the risks for these cancers remained elevated, although the significance became borderline for leukemia and melanoma PMRs. Among 114 white women electrical workers, mortality due to leukemia (PMR=195) and breast cancer (PMR=124) was elevated, but not significantly. More than 82% of all electrical workers studied had greater than 30 years membership in the union. The data show that electrical workers have elevated proportionate mortality for the diseases caused by asbestos (lung cancer, asbestosis, and malignant mesothelioma) and from traumatic injuries, particularly electrocutions and other fatalities that may be related to the workplace. The findings of prostate cancer, tumors of eye, brain and central nervous system, and diseases of the blood forming organs were unexpected. Elevated mortality from leukemia and melanoma skin cancer may be related to electrical work and suggests further evaluation of possible risk factors is needed. These data suggest that construction electrical work is a very hazardous trade.

Motor Vehicle Fatalities in the United States Construction Industry—Fosbroke DE, Ore T, Hixon P

A death certificate-based surveillance system was used to identify 2,144 work-related motor vehicle fatalities among civilian workers in the United States construction industry over the years 1980-92. Construction workers were twice as likely to be killed by a motor vehicle as the average worker, with an annual crude mortality rate of 2.3/100,00 workers. Injury prevention efforts in construction have had limited effect on motor vehicle-related deaths, with death rates falling by only 11% during the 13-year period, compared with 43% for falls, 54% for electrocutions, and 48% for machinery. In all industries combined, motor vehicle fatality rates dropped by 47%. The largest proportion of motor vehicle deaths (40%) occurred among pedestrians, with construction accounting for more than one-fourth of all pedestrian deaths. A minimum of 54 (6%) of these pedestrian fatalities were flaggers or surveyors. Flaggers accounted for half the 34 pedestrian fatalities among women, compared with only 3% among men. Along with previous studies and recent trends in the amount and type of road construc-