among females took place on the same level (63%) and predominantly in the services and wholesale/retail trades industries.

Conclusion: Prevention of the most severe workplace injuries must focus on contact with objects and equipment and falls, taking industry into account.

G3.4

Title: Development of a New Electrical Injury Protection System-Selection of RF Transmitter Mounting Location on the Human Body

Authors: Zeng S, Powers JR, Jackson LL, Conover DL

To protect electrical workers near an energized electrical circuit, a new electrical injury protection system is being developed that measures how close a worker is to a live circuit by using a worker-worn low-power radio-frequency (RF) transmitter and a receiver that is plugged into the live electrical circuit. The transmitter emits RF electromagnetic waves through a worker's body to the energized electrical circuit allowing the receiver to judge the worker's proximity or electrical contact by analyzing the RF signal strength. The uniformity of the RF emission strength through the body, which is mainly determined by body-mounting location of the RF transmitter, affects the accuracy of the RF-receiver proximity/electrical contact measurement.

After the approval by the CDC/NIOSH Human Subject Review Board, nine human subjects were tested to measure the strength of RF emissions through different parts of their bodies to an electrical circuit. Two practical RF-transmitter-mounting locations, wrist and upper-arm, were tested by attaching an RF signal source (100-150 kHz). The RF signal path is: RF signal source – body transmitter-mounting location – body extremity/forehead – air (omitted in electrical contact simulation) – electrical circuit – RF spectrum analyzer. Non-uniform RF emission levels were observed through hands and forehead to an electrical circuit. The greatest RF signal strength difference of 9.47 dB (mean) was observed between the left-hand emission and right-hand emission when the RF signals were transmitted from the subject's right wrist. As the RF transmission location was moved from right-wrist to right-upper-arm, the above RF emission strength difference was reduced to 4.20 dB (mean). This RF-emission-uniformity difference may be attributed to the different electrical-path lengths between the signal transmitter location and RF-emitting parts of the body.

Thus, continued development of the protection system will use the upper-arm as the RF-transmitter mounting location to most accurately measure human-to-electrical-circuit proximity and electrical contact.

G3.5

Title: Welding-Related Ocular Injuries

Authors: Lombardi DA, Pannala R, Sorock GS, Wellman H, Courtney TK, Verma GS

PURPOSE: Welders are exposed to multiple sources of ocular injury. There are few published studies of US data examining the activities and processes proximal to a welding-related eye injury. This study describes a one-year sample of welding related injuries from a large US-based provider of workers' compensation (WC) insurance.

METHODS: For the year 2000, 26,413 WC claims with eye as the primary body part injured were abstracted. Using a narrative text search we identified 1,349 claims where occupation was listed as welder. Additionally, 826 non-welders injured while engaged in a welding-related activity (e.g., pipe fitters) were identified using a narrative search of the injury and accident description, manual class and SIC code data fields.

A coding system was developed with categories for activity when injured, initiating process, mechanism of injury, object or substance causing injury and any mention of personal-protective equipment use (PPE). Descriptive analyses of demographics, injury and occupational characteristics, and the narrative coding categories were conducted.

RESULTS: Welders accounted for 5.2% of all eye injury claims. Most cases were male (97%) with an average age of 35 years and were from manufacturing (70.4%), service (11.7%), and construction (8.4%) related industries. Eye injuries were predominantly unilateral (82.3%). Foreign bodies (72.7%) and flash burns (19.4%) were the most frequent natures of injury. At the time of injury, welding (31.7%) and grinding (22.5%) were the common activities. In 56.3% of cases, the mechanism of injury was 'struck by a propelled or airborne object'. Injuries occurred most often during normal mechanical processes (70.6%). Results for non-welders were generally similar, however flash burns (38.5%) and bilateral injuries (34.9%) were more frequent in this group.

CONCLUSIONS: Workers performing welding-related tasks should be trained to recognize all potential ocular hazards. To prevent ocular injury, the effective use of proper safety equipment (PPE) should be stressed.

NOIRS 2003 ABSTRACTS

Although the abstracts in this publication were proofread to eliminate obvious errors in spelling, punctuation, and grammar, they were neither edited nor officially cleared by the National Institute for Occupational Safety and Health (NIOSH). Therefore, NIOSH is not responsible for the content, internal consistency, or editorial quality of the abstracts. That responsibility lies solely with the individual authors. Any use of company names and products throughout this publication does not imply endorsement by NIOSH, the Centers for Disease Control and Prevention, the Public Health Service, or the Department of Health and Human Services.