

62 Occupational Health and Safety

Program Overview

Program Description

The products, tools, and strategic research from this program help electric power companies reduce workplace injuries, improve worker health, and control labor-related costs. The work identifies injury and illness trends, develops ergonomic interventions, and addresses critical occupational exposure issues. The program serves as the foundation for occupational safety-related work at the Electric Power Research Institute (EPRI).

Industry Needs and Issues Addressed

- Safeguarding of worker health and safety
- Reduction of workplace injuries
- Reduction of medical costs and productivity losses caused by worker illness or injury
- Compliance strategies for Occupational Safety and Health Act requirements for workplace safety and ergonomics guidelines
- Compliance strategies for Occupational Safety and Health Administration (OSHA) exposure guidelines likely to become more stringent for exposures such as hexavalent chromium and crystalline silica
- Holistic view of worker exposures, illnesses, and injuries, including a comprehensive job-exposure matrix
- Prevention of injuries through ergonomic power plant design
- Investigation of shift work, recently classified as a probable carcinogen by the International Agency for Research on Cancer

Impact

- Significantly improved worker health and safety through reduced workplace injuries. For example, EPRI ergonomic solutions have reduced strain and sprain injuries among line and power plant workers.
- Reduced health care costs, now estimated at millions of dollars per injury case for some injuries for individual electric companies and at billions of dollars annually for ergonomics-related injuries alone for the industry.
- Improved productivity and morale in a healthier workforce, as well as improved product quality.
- Timely, reliable, and comprehensive solutions to industry-specific needs and practical implementation guidance.
- Credible, rigorous research addressing occupational exposures that may be limited by increasingly stringent exposure guidelines.
- Access to comprehensive, standardized information on injury and illness rates and statistical analyses drawn from a unique, industry-specific database.

Key Accomplishments

- EPRI is an innovative leader in occupational ergonomics specifically for the electric power sector, developing cost-effective interventions for distribution workers (overhead distribution, manhole, vault, conduit, and other workers) and generation workers (power plant operators, mechanics, and electricians). Ergonomic interventions are described in easy-to-read handbooks.
- EPRI pioneered research on injury prevention through ergonomic design of fossil-fueled power plants. This work produced the first ergonomic plant design handbook, a key reference for design engineers.

- By invitation, EPRI presented its ergonomics work to OSHA's National Advisory Committee on Ergonomics, illustrating the central role that EPRI's research has attained in this arena.
- EPRI's Occupational Health and Safety Database, now containing over one million worker-years of information from electric power companies, has proved to be a valuable resource for tracking occupational injury and illness rates and costs.

Current Year Objectives

- Provide accurate, quantitative data and statistical analyses on injury rates and trends and associated costs, including the 2009 *Annual Occupational Health and Safety Statistics Report*
- Reduce injury rates and associated costs through prevention of chronic injuries resulting from inefficient design of tasks, tools, and equipment
- Minimize the impact of specific occupational health outcomes through understanding relationships among occurrence rates, occupational exposures, and lifestyle factors
- Provide relevant scientific data for setting occupational guidelines on crystalline silica exposure
- Develop ergonomics videos for worker safety training and webcasts for occupational health and safety staff education

Industry Involvement

- Estimated 2009 funding: \$1.3M

Program Technical Lead

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Summary of Projects

Project Number	Project Title	Value
P62.001	Occupational Health and Safety Database	This project produces the Occupational Health and Safety Database, a unique source of detailed, comprehensive, standardized injury and illness rates and statistical analyses specifically for the electricity industry. The database is updated with new information from multiple electric companies on an annual basis. An annual report on major injury trends and costs is prepared from information drawn from the database. The database also helps guide program priorities.
P62.002	Ergonomics Research	This research determines the role of ergonomic factors in current work task design and in implementation of tools and equipment, and suggests remedial interventions. Results provide impartial information for dealing with costs and complying with ergonomics guidelines and regulatory needs. In 2009, this project will address ergonomics issues related to the purchase, retrofit, operation, and maintenance of fleet vehicles.
P62.003	Occupational Exposure and Health Studies	This research investigates relationships among injury and illness occurrence rates, lifestyle factors, and workplace exposures. Epidemiologic research addresses occupational and lifestyle factors potentially associated with injuries and illnesses, and statistical analyses of existing occupational health information provide further insight. Current health issues include exposure to crystalline silica, arsenic, and hexavalent chromium.

Project Descriptions

P62.001 Occupational Health and Safety Database (101907)

Issue

To maintain a healthy workforce, improve productivity, and control health care costs, electric power companies need access to accurate illness and injury incidence rates and cost impacts. Only a comprehensive, industry-specific database populated with information from multiple companies can provide accurate, quantitative data. For comprehensive databases, the National Academy of Sciences recommends coding of injury/illness data using standardized procedures and precise, consistent descriptions; the EPRI database meets these criteria.

Description

The Occupational Health and Safety Database is a unique source for detailed, comprehensive, standardized injury and illness rates across the electricity industry. The database also enables monitoring and evaluation of workforce injury and illness trends and provides a basis for identifying high-risk occupations, quantifying costs and lost time, and setting research priorities. In addition, the database is a powerful tool for benchmarking and safety program evaluation for participating companies. The database is the source of information for tailored analyses for individual electric companies and for the *Annual Occupational Health and Safety Statistics Report*, providing statistical analyses for the electricity industry.

Value

- Enables medical cost control by identifying injury trends and tracking related costs
- Contributes to reduction of injury and illness rates
- Enables benchmarking and continual injury monitoring
- Provides information for establishing health and safety program priorities and for estimating the impact of prevention programs
- Provides guidance for developing targeted health and safety research
- Reduces uncertainties associated with occupational health and safety issues

How to Apply Results

Occupational health and safety staff at participating electric companies will use project information and analyses to monitor and control health care costs, improve health and safety programs, and reduce occupational illness and injury rates. Information from this project can also be used to identify health and safety research needs.

2009 Products

Product Title & Description	Planned Completion Date	Product Type
Annual Occupational Health and Safety Statistics Report: Improvements to the Occupational Health and Safety Database are expected to include classification of work location and business unit information. Analyses of injury data by these new classifications will be conducted. Data gaps and other issues also will be addressed to provide even greater depth to analyses and insights. In 2009, this work will focus on evaluating data for overtime and shift work.	12/31/2009	Technical Report

Future Year Products

Product Title & Description	Planned Completion Date	Product Type
Annual Occupational Health and Safety Statistics Report: This annual report will continue to provide quantitative, detailed incidence rates and strategic economic impacts from trends analyses based on information from the Occupational Health and Safety Database.	2010	Technical Report

P62.002 Ergonomics Research (102993)

Issue

Musculoskeletal (strain and sprain) injuries currently account for more than 40% of total medical costs for electric power companies. EPRI statistical analyses found that in just four companies, there was a loss of more than 70 full-time-equivalent employees for one full year due to these injuries. Reduction of injury rates and associated costs depends on prevention of chronic injuries resulting from inefficient design of tasks, tools, and equipment. Evaluation of existing designs and development of ergonomic interventions are essential to strain and sprain injury prevention.

Description

The aim of this research is to develop specific interventions to prevent chronic injuries resulting from inefficient design of tasks, tools, and equipment. Effective ergonomic interventions reduce injury rates and associated costs. Research results also provide objective information relevant to compliance with ergonomics guidelines and regulations. Previous research in this project focused on electric power plant workers and tasks; in 2009, research will focus on ergonomics issues related to fleet vehicles in the electric power industry.

Value

- Reduces injury rates and associated costs through prevention based on ergonomic evaluation and intervention. One company documented a six-month payback for a \$1.3 million investment in implementing just one ergonomic intervention for overhead distribution line workers that was based on recommendations in an EPRI ergonomics handbook.
- Helps improve worker morale and productivity.
- Helps ensure compliance with ergonomics guidelines and regulations.

How to Apply Results

Application of EPRI ergonomics research results will help prevent chronic injuries among power industry workers through improved work practices and ergonomically designed tools and equipment. These interventions will also help ensure workforce compliance with ergonomics guidelines and regulations. Results from the fleet vehicles project will help power companies prevent vehicle-related injuries associated with ergonomically poor entry and exit design, seating, and access to parts, tools, and equipment. Implementation of ergonomic interventions requires an investment of time and money; however, many recommended interventions are of low cost. With additional funding, EPRI provides assistance tailored to the needs of individual companies.

2009 Products

Product Title & Description	Planned Completion Date	Product Type
<p>Ergonomic Fleet Vehicle Design, Retrofitting, and Selection: Progress Report: This progress report will describe work on a new three-year project to assess the ergonomic design of original and retrofitted fleet vehicles and to develop a cost-effective process for selecting and purchasing ergonomically designed vehicles.</p>	12/31/2009	Technical Report

Future Year Products

Product Title & Description	Planned Completion Date	Product Type
<p>Ergonomic Fleet Vehicle Design, Retrofitting, and Selection: Progress Report: This interim technical report will provide an update on work to assess ergonomic fleet vehicle design and retrofitting and develop a cost-effective vehicle selection process.</p>	2010	Technical Report
<p>Ergonomic Fleet Vehicle Design, Retrofitting, and Selection: Final Report: This final report will present the results of work to assess the ergonomic design of original and retrofitted fleet vehicles and to develop a cost-effective process for selecting and purchasing ergonomically designed vehicles.</p>	2011	Technical Report

P62.003 Occupational Exposure and Health Studies (055833)

Issue

Adverse health effects can result from occupational exposure to dust, fine particles, or toxic substances. For example, inhalation of crystalline silica over a prolonged period of time can cause respiratory disease. In 1997, the International Agency for Research on Cancer classified crystalline silica as a Group 1 carcinogen; OSHA is currently considering drastically lower exposure limits for this substance. To minimize occupational exposure of electric power company personnel to crystalline silica and other potentially toxic substances, such as arsenic and hexavalent chromium, in-depth analysis of existing occupational health information and collection of new information are critical.

Description

Scientific research in this project provides relevant data for OSHA guideline setting and for development of appropriate strategies to comply with OSHA regulations for exposure to substances such as crystalline silica and hexavalent chromium. Depending on the results of a 2008 feasibility assessment, 2009 research will include analysis of air sampling data from multiple electric power companies to determine the potential for overexposure to hexavalent chromium in various work situations. Engineering controls will also be evaluated. Work to develop a job-exposure matrix (JEM) that captures a wide range of occupational exposures is also planned for 2009.

Value

- Provides knowledge necessary for the development of preventive measures to minimize the health impact of environmental exposures
- Helps ensure compliance with exposure standards
- Offers the opportunity to improve worker health, morale, and productivity
- Reduces health-related costs

- Provides information about health risks associated with power plant occupational exposures that can be used to address proposed regulatory limits and to effectively protect and communicate with workers

How to Apply Results

Results from this work can be used to assess potential health risks associated with occupational exposures and develop preventive measures, including appropriate work practices, that electric companies can implement. Electric company occupational health and safety staff also will use results to determine compliance with exposure standards. In addition, results may provide input to exposure standard formulation.

2009 Products

Product Title & Description	Planned Completion Date	Product Type
Job-Exposure Matrix (JEM) Progress Report: This report will summarize progress in developing a holistic job-exposure matrix to capture a wide range of occupational exposures. The JEM (to be developed in coordination with Project Sets 60B and 60C) will provide information for addressing possible health effects associated with occupational exposures and for assessing compliance with exposure standards.	12/31/2009	Technical Report

Future Year Products

Product Title & Description	Planned Completion Date	Product Type
Job-Exposure Matrix: Development of an extensive job-exposure matrix for a wide spectrum of occupational work practices is the first step in addressing possibly associated health effects. Such a matrix will be developed in coordination with Project Sets 60B and 60C. The matrix also will be useful in assessing exposure standards compliance.	2011	Technical Report
