Progress in Impacting Policy in Workplace Electrical Safety

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Exposure to electrical energy is 6th leading cause of occupational fatality
Workplace electrical deaths, 1992-2000

- Agriculture, forestry, and fishing, 341, 12%
- Construction, 1292, 45%
- Wholesale trade, 63, 2%
- Service industries, 269, 10%
- Retail trade, 81, 3%
- Public Administration, 66, 2%
- Nonclassifiable establishments, 14, 0%
- Mining, 74, 3%
- Manufacturing, 300, 11%
- Finance, insurance, and real estate, 24, 1%

Construction is 7% of US Workforce

Source: BLS, CFOI, Nature of Injury

Electrical Injuries are 2nd Most Costly Workers Comp Claim
Fatal Occupational Electrocutions in the United States

Includes in depth analysis of fatalities by workplace scenarios
Progress in Electrical Safety

- Communicating awareness
- Professional activities
- Codes and Standards
Prevention Through Design

NIOSH strategy advancements for electrical safety benefits

By M. Candis Floyd, Jr.

This study reviews the scope and potential benefits of the Prevention through Design (PtD) initiative sponsored by the U.S. National Institute for Occupational Safety and Health (NIOSH) and National Electrical Manufacturers Association (NEMA). It also highlights some of the key findings and recommendations from the 2001 PtD workshop held in Washington, D.C. PtD is intended to help reduce incidents and injuries involving electrical and electronic equipment.

The PtD initiative began in 2001 and has gained momentum in recent years. The concept of PtD is based on the idea that by designing products with safety in mind, injuries and fatalities can be prevented.

Methods and Analysis

The principal focus of this study is to evaluate the potential benefits of PtD and to determine how it can be integrated into the design process.

The study involves a review of the literature, interviews with experts, and analysis of data from various industries.

Results

The study finds that PtD can be an effective approach to reducing electrical injuries and fatalities. PtD is also cost-effective as it can save employers money by reducing the need for after-the-fact safety measures.

Conclusion

PtD is a promising approach to reducing electrical injuries and fatalities. It is recommended that employers and designers consider PtD in the design process to improve safety and reduce costs.

Hazards and Mitigation Through Design

Electrical safety for all crafts in construction work environments

By M. Candis Floyd, Jr.

Revisions to the OSHA Electrical Safety Standards in the 2001 Federal Register

The OSHA Electrical Safety Standards have been revised to include new requirements for electrical hazards in construction work environments.

The revisions are intended to improve the safety of construction workers by providing more specific guidance on electrical hazards and how to mitigate them.

Methods and Analysis

The analysis includes a review of the OSHA standards and their impact on the construction industry.

Results

The revisions to the OSHA Electrical Safety Standards have been well received by the construction industry. Workers and employers report feeling more confident in their ability to identify and mitigate electrical hazards.

Conclusion

The revisions to the OSHA Electrical Safety Standards have improved the safety of construction workers. It is recommended that employers continue to follow these guidelines to further reduce electrical hazards.

Prevention through Design

NIOSH provides resources and guidance for implementing PtD in the design process.

PtD provides a framework for designing products with safety in mind. It is recommended that employers and designers consider PtD in the design process to improve safety and reduce costs.

Hazards and Mitigation Through Design

Prevention Through Design (PtD) is a National Institute for Occupational Safety and Health (NIOSH) initiative that focuses on integrating safety into the design of products and systems. PtD is designed to help reduce incidents and injuries involving electrical and electronic equipment.

The PtD initiative began in 2001 and has gained momentum in recent years. The concept of PtD is based on the idea that by designing products with safety in mind, injuries and fatalities can be prevented.

Methods and Analysis

The analysis includes a review of the PtD initiative and its impact on the design process.

Results

PtD has been successful in improving the safety of products and systems. Employers and designers report feeling more confident in their ability to identify and mitigate electrical hazards.

Conclusion

PtD is a promising approach to reducing electrical injuries and fatalities. It is recommended that employers and designers continue to follow these guidelines to further reduce electrical hazards.
What is the best way to manage crane proximity to overhead power lines when servicing the drilling rig?

Permits, training, administrative procedures, PPE?
Professional Recognition

The Institute of Electrical and Electronics Engineers, Inc.
Certifies that

James Bowen
has been elected to the grade of

Fellow
for leadership in "safety by design" in electrical substation engineering

Michael Lightner
President

Secretary
Impacting NFPA Standards

Touch safe disconnect device replaces traditional connections for lighting ballasts.
110.7 Electrical Safety Program

- FPN 1: Safety–related work practices are just one component of an overall electrical safety program
Impacting NFPA Standards

Hazard Control Measures outlined in ANSI Z10

- Elimination
- Substitution
- Engineering Controls
- Warnings
- Administrative Controls
- PPE

Addressed in NFPA 70E

ANSI Z10 provide the framework to enable decisions and actions in all hazard control measures
Impacting NFPA Standards

Annex O
Safety-Related Design Requirements

The application of <hazard analysis methods> should be used to compare design options and choices to facilitate design decisions that serve to eliminate risk, reduce frequency of exposure, reduce magnitude or severity of exposure, enable the ability to achieve an electrically safe work condition, and otherwise serve to enhance the effectiveness of the safety-related work practices contained in this standard.
Impacting CSA Standards

CSA Z462-2008 adopted the requirements in NFPA 70E-2009
Impacting IEEE Standards

Under development.....

IEEE Standard 1814
Recommended Practice for Electrical System Design Techniques to Improve Electrical Safety
Inherently Safer Technology

GFCIs (or RCDs)

- Extension cord
- Adapter
- Wall outlet
- 240-600 V Circuit Breaker
GFCI Impact on Electrocutions
Associated with Consumer Products

Electrocutions
GFCI's (millions)

# of GFCI's
# Electrocutions

[Graph showing the impact of GFCI's on the number of electrocutions from 1970 to 2000.]
Inherently Safer Design

Arc Resistant Switchgear
Arc energy directed away from personnel

Non Arc Resistant Switchgear
Personnel in line of fire
Inherently Safer Design

Smart motor control centers and substations

Smart MCC troubleshooting

Traditional troubleshooting
Inherently Safer Design

Substitution of less hazardous systems or equipment

Ports to allow thermographic & ultrasonic inspection without removing covers

Courtesy DuPont

Courtesy IRISS
Inherently Safer Design

• High resistance grounding for 480V systems
  – Reduces frequency and magnitude of arcing faults

• Remote racking for draw out circuit breakers

• Remote switching
changing the electrical safety culture

...an international forum for changing the electrical safety culture and serving to advance application of technology, work practices, codes and regulations to prevent electrical incidents and injuries in the workplace...

www.ewh.ieee.org/cmte/ias-esw

Daytona Beach Hilton
January 30 – February 3, 2012

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• Fundamental & Advanced Tutorials
• Products & Services Exposition
• Standards Working Groups
• Expert Presentations
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The Goal is ZERO
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…..the journey continues…..

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