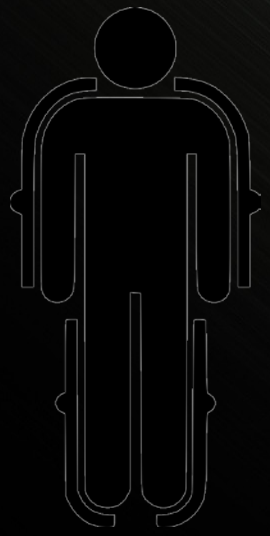
worker-wearable  worker-attachable

industrial robotics



Exoskeleton Technical Interchange Meeting

worker-wearable  worker-attachable

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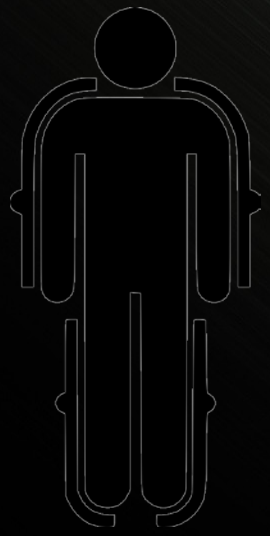


Exoskeleton Technical Interchange Meeting

Crystal Gateway Marriott

Arlington, Virginia

June 28 and 29, 2017

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

US ARMY NATICK SOLDIER RD&E CENTER

National Institute for Occupational Safety and Health
NIOSH®

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA
FDA

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

U.S. Department of Veterans Affairs

Sandia National Laboratories

SRNL™
SAVANNAH RIVER NATIONAL LABORATORY
OPERATED BY SAVANNAH RIVER NUCLEAR SOLUTIONS

Meeting Purpose

Engage the robotics community on industrial applications of human-wearable and human-attachable robotic devices to enable and proliferate use in the workforce

Images Courtesy EXOSKELETON REPORT

Agenda Highlights: Industry Perspectives

UNITED STEELWORKERS
USW
UNITY AND STRENGTH FOR WORKERS

BMW

LOWE'S

VirginiaTech
Invent the Future®

BRIOTIX

HONDA

GM

NASA

WearRA
WEARABLE ROBOTICS
ASSOCIATION

Agenda Highlights: Breakout Sessions

- Test Methods and Metrics
- Ergonomics
- Sizing and Fitting
- Risks and Regulation

Agenda Highlights: Topical Discussions

- Workplace Physical Demands and Musculoskeletal Injury Surveillance (NIOSH)
- Standards, Terminology Working Group, ASTM Standards Development (NIST)
- Update on Military Applications (NSRDEC)
- Update on Medical Applications (VA and FDA)

DOE-EM Perspectives

- Wearable, prosthetic-like, exoskeletal, and other attachable robotic devices that serve as
  - Personal protective equipment (PPE) and/or
  - Performance augmentation and amplification devices (PAADs)

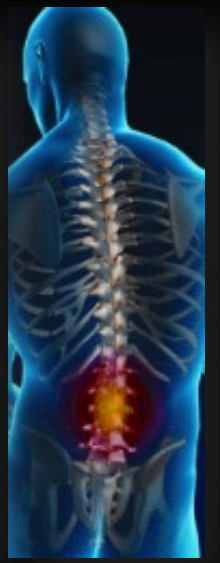
Robotic PPE

Protect workers from sustaining internal injuries due to forceful or over-exertion, fatigue, hyperextension, over-rotation, abrupt movements, repetitive motion or stress, repetitive or excessive vibration, awkward or prolonged postures, and possibly the latent effects of aging







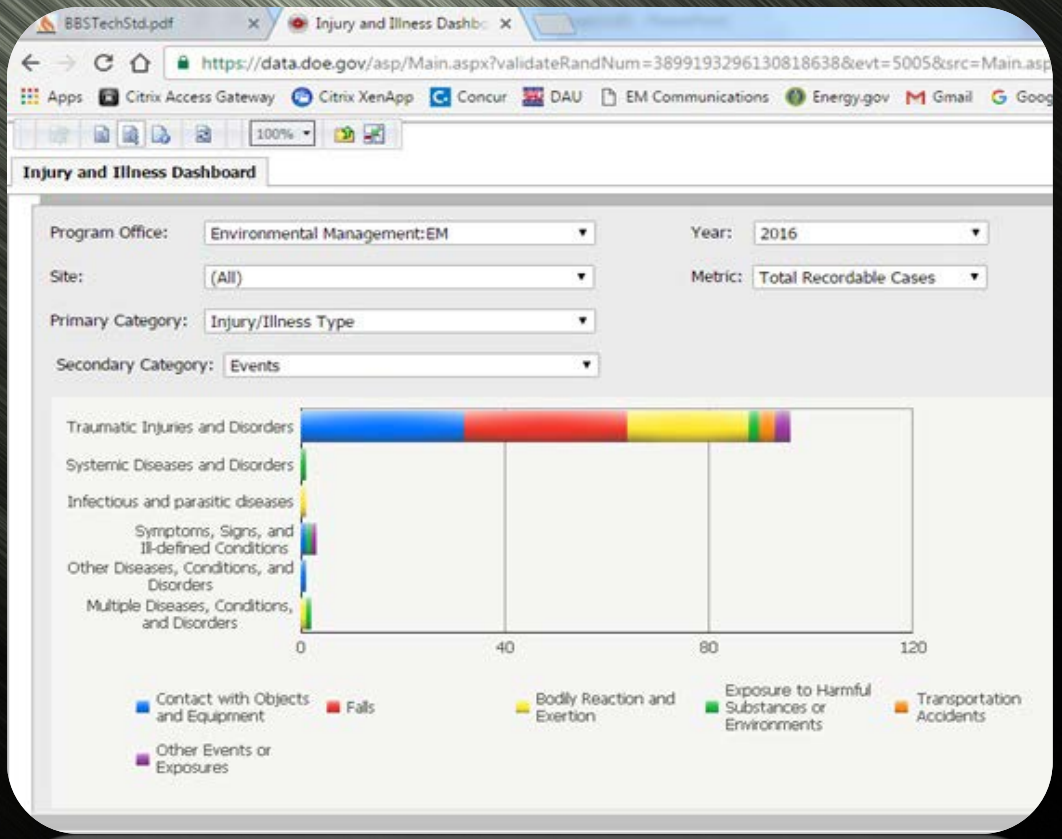
Traditional PPE

Current PPE protect workers from external hazards and exposures in the workplace

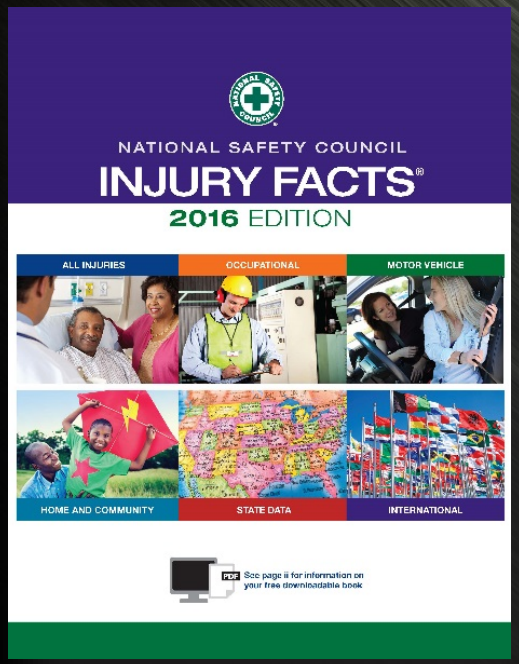
Preventing Injuries

- Top three injuries at EM sites are

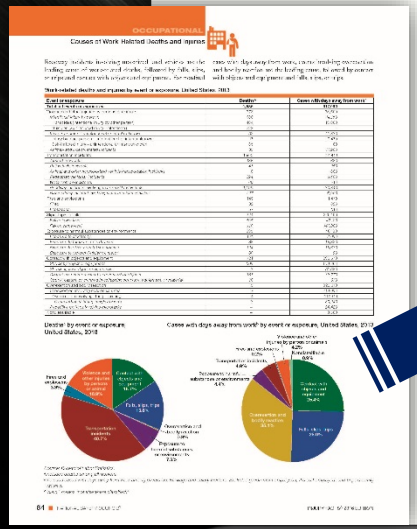
1) Contact with objects and equipment [■],
2) Falls [■] and,
3) Bodily reaction exertion [■]



Preventing Injuries



Cases with days away from work by event or exposure. *United States, 2013*



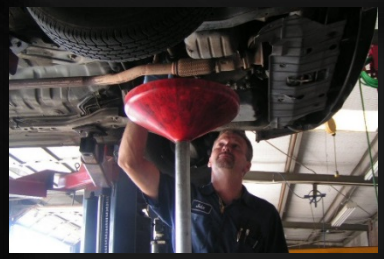
Performance Augmentation and Amplification Devices

Enable workers to more easily perform tasks that are physically stressful or demanding, mentally taxing, ergonomically challenging, or even beyond human capability









Work SAFER

Work SMARTER

EM is actively promoting the use of advanced robotic technologies as a key mission-enabler

worker-wearable  worker-attachable

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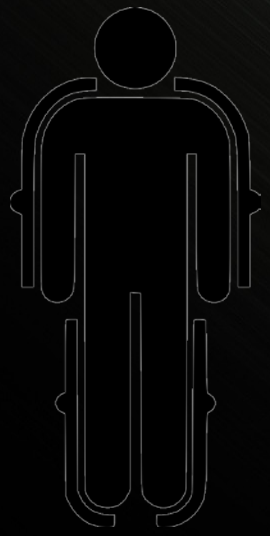

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