ACCSH Health Hazards, Emerging Issues, and Prevention through Design Workgroup

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The Work Group discussed two items that make for recommendations:

a) The potential for Construction Focus 4 Health, modeled in part on Construction Focus 4 Safety; and
b) The potential for a noise app.

We discussed briefly Safety and Health Management Systems (SHMS).

Concerning (a), our recommendation is that OSHA consider supporting AIHA as it considers a proposal put before its Board to consider Construction Focus 4 Health. The topics under consideration are temperature extremes; respiratory hazards; musculoskeletal illnesses; and noise. Furthermore, we recommend that the effort begin with an emphasis on awareness across the industry.

Justification: These topics are broadly defined, and can be expanded and collapsed as occasion serves; are driven by data, for the most part; can draw a wide network of support; can include hierarchy of control(s), training and personal protective equipment, and prevention through (by) design.

Concerning (b), our recommendation is that OSHA considers packaging elements suggested by Scott Schneider into one app (see attached Noise App Proposal).

Justification: OSHA is in a position to encourage external entities to develop the app using information compiled by OSHA, NIOSH and others.

Noise App Proposal

1) Education -about the effects of noise on your health, anatomy of the ear and how it works, what is a decibel and how it is measured logarithmically, what the risks are at various levels (see NIOSH 1998 criteria document) (including non-auditory effects), temporary threshold shifts, audio clips- what it should like to have hearing loss and what tinnitus sounds like, audiometric testing- how to read an audiogram, compare it with previous one (the app could even store your audiogram for later comparison). Explain the 3 foot rule (if you have to shout to talk with someone 3 ft. away…). Synergistic effects with ototoxic chemicals (list of known ototoxins).

2) Have a list of common tasks or equipment and the noise levels associated with them,

3) Each task would also have a list of simple noise controls

4) Review types of hearing protectors (plugs, muffs, flat attenuation, etc.) and their advantages and disadvantages. Have the EPA hearing protector ratings for all hearing protectors,

5) Estimate/measure your noise level (apps already exist for this) and

6) Match your hearing protector with the noise level or task and tell you what your noise exposure will be if you use the hearing protector you selected AND/OR how much time you are allowed (using the OSHA and also the NIOSH-ACGIH limits) to do that task with and without hearing protection. A warning should also be given to avoid "overprotection"

7) Include a short video showing how to properly insert and wear the hearing protection (the manufacturers would be happy to provide that)

8) Non-occupational exposures and the need for hearing protection when shooting, using chainsaws, mowing the lawn, etc.

9) Audiometry- Connect the phone to earplugs which will play tones at various frequencies into one ear at a time and the user can tap the phone when they hear the tone as it gets louder (probably has to be in a quiet room and before work, though they could also test themselves after work and see if there is a temporary shift by comparison). This will give them a rough idea of how much hearing they have lost. (Apps already exist for this.) It should include a caveat that this test is just for screening and they should get a hearing test from a professional each year

OSHA CONSTRUCTION PREVENTION THROUGH DESIGN (PtD) WEBPAGE OUTLINE

Introduction

It has been well established that the most effective, and the most cost-effective, way to prevent injuries and fatalities in construction is through changes made in the design phase of the project.

Several OSHA standards already incorporate design requirements (listed below). But much more could be done to move safety "upstream" and prevent many more construction injuries and fatalities. Design changes will not only help workers building the project. They will prevent injuries throughout the lifecycle of the building. Maintenance workers, for example, who have to service HVAC equipment on the roof of a building will benefit from the protection afforded by a 42 inch high parapet or guardrails installed on the roof edge to protect roofers from falls.

This webpage provides links to the many resources now available to incorporate safe designs into projects. It is hoped that owners and designers will take advantage of them and make a significant contribution to the effort to ensure that no construction or maintenance worker gets injured or killed in the course of their work.

Construction Workplace Design Solutions

The OSHA Alliances in the Construction Sector have developed over a dozen fact sheets explaining simple design changes that could help prevent falls in construction. Falls cause about a third of all fatalities in construction every year or about 300 deaths per year. Adoption of these design changes could have a significant impact.

Falls From Roof Edge
Falls From Floor Openings
Falls From Non-Moving Vehicles
Roof Hatch Access and Hole Protection
Specify Non-Fragile Skylights and/or Skylight Guards
Specify Sufficient Wall Height to Allow Parapets to Function as Fall Prevention
Falls from Ladders
Roof Anchors
Scaffolds
Structural Steel--Construction Loads
Structural Steel--Beams and Columns

Structural Steel--Unloading Flatbeds
Workplace Design Solution Industrial Large Duct

Design for Construction Safety

Several construction safety engineers have been working on construction prevention through design projects for the past 20 years. Much of their work can be accessed on the Design for Construction Safety website established by Mike O'Toole at Bucknell University:

http://www.designforconstructionsafety.org/index.shtml

NIOSH

NIOSH has had a very active Prevention through Design (PtD) program for many years on their website: http://www.cdc.gov/niosh/topics/PTD/ you can find several "Workplace Design Solutions" some of which are specifically focused on construction:

http://www.cdc.gov/niosh/pubs/workplace_date_desc_nopubnumbers.html

http://www.cdc.gov/niosh/docs/2014-108/pdfs/2014-108.pdf

http://www.cdc.gov/niosh/docs/wp-solutions/2014-124/pdfs/2014-124.pdf

http://www.cdc.gov/niosh/docs/wp-solutions/2015-198/pdfs/2015-198.pdf

The NORA (National Occupational Research Agenda) Construction Sector Council, lead by NIOSH, has worked with the US Green Building Council (USGBC) to develop a pilot credit for designers going for LEED certification. This credit is for designers that incorporate PtD into their projects. http://www.cdc.gov/niosh/topics/ptd/greenjobs.html

United Kingdom CDM

In The United Kingdom, the Health and Safety Executive (HSE) passed the Construction Design and Management (CDM) regulations many years ago which place specific requirements on the project designer to identify potential safety and health issues and address them early on in the design of the project:

http://www.hse.gov.uk/construction/cdm/2015/index.htm

Australian CHAIR

Australia has also had a very active project to promote safety in the design of construction projects. It is called CHAIR(Construction Hazard Assessment Implication Review). Here is a link to the CHAIR tool used for project review:
http://www.cdmills.cn/images/img/122003004.pdf

How do OSHA standards address design issues? Construction-relevant examples:

1) 1926.36 Design and construction requirements for exit routes

1910.36(a) Basic requirements. Exit routes must meet the following **design** and construction requirements:

2) 1926.404 Wiring design and protection

1926.404(b)(1)(iii)(F)

The employer **shall not make available or permit the use by employees of any equipment which has not met the requirements** of this paragraph (b)(1)(iii) of this section.....

1926.404(c)(1)(ii)

Clearance from ground. Open **conductors shall conform to the following minimum clearances:**

1926.404(c)(1)(ii)(A) 10 feet (3.05 m)-above finished grade, sidewalks, or from any platform or projection from which they might be reached.

3) 1926.57 Ventilation

1926.57(b) "Local exhaust ventilation." Local exhaust ventilation when used as described in (a) shall be **designed** to prevent dispersion into the air of dusts, fumes, mists, vapors, and gases in concentrations causing harmful exposure. Such exhaust systems shall be so **designed** that dusts, fumes, mists, vapors, or gases are not drawn through the work area of employees.

4) 1926.1433 Cranes & Derricks in Construction

1926.1433(d)(7)(i) Cabs must be **designed** with a form of adjustable ventilation and method for clearing the windshield for maintaining visibility and air circulation. Examples of means for adjustable ventilation include air conditioner or window that can be opened (for ventilation and air circulation); examples of means for maintaining visibility include heater (for preventing windshield icing), defroster, fan, windshield wiper.

1926.1433(d)(7)(ii) Cab doors (swinging, sliding) must be **designed** to prevent inadvertent opening or closing while traveling or operating the machine. Swinging doors adjacent to the operator must open outward. Sliding operator doors must open rearward.

5) 1926.152 Flammable and Combustible locations

1926.152(b)(4)(ii)

Where an automatic extinguishing system is provided, the system shall be **designed** and installed in an approved manner.

6) 1926.651-652 Excavation

1926.652(a)(1) Each employee in an excavation shall be protected from cave-ins by an adequate protective system **designed** in accordance with paragraph (b) or (c) of this section except when:

1926.651(c)(1)(i) Structural ramps that are used solely by employees as a means of access or egress from excavations shall be **designed** by a competent person. Structural ramps used for access or egress of equipment shall be **designed** by a competent person qualified in structural design, and shall be constructed in accordance with the design.

7) 1926.153 Liquified Petroleum Gas

1926.153(h)(7) Hose shall be **designed** for a working pressure of at least 250 p.s.i.g. **Design**, construction, and performance of hose, and hose connections shall have their suitability determined by listing by a nationally recognized testing agency. The hose length shall be as short as practicable. Hoses shall be long enough to permit compliance with spacing provisions of paragraphs (h)(1) through (13) of this section, without kinking or straining, or causing hose to be so close to a burner as to be damaged by heat.

8) 1926.452 Scaffolding

1926.452(a)(10) Pole scaffolds over 60 feet in height shall be **designed** by a registered professional engineer, and shall be constructed and loaded in accordance with that design. Non-mandatory Appendix A to this subpart contains examples of criteria that will enable an employer to comply with **design** and loading requirements for pole scaffolds under 60 feet in height.

9) 1926.754 Steel Erection

1926.754(e)(2)(i) Framed metal deck openings shall have structural members turned down to allow continuous deck installation except where not allowed by structural **design** constraints or constructibility.

10) 1926.703 Requirements for cast-in-place Concrete

1926.703(a)(1) Formwork shall be **designed,** fabricated, erected, supported, braced and maintained so that it will be capable of supporting without failure all vertical and lateral loads that may reasonably be anticipated to be applied to the formwork. Formwork which is **designed,** fabricated, erected, supported, braced and maintained in conformance with the Appendix to this section will be deemed to meet the requirements of this paragraph.

11) 1926.407 Hazardous Locations

1926.407(b)(3) Safe for the hazardous (classified) location. Equipment which is safe for the location shall be of a type and **design** which the employer demonstrates will provide protection from the hazards arising from the combustibility and flammability of vapors, liquids, gases, dusts, or fibers. NOTE: The National Electrical Code, NFPA 70, contains guidelines for determining the type and **design** of equipment and installations which will meet this requirement.

12) 1926.601 Motor Vehicles, Mechanized Equipment, and Marine Operations

1926.601(b)(10) Trucks with dump bodies **shall be equipped** with positive means of support, permanently attached, and capable of being locked in position to prevent accidental lowering of the body while maintenance or inspection work is being done.

1926.601(b)(11) Operating levers controlling hoisting or dumping devices on haulage bodies **shall be equipped** with a latch or other device which will prevent accidental starting or tripping of the mechanism.

1926.601(b)(12) Trip handles for tailgates of dump trucks **shall be so arranged** that, in dumping, the operator will be in the clear.

13) 1910.333 "Wiring design and protection"

1910.333(a)(1) "Deenergized parts." Live parts to which an employee may be exposed shall be deenergized before the employee works on or near them, unless the employer can demonstrate that deenergizing introduces additional or increased hazards **or is infeasible due to equipment design** or operational limitations.