OSC | 10
Ohio Safety Congress & Expo

Reality check for construction: Ergonomics does impact you!

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Brad Ridenour

Wednesday, March 31, 2010 10:30 to 11:30 a.m.

Continuing Nursing Education Disclosures

- **Goal:** To educate conference attendees on specific aspects of accident prevention and Ohio's workers' compensation system
- **Learning objectives:**
  - Explain how to prevent MSDs and provide practical alternatives to traditional high-risk activities, including both short term and long term solutions.
  - Describe how ergonomics impacts construction; health effects of MSDs on construction workers; and
  - List safe solutions for specific construction tasks.
- **Criteria for Successful Completion:** Attend the entire event and complete a session evaluation.
- **Conflict of Interest:** The planners and faculty have no conflict of interest.
- **Commercial Support:** There is no commercial support for this event.
- **Continuing Education:** Awarded 0.1 IACET general CEUs and 1.0 RN* contact hour.

**The Ohio BWC (OH-188/01-01-2013) is an approved provider of continuing nursing education by the Ohio Nurses Association (OBN-001-91), an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.*

Ergonomics: What and Why

Brad Ridenour
Industrial Engineer, Ergonomics Consultant

Dayton Customer Service Office
937-405-8311

A balance for optimization

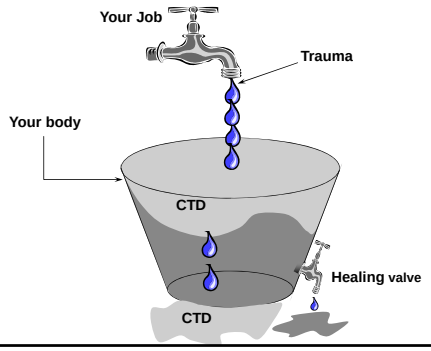
Cumulative trauma disorders (CTDs)

Term assigned to identify a group of injuries that classically result from long-term and repeated "wear and tear" on the musculoskeletal system

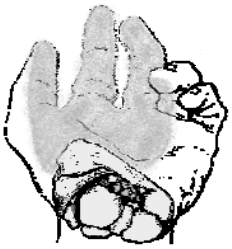
- **Cumulative** indicates injuries that develop gradually over time, and result from many repeated stresses on a particular body part.
- **Trauma** signifies bodily insult or injury from mechanical stresses.
- **Disorders** describes the adverse health effects that arise from chronic exposure to repeated trauma.

CTD trauma bucket balanced

CTD trauma bucket unbalanced



Carpal tunnel syndrome



Hierarchy of controls

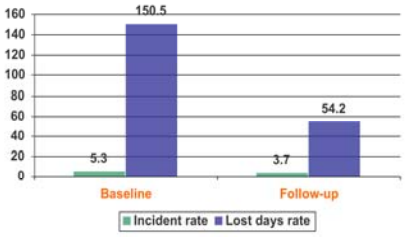
First choice	Second choice	Last and least
Engineering controls	**Administrative Controls**	**Band-aid solutions**
Workstation design	Training	Gloves
Tool design	Job rotation	Wraps
Process modification	Pacing	Shields
Mechanical assist	Policy	
	Job enlargement	

Man vs. machine

- o Decision making
- o Low repetition activities
- o Low force application
- o Delicate force application

- o Taking instruction
- o High repetition activities
- o High force application
- o Hazardous environments

CTD incident and lost days rates in construction



n = 30, per 200,000 hours worked, incident 32%, lost days 82 improvements

Problem

Lifting five gallon buckets at 50 pounds

Solution

A grout delivery system that eliminates manual handling

A hopper with an auger that attaches to the front of a forklift

Results

The incident rate (standardized per 200,000 hours worked) decreased from 5.1 the two years prior to the intervention to 0.0 during the two years following, a 100% improvement.

Using National Safety Council data on the average cost of a claim being $19,382, the return on investment was 1.6 years.

Adena has worked 137,546 hours without any injuries related to grouting operations.

A 25% to 30% increase in productivity over the bucket method has been achieved on several projects using the job-cost tracking system.

Problem

Removing the roof requires high forces while working in awkward postures.

Solution

Garlock roof warrior eliminatesthe manual force to remove material.

Problem

Stooped, bending and kneeling

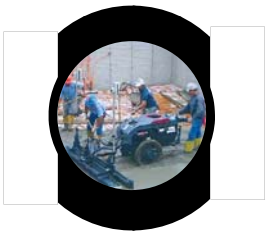
postures while laying felt

Solution

Felt laying machine that allows employees to work upright

Problem

Hours spent bent over screeding by hand.



Solution

Laser screed

Results

The CTD incidence, lost days and restricted days rates all remained at zero.

The turnover rate (per 200,000 hours worked) changed from 202 to 138 – a 32% improvement.

The risk factor score for the affected task was 45 before the laser screed was used, and was one afterward – a 98% improvement.

The company found it could use the laser screed on 63% of the square footage it poured. Productivity, measured in square footage per man hour, increased 40% to 45% as a result of using the laser screed.

Problem

High forces, awkward wrist postures

Solution

Plasma cutting machine or Starter coil line that automatically, cuts to size, notches, forms cleats, bends metal

Problem

Manually lifting granite slabs

Extremely heavy loads

Solutions

Crane w/ attachment
Hydraulic slab cart (vertical to horizontal position)
Power tilter – connects to forklift

Problem

Manually cranking the scaffold resulted in fatigue, pinched fingers, strained wrists

Planking shifted = trip hazards

Solution

Fully automated, self-climbing hydraulic platform scaffolding and extension components

Replaced wood planking with 24x7' steel platform to eliminate trips.

Problem

Carrying, lifting and holding materials while climbing and working on ladders

Solution

Articulating boom lift

Results

The incident rate (standardized per 200,000 hours worked) decreased from 3.6 the two years prior to the intervention to 0.0 during the one year following, a 100% improvement.

Using National Safety Council data on the average cost of a claim being $19,382, the return on investment was 4.8 years.

There is approximately a 5% time savings from not having to bring material up ladders. This equates to approximately $23,950 in payroll.