PtD Construction Case Studies

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PtD – Prevention through Design
Washington DC, August 23, 2011

Study sponsored by,
“The matter of worker safety during construction is the responsibility of the Contractor, and NOT the Architect” (Architect 2010)
Outline

• Goals
• Methodology
• Examples
• Remarks
Goals of study

• Develop 5 examples where PtD is used to mitigate worker safety
• Beginnings of an online database by NIOSH for designers to access
Methodology

• The five examples were identified during interviews and communications with:
  • Architects
  • Safety Engineers
  • Contractors
Example 1 – Concrete Fall Arrest Straps

- Polyester, single use
- Several manufacturers
- Installation prior to casting
- D-ring on strap allows workers to attach their personal safety harness

Picture from 3M http://www.3m.com/
Example 1 – Concrete Fall Arrest Straps

• Designer requirements:
  • Rebar must support an additional 5000 lb
  • Designer must specify the locations for straps to be tied

• Upon completion of work, the strap is cut

• Current Limitations
  • Contractor-led safety initiative
  • Each contractor/subcontractor supplies own straps. If designer specifies strap placement, there will not be a need for multiple straps in one location.
  • Permanent fall restrain systems necessary

• Benefits: Inexpensive
Example 2 – Increasing Height of Roof Parapets

- Increase parapet height to 39”
- Eliminates the need for temporary guardrails

Limitations:
- Additional monetary cost
- Additional design requirements
Example 2 – Increasing Height of Roof Parapets

• Benefits
  • Reduce risk of falls from roof edges
  • Eliminates the for fall restraint systems
  • Eliminates requirement for roof equipment to be set back by 15’

(S. Rajendran 2010)

Pictures from S. Rajendran
Example 3 – Placing electrical wires in slabs and underground

- Placement of wires through in slab conduits/underground
- Eliminating falls from elevation

Pictures from S. Rajendran
Example 3 – Placing electrical wires in slabs and underground

• Limitations:
  • Workers forced to work from kneeling position
  • Additional risk of tripping
  • Early involvement of electrical/mechanical contractor
  • No studies on economic feasibility

• Benefits
  • Eliminate risks from falling
  • Eliminate awkward postures

Pictures from S. Rajendran
Example 4 – Concrete imbeds for guardrail support

• Description
  • Steel imbeds (plates or other attachment points) installed in concrete slab edge
  • Temporary guardrails can be attached to imbeds
  • Imbeds can be used to support other permanent wall systems (masonry, glass curtain walls)
Example 4 – Concrete imbeds for guardrail support

- **Limitations**
  - Imbeds need to be specified for other building systems

- **Benefits**
  - Minimal amount of redesign required
  - Provides quick anchor points for slab edge protection
Example 5 – Soil Retention with railing

• Description
  • Provide a guardrail at grade level when personnel are working next to an excavated trench
Example 5 – Soil Retention with railing

- **Limitations**
  - Products not available
  - Extensive design required to develop

- **Benefits**
  - Reduce the risk of falls from elevation into trench
Remarks

• Examples are initial efforts to generate a database for designers to access and implement in their designs

• Primarily deal with falls, which cause the most fatalities in construction (CPWR 2007)
Questions?

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