

PtD Construction Case Studies

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PtD – Prevention through Design
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“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

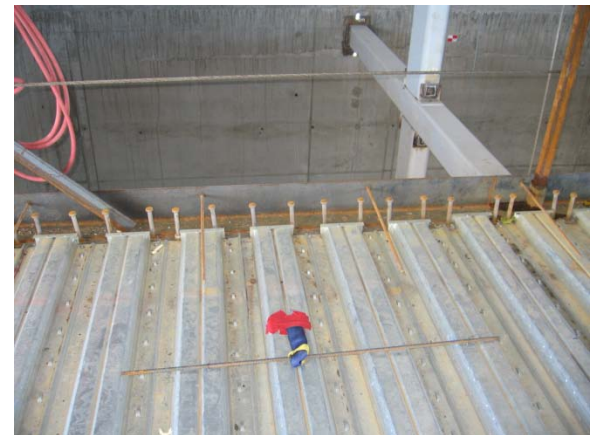
- The five examples were identified during interviews and communications with:
 - Architects
 - Safety Engineers
 - Contractors

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/>



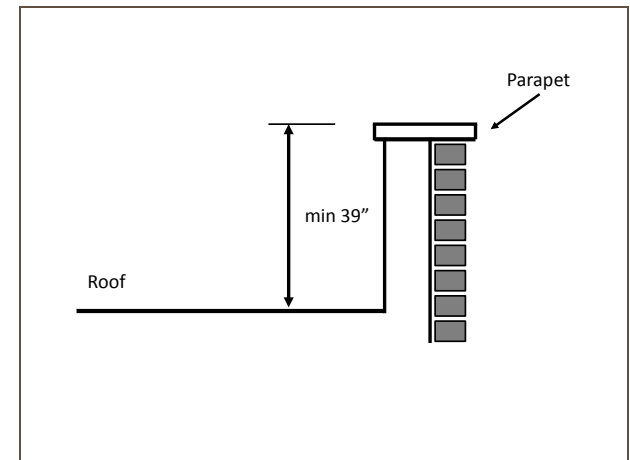
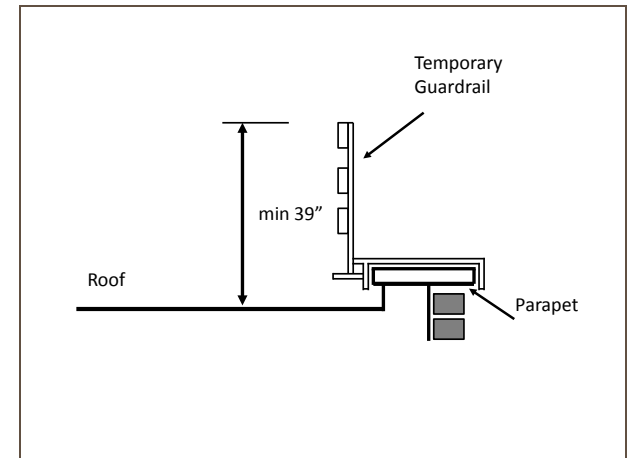
Example 1 – Concrete Fall Arrest Straps

- 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

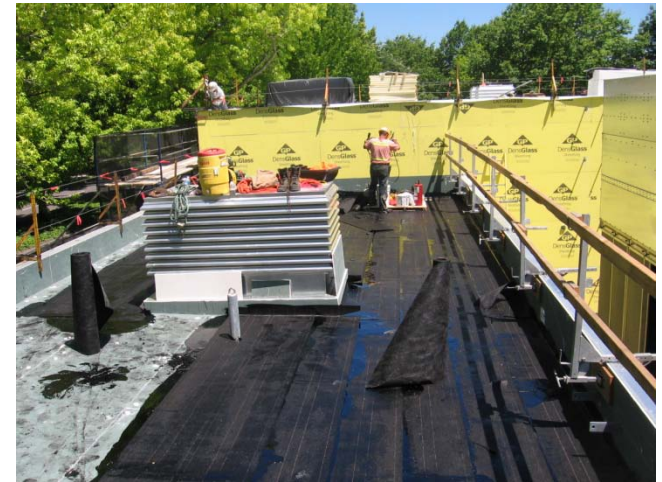
- Increase parapet height to 39"
- Eliminates the need for temporary guardrails
- Limitations:
 - Additional monetary cost
 - Additional design requirements



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

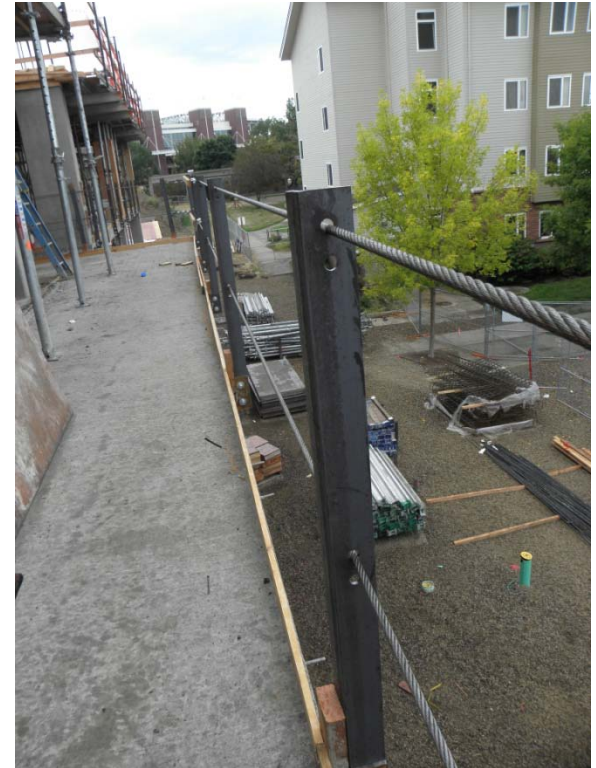
Example 4 – Concrete imbeds for guardrail support

- 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

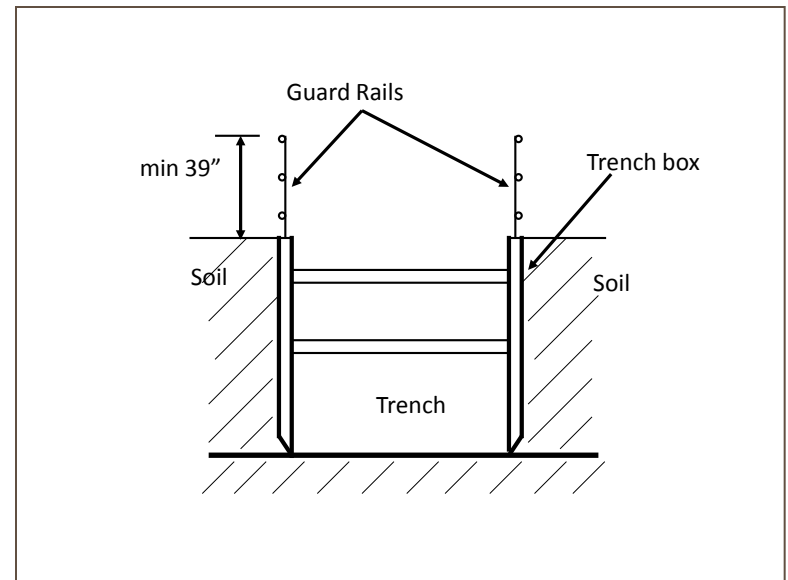
- Description
 - Provide a guardrail at grade level when personnel are working next to an excavated trench



Picture from www.ur.com

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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