WELCOME TO THE ASCE 142ND ANNUAL CIVIL ENGINEERING CONFERENCE

The Global Growth of Prevention through Design (PtD): Overview of the PtD Concept

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What is Prevention through Design (PtD)?

"Addressing occupational safety and health needs in the design process to prevent or minimize the work-related hazards and risks associated with the construction, manufacture, use, maintenance, and disposal of facilities, materials, and equipment."
(http://www.cdc.gov/niosh/topics/ptd/)

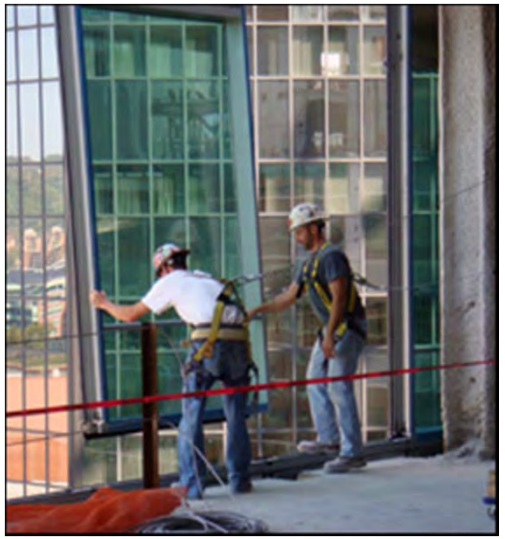
PtD™ Prevention through Design

PtD in Construction is…

- Explicitly considering construction safety in the design of a project.
- Making design decisions based in part on a project's inherent safety risk to construction workers.
- Addressing worker safety in the constructability review process.

"Safety Constructability"

(Source: www.designforconstructionsafety.org)



Why PtD in Construction?

- 22% of 226 injuries that occurred from 2000-2002 in Oregon, WA, and CA[1]
- 42% of 224 fatalities in US between 1990-2003[1]
- 60% of fatal accidents resulted in part from decisions made before site work began[2]
- 63% of all fatalities and injuries could be attributed to design decisions or lack of planning[3]

[1] Behm, M., "Linking Construction Fatalities to the Design for Constr. Safety Concept" (2005)

[2] European Foundation for the Improvement of Living and Working Conditions

[3] NSW WorkCover, *CHAIR Safety in Design Tool*, 2001

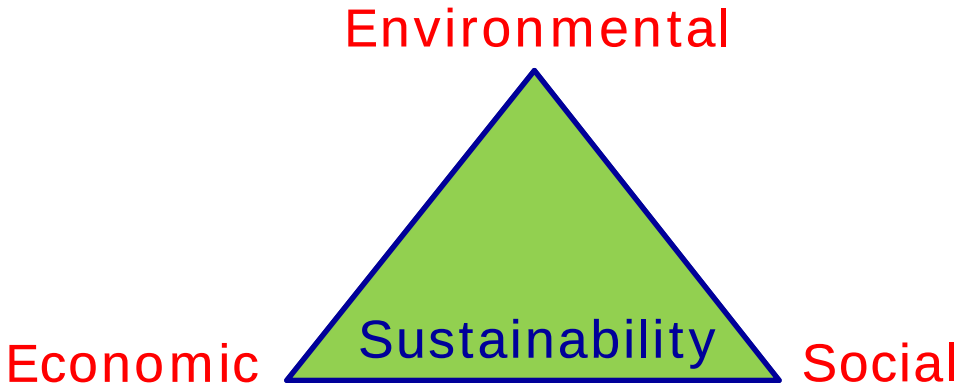
Additional Motivations

- Moral and ethical standards

  "Engineers shall recognize that the lives, safety, health and welfare of the general public are dependent upon engineering decisions …." (ASCE Code of Ethics)

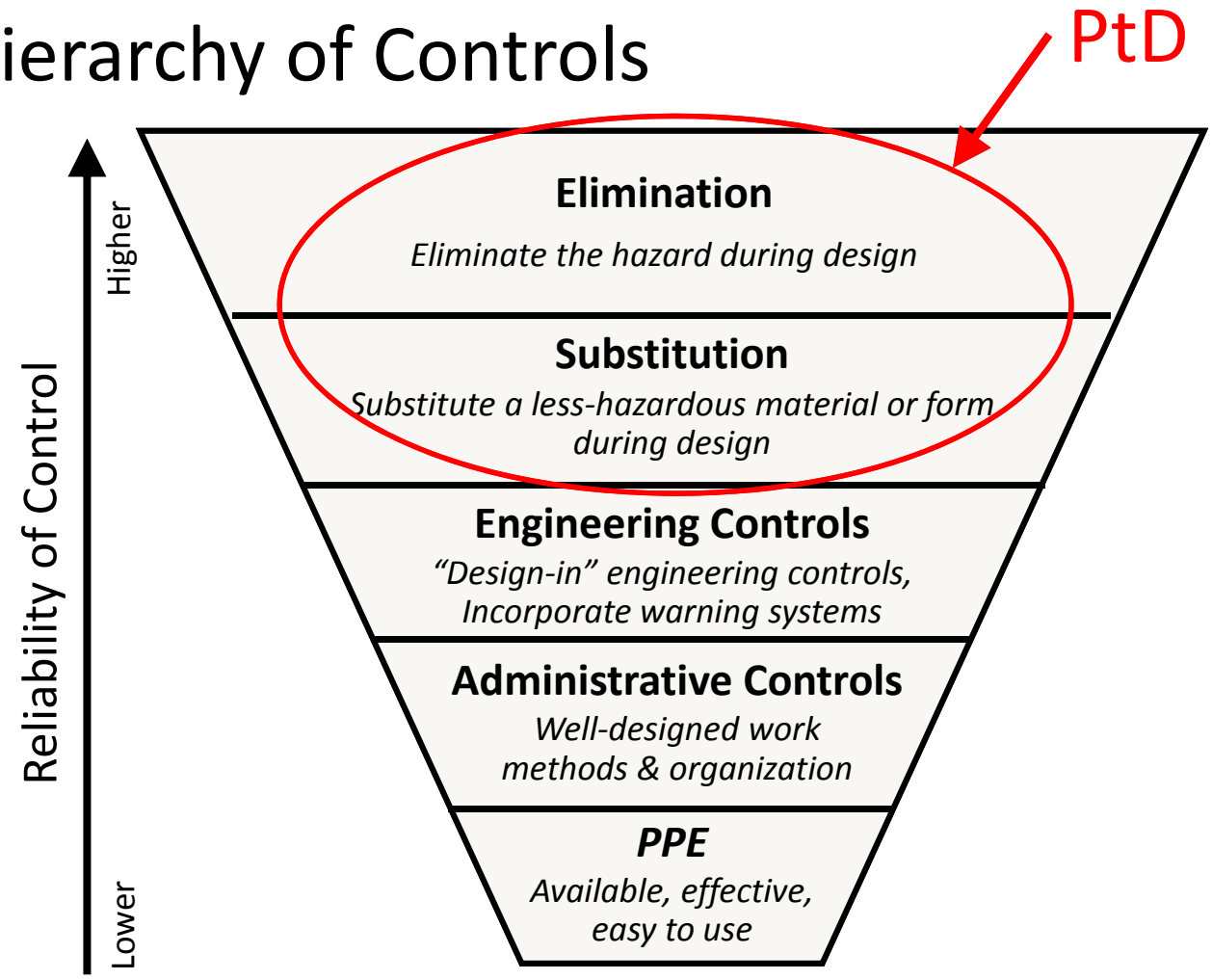
- ASCE Policy Statement 350

- Sustainability

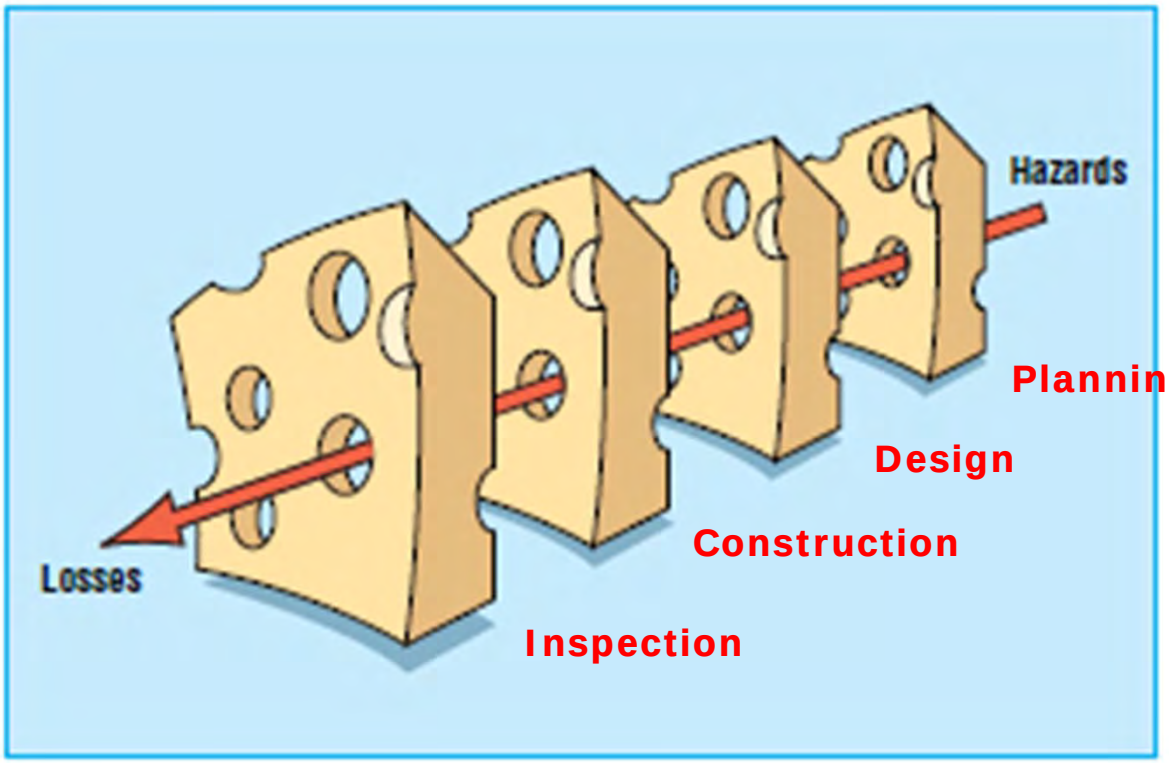


Additional Motivations

Hierarchy of Controls



"Swiss Cheese" Model of Accident Trajectory

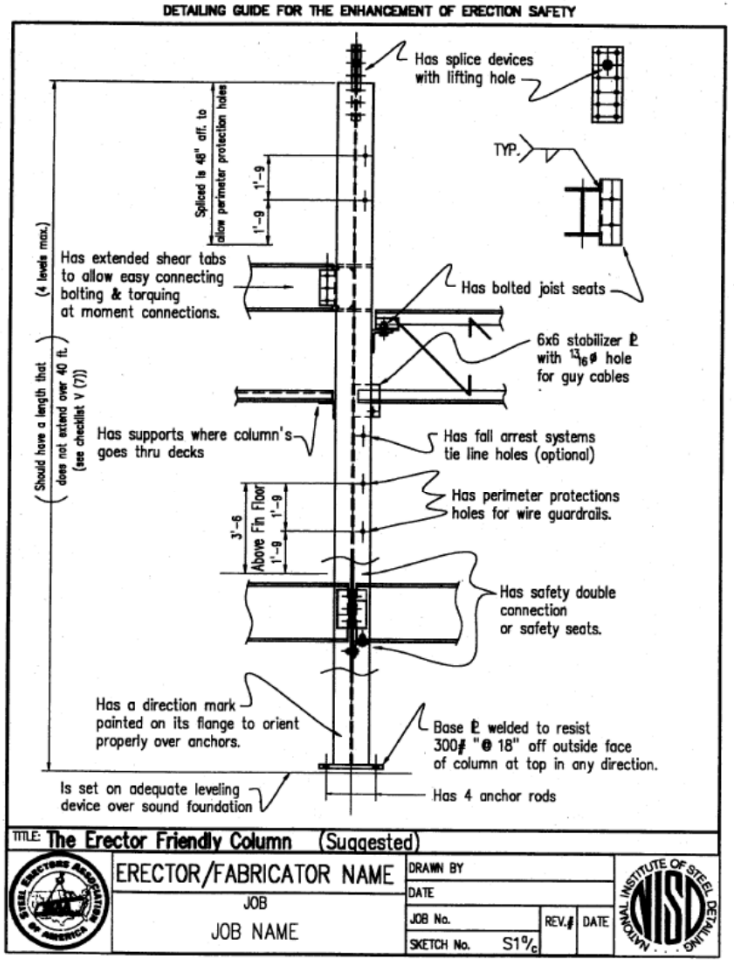


(Sources: Reason, J. "Education and Debate." BMJ, Vol. 320, 768-770, March 2000)

PtD Example

The Erector Friendly Column

- Include holes in columns at 21” and 42” for guardrail cables and at higher locations for fall protection tie-offs
- Locate column splices and connections at reasonable heights above floor
- Provide seats for beam connections



(Source: National Institute of Steel Detailing and Steel Erectors Association of America)

Benefits of PtD Implementation

- Eliminate/reduce site hazards
  - Fewer worker injuries and fatalities
- Increased productivity; increased quality
- Fewer delays due to accidents
- Encourages designer-constructor collaboration
- Improved operations/maint. safety
- Reduced workers' comp. premiums

Barriers to PtD Implementation

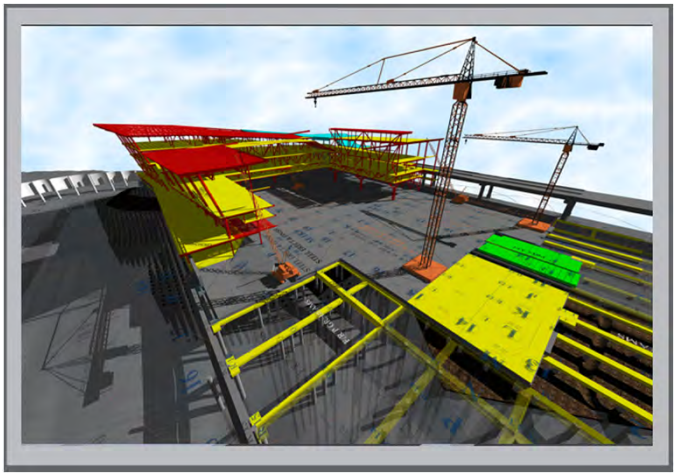
- Barriers:
  - No/minimal site safety in designer education and training
  - Competing priorities (e.g., safety vs. cost/schedule)
  - Lack of knowledge of how to design for safety
  - Unclear authority and responsibility for PtD

Barriers to PtD Implementation (continued)

- Barriers:
  - Difficult for designers to assess risks if lack of field experience
  - Contractual separation of design and construction
  - Cost and time requirements for implementation of PtD
  - Fear of liability

Enablers of PtD Implementation

- Enablers:
  - A committed owner/client
  - Positive safety culture
  - Design engineer experience and training
    - Both construction and safety
  - Integrated project delivery methods
  - Design/construction visualization tools



PtD as a National and International Initiative

- NIOSH PtD National Initiative
  - NORA Construction Sector Council CHPtD Workgroup
- OSHA Construction Alliance Roundtable
- ANSI/ASSE PtD Standard Z590.3-2011

PtD™ Prevention through Design

alliance An OSHA Cooperative Program

- U.K. - Construction (Design and Mgmt.) Regulations
- Singapore: Design for Safety Pledge, 2012
- Other EU countries, Australia, South Africa, and more

Which is safer to build? How much safer?

Steel-framed building

Concrete-framed building