

Collaborative Construction Planning: A Convergence of Sustainability, Lean Construction, and Safety in Design

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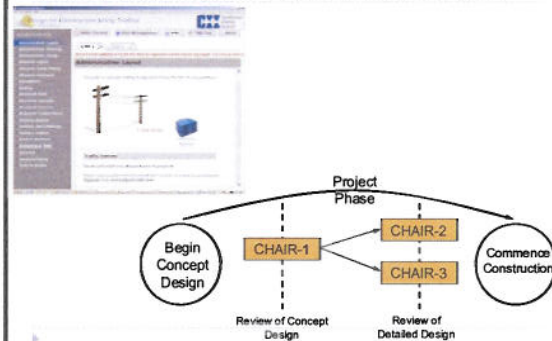
What impacts a design?



Safety in Design: Examples



Safety in Design: Tools and Processes



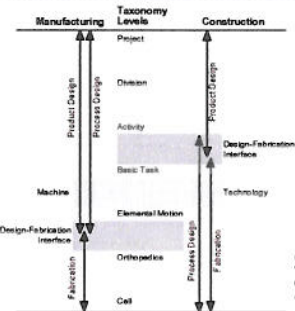
Safety and Sustainability: Research Study

- Survey of Construction workers: 80% feel LEED buildings are **safer**
- Negative impacts – material handling, congestion, and atrium design
- Positive impacts – good house keeping, emission free materials, and paint control
- Case study incident – foot punctured by nail during material separation

	Type	# of Projects	Mean	Std. Dev.	Median	Mann-Whitney (2-tail p-value)
RIR	LEED	38	6.12	5.36	6.86	0.1859
	Non-LEED	48	5.63	7.65	4.63	
LTCR	LEED	38	2.45	4.24	0.70	0.7212
	Non-LEED	48	2.50	7.75	0.78	

Source: Rajendran, Sathyanarayanan, 2007, "Sustainable Construction Safety and Health Rating System," PhD Dissertation, Oregon State University.

Lean Construction



(Source: Everett, J.G. and Slocum, A.H., 1994, "Automation and Robotics Opportunities: Construction versus Manufacturing," *Journal of Construction Engineering and Management*, ASCE, Vol. 120, No. 2, pp. 443-452).

Expected Impacts: "Trajectories"

- ▶ Increased prefabrication
- ▶ Increased use of less hazardous materials and systems
- ▶ Increased construction engineering
- ▶ Increased spatial investigation
- ▶ Increased collaboration and integration



(Source: Toole, T.M. and Gambatese, J.A., 2008. "The Trajectories of Prevention through Design in Construction." *Journal of Safety Research*, Special Issue on Prevention through Design, Elsevier and the National Safety Council, 39, 225-230).

Challenges/Barriers

- ▶ Change in project team mindset
 - ▶ Collaboration
 - ▶ Upfront involvement of all stakeholders
- ▶ Contracting:
 - ▶ Revised model contracts
 - ▶ Alternative contracting methods
- ▶ Availability of visualization and work flow tools
- ▶ Education and training:
 - ▶ From separate to integrated



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▶ Questions? Comments?

▶ For more information:

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