CONSTRUCTION SAFETY DESIGN SOLUTION #11 DESIGN CATEGORY: ENVELOPE/INTERIOR HAZARDS: FALLS FROM STRUCTURAL STEEL DESIGN SOLUTION: CONSIDER ACTUAL CONSTRUCTION LOADS

This design solution reduces the risk of serious falls from structural steel during the construction of a building. Falls from structural steel can result in death or serious injury – about 36 fatalities per year [BLS, 2008] are reported. Not included in these statistics are injuries and fatalities that have results from structure failures because the design professional did not consider actual construction loads in the structural design. The actual loads during construction could be higher than the building code requirement.

SOLUTION

Building codes requires sizing structural members based on the dead load of the construction materials and the live load resulting from occupancy. However, structural failures have occurred because the designer did not consider the actual construction loads or processes. For example, Figure 1 below shows a typical composite beam construction. The steel beam is proportioned based upon composite action. But, during construction the structure does not act like a composite structure. Designers should consider how the structure behaves during construction as well as the when it is complete. The weight of construction vehicles, pallets of bricks, lumber and other materials should be considered in addition to the building code requirements when sizing structural members.

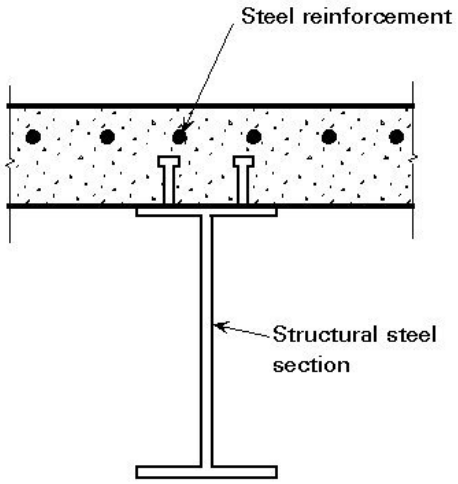

Figure1Typical Composite Construction

Figure 2 Structural collapse from weight of equipment

BACKGROUND INFORMATION

US Building Codes

See for example, International Building Code, International Code Council

Other Applicable Design Guidelines:

National Institute of Steel Detailing and Steel Erectors Association of America. *Detailing Guide for the Enhancement of Erection Safety.* 2001. *www.nisd.org and www.seaa.net.*

OTHER CONSIDERATIONS

-Avoid exterior slender columns

-Show reinforcement details on drawings

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