Resistance and Robustness of Composite Floor Systems to Fire

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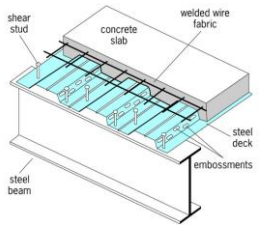
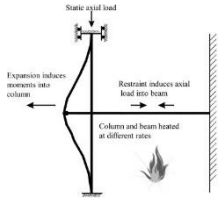
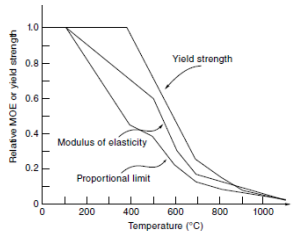
Background

Composite floor systems:







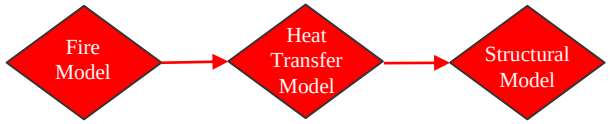
Spray-applied fire resistive material (SFRM)

Prescriptive design:

- ❑ How buildings should be *constructed to resist* fire
- ❑ "Designs" based on standard fire results

Performance-based design (PBD):

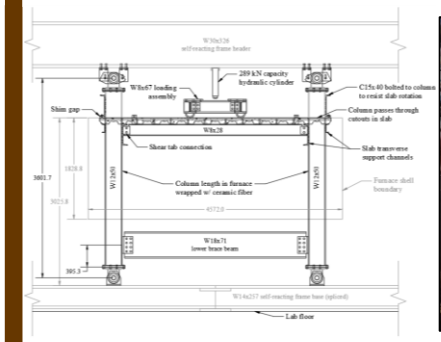
- ❑ How a structure is to *perform* in a fire
- ❑ Incorporate engineering analysis

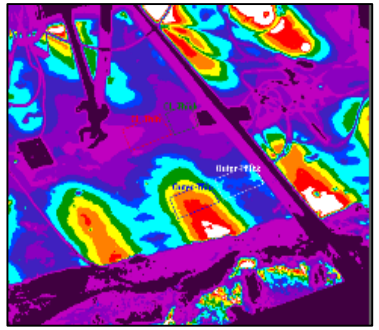


Research Questions

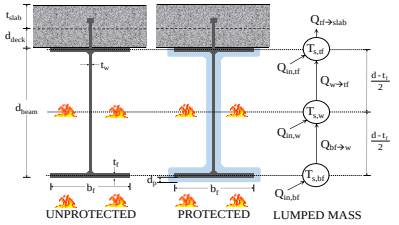
- ❑ How do standard fire conditions translate to real building systems?
- ❑ What fire/heat transfer/structural modeling complexity is warranted for design?
- ❑ How can we improve resiliency of buildings to fire?

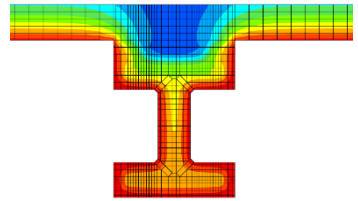
Experiments

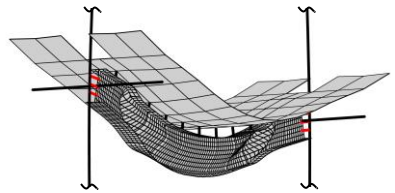


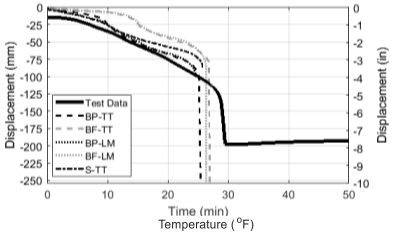


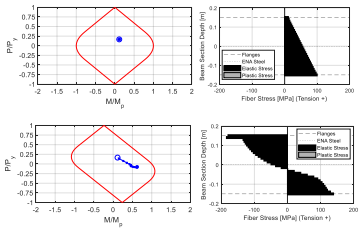
Modeling and Results

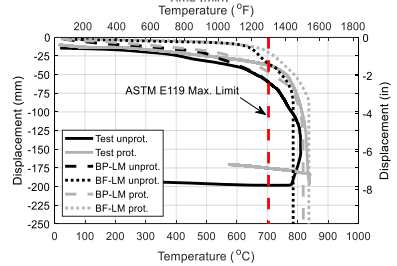


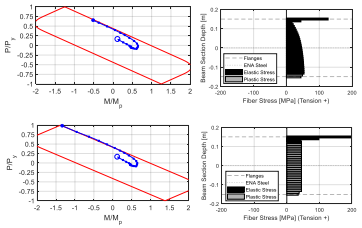












References

1. Drury, M.M., Kordosky, A.N., Quiel, S.E. (2020). "Structural fire resistance of partially restrained, partially composite floor beams, II: Modeling." *Journal of Constructional Steel Research*, Vol. 167.
2. Kordosky, A.N., Drury, M.M., Quiel, S.E. (2020). "Structural fire resistance of partially restrained, partially composite floor beams, I: Experiments." *Journal of Constructional Steel Research*, Vol. 167.
3. "Resistance and resilience of composite floor systems to fire experiments, modeling, & design", NASCC Virtual Steel Conference 2020, via AISC education archive: https://www.aisc.org/education/continuingeducation/education-archives/resistance-and-resilience-of-composite-floor-systems-to-fire-experiments-modeling-and-design-e13/