


UNIVERSITY OF
MARYLAND
Department of Fire Protection Engineering




The Effect of Fires on People, Property and the Environment


Effect of Fire on Property and the Environment

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Overview of Week 5 Lecture


- Impact of Fire Exposure on Structures
- Impact of fire, smoke and extinguishing agents
 - on contents
 - on the environment



2




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Impact of Fire Exposure on Structures

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More Information



- See Fire Protection Engineering Magazine (<http://magazine.sfpe.org/>)
 - Integrating Structural Fire Protection Into The Design Process, H. Locke
 - Challenges Facing Engineered Structural Fire Safety-A Code Official's Perspective, J. Siu
 - Historical Survey of Multistory Building Collapses Due to Fire, J. Beitel and N. Iwankiw


4




Why is protecting the structure important?



5




Protecting Structures




- Is the same level of fire resistance provided in ALL structures?

6




Fire Resistance Requirements




- “The Subcommittee believes that the idea of designing some buildings for the full fire severity corresponding to the occupancy ... is a logical advance in fire protection engineering”. (BMS 92, 1942)
 - Initially formulated based on Ingberg’s hypothesized relationship between
 - occupancy (fuel load)
 - building area (compartmentation level)


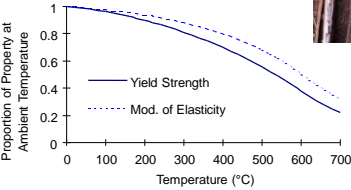
7




Protecting Structures




Steel



8


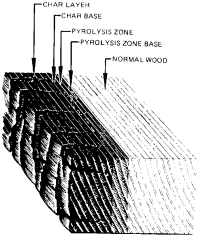


Protecting Structures




Wood


Concrete




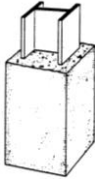
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Methods of Protecting Structures



- Passive Methods
 - Insulating materials
 - Heat sink materials

10




Methods of Protecting Structures




- Active Methods
 - Suppression systems
 - Venting

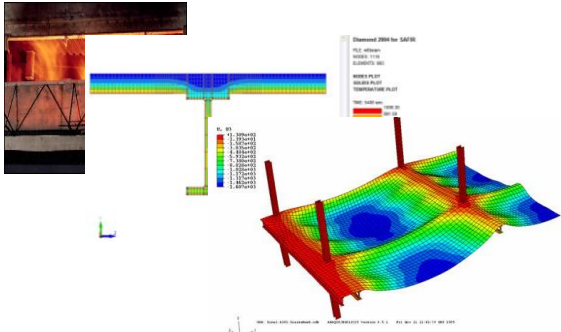



11



Analysis of structures






12




How can a steel structure be protected?



13



Summary



- Fire resistance levels vary, depending on the potential fire severity (i.e. the hazard)
- The strength of all structural materials decreases with temperature.
 - Protection methods are intended to restrict temperature rise in structural materials.

14
