Probability of pit sprinkler activation in elevator pits
3 May 2019

**Background:** Pit sprinklers are required in all hydraulic elevator pits by NFPA 13. These sprinklers require routine maintenance, and also associated Fire Alarm Initiating Devices (FAIDs) located in the pits. The pit sprinklers and FAIDs require non-elevator personnel to perform work in the pits which are extremely dangerous locations. The risk for injuries and fatalities for these workers may exceed the risk of potential hydraulic pit fires. The intent of this research is to identify the potential ignition sources in elevator pits and assess the probability of potential hydraulic pit fires which will cause the pit sprinkler to activate.

**Research Goal:** The objective of this research is to assess the probability of hydraulic elevator pit fires and the activation of pit sprinklers. This involve identifying potential ignition sources in elevator pits, combustibility of hydraulic fluids in hydraulic elevators, and probability of sidewall sprinkler activation located in pits in the event of fire.

**Project Tasks:**

1. **Literature Review:** Conduct literature review of applicable codes/standards (IBC, NFPA, ASME A17.1) to identify the sprinkler and fire alarm initiating device requirements in hydraulic elevator pits.
2. **Data collection:**
   a. Collect information on any existing data for elevator pit fires.
   b. Conduct a quantitative analysis to identify the different pit fire scenario probabilities, and hazard analysis of ignition sources in elevator pits.
   c. Collect data and loss summaries on injuries and fatalities of workers in elevator hoistways.
3. **Scenario Assessment:** This task involves either building or finding an elevator pit mockup. Based on an actual elevator pit configuration, either model or conduct a small-scale fire test to assess potential ignition sources in elevator pits such as cigarettes, trash, etc. and investigate the combustibility of hydraulic fluids available for hydraulic elevators. The proposed approach for this task shall be reviewed with the project technical panel prior to implementation.
4. **Probability Assessment:** Assess the probability of activation of sidewall sprinklers during a fire in hydraulic elevator pits.
5. **Final Report:** Summarize all the tasks in a final report.

**How this information will be used:**
Project deliverables will be useful for NFPA 13.