Evaluating Sprinkler Spacing Requirements for Residential Sprinklers on Sloped Ceilings and Sloped Ceilings with Beams

Jason Floyd, Haavard Boehmer, Josh Dinaburg, Ed Budnick Hughes Associates, Inc. 3610 Commerce Dr. #817 Baltimore, MD 21227 jfloyd@haifire.com 410-737-8677

In 2009, the Fire Protection Research Foundation (FPRF) funded a research project to investigate sprinkler spacing requirements for residential sprinklers installed on sloped ceilings and sloped ceilings with beams. The goals of the project were to review existing data regarding sprinkler performance on sloped ceilings, develop and implement a test and analytical program to evaluate performance, develop a large scale test plan to test performance, and develop design guidance to relate performance to flat ceiling criteria.

This paper will present the results of each of the project goals. Existing literature will be reviewed. Results of a small scale testing program will be reviewed. The testing program included fire tests beneath sloped ceilings and the measurement of delivered density for various configurations of ceiling slopes and beams for both pendant and sidewall sprinklers. Results of an analytical program will be reviewed. The analytical program use FDS to evaluate the performance of residential sprinklers for a range of room geometries and ceiling configurations. An overview of the large scale test program will be given. Lastly, recommendations and design guidance that resulted from the project will be presented.