Fire Spread Characteristics Determined in the Laboratory, - Intermountain Forest & Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1966 - 1966 - Richard C. Rothermel, Hal E. Anderson

Research on fire spread in super high-rise buildings is crucial for identifying feasible methods of fire prevention and personnel evacuation.Â Basically, the combustion characteristics of high-rise and super high-rise fires are the same; with that the potential spreads many ways, the speed is fast, the fire control is difficult, and the chimney effect is easy to form. The reliability of super high-rise fire facilities is low, the external rescue is difficult, and the environmental conditions are greatly affected.Â In the fire settings, the factors determining the degree and speed of fire development were mainly the heat release of the combustion material, fire growth factors, and the ambient temperature affecting the height of the neutral surface of the building. Flame spread or surface burning characteristics rating is a ranking derived by laboratory standard test methodology of a material's propensity to burn rapidly and spread flames. There are several standardized methods of determining flame spread, NFPA 255 Standard Method of Test of Surface Burning Characteristics of Building Materials, utilizes ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials. This test method measures flame growth on the underside of a horizontal Laboratory research on the mechanisms of fire spread was directed at understanding the influence of these two factors on the behavior of fire in a mat-type fuel bed of randomly placed pine needles. Past research in forest fuels (~, 10, JJ). was hampered by the variability of outdoor. weather conditions. Consequently, most of the work in the last decade (5, 13, 14, 17) has been directed toward controlled environmental conditions and controlled fuel bed characteristics.Â From these traces, the rate of spread of the fire was determined by the time required for the flame front to travel the 9 inches between thermocouples. Residence time of the fire, i.e. , the time flaming exists at one point, was taken as the difference between rise time and drop time of the thermocouple. forest fire spread and suppression potential. Both geometrical and thermal flame. characteristics are needed as input variables in different sorts of fire studies. Flame length and angle are required for radiative heat transfer calculations [1], crowning potential modeling [2] and suppression difficulty estimations [3].Â Flame length and flame pulse for stationary fires in laboratory and in the open. has been determined with an automatic algorithm using a sequence of images. extracted from VHS according to flame luminosity. laboratory fires. light burning. needles.Â Fuel beds of ponderosa pine needles and white pine needles were burned under controlled environmental conditions to determine the effects of fuel moisture and windspeed upon the rate of fire spread. Empirical formulas are presented to show the effect of these parameters. A discussion of rate of spread and some simple experiments show how fuel may be preheated before the fire reaches the fuel. The interrelationship between unit energy release rate and rate of spread produces a fire characteristics curve. Diffusion flame analysis shows good agreement when working with 1/2-inch stick fires.