Ignition of Vegetation and Mulch by Firebrands in Wildland/Urban Interface (WUI) Fires

Firebrands or embers are produced as trees and structures burn in wildland/urban interface (WUI) fires. Hot firebrands ultimately come to rest and may ignite fuels far removed from the fire, resulting in fire spread. It is believed that firebrand showers created in WUI fires may ignite vegetation and mulch located near homes and structures. This, in turn, may lead to ignition of homes and structures due to burning vegetation and mulch. Understanding these ignition events due to firebrands are important to mitigate fire spread in communities.

To assess the ignition propensity of such materials, firebrands were simulated by machining wood (pinus ponderosa) into small disks of uniform geometry and the size of the firebrands was varied. Firebrands were suspended and ignited within the test cell of the FE/DE apparatus. The Fire Emulator / Detector Evaluator (FE/DE) was used to investigate the influence of an air flow on the ignition propensity of a fuel bed. A similar methodology has been used to determine the ignition propensity of structural materials due to firebrand impact [1-4].

Three different materials were used as test fuel beds for the ignition studies: (1) dried cut grass (2) shredded hardwood mulch, and (3) pine straw mulch. Dried cut grass was used as surrogate for typical vegetation located around structures. The moisture content of these materials was varied. The total number of firebrands deposited upon the fuel beds was varied to assess the influence of multiple firebrand contact on ignition propensity. Ignition regime maps were generated for each material tested as a function of impacting firebrand size, number of deposited firebrands, air flow, and material moisture content. Results of this study will be presented.

KEYWORDS: Firebrands, Wildland/Urban Interface Fires, Ignition

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