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**Investigation of firebrand production from Douglas Fir**

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Abstract

Firebrands are one of the leading mechanisms of spread during wildfire and WUI fires, where they can be transported on several kilometers ahead of the fire front, potentially creating new fires. Thus, a better understanding of the parameters affecting firebrand generation and characteristics is mandatory to develop better simulation models and to predict the “firebrand generation potential” of different vegetative fuels. The goal of this study was to understand the impact of the wind on the firebrand generation. The experiments were conducted inside a 11m-long wind tunnel with 2 variable speed fans. Trunks and branches from Douglas-Fir (*Pseudotsuga menziesii*) were dried and tested separately using a 30cm-by-30cm propane burner under wind velocities that ranged from 0.4 m/s to 2.0 m/s. For each experiment, the firebrands generated were collected using water filled pans with fine meshes inside. The mass and area distribution of the firebrands over the test section was measured using a load cell and MATLAB image processing. It was observed that the wind velocity has an important effect on the distribution of the firebrands and is mainly controlling the location where the firebrands landed. Moreover, the speed of the firebrands inside the test section was determined using an image processing tool. It appeared that both the wind and the fire plume have an impact on the speed and the trajectory of the firebrands. In addition, the experiments conducted in this work need to be continued and diversified to different vegetative fuels to fully understand and simulate firebrand generation.