# SUMMARY

## Hot metal fragments from forestry operations: A potential source of forest ignitions or not?


**Sparks, or hot metal fragments, from heavy machinery in off-road terrain is a common phenomenon which rarely, but recurringly, leads to ignition of forest litter with an annual average of 20–50 rescue service dispatches. Post-ignition assessment of sparks is inherently difficult, and studies suggest that ignition from metal fragments are practically impossible but stem from other activities around the machinery. This project studies processes for creation, evolution, and ignition potential of the fragments.**
**Syfte och mål**

**Objectives**
The project seeks to characterise the fragments formed by hard strikes between steel and rock and possibly explain how ignitions occur. The objective is therefore to validate a temperature measurement technique on small and fast-moving fragments and to characterise their temperatures and sizes to assess ignition potential and possibly identify mitigating actions.

**Method**
Using a spectrometer technique, the fragment temperatures are defined from their black body radiation. We study different types of strikes between hard metal and rock in addition to other known ignition sources such as traditional steel and flint, using a spectrometer and high-speed camera. The ignition potential is thereafter assessed using fragments of similar size and temperature.

**Results**
A problem with sparks from heavy strikes is that the fragment trajectory is difficult to control. However, we show that fragments from hard metal and rock can easily exceed 1500 °C after the strike and that the new surfaces exhibit rapid oxidation in the air which can increase temperature up to several hundred degrees further. Many fragments disintegrate along the trajectory, forming several smaller fragments with high heat losses to the surrounding. Such fragments are viable for igniting forest litter and it is difficult to technically reduce their occurrence. Instead, mitigation actions should focus on educated operators, sufficient extinguishment equipment and pre-operational consultation between landowners and contractors during high fire danger.


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