ASSESSMENT OF THE APPLICATION OF COMPRESSED AIR FOAM TANKERS FOR GRASSFIRE FIGHTING

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INTRODUCTION

This work was completed as a summer student research project aiming to determine the most appropriate use of compressed air foam (CAF) for suppressing grassfires.

CAF is a regulated mixture of foam concentrate (class A foam), air and water that produces a uniform bubble solution. The foaming agent expands the volume of water through the formation of bubbles, effectively using less water to cover the same area of fuel.

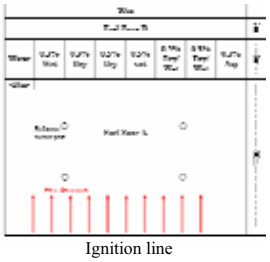
Experiments compared various applications of CAF, water and aspirated foam to determine their durability, effectiveness as a wet line for stopping fire spread and effectiveness for direct attack. These experiments were conducted in a *Phalaris sp.* grassland (1.3 m, 6.2 t.ha^{-1}, 95% cured) in Monash ACT, under high fire danger conditions.

Application of a "wet line" from the CAFS truck

INDIRECT ATTACK EXPERIMENT

The effectiveness of wet lines of different CAF solutions, normal aspirated foam and water were tested against two moderately intense (4000 kW.m^{-1}) grassfires. All solutions tested were ineffective at stopping a fire lit 45 minutes after application, but stopped a fire lit 15 minutes after application. Wet CAF applications applied 2.5 hours prior to ignition were found to prevent spot ignitions from ember attack, while dry mix applications allowed spot fires to start.

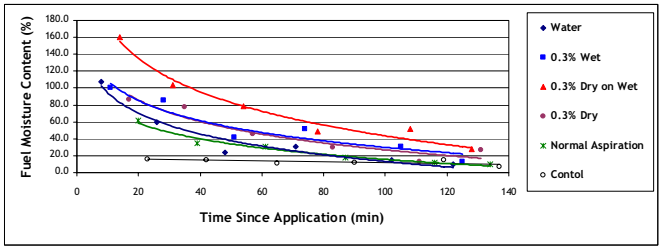
This testing occurred under moderate grassfire danger (GFDI 7, T 29°C, RH 20%, Wind 10-15 km.h-1 NW). The expected period of effectiveness under extreme fire weather would be significantly less. Further tests between 15 and 45 minutes are required to determine differences in the effectiveness between the different CAF mixes and water.



Experimental block layout

DURABILITY EXPERIMENT

The durability of a range of CAF solutions applied in "wet lines" were investigated by monitoring fuel moisture content. Elevated fuel moisture was found to persist for up to two hours after application. The dry on wet CAF mix application maintained the highest moisture contents and persisted longer than other applications tested. The dry mix provides insulation to the wet mix. This application used more water than others tested, as it required two passes. Wet CAF solutions were found to persist for longer periods than dry solutions.



Example of drying curves (GFDI 13 (High), T 36°C, RH 30%, Wind 20 km.h^{-1} NW)

DIRECT ATTACK EXPERIMENT

The testing of CAFs for direct attack on fires was very limited and subject to complications. While the CAF mix was observed to be more efficient than water, this test can only be considered a pilot study due to differences in fire behaviour experienced between tests. Smouldering material underneath dry CAF mixes suspended in thick grass could potentially lead to fire escape.

CONCLUSIONS

While these experiments gave a good insight to the longevity of CAF lines under high grassland fire danger, further experiments are required to fully understand the usefulness of CAF for direct and indirect grassfire suppression. These would include more replicates of the experiments conducted here and should cover a broader range of fuel and weather conditions.