

# Aerial and Ground Suppression Evaluation Project

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## Introduction

Fire fighting aircraft have received considerable media attention during the last few years, as they have been the most conspicuous fire fighting appliance in use on fires near populated areas. Their heavy usage during recent busy seasons has expressed concerns of their rising cost and effectiveness.

The objective of this project is to optimise the effectiveness and efficiency of aircraft use during fire fighting operations. This objective will be achieved through the production of guidelines that identify the most effective combination of suppression resources for minimising the impacts of wildfires. These guidelines will be based on data collected during the research phase of the project, which commenced during the 2004/05 fire season.



The research team have produced a project brochure (left) which has been distributed amongst fire fighters and managers. They have also undergone specialist training to gain a better understanding of fire aviation procedures.



## Operational Studies

### Field observation

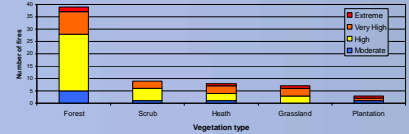
The research team have been making field observations and measurements of fire bombing effectiveness. They have made ground observations during suppression operations at four fires (all Victoria). They have collected information on the location and timing of drops, drop coverage, fuel, fire behaviour, weather, and ground suppression efforts. The research team have also made observations of suppression operations from a distance during two fires (New Zealand during project FuSE experiments) and have made post fire measurements of suppression activities on seven fire sites (6 Victoria, 1 NSW).



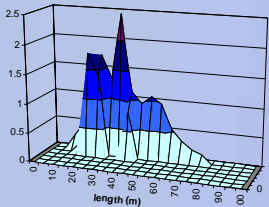
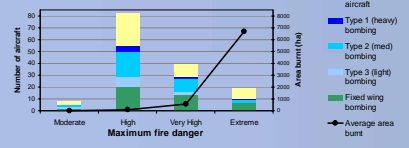
### Interviews and Surveys

The research team have been surveying and interviewing fire fighters who have been involved in suppression operations that featured aircraft. This method has been used to collect information in situations when the research team cannot get to the fire ground. Ground personnel have been interviewed to gather information on the effectiveness of aerial suppression during 41 fires (23 Vic, 10 NSW, 6 Tasmania, 1 Queensland, 1 New Zealand) during the 2004/05 season. Surveys on water bombing effectiveness have been completed by Air Attack Supervisors and are currently being collected for analysis.

Number of fires in ground personnel data for vegetation types and fire dangers



Number of aircraft used and average area burnt in fire danger classes



Drop pattern for bellytank with 2 doors & foam mix

## Experimental Studies

### Tasmania 21-23 February 2005

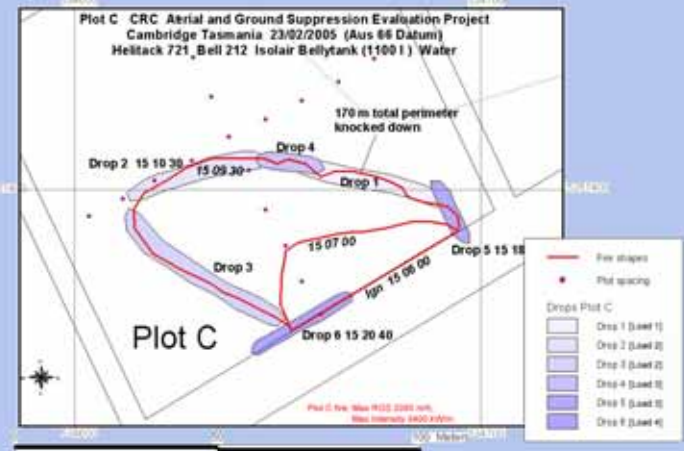
**Aims:** determine the effects of suppression drops on fire behaviour in stubble fuels and develop a field method for further experiments

**Components:**

- 1) Drop pattern tests (6)  
Determine ground distribution from delivery systems used
- 2) Head fire drop (8)  
Test effectiveness of drops on the most intense fire we could give it under the fuel and weather conditions
- 3) Line length (12)  
Determine maximum fire size a single drop can deal with
- 4) Multiple drop (3)  
Assess effectiveness of repeated unsupported drops on fire perimeter

### Quick facts:

- Site: Uni of Tasmania farm
- Fuel: barley stubble (3.4 t/ha)
- Max flame height 1.4 m
- Max ROS 2 km/h
- Max Intensity 4000 kW/m
- Type 2 helicopter (Bell 212)
- Bellytank & bucket, water & foam
- 120m of active fire perimeter extinguished in 6 drops/ 3 loads (4600 L water)



### Outcomes

- Helicopter tested performs well in mild weather (GFDI <8) and light fuels
- There was no significant difference between the effectiveness of water and foam in these conditions
- Aircraft are unlikely to be deployed in these conditions
- We have an experimental design to evaluate aerial suppression in stubble fuels and can use this as a basis for developing a methodology in more complex fuel types
- Cooperation essential for experimental studies (Tasmania Fire Service, Forestry Tasmania, University of Tasmania)

### Future work

- Operational data collection will continue over the next two fire seasons
- Field experiments may continue if suitable field sites can be obtained
- Research into resource optimisation modelling
- Extend into evaluation of ground crews
- Integration with Program C to investigate the economics of aerial fire fighting

