

PROPOSED FIREFIGHTER CLOTHING TEST METHOD

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BACKGROUND

- Clothing (PPC) is critical protection equipment for firefighters
- A balance exists between heat protection and metabolic heat rejection
- PPC is currently assessed using small-scale tests or manikin tests that may not adequately predict real fire performance



AIM

Investigate feasibility of developing a new thermal manikin apparatus to improve real scale performance assessment and optimisation of both wildfire and structural protective clothing ensemble systems

LIMITS OF CURRENT TEST METHODS

Small-Scale Methods

- PPC tests on material components may not predict real-scale behaviour of complete ensemble

Existing Manikin Tests

- Poor reproducibility
- Direct burners impingement in open conditions do not correctly simulate wildfire or structural exposure
- The balance between external and metabolic heat is not properly assessed.
- No manikin test facility in Australasia



PROPOSED METHOD APPARATUS

- Manikin with 120 thermal sensors
- Controllable gas burner system
- Configurable burn room
- Manikin support and movement system
- Data logging system



PROPOSED METHOD PROCEDURE

- Burners arranged inside burn room and controlled with output up to 1.5MW
- Wildfire PPC presented to burn room opening for radiant and convective exposure
- Structural PPC passed through burn room for direct flame exposure
- Manikin temperature sensors indicate burns
- Manikin cool down may indicate metabolic heat rejection

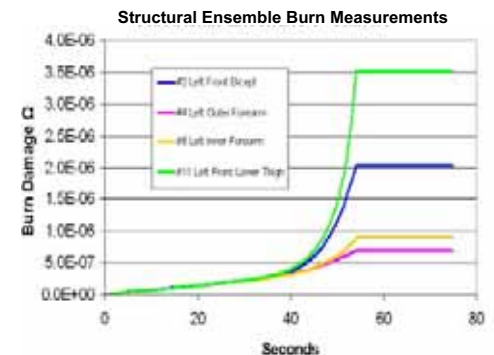
ADVANTAGES OF METHOD

- Fire exposure, duration and manikin movement controlled to simulate wildfire or structural fire conditions.
- Balance between heat protection and metabolic heat rejection may be assessed
- Australian facility may service Australasian brigades
- Multipurpose apparatus can be use for fire exposure experiments on other materials



FEASIBILITY TESTS

Tests are being conducted on Australian wildfire & structural PPC using a modified manikin apparatus at Worcester Polytechnic Institute (WPI) in USA to investigate feasibility of method



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