Analysis of the Sawmill Track Fire

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The Sawmill Track fire in the Grampians National Park started as a lightning strike and was first reported around 1:30 pm on 4th January, 2012. It ended up over 230 hectares in size. The first crews arrived onsite around 2:30pm and measured onsite weather of: Temp 23°, RH – 41%, Wind – Variable at 2 – 4 kph. This gives a Fire Danger Index (FDI) of 7 (Moderate).
I have assumed a fuel load of 22 tonne per hectare based on Overall Fuel Hazard Guide ratings of extreme for bark and elevated fuel and moderate for surface fuel. This gives a potential flame height of 5.7m and rate of spread of 190 m/hr. While serious this should not have presented a problem for DSE crews to bring under control quickly. Unfortunately they struck boggy ground and were unable achieve a successful initial attack. Boggy ground is not unusual during a normal fire season so having it cause the loss of a fire under reasonably benign conditions indicates DSE equipment is inappropriate for the role. Below is an alternative scenario using more appropriate technology.

Estimated On-ground Suppression Costs for the Actual Sawmill Track Fire

Wages – 25 person days including over time and overheads	$14,000
Slip On and Tanker costs – 6 Slip On units and 1 Tanker	$3,600
Dozers – 3 machines for 6 hours @ $150/hour	$2,700
Aircraft – 2 Fixed Wing Bombers and 1 Helitak for 4 hours	$20,000
Retardant Cost – 10,000litres of mix @ $0.50/litre	$5,000
Total On-ground Suppression Cost	**$45,300**

Alternate Scenario using Ground Applied Retardant

TIME	ACTIVITY
14:30	The Fire Track unit arrives at Sawmill Track on its transporter. Its three crew members travel in the transporter cabin. Unloading commences as soon as the transporter arrives. While the flexible track system on the Fire Track makes unloading easier than conventional dozers, it's not an operation to be rushed.
14:40	The unit begins pushing through the Stringy Bark woodland towards the fire. The fire is approximately 300 metres from Saw Mill Track and the unit can travel at over five kph through open woodland like this. The crew sit three across in the machine's air conditioned, ROPS/FOPS cabin with the operator in the centre, spray monitor operator (gunner) to the right of the machine operator and the second hose person/radio operator to the left. The machine weighs over 15 tonne fully loaded with over 4,000 litres of water and 800 litres of liquid retardant. The retardant is mixed with the water as required. The hydraulic angle/tilt blade at the front easily brushes aside the scrub ahead of the unit.
14:45	The Fire Track unit arrives at the western edge of the fire around 200 metres from the front and the radio operator reports to operations that the fire is between 4 and 5 hectares in size. Flame heights on the flank are one to two meters high with those on the front double that. The rate of spread appears to be around 200 to 300 metres per hour. The monitor operator opens the valve to the monitor. A dense fog shoots from the remote controlled monitor nozzle mounted on the front of the machine, above the blade. The stream is around a metre in diameter and over 15 metres long. The unit heads briefly along the fire edge towards the point of origin of the fire. The stream of retardant extinguishes the fire and creates a non flammable zone up to two metres wide. They then head away from the fire edge at an angle to create a "catch break" which will prevent the fire spreading behind them while they control the front. The unit then heads back along the flank towards the front following the fire edge, extinguishing as they go.

14:50	The unit has reached the front whereflame heights of 3 to 4 metres and intense radiant heat slow the operation. The monitor operator sweeps the nozzle from side to side creating a 5 to 6 metre wide hole in the front for around 15 metres. The unit pauses briefly to allow the residual burnout to occur and the retardant to take effect. The operator then edges the machine into the gap created and the process repeats. It takes the crew around 15 minutes to cross the 100 metre wide front. The radio operator reports the fire being checked at just over 5 hectares.
15:05	The Fire Track now follows the eastern flank of the fire back towards the point of origin for around 200 metres. It then diverges off the fire edge briefly to create another catch break. The unit then U turns and heads back to the front.
15:15	The unit reaches the front again and retraces its path across the font picking up any missed sections and relights.
15:25	The unit reaches the western flank and does another U turn, this time heading across the front some 20 to 30 meters out from the control line looking for any spots that may have ignited ahead of the fire. The crew find four, all less than 10 square meters. They are quickly extinguished with a blast from the monitor.
15:35	Back on the eastern flank again the crew continues back towards the point of origin, reaching the southern end of the fire in less than 10 minutes. The machine then turns and follows the western flank back to where they started extinguishing the fire. The radio operator reports they have contained the fire at 15:30 with a controlled size of less than 6 hectares.
16:00	The crew have used almost 2,500 litres or over half their retardant mix so far but will not need to return to the transporter to refill until they have only 1,000 litres remaining. They continue on and circle the fire once more; picking up a small number of relights and misses as they go. A number of larger trees are starting to burn as the fire gets into their hollows. The unit zigzags its way around, dousing these as it goes. The operator reports that the ground is very soft in a couple of place around the fire. Even the Fire Track may have trouble if they keep using the same track. Conventional equipment would have real problems here.
16:30	The water level meter on the machine's dash is showing below 1,000 litres. The crew decide to head back to the transporter to refill. They report progress back to operations and inform the Ops officer that they still have a lot of blacking out to do but the fire is well under control.
17:00	With a full tank the crew take the machine back to the fire and continue blacking out. Now they will use foam rather than retardant as it's cheaper and more effective for blacking out operations. They check the area infront of the fire for any spots that may have relit then criss-cross their way back to the point of origin. Any trees that they are unable to extinguish with the monitor are nudged over with the corner of the blade. Fifteen tonnes and 200 horse power mean the unit has the pushing power of a D5 dozer. Once they are sure there a no dangerous trees, the hose crew leave the safety of the cabin to continue blacking out by hand. One of the hose crew uses a handheld heat detector to check for hot spots. A water tanker reports it's now onsite and waiting to top up the unit as required.
21:00	The crew report that their heat scans are not showing any more hot spots and fire can be considered safe. The Ops officer thanks the crew for a job well done and advises them to pack up and head back to the depot. Another crew will check the fire tomorrow just to be sure
	Final size of fire – 6 hectares

Estimated On-ground Suppression Costs using Ground Applied Retardant

Wages – 4 person days (Fire Track crew + tanker driver) including over time and overheads	$2,240
Fire Track unit –7 hours @ $150/hour	$1,050
Retardant – 4,000 litres of mix @ $0.50/litre	$2,000
Fire Track Transporter – 2 hours @ $100/hour	$200
Water Tanker – 2 hours @ $80/hour	$160
Track maintenance cost – 7km @$1/km	$7
Total On-ground Suppression Cost	**$5,657**