

Forest Fires at the Urban/Wildland Interface in the South of France

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Abstract

During the last years in France, the number of houses scattered into the Mediterranean forest has been increasing. And so did the number of fire starts. Consequently, the fighting operations in the forest areas new conditions turn were getting more and more complicated.

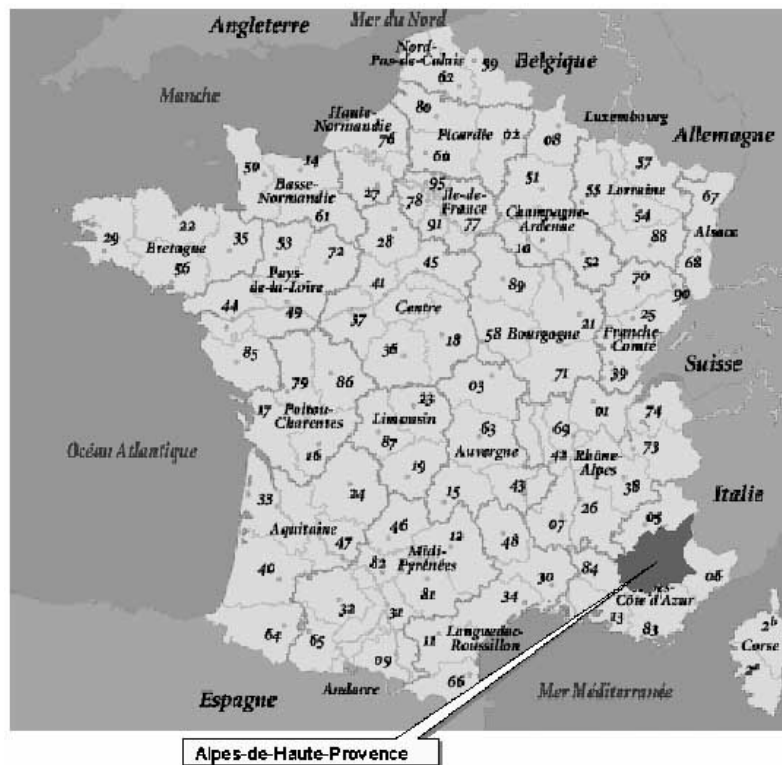
With the purpose of fire prevention, a great number of actions have been developed to reducing the risks, but the forest fire fighting remains very hard in these conditions. Unfortunately, during the summer season 2002 two fires of this type occurred in France.

Introduction

In France, the population have been moving from cities towards the country. And the dwellings have been more and more built in wooded massifs and their surroundings. But the real danger is that people leaving in these areas are not familiar with “the natural risks” such as the forest fires or the floods; they may have hazardous behaviour (leaving the windows open, storing firewood on the side of the house, bad clearing of the garden...) or having not the suitable behaviour to cope with such disasters. The number of fire outbreaks hasn't stopped increasing that explains the rising number of fire fighting operations with increased difficulties.

During the summer 2002, rainy weather conditions have been prevailing with precipitation starting from August 24. Mid-July was the only fire prone period. Most of the major fires occurred during this period such as the PIERREVERT fire (Alpes de Haute Provence) and the St JULIEN fire (Bouches du Rhône). In these new conditions of the forest areas, two incidents gave an unfortunate account of the problems the fire fighters had to face during operation work.

The PIERREVERT Fire



Map 1 : Locating the Alpes de Haute Provence Department

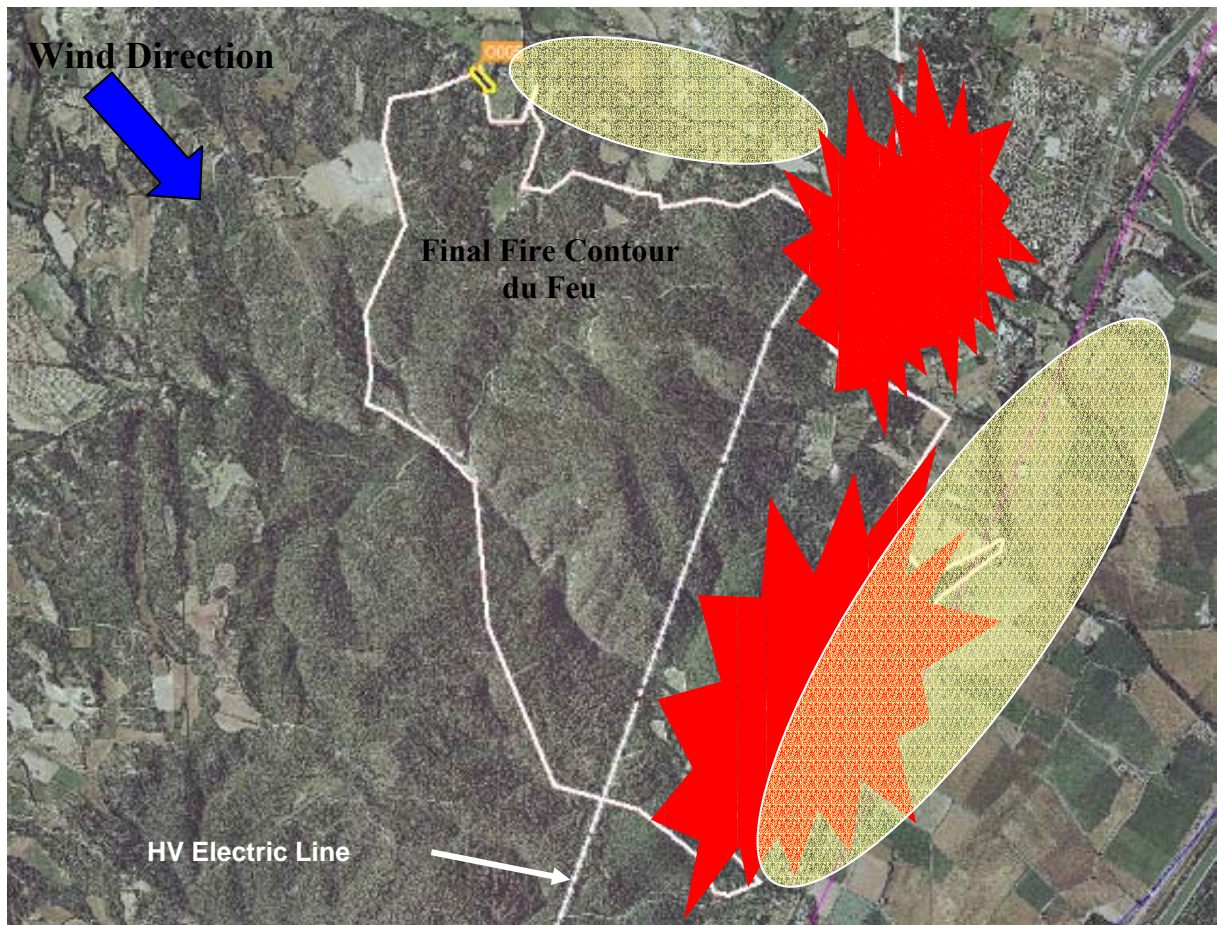
The forest fires are not considered as a major risk in the Alpes de Haute Provence Department. But on that day, Wednesday July 24, 2002, a fire start is reported in the village of Pierrevert. The weather conditions are:

- Wind at 70 km/h, with a direction of 320 °
- Temperature 27°C

It is an electric caused fire (electric arc). In France 8% of the fire starts are caused by electric problems (Prométhée source). At the warning, the fire is not severe (for it is sheltered from the wind because to the relief) and two tankers are committed to the scene. Unfortunately, one of the tankers is damaged hampering the fire extinguishing. Then the fire reaches a very windy area and increases in size: at 17:06, a canadair reported a disastrous situation including a great number of dwellings and structures threatened by the fire (especially a nuclear research complex) and a likelihood of casualties among the population...

There were favourable factors for the control of this incident: the presence of an agricultural area located nearby the housing estate (yellow colour), and the absence of other fire occurrence. On the contrary, we had to cope with a great number of unfavourable elements: the high propagation rate (>2 km/h), the presence of several houses in the fire propagation axis (red colour), a dense vegetation kept in bad conditions (several slashes on the ground due to the previous year tempest), bad weather conditions (fierce wind, drought, low air moisture), the presence of several electric lines

and the bad routing of the fire-fighters coming from other departments towards the fire scene.



Map 2 : the Fire Contour

A total of 7 Canadair participated to the effort, but their actions have been limited by the turnaround necessary time. 4 Trackers have also been committed to the scene with the main duty of protecting the houses located in the fire axis.

The ground resources have been gradually increased (requests for assistance from the neighbouring departments) to reach the number of 450 people dispatched among 125 vehicles.

The fire has been under control the day after during the morning. A reduced detachment remained on the site during several days in order to attack any fire re-ignition.

Are to be noted the following elements related to this fire occurrence:

- unburnt zones due to an severe fire with a fierce wind;
- a great number of spot fires
- a ground cleared area acts as a firebreak, where as a badly maintained area makes the fire propagating;
- several houses located within the massif have been threatened but only 2 out of them have been damaged. The building material were the same for all the houses, their vulnerability has been increased by “outside elements”.

- Stacks of firewood against the house, flammable product stored in the garage, visible wood beams, a car in the vicinity of the house, all are increasing elements for the heat load and consequently increase the vulnerability of the first house.
- Concerning the second house, the outside building has not been damaged, but the fire has propagated inside through the open windows at the first floor.

Final toll of the incident: 630 ha of vegetation and 2 houses burnt, no casualty. Nevertheless, it took several days to make the area safe of any risk.

The St JULIEN Fire



Map 3 : Locating the Bouches du Rhône Department

The Bouches du Rhône Department is a fire prone area. On July 25, 2002 a fire start is reported at 18:25 in the village of Martigues (locality of St Julien). The weather conditions are:

- wind at 70 km/h, with a direction of 320 °
- temperature 28°C

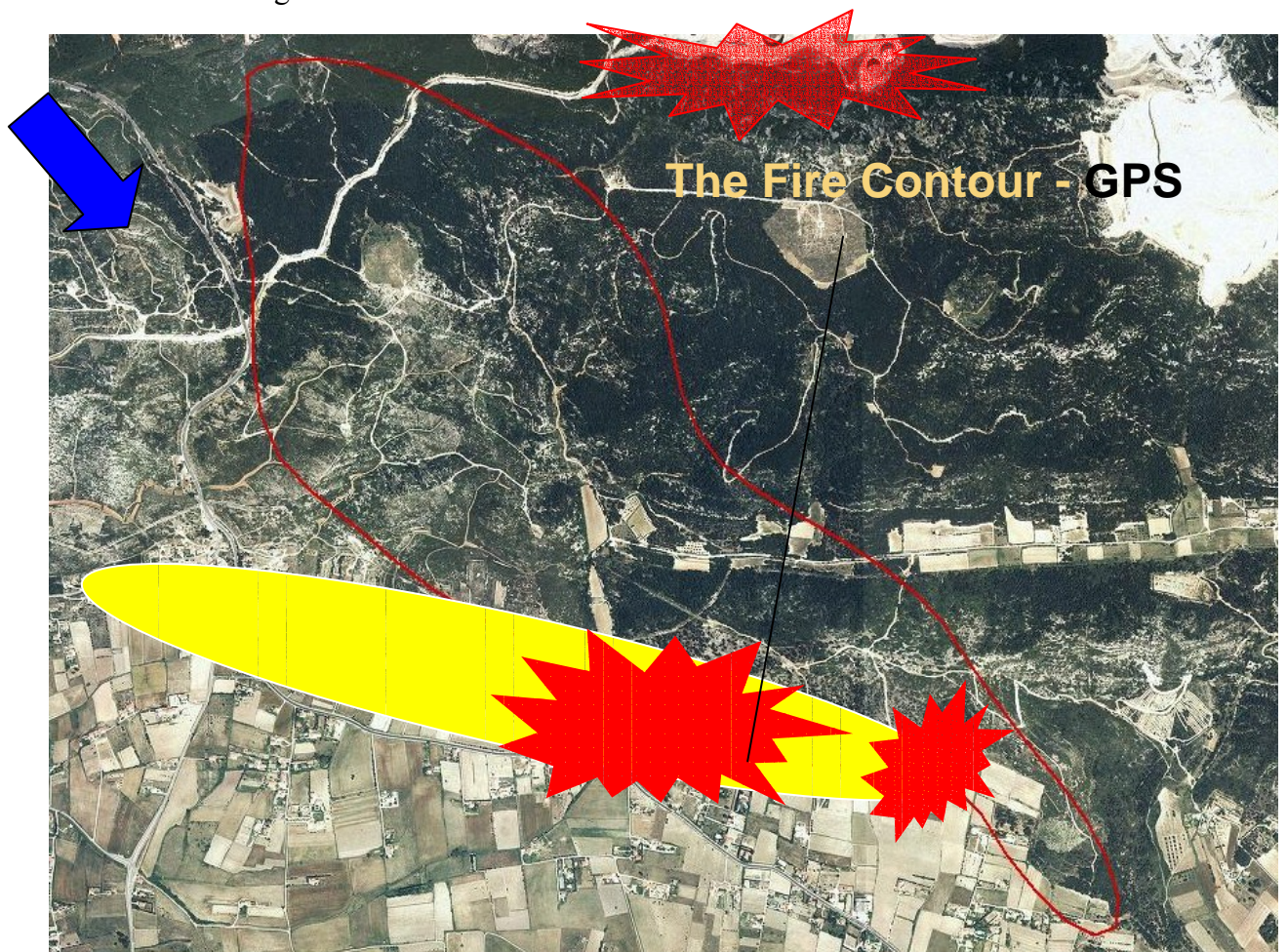
The fire is certainly the act of an arsonist (investigation in progress). In France, 22 percent of the fire established causes are due to malevolence (Prométhée source). When the alert is confirmed, the means pre-positioned on field in the department are increasingly involved in the operation work. Two trucks were located in the vicinity, but the fire was so wild that they had to run a security procedure (self protection + security aerial drops). The fire fighters had to cope with a “huge fire” with a high propagation speed (more than 2 km/h).

To summarise, we can say that several favourable elements are to be taken into account in the control of this fire:

- the presence of an agricultural zone on the left flank (yellow colour)
- the preventive resources pre-positioned
- the increase in involving early rescue teams
- the great number of access paths to the massif

On the other hand, other elements hampered the extinguishment of the fire :

- the high propagation speed (>2km/h)
- the presence of houses in the fire axis (red colour)
- the presence of electric lines
- the presence of sensitive structures (refinery)
- the dense vegetation



Map 4 : Contour of the Fire

The fire fighters used the agricultural zones to controlling the fire. Two sheepfolds were burnt and one house has been damaged, they all were located within the vegetation. The verandah, built with plastic materials, is the only part of the house to be damaged, the structure made of concrete has not been affected.

In total, 230 ha of vegetation were burnt, 2 sheepfolds and 1 house have been damaged, one horse died, but by chance we had no casualties. To be controlled, the fire required on scene 845 fire fighters dispatched among 225 vehicles, 9 Canadair, 2 Tracker and 3 helicopters.

Conclusion

From the analysis of the information collected and the photographs taken by the CEREN team during these fires, we can note common factors such as:

- very unfavourable weather conditions
- a bad maintenance of the forest massifs
- difficult access to the threatened houses
- a bad information provided to the people
- houses having few or no fire protection means
- “dangerous behaviour” of the people living in the houses (open windows, firewood stacks against the house...) or use of unsuitable building materials.

In some houses, the fire was caused by brands that flew inside (it is the case of the Pierrevert fire); the house burnt from inside without any contact with the flames on the side of the fire scene.

The other houses have been damaged through sensitive elements such as a plastic verandah (St Julien fire) that was likely to be burnt due to the radiation effect or to the direct contact with the flames, or because of the presence of firewood stacks, of dangerous materials stored in the garage and because of visible beams overhanging from the roof (2nd house burnt during the Pierrevert fire).

The risk of damage threatening the people, the fire fighters and the buildings could be reduced through an effort of education and information towards the population living at the forest/urban interface areas. At present in France, studies are being carried out for this purpose (refer to the Colonel Picard’s and the Commander Muscat’s presentation).