

The fatal fire entrapment accident of August 24, 2007, near the village of Artemida, Ilia, Greece

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Abstract

The fire season of 2007 in Greece was the worst in recent history as it set new records in regard to damages and loss of life. More than 270,000 hectares of vegetation burned and more than 110 villages were affected directly by the fire fronts. More than 3000 homes were totally or partially destroyed. Most important, a total of seventy eight (78) people, mostly civilians, lost their lives in a series of fire related accidents. The worst of these accidents involved entrapment of three seasonal fire fighters and a large group of civilians fleeing the fire near the village of Artemida in Ilia that resulted in the death of twenty three (23) people. This manuscript describes this tragic event and discusses the circumstances that led to the disaster.

Introduction

The fire season of 2007 in Greece was the worst in recent history as it set new records in regard to damages and loss of life. More than 270,000 hectares of vegetation burned and more than 110 villages were affected directly by the fire fronts. More than 3000 homes were totally or partially destroyed. Most important, a total of seventy eight (78) people, mostly civilians, lost their lives in a series of fire related accidents. The worst of these accidents was the fatal entrapment of three seasonal fire fighters and a large group of civilians fleeing the fire near the village of Artemida in Ilia. The aim of this paper is to describe the events that led to the accident and to identify the factors that contributed to the disaster.

The general conditions

The fire season of 2007 was a difficult one for Greece. Winter was overall deficient in snowfall. Spring brought some rain but it was followed by a completely dry summer in the south of the country. The last days of June and of July respectively were characterized by two heat waves that had caused serious forest fire problems. By the middle of August there had already been very heavy damages due to fires, and it was evident that the Hellenic Fire Brigades (HFB) could not cope well with the difficult conditions. As a result, the fires had become a source of serious concern and anxiety for the public.

A third heat wave hit the south part of the country on August 22 and 23. Air temperature reached 40 °C in many places and relative humidity dropped to very low levels. A fire on mount Parnon and a second one on mount Taygetos in south Peloponnese that both started on August 23, could not be controlled on that day.

Very high fire danger was predicted for Friday, August 24, in Peloponnese. the meteorological forecast was for very strong winds in addition to the drought and the high temperature – low relative humidity combination. A new fire in the morning of Friday erupted near the towns of Oitylo and Areopolis, roughly 30 km south of the fire of Taygetos. Within hours it burned a large area and claimed six lives. It attracted immediately the attention of the HFB and the media until in the afternoon the news about the fatal accident near the village of Artemida in Ilia, Peloponnese, started coming.

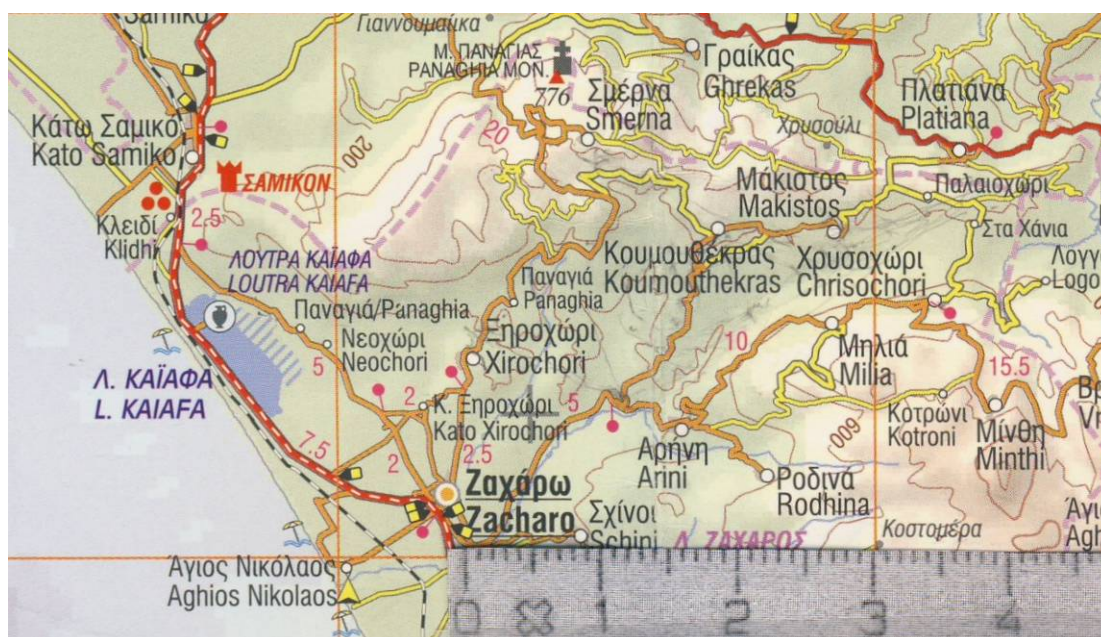


Figure 1. Map of the general area of the fire from a 1:250000 scale map.

The accident near Artemida

The accident of Artemida was caused by a fire that started at about 14:40, August 24, 2007, in the yard of a house in the small settlement of Paleohori (Figure 1). It was started by an old woman cooking on an open stove and was reported immediately to the HFB as a house fire. However, as the fire caught on the vegetation close to the house it started accelerating and moving in a southwest direction fanned by a strong wind. Field weather measurements in the general area showed that temperature was at 40 °C, relative humidity varied between 10% and 17% , and the wind was blowing from a north-east direction at 12 km/h, with gusts reaching 29 km/h (Athanasίου, 2008). According to the account of the pilots of two Canadair water bombers that were flying in the area, they spotted the fire in its early stages as they were flying for another mission. They turned on it and made two water drops but they could not extinguish it completely. Then they flew to the sea to scoop more water. When they

returned, about ten minutes later, they faced a fire perimeter of more than 1000 meters which they were unable to control.

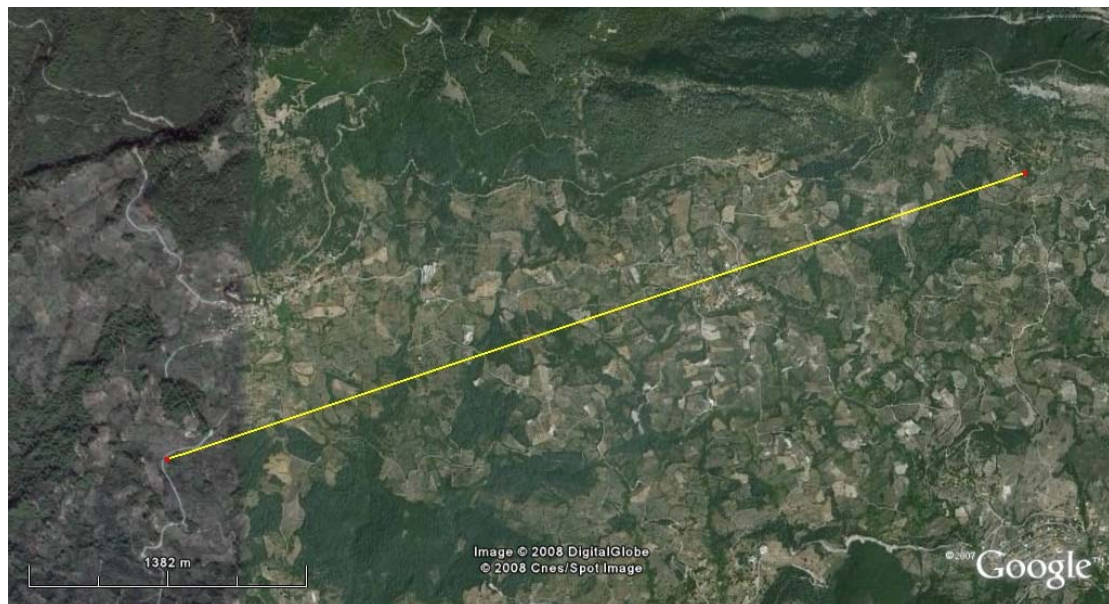


Figure 2. Satellite view of the area between Paleohori and the accident site, showing the vegetation mosaic (Source: Google Earth).

The fire spread the fastest, in the direction of the wind, in the grasses under the olive trees in the valley between the villages of Makistos and Artemida (also known as Koumouthekras) on the north side and Chrisohori, Milia and Arini on the south. This was true even where the grasses had been mowed to the ground. Spotting played a significant role in this quick spread as the dry dead grass was a receptive bed for the burning firebrands. As the fire front moved with bursts, it exhibited an average rate of spread of roughly 5 km/h. Unburned patches of trees, shrubs and other vegetation burned a few minutes later behind the fast moving front. Simultaneously, the perimeter widened as the north flank of the fire moved upslope, sweeping the forest-covered south slope of mount Lapithas Mountain along the north side of the valley.

The first village reached by the fire, at about 14:55, was Makistos at a distance of 1.7 km from Paleohori. The people there were caught by surprise. All but a handful left the village in panic towards the nearby village of Artemida with the fire front running after them. The fire was spreading at an average speed of 5 km/h, enough to catch a walking man. An elderly brother and sister, unmarried and living together, trying to save their donkey, fled on foot. They died next to the road towards Artemida when they were overtaken by the fire front. However, the donkey survived. In the abandoned village most houses were destroyed or seriously damaged. Only 14 of the 60 homes did not suffer damages. Some of them were saved by the efforts of those who stayed behind and fought to save their property.

The village of Artemida, was reached next by the fire at about 15:15. The people arriving from Makistos and most of the people of Artemida, in panic, fled the village in two groups. There is some information that local policemen were the ones who urged the people to leave. The first group formed a convoy of cars and moved towards the town of Zaharo. The second group, at the road intersection at the end of the village, chose to drive to higher ground, towards the village of Smerna. They probably

realized that the quick spread of the fire in the valley would cut-off the route to Zaharo. This group as well as the people who stayed in the village survived without a problem.



Figure 3. Satellite view of the location of the accident.

The convoy driving towards Zaharo had to return as the road was cut by the fire. In the meantime a fire truck crewed by three seasonal fire fighters from the HFB had driven towards Arthemida but was unable to reach the village and returned towards Zaharo. This fire truck met the convoy of civilian cars returning to Arthemida and stopped at the place of the accident. An agricultural guard who was coming from the direction of Zaharo with his motorcycle joined the group. In the meantime the fire had nearly reached the road behind making any effort to return to the village a high-risk alternative. Having no option they stopped on the spot, in a bend of the road next to an olive grove (Figure 3), hoping that the firefighters that were with them would protect them. The grasses in the olive grove downslope from their location had not been cleared. There was also a clump of pine trees there. Grasses on the upslope side of the road had been mowed. The time was around 15:25. Immediately behind the agricultural guard, came the mayor of Zaharo driving his four wheel drive Jeep, having his first deputy-mayor with him. In the next approximately 5 minutes, the people in panic were seeing the fire coming uphill towards them. During these few minutes there were some phone calls, through mobile phones, both to the authorities and to friends and relatives. It is questionable if the authorities would be able to understand the pleas for help under those conditions, at least quickly enough to divert aerial means to make water drops. One of the persons who had remained in Artemida, a retired police officer, responded to the pleas for help of his sister who was with those trapped. He started to go there on foot hoping he would be able to help. He was

later found dead on the road where he collapsed when the smoke and fire reached him.

As the fire was closing on the people from all sides, the mayor drove his Jeep on a narrow agricultural road surrounding the olive grove. At some point however the fire reached that spot and he had to abandon the vehicle returning to the asphalt road on foot. At that moment, coming from the direction of Artemida, the second deputy mayor arrived with another four wheel drive vehicle. The mayor jumped in the vehicle telling to the people that they had to leave by car through the flames. The first deputy mayor did not get into the car, determined to “stay and help the people”. Also, the mayor asked a lady who had her four children with her, to put the kids in the vehicle and run away but she refused to do so. Having no time to spare, he and the second deputy mayor drove through the flames in the direction of Artemida. They were able to escape unharmed.

The rest of the people who chose to stay on the asphalt road were certainly counting on the presence of the firefighters. Unfortunately, the three seasonal firefighters, probably because of the quick fire spread and the extreme fire behaviour on the slope (figure 4), failed to operate their hose and fight the flames adequately although their truck was filled with water. When this became evident it was too late for the people to escape. Some stayed in their cars on the road. They did not survive. Most of the people fled from the road, running uphill in the olive grove. The fire caught some of them as they were running uphill including the mother with the four children. The rest of this group managed to make it to the top of the small hill, but on the other side they found themselves surrounded by fire from three sides. Eleven of them, including the agricultural guard, were trapped when they reached a small stand of pine trees on a steep rocky outcrop. They were found at the base of the rock close to each other.



Figure 4. Picture of the NW part of the front of the fire approximately 15 minutes after the accident, showing the extreme heat loads and the existence of heavy spotting and thick smoke.(Source: An amateur video uploaded on www.youtube.com)

The first deputy mayor and an immigrant worker were able to by pass this obstacle. They reached an open space immediately after the pines with few olive trees, cleared from most grasses. Unable to continue running due to the smoke and heat they fell on the ground and tried to protect themselves by covering their bodies with soil. As they were wearing shorts they received burns on their exposed skin from the burning embers that fell massively on them. However, after the passage of the fire they communicated by mobile phone with a friend asking for help. They were able to walk back to the road where their friend picked them with his car and took them to the hospital. The worker survived but the burns of the deputy mayor were infected and unexpectedly he died 28 days later in a hospital in Athens.

One more person, a young athletic man initially managed to outrun the fire. Immediately after the accident he was reported missing but his body was not found on the site. Unfortunately, he was found two days later, in a rock crevice where he had tried to protect himself from the heat two kilometres away from the accident scene. Obviously he had been running all this distance, mainly uphill towards the village of Smerna, chased by the fire from behind and was probably finally trapped by the north flank of the fire that was spreading along the slope of Lapithas mountain.

One young man and his mother who had stayed in their car on the road, realizing, when the tyres caught on fire, that they would not survive if they stayed there, decided to act. They drove through the flames towards Zaharo and survived.

Discussion and conclusions

The total number of victims reached twenty three (23), including the three firefighters. The first deputy mayor was the 24th victim. It was the worst accident of this type that ever happened in Greece. Studying the evolution of the event, the following contributing factors to the disaster can be identified:

- The extreme weather conditions that led to a fire behavior that the people did not anticipate.
- The incomplete preparation of the olive groves in regard to grass treatment. In most such fields the grass had been mowed but was left on the site. Under this treatment, a large bunch of grass remains at the base of each olive tree, in an effort not to “injure” the tree. Under the extreme weather conditions, flying burning embers ignited massively the grass that was lying on the ground as well as the grass clumps at the base of the olive trees, starting them on fire.
- The erroneous decision of the people to leave the village of Artemida. Those who stayed survived without risking their lives. Only seventeen (17) of the seventy (70) homes of the village were destroyed or heavily damaged.
- The decision of the people to stay with the firefighters was not irrational. However it was unfortunate that the latter were not able to operate their pump and hose to protect themselves and the people in those conditions. Panic and lack of long professional experience may have been a contributing factor. It is also quite clear that had very little time to act and they faced extreme fire

behaviour. We may doubt if that single vehicle was sufficient to save such a large number of persons at that site.

- The specific location where the people stopped, at a bend of the road, contributed to the disaster. Although it was a relatively shallow draw, it did channel hot gasses. In these topography conditions fire erupted uphill with increasing intensity. Furthermore, at a distance of thirty meters from where they stopped, there was a group of tall pine trees among the olive trees. When these pines ignited the flames were tens of meters long and the radiation received by the firefighter crew at a distance of 30 meters was not tolerable. This may explain their failure to use the water in their truck. It may also explain why one or more cars on the road ignited, finally burning all of the other cars and killing the people in them.
- It is notable that people who drove off the site, even at the last moment, both in the direction of Zaharo and towards Artemida, made it to safety. On the other hand, making a delayed decision to outrun the fire on foot when the firefighters failed to offer protection was probably the worst option. The strategy of the first deputy mayor and the immigrant worker to lie on the ground in an open space with little fuel and cover themselves with soil was, under the conditions, an effective one, even if by coincidence the former finally lost his life.

The lessons that can be learned from this accident are related to the mistakes that were made and the need to avoid repeating them in the future. They can be summarized as follows:

- Evacuation of settlements in case of forest fires is not necessarily a good option. However, when an evacuation is done spontaneously, without planning, the results can be catastrophic, especially if realized at the last moment.
- The best option seems to remain in the houses at least as far as possible. This is especially true for the majority of homes in Greece and the rest of the Mediterranean region which are generally not built with flammable materials. There are no reports of lives lost for citizens that remained in their homes.
- Vegetation treatment for fire hazard reduction is a wise measure, especially close to settlements. Citizens as well as the state may find themselves in much better and safer condition in case of an extreme fire event such as the one experienced in Peloponnese in August 2007.
- The people in fire prone countries need to be educated about forest fires, about the need and measures to prevent them, the risks they pose and the ways to protect themselves and their property.
- Firefighter safety training should be a priority for both professional and seasonal firefighters.

It can only be hoped that these lessons will be taken seriously into consideration in Greece and in other countries that face similar problems with forest fires. The extreme weather events that all countries experience as a result of the changing climate should make everyone take the risks posed by forest fires much more seriously than has been the case until now. Otherwise, this tragic event may soon be repeated in some other part of the world.

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