Jaroslav Kapusniak

Activities of a fire brigade during huge forest fire before deployment of the overland firefighting module

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Jaroslav Kapusniak
Regional Headquarters of the Fire and Rescue Corps in Žilina

ACTIVITIES OF A FIRE BRIGADE DURING HUGE FOREST FIRE BEFORE DEPLOYMENT OF THE OVERLAND FIREFIGHTING MODULE

ABSTRACT

Occurrence of forest fires having increasing intensity and extent thereof due to climatic changes is more often in recent years. The article summarizes tasks and recommendations for firefighting brigade relating to a forest fire that jeopardizes to grow into a huge extent in a non-accessible terrain and to performing an intervention exceeding possibilities of a fire brigade from the District Headquarters of the Fire and Rescue Corps (hereinafter only "FRC"), including applying aviation fitrefighting equipment.

KEYWORDS
forest fire, extinguishing of forest fire, activities during forest fire, non-accessible terrain, aviation firefighting equipment

1. Introduction

Forest fires occurring more and more frequently bring new experience and unfortunately also higher and higher deployment of human forces, demands on equipment, as well as victims in form of human lives. They naturally forced us to think of a fact whether we are well prepared for the next fire and whether it is not suitable to prepare some guidance in advance to not forget or neglect anything in case of its origin. Similarly, as pilots in a plane before the start, when they carrying out checks of all systems pursuant to the guidance before they take off.

2. Reporting a fire

To secure the most effective and the fastest intervention.it is necessary to maximally find out from the person reporting fire and during a talk with him/her to find out as precisely as possible:

- location of a fire
  - region, district, owner, accurate site name, especially the name of the hill or at least approximate GPS data;
- what type of vegetation cover is in a fire

  - meadow, bushes, wind-fallen trees, young forest, older forest, or alternatively, deciduous forest, mixed forest, coniferous forest;

- the way of fire spread
  - through roots, along the ground, along the grass, along bushes, along wind-fallen trees, along brushwood stacks, along young vegetation cover, along treetops;
- strength of wind in the fire surroundings
  - windless, weak wind, strong wind, very strong wind, + wind direction;
- cloudy weather in the fire surroundings
  - fog, clouds approximately 100 m above ground, hill tops are in clouds, clouds are high up above hills, cloudless weather;
- altitude of the fire
  - approximately up to 500 m, up to 1000 m, more than 1000 m;
- whether the fire occurs in the protected area
  - locally protected area, nature preserve area, national park;
- possible access route to the fire site
  - area without any forest roads, area with forest roads;
  - the nearest municipality or settlement from which the access to the fire is possible;
  - site where other person will be waiting to the fire brigade to lead it to the fire site (foresters, tourists, other persons).

Consequently, it is very important for particular Commanding Centre of the FRC to decide correctly what firefighting engines and equipment have been sent to the fire site.

When from recorded fire reporting is clear that:

a) for suppressing fire or other emergency event, is necessary to demand aviation equipment, as for example helicopters MI-8, MI-17, MI-171 or firefighting aircrafts, etc.;

b) the fire spreads in an inaccessible terrain that does not allow to deploy transport hose lines from the firefighting engine or from a water source to the fire site and local conditions do not allow to suppress fire by other ways only by simple firefighting equipment (firefighting back bag with hand pump, double-bladed hoe, Pulaski head with an axe end and a mattock blade, buffers, etc.)

c) the fire spreads in extremely hillsides (with high slope gradient, with rocky parts, steep tree-fallen areas, etc.) where the only possible access to the fire site is by foot or by aviation aircrafts;

d) the fire spreads in areas with special social value (protected landscape area, state nature preserve area, national park, etc.) and in adjacent areas thereof;

e) there is an assumption of fast spreading forest fire;

f) there is an assumption that the firefighting module can help in suppressing the emergency event due to its skills or material equipment;

it is necessary to announce this immediately to the Commanding Centre of the Presidium of the FRC and ask to deploy the FRC Overland Firefighting Module especially due to geographic and tactic relief (GTR) provided by this Module.

The FRC Overland Firefighting Module includes 12 GTR experts who are equipped with PCs and they are able from their fire stations to provide the following information by phone, e-mail or SMS to the particular FRC Commanding Centre or the Intervention Commander:

- the complete actual meteorological situation in the fire surroundings;
- an assumption how and where the fire will be spreading; ,
- whether a chimney effect can occur in steep mountain troughs;
- whether forest roads can be found in the fire surroundings and place from which the best access and deployment are possible, or alternatively a suitable route for shuttle water transport;
- the required length of transport hose lines and attack lines (necessary numbers of hoses);
- the nearest site for water pumping and supplying;
- throughput and load carrying capacity of bridges on route leading to the fire site;
- whether any objects, electrical aboveground lines, transformer stations, gas pipelines, gas regulation stations, gas storage structures, railway lines or funiculars can be endangered in the fire spread direction;
- whether it is possible to apply aviation aircraft according to geographical and meteorological situation;
- where the nearest areas for aviation aircraft landing, Fireflex mounting, filling Bambi bags with sufficient water level and possible areas for intervention with transport OTO bags are located;
- possibility of fire suppressing by mobile firefighting reservoir system (mobile firefighting ponds) with calculation of human forces and equipment required for its creating;
- proposal for expert logistic solution of the fire suppressing.

The GTR expert can all recommended routes and sites export by e-mail in the gpx format to the local FRC Commanding Centre where all data can be uploaded into GPS equipment for intervening firefighting brigades.

3. Estimation and the art of forecast

After arrival at the intervention site, it is necessary for the Commander of the first arriving firefighting brigade, i.e. for the Intervention Commander, to sufficiently estimate probable fire growth, actual fire stage, required human forces and equipment and to be able to ask foresightedly for relief, regardless the FRC Overland Firefighting Module for suppressing forest fire, the Search Module, aviation aircraft of the Ministry of Interior of the Slovak Republic, aviation aircraft of the Armed Forces of the Slovak Republic, or other brigades' relief. While these reinforcement units come, he has to carry

out a lot of activities to have everything prepared for the effective intervention and efficient use of deployed forces and equipment.

During the process of calling reinforcement units and preparation for broader deployment, the intervention of own local firefighting brigade has to take place with equipment having for application aimed at least to localize or, mainly, decelerate the fire growth.

When a forest is caught by a fire, hardly anybody can estimate what intensity will have a fire or how increases its spread. At this time there is neither time nor space to make records in water transport into heights or to waste human forces but well overthought and carefully prepared forces and equipment for effective response or for defence preparation take place. It is focused on fact that firefighters or other persons involved should not run down the hill against the fire and mainly not to be endangered by a chimney effect in steep narrow mountain troughs located above the fire; these phenomena should have fatal consequences. This requires really conservative estimation not only human possibilities and capacities but also technical ones.

Under mentioned activities are described only with the goal of summarizing thereof not according to priorities and not always with a necessity of their consistent fulfilling but in the guidance form noticing what everything should be remembered.

It is absolutely clear that firefighting brigades arriving successively will be involved into described preparation activities and they will carry out them according to commands and ideas of the Intervening Commander.

Figure 1: Fire of forest cover in Nižná Boca cadastral area.
(Photo: J. Kapusniak, April 2012)

4. Reconnaissance and terrain mapping

It is necessary to secure contact with forest management companies, to require persons acquainted with terrain, who are capable to judge throughput of outgoing forest communications and roads and on that basis to determine intervention routes, deployment areas and turning points. Also knowledge on geological underlies in area in question, composition and status of woods as well as slope steepness is important.

It is necessary to continuously communicate with owner or manager of affected area as regards potential tree intersection or other technical interventions into terrain. Sometimes it is not possible to response with common firefighting equipment but it is possible to render special forest machinery for water pumping or for its organization and transport.

As regards helicopter deployment for water delivery or for fire suppressing by bags, information on possible areas at the mountain ridge above the fire site is valuable.

Choice and preparation of suitable pace for water filling from available water reservoir (up to 6 flight minutes to the application point) or nearby abundant water source or built-up pumping stand for Fireflex filling is also important.

If firefighting brigade intervenes by its own equipment aimed to localize fire, it is suitable to invite an experienced commander with praxis from neighbouring district or from another firefighting unit or in the best case an expert from the FRC Overland Firefighting Module to judge mentioned statuses. Due to fact that local Intervention Commander has a lot charges with primary intervention management, he will appreciate if someone helps him with organization of more extensive intervention.

5. Investigation of circumstances influencing fire growth

It is necessary to take into account meteorological prognoses concerning possible rain, strength and direction of wind determines direction of the principal attack or determination of performing tree cut-off, terrain segmentation and landforms, nearness of tenanted or untenanted structures
As regards long-term intervention planning, also information concerning sunset time due to aircraft flights as well as data on night temperatures is required.

6. Finding out and preparation of usable water sources

Preparation of water sources, stoppage of watercourses nearby the Fireflex stand with estimation of possibilities of aircraft landing and taking off or alternative emergency area for landing, marking these areas or lighting of aircraft landing and taking off area, respectively.

The Intervention Commander must consider that invited aerial aircrafts with Bambi buckets or VSU type bags may reach intervention site up to one hour and in that time the filling points with extinguishing water have to be prepared.

When use of Fireflex system is planned, it is necessary to prepare in advance massive supply of water from 1 000 litres up to 3 500 litres after each water dipping into bag. When interval between landings is 10 minutes, the Intervention Commander or staff

member responsible for extinguishing water delivery has remember this mentioned fact and has secure reserve of water at least in two fire tank engines.

It is necessary to establish a combat section for filling point immediately after decision of creating filling point and before the helicopter arrival; this combat section can be created from members of voluntary firefighting brigades (professional FRC members are more useful for more demanding task fulfilling).

7. Creating stands for Otovak and Fireflex systems

It is useful to exploit action capacity, training skills and practical experience of the Search and Rescue Module (SAR) with building of sheeting and support systems.

Figure 2: Training of Overland Firefighting Module.
(Photo: Šuba, October 2013

Landing of professionally experienced persons from helicopter or by forest mobile machinery is also possible. Also, sewing equipment and other material (for example beams) for building stands in sufficient dimensions and load bearing capacity for arranging reservoirs and ponds with permanent water supply used by the Overland Firefighting Module for gradual suppressing fireplaces, digging of root system, etc. can be delivered by this way.

8. Creating of resting regeneration base

It is suitable to exploit the Logistics Module for creating resting regeneration base nearby the intervention site in such way that deployed firefighters should know how long they will be deployed in terrain and how long they will be regenerated and how they should exploit their force with understanding that they will be relieved in time.

It is useful to have own ambulance in the resting regeneration base that will be able to solve either immediately or by transport any status of intoxication, exhausting, dehydration, or burnings or other injuries.

The resting regeneration base shall be commanded by the staff member who is responsible for recording review on deployment and relieving of particular teams and is also responsible for permanent possibility of deployment refreshed forces with own supply of drinking water regime and small snack supply but principally with information concerning time of team deployment in terrain.

9. Staff creating, determination of duties and priorities, commanding hierarchy

The Staff for fire suppressing has great responsibility and importance for helping the Intervention Commander. This post results from the legal act in matters of functional supplying by drinking regime, food, fire extinguishing media, fuels, hoses, etc., and fire suppressing shall be effective and especially continuous process. It is necessary to determine connecting intersections and channels for communication in such way not to transfer all information to all involved persons in one channel and to strictly fulfil these determined principles. At huge fires, exists a threat that the Staff for fire suppressing becomes subordinated to the Crisis Staff that can result in confusion management in many areas of the extinguishing course and intervention efficiency. I think that a member appointed from the Crisis staff that consists prevailingly from civilians, should take over intervention commanding and management, create the Staff for fire suppressing and proposal and recommendations of the Crisis Staff remise on the intervening units he is responsible for.

Strict keeping hierarchy of superiority introduced in the FRC should be met in this topic. **Competences cannot be separated from the responsibility but they should be joined together.**

The Intervention Commander shall have final decision on way of deployment and attenuation of chaotic and emotive decisions of particular section commanders, on movement and deployment of machinery and equipment according to immediate requirements because commanding during intervention belongs to him and especially he is responsible for the intervention to the highest representatives of the FRC, Ministry of Interior of the Slovak Republic and through public media also to citizens.

To negotiate co-operation forms, competences, combat sections, way of communication is very important in process of deployment of particular modules together with the FRC brigades.

10. Estimation of human forces and equipment, securing the replacement and deployment

It is very important duty during supposed long-term deployment to inform in advance sufficient number of alternating firefighters with refreshed forces who are able to take over tasks in terrain and to continue in fulfilling thereof.

Firefighters who are informed in advance on having deployed into terrain and who can prepare themselves with material can be sent in totally different way to tasks fulfilling.

Firefighter who is announced on the immediate run off and is in the fast intervention process can work in the full deployment in terrain maximally two – three hours. At the opposite, well prepared firefighter can bear full deployment twice longer and if he knows that logistics and prepared replacement is functional and coordinated, he can distribute his force.

Review on numbers of persons deployed in particular combat sections, times of deployment in terrain is recorded by the staff member who is responsible for commanding the resting regeneration base. It is, except other reasons, due to checks of safe returns, recording possible injuries or other serious emergency events.

11. Securing action agility of own firefighting brigade in own intervening zone

It is a mistake to deploy own firefighters to intervene in a forest fire when intervention is supposed to be running more hours or more days and in own fire station determine to duty foreign reinforce units even from the FRC members. Domestic members are best acquainted with their own intervening zone and foreign FRC brigade can fulfil tasks directly in a forest. It means that on domestic fire station must be present at least two domestic machine men (drivers) all the time.

Conclusion

Forest fires negatively affect whole eco system every year, destroy natural wealth that had been developed for many years, negatively affect economics of soil management, cause large material damages, destroy animals' lives and shelters and even human lives, too.

It is important to deal increased care to remove shortcomings related with forest fires and to take measures to avoid unfavourable events that may cause uncontrolled fire spread.

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