

CONSIDERATIONS ON RISK MANAGEMENT APPLIED TO FOREST FIRES

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Abstract

Forest risk and management are ubiquitous in any socio-economic activity. Forestry, more than any other field, is at risk from fire. Consequently, it appears the necessity to implement a fire risk management that could resolve, at least partially, the specific problems. This study attempts to identify the specific stages and processes of forest fire risk management and their content. At the same time, I will try to highlight how a forest fire risk management process planning can be achieved and to present a way of achieving the Plan. I also deem necessary a forest fire risk monitoring and control system that I have built using the Deming cycle.

Keywords: risk, risk management, forest fires.

1. INTRODUCTION

Forest fires are complex phenomena caused by a multitude of causes. Assessing the risk of fire in the forestry real estate remains a relative item, as the risk is an uncertain event that could have a negative or positive impact. It is characterized by the likelihood of occurrence and magnitude of potential impact.

The need to implement a forest fire risk management lies in the fact that persistent droughts in recent years have favored the increasing number of forest fires in Europe, while aggravating the desertification of a large number of regions.

Since forests are important for the wood production, of but also for maintaining biodiversity, the prevention of fires, floods, avalanches and erosion, for the management of groundwater and natural space and for carbon sequestration, fires that threaten forests should represent a reason of concern (Ciobanu, 2011). In this regard, legislative proposals and initiatives have been developed in the area of forest protection and fire prevention; projects are supported by providing structural funds for forestation/reforestation, favoring native species and mixed forests for the benefit of biodiversity and greater resistance to fire, storms and pests, and the sustainable collection and use of waste forest biomass that constitutes a renewable energy source; activities related to regular data collection, the development of risk maps, the preparation of management plans for fire hazards, the identification of the resources needed and those available, and the coordination at various levels are carried out.

In our country there have been no concerns for developing a risk assessment method until the

alignment of national legislation with the European legislation on fire and the request to introduce a chapter on the method of fire risk assessment in the rules of prevention and firefighting.

Risk management applied to forest fire aims to ensure an efficient and effective management in terms of risks and related opportunities, enabling the planning, identification, assessment, quantification, response, monitoring and control of potential risks (FAO, 2007).

2. SPECIFIC STEPS AND PROCESSES OF FOREST FIRE RISK MANAGEMENT

Risk is both a numeric value - the possibility of occurrence of the unwanted event, hazard, the size of consequences of its occurrence or a product of the two components, as well as an attitude of scientific assessment, prevention of events or mitigation of their consequences. The product of the possibility of occurrence and size of consequences identifies most correctly the specificity of the risk.

The methodology of 21 May 2007 published by the Official Gazette 360/2007 specifies the steps of procedure and the main components, factors, parameters, criteria, tools, techniques and procedures that are considered in identifying, assessing and controlling fire risks, and the conditions which the staff performing such activities must met. Thus, fire risk management involves the following steps:

- determining the system or process under assessment;
- determining the level of risk acceptability;
- selecting the method and work tools;
- identifying fire hazards;
- identifying risks;
- estimating and quantifying risk;
- assessing the risk;
- risk control;
- monitoring the risk
- the documentation resulting from the process of identification, assessment and control of fire risks.

Risk management handles those processes assuming and taking over risk events (Hinescu, 1978). The main processes that take place in forest fire risk management are detailed (Fig. 1).

While a variety of different strategies may mitigate or eliminate the risk, the process of identifying and managing risks is quite laborious and consists of five basic steps. First, threats or risks are identified. Secondly, vulnerability assessment such as information about threats identified. Further, the risk manager must determine the potential consequences of the risks identified. The last two steps reside in implementing actions to mitigate risks, and afterwards to prioritize risks based on their importance.

3. CONTENT OF FIRE RISK MANAGEMENT PLAN

Risk management planning is a process that involves identifying, the analysis and response to potential risks. Risk management planning involves establishing the risk management procedures, depending on their type and importance and maximizing the positive effects and minimizing the consequences of adverse effects (Adam, 2007).

Risk management plan should include the following (Florescu and Nicolescu, 2007):

- methodology for identifying and analyzing risks;
- risks quantified response plans;
- monitoring and risk control.

Fire hazard identification is the process of appraising and determining the factors that can generate, contribute and/or facilitate the production, development and/or propagation of fire, namely (Ciobanu and Ioraş, 2007):

- physical and chemical properties of timber;
- potential sources of ignition;
- preliminary conditions that can cause or promote ignition and production, development and/or spread of fire;
- Indirect or natural sources of ignition.

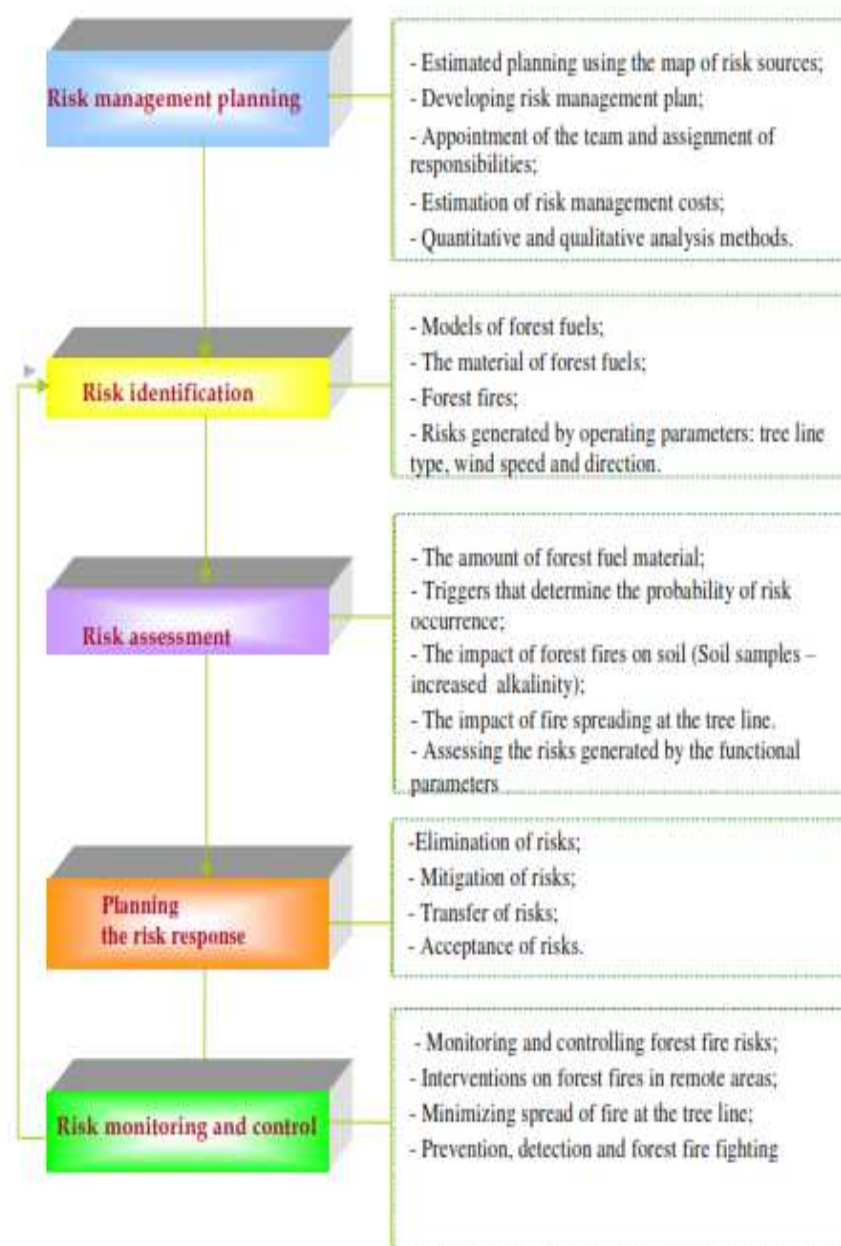


Figure 1. Steps of approaching risk management applied to forest fires

Factors to be considered in the management of fire risk are provided (Fig. 2).

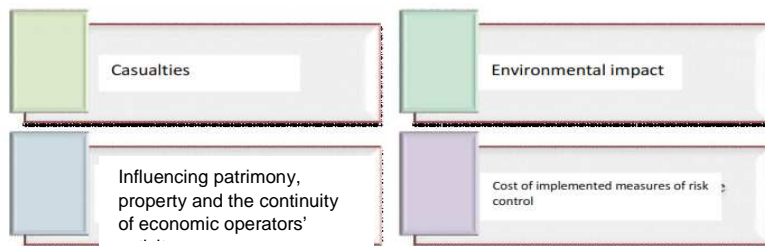


Figure 2. Factors related to risk assessment for forest fires

Risks must be identified and evaluated in terms of the combination of the probability of something (risk) happening and the impact (consequence on objective) of the materialization of such possibility. The assessment result of the probability - impact combination is called risk exposure.

Available risk management resources are limited and the risk number increases with the complexity of the work carried out to achieve the objectives. Therefore, it is necessary to pursue an optimal response to risk, in a certain order of priority (risk profile) resulting from the risk assessment. The measures necessary for the risk management should be adopted up to an acceptable level. This level is called risk tolerance. The concept of acceptability of the fire risk is based on the assumption that in any system/process under assessment, there is a certain level of risk, called acceptable level of risk, above which the seriousness of the consequences of a fire in terms of human, material and/or financial loss cannot be accepted.

The probability of fire occurrence is based on statistics on fires or mathematical models, in the cases where the statistic does not have enough data. The probability of consequences arising is based on the probabilistic analysis and deterministic models on the development of fire, spread of fire, user evacuation evaluation and suchlike.

The risk of fire is the performance criterion which represents the overall probability of fire onset, determined by the interaction of specific properties of materials and combustible substances with potential sources of ignition under certain circumstances.

Measures for fire protection considered in determining the fire risk are those designed to mitigate, neutralize and/or eliminate fire hazards, or to limit, locate and/or put out of fire, if it occurred.

4. MONITORING AND CONTROL OF FIRE RISKS

Monitoring fire risk means all activities of substantiation, elaboration and implementation of a coherent strategy to prevent, limit and fight fire risks, including the supervision of the ongoing of the steps related to the identification, assessment and control of risks, of analyzing the effectiveness of measures taken in relation to the outcomes obtained and making the decisions required.

Forest fire risks monitoring and control should allow (Bradshaw et al., 1983):

- maintaining major risks to an acceptable level;
- ensuring a high degree of protection in case of forest fires in remote areas, but also in adjacent areas;
- ensuring prompt intervention to reduce the human losses and material damage;
- providing intervention for the prevention, detection and extinguishing of forest fires.

Identifying, assessing and prioritizing risks are principles that underlie the planning and organization of preventive actions. In this risk identification, assessment and prioritization process, based on a profound knowledge, the maximum level of manifestation must be taken into account,

their simultaneity and chain reaction, aspects that make the planning consider both each risk separately and combined or interdependent situations of manifestation, in order to ensure a rapid response of preparedness, protection and mitigation of effects.

Prevention needs to be an increasingly important step in the risk management cycle, gaining an increasing social importance (Popa, 2005). Another important component is the risk of fire development to certain flora (forest). Developing contingency plans for emergencies, risk analysis and coverage plans and allocation of necessary resources may constitute components that ensure the successful implementation of contingency actions (HCJSU, 2010).

Prevention is supported by the set of principles, performance criteria, technical requirements and conditions imposed and regulated to ensure a quantified level of security in the normal social and economic life, and preparation for removing the effects of disasters upon life, environment and material assets (Vélez, 2000).

The process of risk management requires an efficient and effective risk management so that the corrective actions adopted ensure the prevention of occurrence and spread of forest fires, which would allow better organization of prevention and firefighting activities.

All risk management processes are based on the (Deming et al, 1972): planning - execution - control - improvement (Fig. 3).

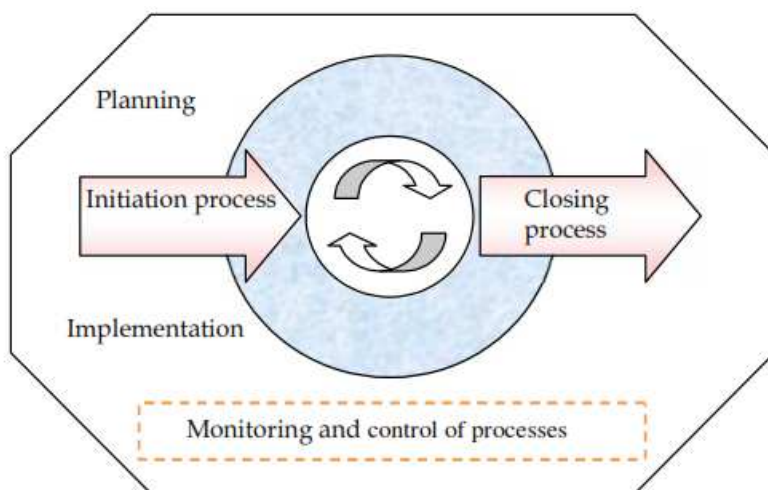


Figure 3. Deming Cycle applied to risk management processes

5. CONCLUSIONS

Developing and implementing risk management systems in forest fires should be a key component of sustainable development strategies of forest ecosystems.

Risk management has become a subject of intensive research, based on three major conclusions:

- similar to hazard, an unknown activity involves a risk;
- the association between risk and particular hazard is not always correct;
- the interest, convenience or emergency cannot be dissociated from the risk, even if the action triggered thereof was successful.

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