



Picture: V. Quadt



Picture: A. Schuck



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A proposal for tactical positions in forest risk management

Using experiences from wildfire to
investigate their application to other
forest disturbance risks

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Summary

Each forest agency is sometimes confronted with a crisis, a situation that pushes the organisation to its limits. The exchange of knowledge and operational skills is the key to the successful management of this type of emergency. Therefore, a common reference system of logic language, positions and skills or professional competences is necessary to enable smoother pan-European exchange and cooperation.

In this article, the minimum common units of key positions in tactical operations are described: operator, crew boss (advanced firefighter for instance), unit chief and analyst. The system is based on professional competences according to the European Qualification Framework (EQF) and is structured in such way to be compatible with the positions and skills of the Incident Command System (ICS) in the USA. It also attempts to be compatible with the already existing management levels and minimum certification units (in Spain and Europe). It provides guidelines to fill common and compatible positions. Each competency is itemised in a series of specific competences, providing the modularity and necessary flexibility for the variety of systems using different management tools (machinery, hand tools, silviculture). It remains in the hands of each organisation to specify, inter alia, the work positions.

Building on the existing knowledge and experience gained in wildfire risk management this paper investigates in how far those are applicable to other forest disturbance risks such as storms, pest and disease, and, if possible at all, also to drought and wildlife management.

Introduction

The new and changing disturbance regimes, those with high-speed and on a large scale, that we are confronted with in Europe, are forest and civil protection emergencies of very high complexity. They include, for instance, large forest fires or storms that impose a simultaneous risk to more humans and goods than we can protect (such as the forest fires that occurred in Greece in 2007). In these 'mega-fires' the suppression organisations work under conditions that they are only rarely confronted with. The conditions change much faster than the information can be made available and spread through the command chain. This circumstance brings the decision-making system to the point of collapse and limits the command capacity and control over resources. It requires the help of other agencies, coming from workplace realities and organisational systems that can be very different.

In such crisis situations, the systematisation of command, control and coordination is crucial to concentrate all forces in an efficient manner in the priority areas. Different solutions are implemented all over the world. The best-known is the Incident Command System (ICS), which was devised to cope with the area of large forest fires in southern California where multiple interacting state and federal agencies coexisted. Now it is applied in the response to every type of large-scale emergency such as the attack on the Twin Towers in New York and Hurricane Katrina. The inter-agency response requires not only a common incident command system but also to standardisation of the knowledge and skills to fill each of the positions.

In the diverse European situation, the agencies that work together are not only from one country as in the USA: frequently they are from different nations and regions, with different legal policies resulting in different incident command systems in emergency situations and different qualification systems. To allow the movement of professionals of all types, the European Union does not intend to standardise accredited qualifications that countries and agencies have to adapt. However, it aims to promote until 2020 the mutual acknowledgement of qualifications between countries and agencies based on training outcomes, measured in knowledge, skills and competences based on the European Qualification Framework (EQF) that the trainee can demonstrate. Thus, the agencies and countries maintain the capacity to decide which typology of qualification is appropriate, which are the training processes (hours and type of education, evaluation system, how to recognise informal training or ability, etc.) and which are the professional competences of the countries and agencies that are recognised as equivalent. Because large forest crisis situations are quite rare and individuals may not acquire experience, these guidelines shall integrate lessons learned from different countries.

When command positions in a large forest crisis are filled by personnel from different agencies, a common reference of positions and skills (professional competences) as well as a common language (in the sense of expression-communication and not idiomatic) is necessary. In the European area, such a reference does not convert into a list of courses and trainings in order to fill standardised positions, but is understood as a system of competences of capability and language that allows the mutual appreciation of accreditations between countries and agencies. The educational concept based on competences on which the EU counts on is successfully applied in various countries all over the world for the development of the skills needed to respond to forest fires and other emergencies, e.g. in the USA (National Wildfire Coordinating Group NWCG, 2012¹), Canada, Australia or New Zealand.

Objective

The objective of this document is to provide guidelines for the standardisation of competencies, knowledge and skills in order to facilitate the creation of an emergency / forest crisis network of agencies and organisations dedicated to forest management in the event of large forest crisis situations.

These guidelines shall facilitate the selection, education and training (including simulations) of personnel to fill key positions. They shall be compatible with different professional profiles already existing in Europe and benefit from the actual frameworks for mutual recognition of professional qualifications, like the EQF, or those for the common work in emergencies, like the ICS.

The paper takes advantage of knowledge and experience gained to date within wildfire risk management and investigates in how far those are applicable to other forest disturbance risks.

¹ http://training.nwcg.gov/sect_fieldmanagers_courseguides.htm

Methodology

Based on the criteria and established positions, the first step is to identify the minimum unit to certify through a detailed analysis of the occupations and workplaces and their contents. These units have to (INCUAL 2004 ²):

- Be identifiable and recognised in a significant number of productive organisations related with the qualification;
- Be able to identify each position with various units and each unit with one or various positions;
- Be expressed as results of training, not as procedures or methods, focusing on performance instead of knowledge.

Therefore, to identify the minimum unit of certification, a matrix has been constructed based on positions and competences (Table 1).

Table 1. Methodology to identify the minimum units of certification based on the existing positions and competences.

Position	Competences
<p>Based on the positions defined by NWCG (2012) for the ICS:</p> <ul style="list-style-type: none"> • Complemented with positions of the French hierarchical structure for firefighters which present the maximum array of levels and functions to be differentiated in the command and logistic chain; • Complemented with specific positions of fire use and analysis • Complemented by a revision of real positions with coincident competences (civil voluntaries, temporary workers in summer) as well as with others identified by EIMFOR or by the Fighting Committee against Forest Fires, etc. 	<p>Based on the competence units described by the Spanish INCUAL (INCUAL 2011) that integrates in the minimum units a great diversity of methods and workplaces:</p> <ul style="list-style-type: none"> • Complemented with own competences of fire use identified in the meetings of Fire Paradox; • Complemented with specific competences in autonomy and responsibility, developed for New South Wales (Australia), and compatible with the ICS.

This grid is filled with professional profiles that are required each, be it analysis, command, operations or prevention. Based on this research, the competence units to fill key positions during a large forest crisis have been identified. To provide flexibility for the system, we assorted general competences that are further developed in specific competences.

² http://www.mecd.gob.es/educa/incual/ice_catalogoWeb.html

Table 2. Example of descriptors of competences in different countries and regions.

<p>UK: Cognitive competence, functional competence, social competence</p> <p>Germany: Fach-, Methoden-, Sach-, Personalkompetenz</p> <p>Spain: ...to be added</p> <p>France: ...to be added</p>	<p><u>Description of each competence unit</u></p> <p>In Europe, every agency and each country uses different descriptors. We base ours on those used in EuroFire (EuroFire 2009) which published a capacity system based on competences for the basic level in forest fire (level 2 of the EQF), describing each competence by:</p> <ul style="list-style-type: none"> • A description of the competence and a description of the specific competences; • A proposal on how to acquire and maintain the minimum certification units and the specific competences; • The competences associated with the general competence and to the specific competences; • The skills to be evaluated associated with the general and specific competence, like the cognitive competence as well as the trainings, be it professional, social or methodological, described in terms of what has to be known and what should be known.
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The description of the skills shall be useful in the evaluation of the professional activity and, hence, requires a brief description of essential, precise and observable aspects. To guarantee compatibility with the ICS, the skills of each competence will be compatible with the task books of the NWCG of the USA, divided into general competences to fill the different positions in the suppression / management system.

Results

In contrast to NWCG, it is the competences knowledge and skills (based on EQF) rather than the positions of the minimum units that will be certified. It shall be compatible with the regulations and institutions in the area of civil protection in the EU, with command systems internationally used like the ICS, with systems based on international competences (New South Wales, New Zealand, South Africa) and shall take advantage of the already existing competences, models and criteria (firefighters from different countries in southern Europe). Our pilot proposal develops the standards initiated in the EuroFire project, based on competences (units of competence). EuroFire focussed on competences of EQF level 2. This proposal advances until levels 3, 4 and 5, basically the tactical positions (see Table 3) because:

- They are susceptible for exchanges between agencies in a large forest crisis, which have the capacity to take decisions. They imply a significant number of persons.
- They take multiple small adequate decisions, following a general strategy. In a system where the mechanisms of decision-making are collapsing, the capacity of individuals to make their own correct tactical decisions is crucial in order to profit in

a secure and efficient manner from the identified opportunities for the strategy in an environment.

- They imply professional competences of levels 2, 3, 4 and 5 of EQF, below the academic levels, developed for national qualification agencies.

Table 3. Description of the developed positions. This includes examples of profiles that can fill this (or other) positions in the ICS, in different autonomous Spanish communities as well as in other places of Europe. These examples seek only to facilitate the understanding of the reader.

Operator: level 2 EQF			
<ul style="list-style-type: none"> • works under direct visual supervision • Prepares and uses tools for the attack, control and stabilisation of flames and hotspots 			
Position	Spain	Others	
Hand tools	Peón forestal	Sardinia	Operario
Water line	Auxiliary forestall		Bush Firefighter
Ignition	Peón forestal Especialiasta BRIF	New South Wales Portugal	Sapador forestal

Advanced firefighter level 3 EQF		
<ul style="list-style-type: none"> • Applies a plan and performs tasks without direct visual supervision • Responsible of building parts of a fireline, to contain, attack, stabilize, control, and protect it by himself or by an operator within his visual or hearing range • Selects and uses the adequate basic techniques and tactics to confront, stabilise and/or suppress safely a fire front in sight, with or without the help of other suppression groups • Has sufficient knowledge to adapt techniques and tactics in different vegetation forms, fire behaviours, etc. 		
Position	ICS – WQS (USA)	Spain
Squad-boss on:		Bombero de 1a
Hand tool	Firefighter type 1	Capataz BRIF, EPRIF; y PRESA
Water line		Capataz BRIF y PRESA
Ignition of low difficulty	-	Agente forestal
Heavy-machinery	-	Bombero GRAF CAIF
Ignition of high difficulty	-	Agente forestal

Unit chief: level 4 EQF		
<ul style="list-style-type: none"> • Plans the operations to suppress the fire in a secure and efficient manner in the work zone. • Organises the task of his intervention unit, handles instructions of the responsible of the contingency. • He bases upon the evaluation of the fire, the landscape, the goods and means, upon the dispatching and assignation of functions and objectives in the intervention unit, and upon the transmission of relevant information. 		
Position	ICS – WQS (USA)	Spain
Hand tool		Cabo especialista
Water line		Cabo
Helicopter		Tecnico BRIF
Ignition of low difficulty	Single resource	Cabo BRIF
Ignition of high difficulty	boss	Bombero GRAF-CAOFT Caporal GRAF-CAOFT, Tecnico BRIF y PRESA
		Crew boss
		Engine boss
		Helicopter boss
		Ignition Specialist
		Firing boss

Analysis: level 4 and 5 EQF

- Identifies and monitors the changing factors, critical points and associated potentials in containment in a large forest fire. He participates in the planning of operations but not in their organisation.
- Interprets and anticipates the operation window of the fire front in sight (qualified monitor or observer), identifies and evaluates the suppression opportunities in a containment axis.
- Passes relevant information to a strategic analyst and/or to the strategic command from the sector, zone or fire where they are assigned. He collaborates in the attack planning.

Position	ICS – WQS (USA)	Spain
Observer Tactical analyst	Fire observer -	Agente forestal Bomber GRAF – CAIF Sargento especialista Tecnico GADEX, PRESA

In the majority of the agencies in a crisis situation, there is no individual exclusively in charge of each one of these positions.

Table 4. Levels EQF, general and specific competences of each position. Positions: om – hand tool operator; ol – water line operator; oi – ignition operator; em – hand tool officer; el – water line officer; eh – officer of helicopter transport; em – engine boss; eb – officer of ignition of low difficulty; ea – officer of ignition of high difficulty; um – unit chief of hand tools; ul – unit chief of water line; uh – unit chief of helicopter transport; ub – unit chief of ignition of low difficulty; ua – unit chief of ignition of high difficulty; am – monitor analyst; at – tactical analyst. Written in *italic* are the competences or specific competences that were not developed for the pilot scheme as they already exist in EuroFire (those of level 2), likewise the links/connections with specific tools. The competences of level 5 are marked with an asterisk *.

level	Competence	Specific competence	Operator			Crew boss / advanced firefighter						Unit chief					Analyst	
			om	ol	oi	em	el	eh	ep	eb	ea	um	ul	uh	ub	ua	am	at
2	<i>Collaborate with colleagues in the adoption and application of preventive means and protection for the prevention of risks</i>	<i>Ensure that the actions in the vegetation fire workplace reduce the risks to yourself and others</i>	om	oi	oi	em	el	eh	ep	eb	ea	um	ul	uh	ub	ua	am	at
		<i>Communicate within a team and with supervisors at vegetation fires.</i>	om	ol	oi	em	el	eh	ep	eb	ea	um	ul	uh	ub	ua	am	at
	<i>Perform intervention work ordered by the responsible for the suppression or control</i>	<i>With hand or mechanic tools With teams building a water line With ignition tools following a specific plan under direct supervision</i>	om	ol	oi	em	el	eh	ep	eb	ea	um	ul	uh	ub	ua		
3	Develop task independently	In a vegetation fire				em	el	eh	ep	eb	ea	um	ul	uh	ub	ua	am	at
	Perform inspection/lookout work for the detection and information about vegetation fires	Set up permanent observation points with good visibility over the area In mobile form in zones defined by the responsible				em	el	eh	ep	eb	ea	um	ul	uh	ub	ua	am	at
	Perform control operations and/or suppression of vegetation fires through techniques and basic tactics of construction of barrier lines	<i>With hand and mechanic tools With teams building a water line With help of heavy machines Involving aerial means</i>				em	el	eh	ep	Minimum 1	More than 1	um	ul	uh	Minimum 1	More than 1		
	Perform control operation and/or suppression of	In prescribed burnings, extension burnings and backfires of low difficulty																

	vegetation fires through the use of technical fire	In prescribed burnings of high difficulty (low wooded) In backfires of high difficulty										ea						
													ea					

level	Competence	Specific competence	Operator			Advanced Firefighter					Unit chief					Tactic analyst				
			M	L	I	M	L	H	M P	lb	la	M	L	H	lb	la	mo	t		
4 - 5 *	Planning of the operations in control and/or suppression of vegetation fires in the assigned area	For one intervention unit In monitoring tasks In tasks of tactical analysis in large forest fires*										ea	um	ul	uh	ub	ua	ua	am	at
	Organise the control operations and/or suppression of vegetation fires in the assigned area for an intervention unit	<i>For an intervention unit of one terrestrial crew with hand and mechanical tools</i> <i>For an intervention unit building a water line</i> <i>For an intervention unit of a helicopter crew</i> <i>For an intervention unit of water pump resources*</i> ...											um	ul	uh	uh	Minimum 1	Minimum 2		
	Plan and adjust the ignition in operations with technical fire in a secure and efficient manner	In burnouts and backfires of low complexity In backfires of high complexity															ub	ua	ua	

The specific competences are only described for the general competences of autonomy and responsibility and for analysis tasks and tactical fire use. The specific competences related to the management of a water line or hand tools are not described. They require a separate detailed description as has been done for fire in order to differentiate specific competences.

The selected descriptors (Figure 1) are based on the descriptors of EQF (competence, knowledge and skills) and those used in the EuroFire project. They are used to define each general competence and each specific competence in Table 4 (except for those in italics).

This allows not only preparation of training contents (knowledge) and their evaluation (what should be known and understood) but also to prepare and evaluate practices and actions (skills, what one should be able to do). It also describes the competences precedent required, and allows for recommendations to be elaborated on how to evaluate the knowledge and the skills (acquisition and maintenance of the competence).

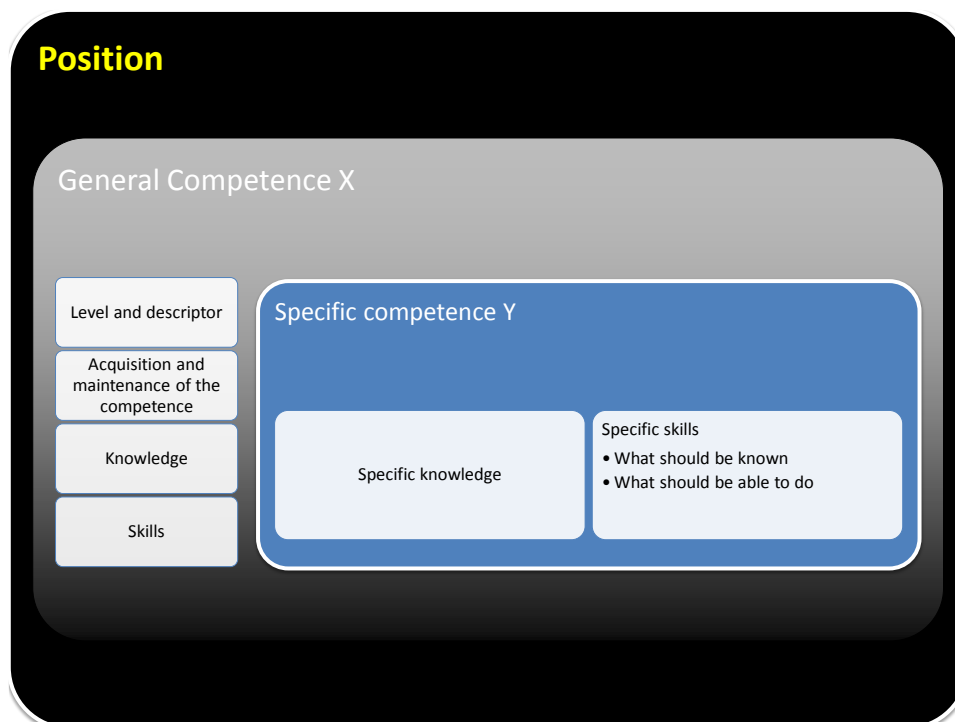


Figure 1. Used descriptors for each of the competences and specific competences.

Each organization remains responsible for: development of these positions and description of competences in the workplaces; description of relations with other positions and actors; the physical and psychological environment; the technical level; the academic level; and other specific conditions for access; the educational system; the evaluation system; education hours; the recognition of informal training or capabilities; the profiles and competences of professors, mentors, evaluators, etc.; the recognition of previous experience; the educational environment; and identification of training needs for individuals and crew.

In this proposal we have developed the competences of the analysis and fire / forest crisis management in a much more detailed way than in the Spanish INCUAL as these are crucial

skills to gain the initiative over a fire /forest crisis, to benefit from the few existing opportunities, reduce the impact, cost and duration of a mega-fire /crisis and to improve the safety and efficiency which are key issues in large-scale forest disturbance situations.

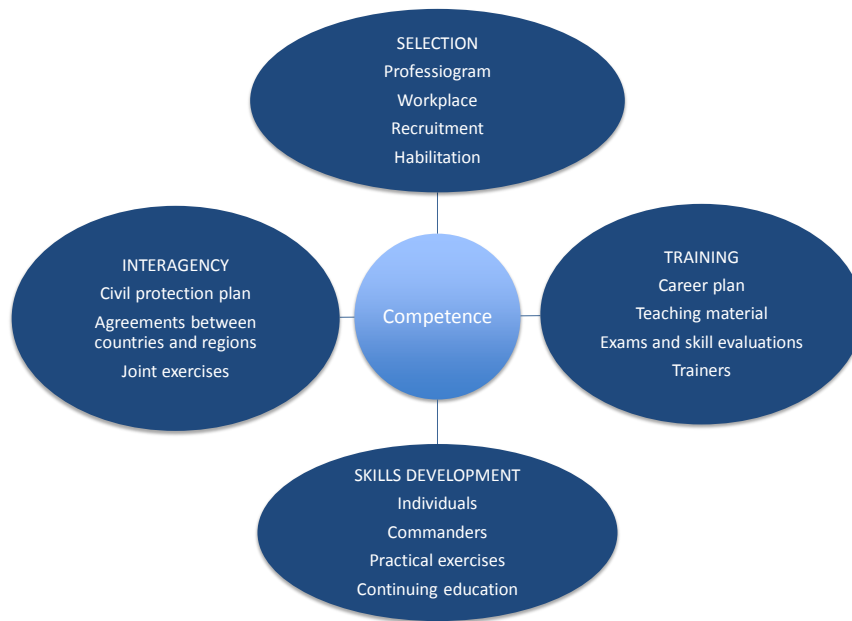


Figure 2. Example of the uses of the pilot scheme of the competences in Catalonia.

One example of the uses that can be given for a pilot scheme of this type is practiced by firefighters of the Government of Catalonia and can be seen in Figure 2. This embraces the preparation of a job profile (in the form of a professiogram) for the selection of personnel, the elaboration of an education and training plan for the horizontal and vertical promotion of the personnel, the planning of trainings linked to an evaluation of competences of the personnel or agreements between agencies or with neighbouring regions. The next steps initiated include the incorporation of these competences in the formulation of positions and associated competences in the Emergency Plan for Forest Fires in Catalonia (INFOCAT).

At an organisational level, it is interesting to reflect on the competence levels of the personnel that build intervention units of immediate response, with units composed of one or two officers and assistants (EQF levels 2 and 3), units with one unit boss plus a pair of advanced firefighters and assistants (EQF levels 2, 3 and 4 or more), or units with one unit boss and officers (EQF levels 3 and 4).

Discussion

The growing difficulty in the management of mega-fires or large-scale storm events requires a common inter-agency framework that facilitates the exchange of resources. The political framework of the inter-agency cooperation can take different forms from a solely supranational appointment led by a much accentuated regional integration to a strongly structured, institutionalised and multilateral cooperation.

The tools for a mutual recognition of qualifications in Europe work through a structure based on competences and results of common training instead of training courses and processes. This allows:

Recognition of the workplaces and management tools of the agencies already adapted to the familiar realities of the regions as well as the positions of the Incident Command System;

Standardisation of the knowledge and key skills for large forest fires / large storms / disturbance;

Recognition of the non-formal training and possibilities for adaptation to different vocational training systems, shifting the focus from certifying training duration and acquisition of knowledge to certifying performance and learning outcomes.