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Deliverable D4.1.2
**Model of Organisational Behaviour and
 Structures in Emergencies 2**

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PU	Public	✓
PP	Restricted to other program participants (including Commission Services)	
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Executive Summary

Model of Organisational Behaviour and Structures in Emergencies 2

This document presents Deliverable D4.1.2 (Model of Organisational Behaviour and Structures in Emergencies 2) of the project FP7-614154 | CNPq-490084/2013-3 (RESCUER), a Collaborative Project supported by the European Commission and MCTI/CNPq (Brazil). Full information on this project will be available online at <http://www.rescuer-project.org>.

Deliverable D4.1.2 focuses on the coordination of workforces and provides the results of Task 4.1 (Organisational Behaviour and Structures in Emergency Situations) for the second project iteration, whose goal is to identify and describe the organisations and stakeholders during emergency situations, as well as their roles.

This document is a living document and will be extended in the next project iterations to give rise to D4.1.3 (Model of Organisational Behaviour and Structures in Emergencies 3) with focus on the communication of emergencies to the public).

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1. Introduction

1.1 Purpose

This document presents the results of Task 4.1 - Organisational Behaviour and Structures in Emergency Situation, whose purpose is to: (1) identify and characterize the organisations and stakeholders involved in emergency management situations, understanding their behaviour, structure and role; (2) investigate how the coordination among the different organisations occurs; (3) present the information needs of each organisation; and (4) identify the challenges coming up in an incident.

Overall, Deliverable D4.1.2 considers the first two iterations in RESCUER project: 1) Crowdsourcing information gathering, and 2) Group-target follow-up interaction and coordination among workforces.

1.2 Change Log

This deliverable is a living document. It extends the contents of the first iteration (D4.1.1) by adding new information and updating information that was not available at the time of the first interaction, improving the overall deliverable. In summary, the following modifications were performed:

- The Emergency Management Process was removed. We observed that it did not contribute to understanding the organisations' roles and structures during an emergency situation.
- The document was reorganised to present the organisations and their roles in an emergency before stating their information needs.
- The definitions about organisations in the scenario of industrial parks were reviewed according to the results of a workshop held in Kaiserslautern, Germany, during the Project Annual Meeting, in November 2014, with representatives from the end-users in Brazil and Europe.
- The information needs were reviewed during the meeting in Kaiserslautern and the tables that correlate information needs with the organisations and stakeholders were changed to allow better understanding of the information they provide.
- The challenges section was moved as subsection of Chapter 4 and it was extended to present how RESCUER can address the identified challenges and also the challenges regarding RESCUER deployment.

1.3 Partner's Roles and Contributions

UFBA coordinated the task in the second iteration (Deliverable D4.1.2). VOMATEC provided input about the coordination of workforces in large-scale events and industrial parks from the European point of view, while UFBA did the same for the Brazilian side. UFBA changed the deliverable structure, swapping the order of some sections to improve the document readability and information understanding.

1.4 Document Overview

The remainder of this document is structured as follows.

- Chapter 2 introduces the involved organisations with an analysis of their roles in emergency situations;
- Chapter 3 presents the information needs identified with the end-user partners, according to organisations and stakeholders;
- Chapter 4 discusses the coordination of workforces in Brazil and Europe along with the associated coordination challenges;
- Chapter 5 presents a description of the communication flow during emergencies in the industrial park, both in Brazil and Europe;
- Chapter 6 provides the conclusions of this document.

2. Organisations in Emergency Situations

This chapter identifies and analyses the organisations involved in an emergency situation considering the four scenarios related to the RESCUER project, as described in Deliverable D1.1.1:

- 1) industrial parks in Brazil;
- 2) industrial parks in Europe;
- 3) large scale events in Brazil; and
- 4) large scale events in Europe.

To identify the involved organisations, three RESCUER end-user partners were studied:

- a) FireServ (Europe);
- b) COFIC (Brazil); and
- c) CICC-BA¹ (Brazil).

In the first iteration, we presented a model of the involved organisations. This model was obtained through interviews and workshops with our partners in Brazil and Europe.

In this second iteration, we validated the model related to **industrial parks** in a face-to-face workshop with representatives from COFIC and FireServ, held during the Annual Project Meeting in Kaiserslautern, Germany. During the workshop, the end-users updated and validated the information provided previously, by drawing the structure of the involved organisations and adding important observations when necessary. We also conducted a discussion to identify the differences and similarities between the Brazilian and European models. The workshop exposed the complexity of the involved organisations (e.g., their role, when they are required or not, their internal structure), which can vary according to the emergency and the characteristics of the company where the incident began.

The data gathered during the workshop, concerning Brazilian industrial parks, was later validated by COFIC representatives. They requested some adjustments to correct mistaken information given at that time. They also made clear that the role of the involved organisations may be changed or adjusted whenever necessary, for improvement (e.g. to correct flaws found on training exercises).

During this iteration, we could not perform the same workshop with representatives from CICC-BA, regarding **large-scale scenarios**. This will be done in the next iteration and will be presented in D4.1.3. Thus, for large-scale events, this document considers the information identified in the first iteration and presented in Deliverable D4.1.1.

All organisations presented in this document (see Table 1, Table 2 and Table 3) play some role in the emergency management process. However, we could not have access to the internal structure of them all, thus we depicted those according to the general role they play in the emergency. For the organisations we had access (i.e. those directly related to our partners in Brazil and Europe), we were able to specify their internal structure, which is presented in this document.

¹ CICC-BA is the Integrated Centre for Command and Control of the State of Bahia; they joined the RESCUER project as a support organisation to provide large-scale events information and to collaborate with the system evaluation.

2.1 Organisations in Brazil and Europe

All organisations involved in an emergency situation are identified in Table 1, Table 2 and Table 3. Table 1 presents the organisations that are common to both scenarios (industrial parks and large-scale events) in Brazil and Europe. Table 2 presents the organisations for industrial parks and identifies whether they exist in Brazil, Europe or both. Finally, Table 3 presents the organisations for large-scale events, both in Brazil and Europe. The description of these organisations is shown in Sections 2.2 and 2.3.

Table 1: Common organisations in the scenarios of industrial parks and large-scale events in Brazil and Europe

Organisation Name	ID
Police	O1
Firefighters	O2
Rescue service	O3
Public health care	O4
Public authorities	O5
Press	O6

Table 2: Organisations in the industrial park scenario

Organisation Name	ID	BRAZIL	EUROPE
Company where the incident occurred	O7	✓	✓
Emergency committee	O8	✓	✗
Command and Control Centre	O9	✗	✓
Crisis Committee	O10	✓	✓
Emergency Brigade	O11	✓	✓
Fire Brigade	O12	✗	✓
Medical support	O13	✓	✓
Patrimonial security	O14	✓	✓
Neighbour companies	O15	✓	✓
Civil Defence	O16	✓	✗
Community volunteers	O17	✓	✗

Table 3: Organisations in the large-scale event scenario

Organisation Name	ID	BRAZIL	EUROPE
Event organiser	O18	✓	✓
Command and Control Centre	O19	✓	✓
Event security	O20	✓	✓

2.2 Industrial Parks

This section describes each organisation identified for the industrial park scenario. Even if two organisations have the same name, they can play different roles according to the context (Brazil or Europe). These differences are also presented in the next subsections.

2.2.1 Police

Europe

The police force supports the operations of traffic management and safety actions, and carries out investigations over the incident. They are responsible to enforce the law and provide first aid, if there is still no medical service there.

Brazil

The police force in Brazilian industrial parks supports the patrimonial security by controlling the traffic and the access to the industrial park, in the perimeter around its area. In case of evacuation, it ensures the public order, the safety of the population and the properties. It can also perform aerial rescue when requested by the emergency or the crisis committee.

2.2.2 Firefighters

Europe

The firefighters are requested either by the fire brigade or by an automatic alarm at a certain scale of the event. The firefighters supports the fire brigade and takes over the leadership on the incident combat after their arrival.

Brazil

In Brazil, the firefighters do not act inside the industrial park. It is requested by the civil Defence or the crisis committee, when the emergency affects the neighbouring community of the industrial park. It works in combating the fire, searching and rescuing people.

2.2.3 Rescue Service

Europe

The rescue service of the company where the incident occurred takes over the emergency-medical care for ill, poisoned or injured people. When required, this service requests support from the public rescue service of the city.

Brazil

The rescue service organisation in Brazil is represented by the emergency brigade of the industrial park. They are responsible for removing people from the incident hot zone and to provide first aid. Furthermore, the police, the firefighters, the public health care, the medical support and the civil Defence also perform rescue services when needed.

2.2.4 Public Health Care

The responsibilities of this organisation involve providing medical care, moving injured people to the hospitals, declaring if people are death and general tasks related to medical assistance. The public health care executes the same tasks in Brazil and Europe.

2.2.5 Public Authorities

Europe

Experts from public authorities can be assigned to participate in the crisis management team or in the Command and Control Centre.

The public authorities responsible to participate in the situation depend on the scale of the emergency. The emergency may affect only the city, therefore the mayor is the responsible. It can affect several closed cities, therefore the region authority would be responsible. This changes depending on how the country is politically structured. In the worst case, the country governor should directly take care of the situation.

Additionally, public administration agents (e.g. Assemblyman, Mayor, or Governor) may appear to the public in a later phase of the incident to report about the incident

Brazil

The public authorities are informed when an incident has occurred in the industrial park area. They do not have an active role in the emergency management.

2.2.6 Press

The press organisations spread their available information about the incident to the general public. They transmit what they see about the emergency situation and try to get information from organisations involved and show it on the media channels.

2.2.7 Company where the Incident Occurred

Europe

This company supports the workforces and holds contact with its employees, the neighbouring enterprises and the headquarters. An emergency manager is part of the operation control and establishes a crisis management team in the enterprise, if required.

Brazil

This company is the main responsible for controlling and coordinating the actions during the emergency. This is done by the role of the emergency committee, which provides a safe place for the emergency brigade to set a temporary headquarter and logistic support (e.g., necessary equipment and provision supplies). It has a representative inside the crisis committee to support the communication flow and the emergency management.

2.2.8 Emergency Committee

The emergency committee is a Brazilian organisation in the industrial park scenario. This is a group created in the company where the incident occurred, responsible to manage and control the emergency. It contacts the crisis committee, the neighbour companies and the public authorities, informing about the incident (where and how it happened, the number of victims, the emergency severity, the conducted protective actions, and so on). Its main responsibilities are to:

- coordinate actions to combat and control the emergency;
- maintain contact with the Crisis committee;
- start the Local Emergency Plan, informing neighbour companies about the characteristics of the emergency;
- constantly provide information about the incident to other companies;
- start and coordinate the Mutual Aid Plan, if necessary;
- start and coordinate the Health Care Plan for emergency, if necessary;
- request to the patrimonial security of the industrial park to block the roads access to the site of the incident, or to the industrial park;
- inform the neighbouring communities, if necessary; and,
- inform when the emergency is under control or has ended.

Figure 1 presents the hierarchical structure of the emergency committee and Table 4 gives a description of each role.

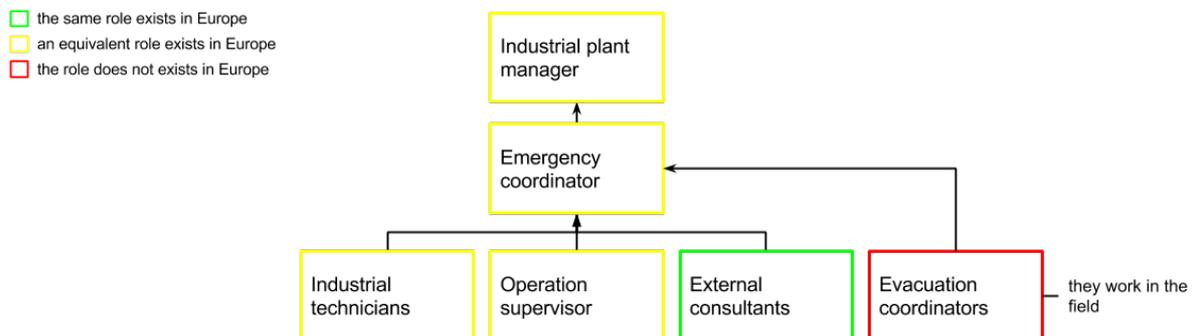


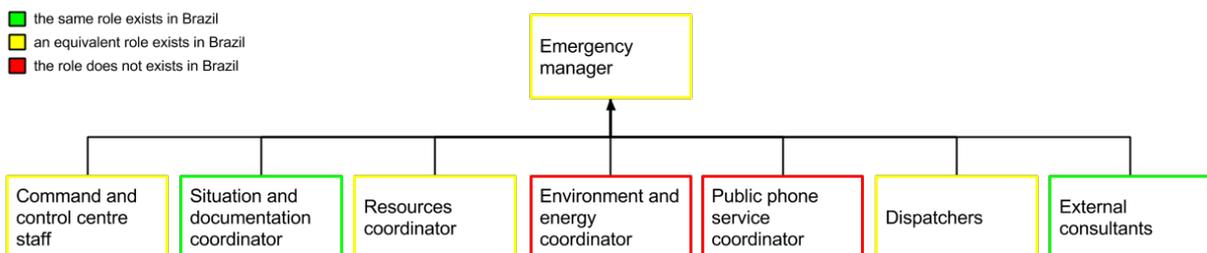
Figure 1: Emergency committee structure

2.2.9 Command and Control Centre

In the industrial park scenario the Command and Control Centre (C&CC) is a European only organisation. The industrial parks in Europe, as a general rule, have a C&CC for the whole park. In this centre, emergency calls are dispatched, incidents are monitored and the fire and emergency brigades are alerted and sent to the incident site. The C&CC also receives and activates the signals from alarm sensors when an incident occurs. Figure 2 shows the internal structure of a C&CC with the considered roles, and Table 5 describes each role.

Table 4: Roles in the emergency committee

Role Name	Description	ID	Equivalents In Europe
Industrial plant manager	Is the leader of the emergency committee, participating actively in the decisions. He/she keeps contact with the company board updating the current status of the situation.	R1	R7
Emergency coordinator	Is responsible to manage the emergency, having control over all its aspects. He/she commands a team of technicians with different expertise to control and combat the emergency, keeps contact with the crisis committee, giving the necessary information or asking for help, and makes decisions together with the industrial plant manager.	R2	R7
Industrial technicians	They are part of the emergency coordinator team with expertise comprehending e.g., EHS ² , resources management or maintenance.	R3	R8, R10
Operation supervisor	Monitors the operational panel of the industrial plant control room, analysing information related to the operational processes, equipment and the main raw materials of the company production. He/she keeps contact with the emergency brigade, acting as a bridge between them and the industrial technicians.	R4	R13
External consultants	Specialists in some aspect of the emergency. They help the industrial plan manager and the emergency coordinator giving specialized information about what should be done.	R5br ³	R5EU
Evacuation coordinators	When an evacuation is required, they guide people (e.g., employees, visitors) to the safety points and update the emergency coordinator with the status of the evacuation.	R6	-


Figure 2: Command and control centre internal structure for industrial parks in Europe
² Environment, health, safety & security

³ The use of BR (Brazil) together with the ID indicates that a role with the same name also appears in Europe, and vice-versa.

Table 5: Roles in the command and control centre in an industrial park (Europe)

Role	Description	ID	Equivalent in Brazil
Emergency manager	Head of the C&CC and key connection between the C&CC and the crisis committee	R7	R1, R2
Command and control centre staff	The staff helps to gather information and to fulfil other duties from the emergency manager (e.g., distributing information to other companies)	R8	R3
Situation and documentation coordinator	One person is in charge of maintaining a journal where every action and decision is documented.	R9EU	R9BR
Resources coordinator	Handles everything related as resources (e.g., workforces, vehicles, special equipment or information equipment) so the forces on site can fulfil their tasks.	R10	R3
Environment and energy coordinator	In case of an incident that is affecting the environment, a specialist will be called on site to provide information about the affected environment or energy supplies and the environmental aftermath.	R11	-
Public phone service coordinator	When an incident happens, many companies provide a hotline number that people can call to receive information about the incident (e.g., relatives and unaffected companies). However, only some information is made available, previously approved by the crisis committee.	R12	-
Dispatcher(s)	A dispatcher coordinates all emergency forces and also communicates with them. He/she is the key point for gathering information and the connecting link between emergency forces on site and the crisis team off site.	R13	R4
External consultants	Depending on the type of the incident it may be necessary to call external consultants (in different areas) to provide special knowledge and help the C&CC with their decisions.	R5EU	R5BR

2.2.10 Crisis Committee

Europe

In European industrial parks, the main tasks of a crisis committee are to:

- release and support the emergency manager;
- secure functional work-procedures;
- determine and evaluate the current situation of the incident;
- develop proposals to support the decisions; and
- implement the decisions made by the committee leader.

Another goal is the maintenance of liaisons with the authorities, emergency forces and other institutions. Figure 3 shows how the crisis committee is structured and Table 6 gives a description of each role.

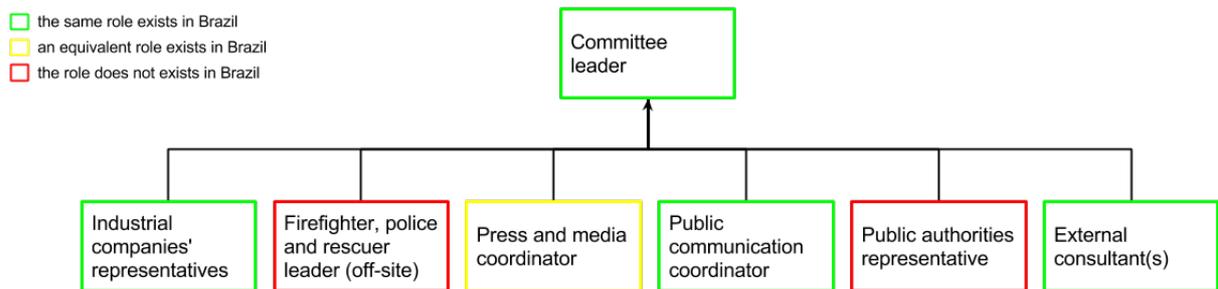


Figure 3: Crisis committee structure in Europe

Table 6: Roles in crisis committee (Europe)

Role Name	Description	ID	Equivalent in Brazil
Committee leader	Decision maker, relying on information from the command and control centre. Does not speak to the public.	R14EU	R14BR
Industry companies representatives	Establish the connection with neighboured companies	R15EU	R15BR
Firefighter leader	Commander of the firefighters, called by the committee leader when necessary.	R16	-
Police leader	Commander of the police, called by the committee leader when necessary.	R17	-
Rescue leader	Commander of the rescue service, called by the committee leader when necessary.	R18	-
Press and media coordinator	Person in charge of media releases, social media, press releases and black-page. He/she does not speak in public.	R19	R20BR
Public communication coordinator	Press speaker, speaks in public, give interviews, etc.	R20EU	R20BR
Public authorities representative	Establish the connection between the crisis management team and the public authorities (e.g., mayor and administrative bodies).	R21	-
External consultant(s)	Can be called to provide specific knowledge regarding the incident. Depending on the current situation they help the crisis committee on making decisions.	R5EU	R5BR

Brazil

The activities of the Crisis Committee in Brazil are primarily focused in: supporting environmental, industrial and property security; providing occupational health and infrastructure. They are responsible for setting standards and procedures for the industrial area that should be implemented by all associated companies. They coordinate the security programs and activities, such as trainings and simulations, with support of the industrial park companies. In an emergency management, they interact with the press, the public authorities, and the affected community, providing information about the incident status. If necessary, they can request evacuation of the industrial park and nearby areas.

The main responsibilities of the crisis committee are:

- to evaluate and classify the emergency;
- to define strategies to manage the incident and its consequences; and
- to coordinate actions to control the situation and to minimize the repercussions of the event.

Figure 4 shows the hierarchical structure of the crisis committee in Brazil and Table 7 gives a description of each role in it.

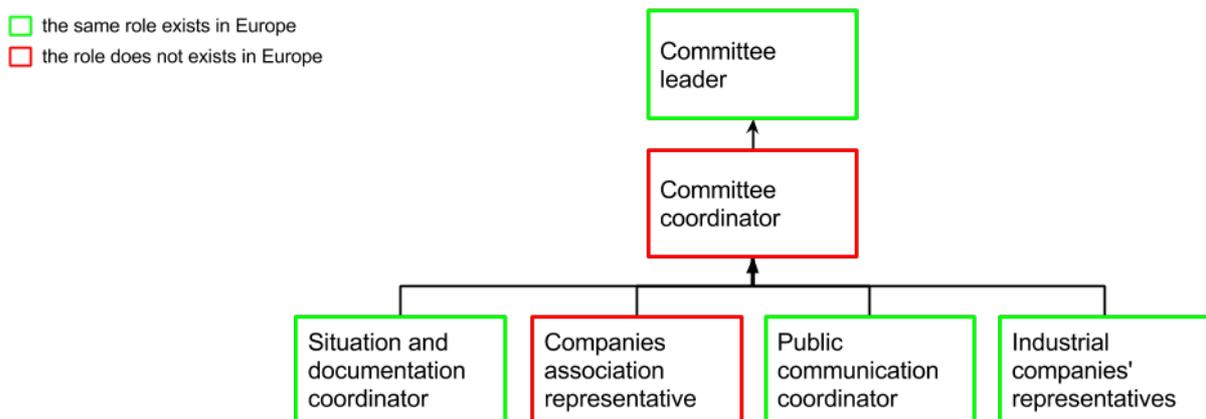


Figure 4: Crisis committee structure in Brazil

2.2.11 Emergency Brigade

Europe

The emergency brigade takes over the leadership at the beginning of the incident, starting the first actions to save or protect people and facilities/goodies, and to prevent contamination of the environment. In case the severity level of the emergency is low (level I), the Emergency Brigade would coordinate the response. In case of higher levels, the public services (e.g. police, firefighters) would be informed to be in charge of the situation and the Emergency Brigade will support them. The only distinct member inside the emergency brigade staff is the emergency brigade leader, described in Table 8.

In case of an emergency, the leader of the brigade sends his fire and rescue units to the meeting points. In these points, they should check if all staff members are there in order to start the firefighting and the medical care.

Table 7: Roles in the crisis committee (Brazil)

Role Name	Description	ID	Equivalent in Europe
Committee leader	Responsible for establishing and presiding the committee. He/she interacts with public authorities to inform about the current situation.	R14BR	R14EU
Committee coordinator	Coordinates the actions of the committee and communicate the situation to public authorities (same as the Committee Leader), police, firefighters and other public services	R22	-
Situation and documentation coordinator	Responsible for documenting the decisions made during the emergency, verifying legal aspects involved. This role is not mandatory and can be dropped in favour of a more important task during the emergency.	R9BR	R9EU
Industrial companies' representatives	They are responsible to interact and inform about the situation to their industrial segment (e.g., suppliers, company employees)	R15BR	R15EU
Public communication coordinator	Responsible to appear to the public through the media to give information about the incident.	R20BR	R20EU
Companies association representative	Responsible to contact the medical support, environmental organisations, police, firefighters.	R23	-

Table 8: Roles in the emergency brigade (Europe)

Role	Description	ID	Equivalent in Brazil
Emergency brigade leader	Coordinates the actions of the team in the emergency site and maintains contact with the dispatcher of the command and control centre.	R24EU	R24BR
Emergency brigade staff	Follows the leader's instructions	R25EU	R25BR

Brazil

The emergency brigade is the organisation directly responsible to control and fight the consequences of the emergency inside the industrial park. They act in the hot zone⁴ of the incident.

Each company in the industrial park has an emergency brigade. The company's employees who have received training compose this brigade. They are able to work directly on fighting the incident, rescuing injured people and providing first aid. This brigade acts under the supervision of the

⁴ The incident site can be subdivided in three zones: hot (dangerous), warm (risk zone), cold (safe).

Emergency brigade leader. As in Europe, the distinct role inside the Emergency Brigade is the Emergency Brigade Leader, described in Table 9.

Table 9: Roles in the emergency brigade (Brazil)

Role	Description	ID	Equivalent in Europe
Emergency brigade leader	Coordinates the actions of the team in the emergency site, ensures their safety and maintains contact with the emergency committee. He/she is also responsible to inform the emergency committee when the emergency is under control.	R24BR	R24EU
Emergency brigade staff	Follows the leader's instructions	R25BR	R25EU

2.2.12 Fire Brigade

The fire brigade organisation only exists in European industrial parks. They work together with the emergency brigade and the firefighters to combat the incident, e.g. a gas leak or a fire. Table 10 shows the description of the fire brigade leader.

Table 10: Roles in the fire brigade

Role	Description	ID	Equivalent in Brazil
Fire brigade leader	He/she commands the members of the fire brigade during the incident.	R26	-
Fire Brigade Staff	Follows the leader's instructions	R27	-

2.2.13 Medical Support

Europe

Industrial parks in Europe usually do not have an associated medical staff. However, there are external medical organisations that aid them in case of high severity emergencies, with many casualties. The biggest one is the Red Cross⁵, but each country may have their own, e.g. "Arbeiter Samariter Bund"⁶ or "Johanniter"⁷, and other smaller ones. They are in charge of the medical treatment for casualties, providing first aid and transportation to the hospitals. In an emergency situation, they work in the warm and cold zones, which is an advantage for coordination. They can also get into the hot zone but only for critical reasons.

5 <http://www.ifrc.org/>

6 <https://www.asb.de/de>

7 <http://www.johanniter.de/>

Brazil

All companies in the industrial park have a medical support team, which is trained to act in emergencies and is part of the emergency brigade. It has the following responsibilities:

- to move to the site of emergency to provide medical care;
- to send ambulances to the emergency site, when requested by the emergency committee; and,
- to indicate the hospital that injured people should be taken to.

The medical support team works in the warm and cold zones of the incident and, in extreme cases, they can provide assistance in the hot zone, when authorized by the emergency brigade leader.

2.2.14 Patrimonial Security

Europe

They protect the entries of the factory to prohibit access to people without permission (e.g., journalists). Furthermore, they carry out the movement of the workforces, which are foreigners in the factory.

Brazil

The patrimonial security in Brazil is managed by a team of private property security, coordinated by the emergency coordinator. These security guards are responsible for the internal security of the entire industrial park. In emergency situations, they assume specific roles in managing the incident, such as:

- to block/unblock the roads;
- to help the evacuation of employees to the safety points.

2.2.15 Neighbour Companies

These are organisations that are near the organisation where the incident occurred. They must be informed if the incident can affect them and may provide help to each other in order to control and combat the emergency. The neighbour companies play the same role in Brazil and Europe.

2.2.16 Civil Defence

In Brazil, the civil Defence is informed of emergencies that could scale and affect the neighbouring communities of the industrial park and has an active role in the management of emergencies in the community (it does not act inside the industrial park). They help the police and the firefighters, providing rescue services and supporting the neighbouring community. The civil defence also coordinates the actions of the community volunteers.

2.2.17 Community Volunteers

In Brazil, the community volunteers are trained to support the neighbouring community of the industrial park. They act as a link between the community and the crisis committee. In case of an

evacuation they guide people out the risk area to the defined safety points. They provide useful information (e.g. people living in the area, exit routes) to the organisations working in the incident area to help the evacuation process, and they transmit official information to the community.

2.3 Large-scale Events

This section describes the organisations involved in emergency management in large-scale events. The list of the organisations was presented in Section 2.1, Table 1 and Table 3. As explained earlier, in this iteration we could validate the model presented in the first iteration of this deliverable (D4.1.1). The organisations in the following are described according to the information received from the end-user Brazilian partner and from the end-user European partner from the first iteration.

2.3.1 Police

According to the event type, the police force has the traffic-control, criminal and security control duties. The main focus is on keeping the general security of people and properties. The police plays the same role in Brazil and Europe.

2.3.2 Firefighters

The firefighters are a common organisation in Brazil and Europe. They operate in the place of the incident and guarantees: fire prevention and extinguishing, inspection rounds in the event area, and the supply of vehicles and workforces. It is a public service of the city where the large-scale event occurs. During an emergency, it is responsible to combat the fire and to remove people from the hot zone of the incident.

2.3.3 Rescue Service

Europe

The rescue service has an essential role in large-scale events. Their duty lies in the emergency-medical care of ill, injured or poisoned people as well as the preparation of medical actions for a mass attack.

Brazil

In large-scale events in Brazil, the departments related to the police and the firefighters perform the rescue service.

2.3.4 Press

Their role is the same as described in Section 2.2.6.

2.3.5 Public Authorities

They play the same role as described in Section 2.2.5.

2.3.6 Public Health Care

Their role is the same as described in Section 2.2.4.

2.3.7 Event Organiser

The organizer of a large-scale event has to ensure all measures for safety and security. In preparation for the event, the organiser manages the creation and approval of emergency plans for the event. A representative of the organiser is a part of the Command and Control Centre. In Europe, he/she is in charge of coordinating the communication between onsite rescue services and offsite parties, like authorities, responsible personnel and press.

2.3.8 Event Security

According to the kind of the large-scale event, the Event security takes the access control tasks for keeping the order and the security. If required, this organisation can also takes care of personal protection of people. When required, the police can support them. This organisation exists in Brazil and Europe.

2.3.9 Command and Control Centre

This organisation is responsible to make decisions to handle the emergency situation. The leader of each workforce (police, firefighters or rescue services), the event organiser, and supporting staff compose the working group of this organisation.

3. Information Needs in an Emergency Situation

Information is one of the major requirements for the workforces working in an incident. In case of an emergency situation, each organisation needs (and gives) particular information related to its tasks. Table 11 summarizes the relevant information required in emergency situations. Those were obtained from a technical report produced based on the Workshop held in Linz [4], in December 2013, with end-users in Europe. This preliminary list was revised in the workshop held in Kaiserslautern, during the Annual consortium meeting, in November 2014, with both end-users from Brazil and Europe. The described information can be detailed in different ways to different types of users. This list should be used as a reference of the types of information that are important for RESCUER end-users, and each type can be subdivided and further explored in the RESCUER modules.

3.1 Organisations and Information Needs

As shown in Chapter 2, each organisation has a role to play during an emergency. This section relates the information needs with the members of the organisations that are going to use the RESCUER system.

3.1.1 Information Needs of Organisations in the Industrial Park

Table 12 and Table 13 show the relation among the information needs and the organisations in the industrial park scenario (represented by their internal roles). The staff groups (command and control centre and industrial technicians) and external consultants have different types of expertise. In this sense, they may need or provide all types of information. In these tables, the letters have the following meaning:

- **N** means that the role needs that information;
- **G** means that the role gives the information; and
- **B**, when both cases apply.

The roles that give (G) information are the original source of that information. In this sense, “**G**” is not used for those who only forward received information.

3.1.2 Information needs of Organisations in Large-scale Events

The information needs were reviewed after the Annual Project Meeting in Kaiserslautern, in November 2014. It was not possible to include in this deliverable the information needs regarding large-scale events organisations. This will be done in the third iteration of this deliverable.

Table 11: Information needs in emergency situations

Information Type	Description	Examples
Incident Local	Refers to the incident geo-location	Latitude, longitude, perimeter
Incident Type	What type of the incident	Fire, explosion, gas leak
Incident Time	When the incident happened	Date, time, weekday
Incident Severity	Level of severity of the incident	Level I, II, III, IV
Incident Details	Additional information about the incident	Cause, immediate consequences
Incident Status	Current status of the situation considering the actions taken to control or end the incident	In progress, under control
Affected People	Who was affected by the incident considering casualties, injured people	Number of injured people, casualties
Potential Hazardous Materials	What kind of dangerous materials are in the area of the incident	Material identification, characteristics
Integrity of Physical Infrastructures	What are the situation of the buildings affected by the incident	Risk of collapse
People Movement Dynamic	Where people are going to	Direction, location
Conducted Protective Actions	What actions have been taken to control or end the incident	Performed actions and their status
Public Safety and Security Status	What the level of safety and security is for those nearby the incident	Evacuation needed
Information Reliability	What the reliability of the given information is.	Low, medium, high
Weather	How the weather conditions in the incident area are.	Temperature, humidity, wind speed/direction
Workforces	Where the workforces are; what they are doing, what they have done and where they should go next.	Latitude, longitude, assigned tasks and their status

Table 12: Industrial park organisations in Brazil X Information needs

Organisations	Role	Information														
		Incident local	Incident time	Incident type	Incident Severity	Incident details	Incident status	Affected People	Potential hazardous materials	Integrity of physical infrastructures	People movement dynamic	Conducted protective actions	Public safety and security status	Information reliability	Weather	Workforces
Emergency Committee	Industrial plant manager	N	N	N	G	N	N	N	N	N	N	N	N	N	N	N
	Emergency coordinator	N	N	N	G	N	N	N	N	N	N	N	N	N	N	N
	Industrial technician(s)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Operator supervisor	B	B	B		B	B	B	B	B	B	B	B	B	B	B
	External consultant(s)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Evasion coordinators	N	N	N	N	N	N				G	G	G	N		
Crisis Committee	Committee leader	N	N	N	N	N	N	N	N		N	N	N	N		
	Committee coordinator	N	N	N	N	N	N	N	N		N	N	N	N		
	Situation and documentation coordinator											N				
	Industrial companies representative(s)	N	N	N	N	N	N	N	N	N		N		N		
	Public communication coordinator	N	N	N	N	N	N	N				N	N			
	Companies association representative	N	N	N	N	N	N	N				N	N			
Emergency Brigade	Emergency brigade leader	B	G	G	B	G	G	B	B	G		G		N	N	G
	Emergency brigade staff					G		G	B	G		G				G
Patrimonial security		N	N	N							N					G
Medical support		N	N	N	N	N	N	B	N			G		N		G

Table 13: Industrial park organisations in Europe X Information needs

		Information															
Organisations	Role	Incident local	Incident time	Incident type	Incident Severity	Incident details	Incident status	Affected People	Potential hazardous materials	Integrity of physical infrastructures	People movement dynamic	Conducted protective actions	Public safety and security status	Information reliability	Weather	Workforces	
		Command and control centre	Emergency manager	N	N	N	G	N	N	N	N	N	N	N	N	N	
Command and control centre staff	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Situation and documentation coordinator												N					
Resources coordinator	N			N	N	N								N		G	
Environment and energy coordinator	N			N	N	N			N					N	B		
Public phone service coordinator	G			G				G				G	G				
Dispatcher(s)	B		B	B	N	B	B	B	B	B	B	B	B	B	B	B	B
External	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

		Information															
Organisations	Role	Incident local	Incident time	Incident type	Incident Severity	Incident details	Incident status	Affected People	Potential hazardous materials	Integrity of physical infrastructures	People movement dynamic	Conducted protective actions	Public safety and security status	Information reliability	Weather	Workforces	
	consultant(s)																
Crisis Committee	Committee leader	N	N	N	G	N	N	N	N	N	N	N	N	N		N	
	Industry companies representative(s)	N	N	N	N	N	N		N	N				N			
	Firefighter leader	N	N	N	N	N	N	N	N	B		N	N	B	G	G	
	Police leader	N	N	N	N	N	N	N			N	N	N	B		G	
	Rescue leader	N	N	N	N	N	N	N	G			N	N	B		G	
	Press and media coordinator			N	N		N	N									
	Public Communication coordinator	N	N	N	N	N	N	N				N	N				
	Public authorities representative	N	N	N	N	N	N	N				N	N	N			
	External consultant(s)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Emergency Brigade	Emergency	B	G	G	B	G	G	B	B	G		G		N	N	G	

		Information														
Organisations	Role	Incident local	Incident time	Incident type	Incident Severity	Incident details	Incident status	Affected People	Potential hazardous materials	Integrity of physical infrastructures	People movement dynamic	Conducted protective actions	Public safety and security status	Information reliability	Weather	Workforces
	brigade leader															
	Emergency brigade staff			N		G		G	B	G		G				G
Patrimonial security		N	N	N							N					G
Medical support		N	N	N	N	N	N	B	N			G		N		G
Firefighters	Firefighter leader	G	G	G	G	B	G	G	B	B		B		B	N	G
	Firefighters	N	N	N	N	B	G	G	B	B		G		N	N	G
Police	Police leader	B	B	N	N	B	N	G			G	G	G	B		G
	Police officers	N	N	N	N	B	N	G			G	G	G	B		G
Rescue service	Rescue leader	N	N	N	N	N	N	B	N			G	G	B		G
	Rescue forces	N	N	N	N	N	N	B	N			G	G	B		G

4. Coordination of Workforces

One of RESCUER requirements is that it should be used both in Brazil and Europe. Therefore, it is important to know the behaviour of the workforces in these two contexts. Furthermore, it is also important to identify the behaviour inside the scenarios of large-scale events and industrial parks.

In order to be prepared for act during an emergency, the involved organisation often defines a emergency management process. This process defines responsibilities that should be followed by the organisations to help emergency managers to coordinate the actions of these organisations. The emergency management process for industrial parks was defined during the workshop in Kaiserslautern held during the Annual Project Meeting. The process for large-scale events can vary according to the type of event and will be defined in the third iteration of this deliverable.

Section 4.1 presents and discusses the challenges related to the coordination of the involved organisations in emergency situations. Section 4.2 discusses the European specificities and Section 4.3 describes the Brazilian context.

4.1 Coordination Challenges among Workforces

This section describes some challenges that impose difficulties in the cooperation among involved organisations in Chapter 2. They were identified through workshops, held in Brazil and in Europe, with representatives of the workforces and people with experience in emergency situations. We also used information gathered from existent work found in the literature review.

Regarding the collaboration of workforces from different organisations, the challenges rely on the lack of knowledge about multiple operational plans, conflicts in their competences and different knowledge backgrounds. Some organisations provide similar services, but they have different ways to do it. The involved organisations do not perform exercises of standard operations and emergency-handling situations together. In order to get effectiveness and a better coordination of the joint work among organisations, each organisation should be aware about the emergency management plans of each other, leading to a better understanding of the organisations and awareness of each other's goals and activities.

Additionally, the organisations may use different expressions and words to refer to the same thing. Therefore, it is important that the different organisations practice together through trainings, simulations and exercises, which could help them to act as a team.

During an incident, each organisation collects their own set of information, which may be useful for other stakeholders. The challenge is that organisations only share partial information, because, sometimes, they are not authorized to share everything. Another problem is the lack of feedback information from the workforces in the field; often, people that execute the task do not inform their leaders about the status of their actions.

Workforces (e.g., police, firefighters and rescue services) work in different structures, with specific hierarchies and chains of command. This means that each force is taught to act in one specific way. Hence, the organisations may have special structures and infrastructures for legal or

security reasons (e.g., the police has their own radio channel, which, for security, may not be shared with others). This fact adds difficulties for cooperation. Furthermore, different rules and policies lead to particular decision-makings. The organisations should establish how to make decisions when working together.

4.1.1 Addressing Coordination Challenges with RESCUER

The lack of knowledge about multiple operational plans is not directly being addressed by RESCUER. However, Deliverable D4.2.2 presents a feature that allows the visualization of workforces in the field along with the tasks they are performing in the moment. This allows the organisations using the system to know the activities each other are performing, if there are no confidentiality issues among them.

Regarding the information confidentiality challenge, Task 3.4 (Usage control) envisages identifying data security requirements along the RESCUER data lifecycle, i.e. throughout data handling in RESCUER from data collection up to data deletion, while also taking into consideration other data-related operations, such as data storage, data processing, and data disclosure. Based on these requirements, Task 3.4 shall propose and implement, whenever possible, adequate security enforcement mechanisms to ensure the satisfaction of the identified security requirements.

Concerning the lack of feedback from the workforces in the field, Deliverable D1.1.2 has presented requirements for follow-up interaction that aims to ask further information about an incident, including missing information, unclear information, contradictory information, investigation of potential problems, and continuously evolving information. Deliverable D1.4.2 provides a feature model that includes follow-up interaction features for the ERTK and the mobile application.

The challenges related to the structure and the organisations' chain of command (e.g., lack of a common training, and specific hierarchies and chains of command) and the use of different expressions and words are beyond the scope of the RESCUER system. The system can be used to support decision making by providing information, but the effective collaboration between the multiple organisations is in charge of each of them.

4.1.2 Identified Deployment Challenges

By understanding the behaviour and structure of workforces, and the challenges they already face during an emergency, it is possible to identify potential difficulties.

The first one is the **existing communication system** used by the organisations. Many organisations utilize radio communication as the main way to exchange information between the on-site and off site operation centres (e.g. Command and Control Centre, Emergency Committee). This is done because the radio is not dependent of phone carriers, which can fail in case of an incident (e.g., a fire, a blackout, or a problem in the phone network). The RESCUER system is addressing this problem by creating an ad-hoc network (Task 1.3 – Communication Infrastructure) that will maintain communication channels operative even when the main network fails. The group-target follow-up interaction shall allow the dispatcher to communicate with multiple groups, and also messages broadcasting.

Another challenge is the **integration of RESCUER with existing protocols and systems** of the organisations. This is a major concern, especially to the police and firefighters that have more strict constraints to adopt new technologies. According to its current modelling, RESCUER acts as an additional source of information, not interfering with current systems but giving support to the organisations with data that was not available or scattered between different places. As results of Task 3.3 - Data Integration, RESCUER will provide solutions to support RESCUER integration with legacy systems, including the definition of an ontology, based on standard vocabularies and protocols used in emergency management.

Some of RESCUER stakeholders, especially those from the workforces, have constraints using mobile devices. At the Industrial Park of Camaçari, only devices that meet especial criteria can be used within the production sector. Some officers, from the firefighters for example, cannot use mobile devices during their tasks (like when combating a fire or removing people from a hot zone). Nevertheless, the RESCUER web solution can be accessed by any device within a web browser and network access, and the mobile application can be installed on any device running the supported operational systems. These topics are further detailed in the Work Package 2 - Mobile Crowdsourcing Solution.

4.2 Coordination of Workforces in Industrial Parks

4.2.1 Europe

The Industrial Park of Linz, in Austria, has been used to model the behaviour of the workforces in an emergency situation in Europe.

The emergency management process is shown in Figure 5. It uses the BPMN standard. The rectangular boxes represent actions that are taken (e.g. call emergency number, start incident combat). The diamond shape with the plus sign indicates a series of actions taken in parallel (e.g. trigger sensor, push emergency button, call emergency number). Finally, the dashed arrows link the role(s) that can perform an action, with the action to be performed.

In case of an emergency, the severity of the situation is assessed and classified using a danger scale of four levels, from I (the lowest) to IV (the highest). The factors taken into account to decide the severity level, are:

- Level I: If the incident has environmental or safety relevance and/or it is subject to obligatory reporting under Water Protection Act¹;
- Level II: If the incident, and its consequences, are perceivable (or not) outside of the industrial park;
- Level III: In case the incident is perceivable outside, the following characteristics are important: clouds of smoke, loud and lengthy noise, powerful malodours; and
- Level IV: If the incident is linked to the possibility of danger external to the industrial park.

¹ http://www.bclaws.ca/Recon/document/ID/freeside/00_96484_01

Figure 6 shows how the workforces are distributed in the zones (cold, warm and hot) at the site of the incident. Figure 7 shows the communication flow between the workforces and the off-site organisations (Crisis Committee and C&CC).

4.2.2 Brazil

Industrial parks in Brazil have emergency processes defined to deal with emergencies, which describes what each organisation should do to overcome the emergency. This process is put into testing through simulations and trainings that happen every year, at least twice a year, involving the whole industrial park. The current process of emergency management in industrial parks in Brazil is shown in Figure 8. It follows the same structure of Figure 5.

The industrial parks consider four distinct levels of emergency, numbered from I (less severe) to IV (most severe), as explained below:

- **Levels I to III:** the emergency occurred in the industrial park and only impacts the organisations inside the park;
- **Level IV:** the emergency has impact on the external community around the industrial park. In this case, the industries are responsible to combat the effects of the emergency inside the park, and the civil Defence will act on the community together with the firefighters, police, public health care, and others.

Figure 9 gives an overview of the organisations at the site of the incident. The emergency brigade of the affected company starts the process of controlling the situation. The neighbouring companies send their own emergency brigade to help the affected company. The patrimonial security blocks the roads in the incident perimeter and controls the access to the industrial park. The medical support team acts on the warm zone of the incident providing care to injured people.

Figure 10 shows the communication flow between the off-site and on-site organisations. The Emergency Committee keeps the Crisis Committee updated during the whole emergency. It also coordinates the actions of the Emergency Brigade, Evacuation Coordinators and Patrimonial Security. Also, the Emergency Committee maintains contact with the Medical Support Leader, who is responsible for the actions of the Medical Support team.

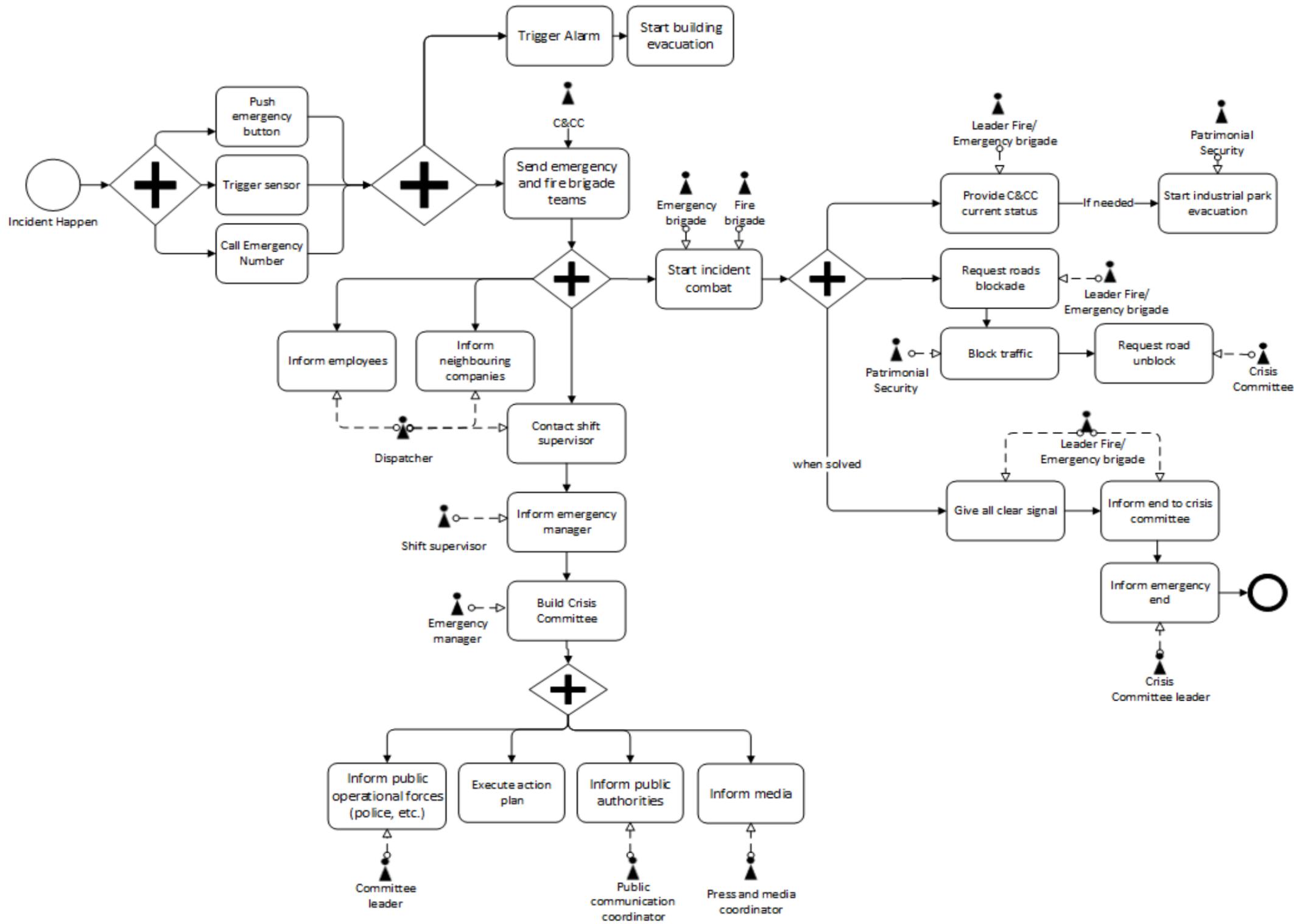


Figure 5: Emergency management process in industrial parks in Europe

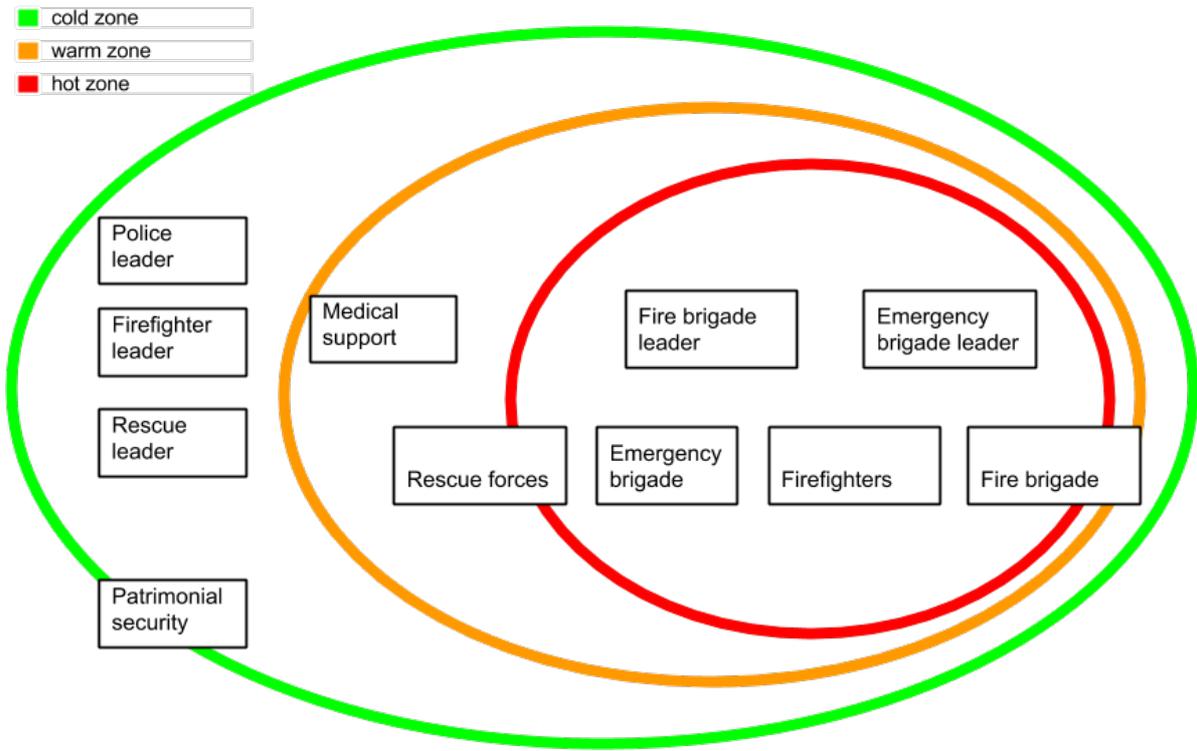


Figure 6: On-site organisations in industrial parks in Europe

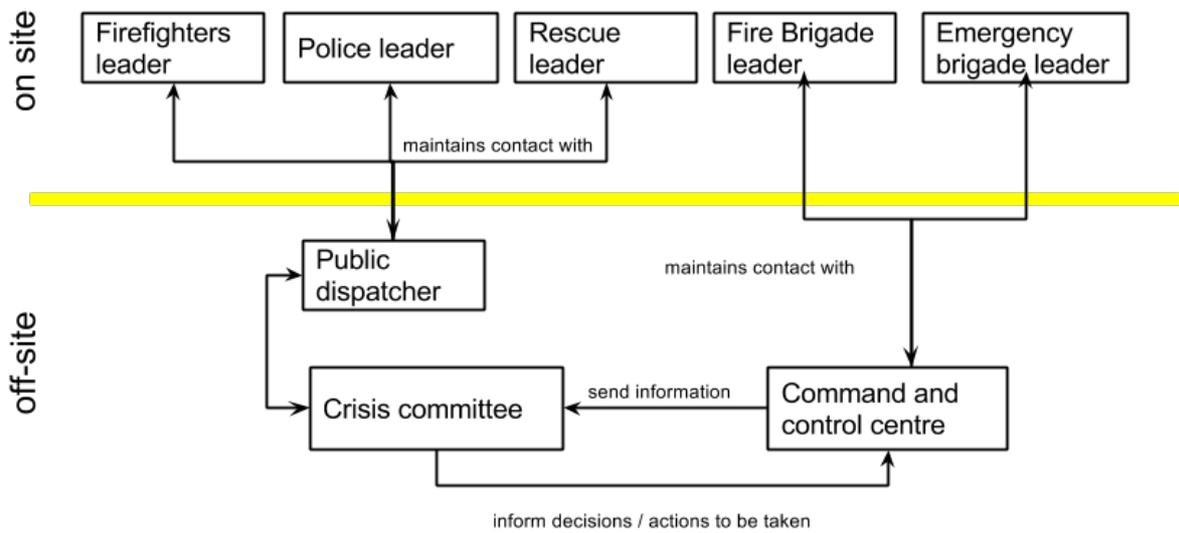


Figure 7: On-site and off-site communication flow in industrial parks in Europe

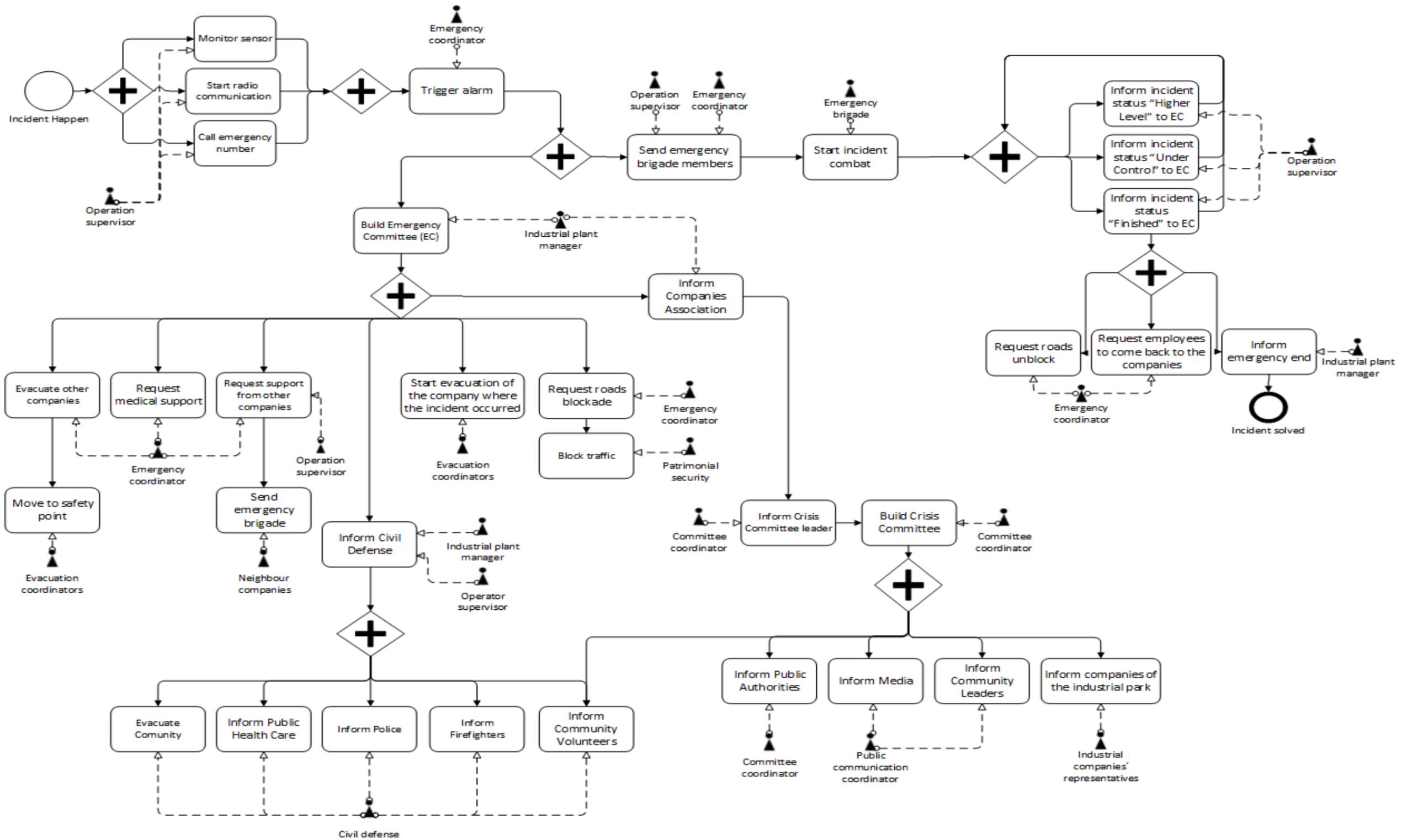


Figure 8: Emergency management process in industrial parks in Brazil

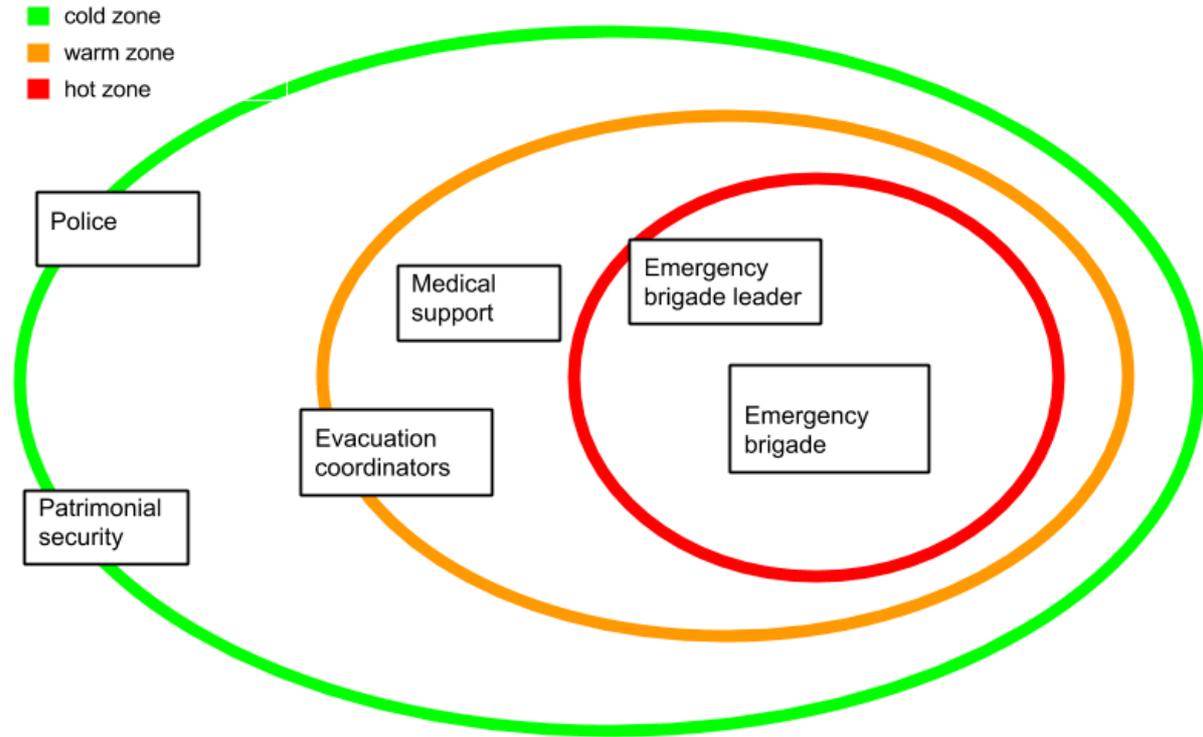


Figure 9: On-site workforces in industrial parks in Brazil

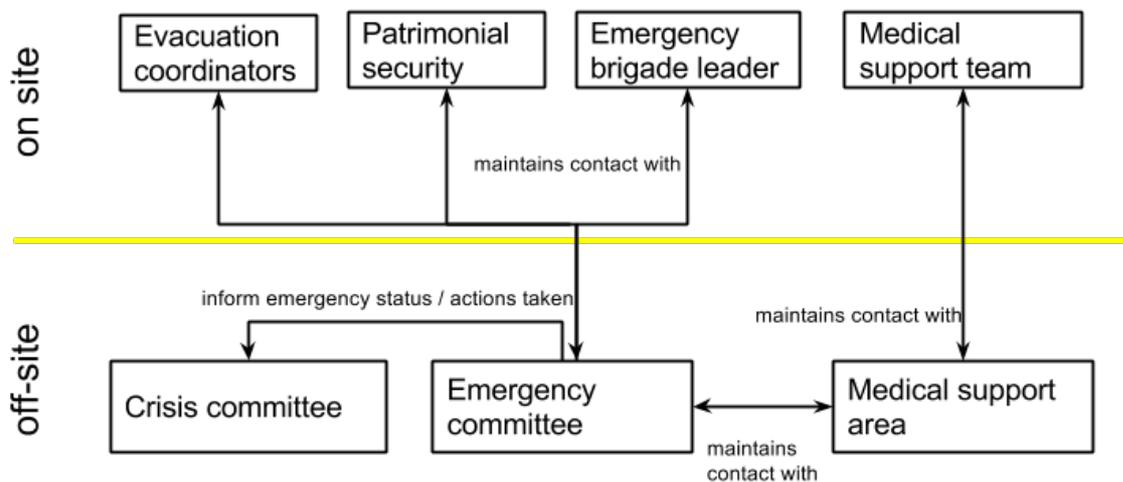


Figure 10: On-site and off-site communication flow in industrial parks in Brazil

4.2.3 RESCUER on Industrial Park

The cooperation and communication challenges identified in Section 4.1 do not have the same impact on the workforces inside the industrial park as they have on the workforces in large-scale events. The brigade members often train together, all the employees have specific protocols to

follow in case of emergency, the evacuation points are pre-defined and the responsibilities are well known, avoiding overlaps. Also, the command is centralized and there are no problems of information confidentiality among the workforces (the emergency brigade and patrimonial security).

Nevertheless, there are improvement opportunities and RESCUER can help the industrial park. During an emergency, the **crisis committee has no visual information** about the current status of the incident. The roads, exit points, companies, and so on, are only identified in static maps (on paper). The visualisation mechanisms and features presented proposed in Task 4.2 and implemented in Task 4.4 aim to allow the crisis committee to have a better understanding of the emergency situation at the incident site.

As an emergency arises, different people and organisations have to be informed and there is no computer system for this task at the industrial park. Radio call, emails, SMS, mobile messaging and phone calls are the ways currently used to send or receive the necessary information. This can lead to communication problems, such as someone not being informed, information loss, or information delay. The RESCUER system will support information of people and organizations through Crowd Steering (Task 2.4) and Public Communication of Emergencies (Task 4.3).

In general, the necessary communication for the emergency management in industrial parks is currently done by radio. Different radio channels are used and the amount of information during an emergency is very high. Stakeholders that do not have access to the radio system have to wait for the information arrival through other means (e.g. employees, people in the neighbouring community, press). Also, sometimes is difficult to keep track of everything that happened until a certain moment because the messages are not persisted. From this point of view, the reports provided by the crowd and the workforces members, using the RESCUER Mobile Crowdsourcing Solution, will be available in the ERTK all the time during the emergency. This will help commanders and coordinators to keep track of what happened, actions taken, and so on. These reports are also useful to update new staff arriving at the command and control centre making them aware of the current situation.

4.3 Coordination of Workforces in Large-scale Events

4.3.1 Europe

In Europe, large-scale events have their emergency plan and, depending on the quantity of visitors, rescue services and security guards. However, in case of an emergency situation, the workforces (firefighters, police and rescue service) are informed. The workforces are in charge of the situation.

In case of a fire-related emergency, firefighters take the first actions to combat the fire, supporting the rescue teams. The firefighter leader at the command and control centre coordinates them. The firefighter leader at the incident site is part of the leader group, so the other organisations communicate with him/her and he/she transfers the tasks to his/her units.

The police are responsible for the security in the incident site, for the people and the public properties, controlling the roads and traffic, and blocking them, if necessary. Besides, it must ensure that people do not access the areas next to the incident. They support the rescue and firefighter

teams to cope with the situation. The police have a leader who is part of the commander-in-chief group to support the coordination of the situation and to communicate with the other organisations.

The Rescue forces support the evacuation and take care of the casualties and injured people. They have a leader who is part of the command and control centre.

4.3.2 Brazil

Brazil lacks a unified organisation model among the police, the firefighters and the rescue forces. In some states of Brazil, the firefighters are part of the military police, whilst in others they are separated organisations. This fact has implications in the existence and modelling of protocols to respond to the emergencies.

We interviewed Brazilian firefighters from the state of Bahia, Brazil, to identify and model possible actions they take during an incident. We considered the scenario of a fire during a game in a football stadium. In this scenario, we assumed a case in which the involvement of all workforces is necessary. Figure 11 shows the relations among involved officers from the workforces in the proposed scenario. The police force acts on the cold zone of the incident to secure the perimeter and ensure public security. The firefighters and the rescue forces are part of the same organisation; they are the only ones that act on the hot zone of the incident. The main form of communication is through radio; this applies for all workforces. Also, all workforces communicate with their own off-site command centre.

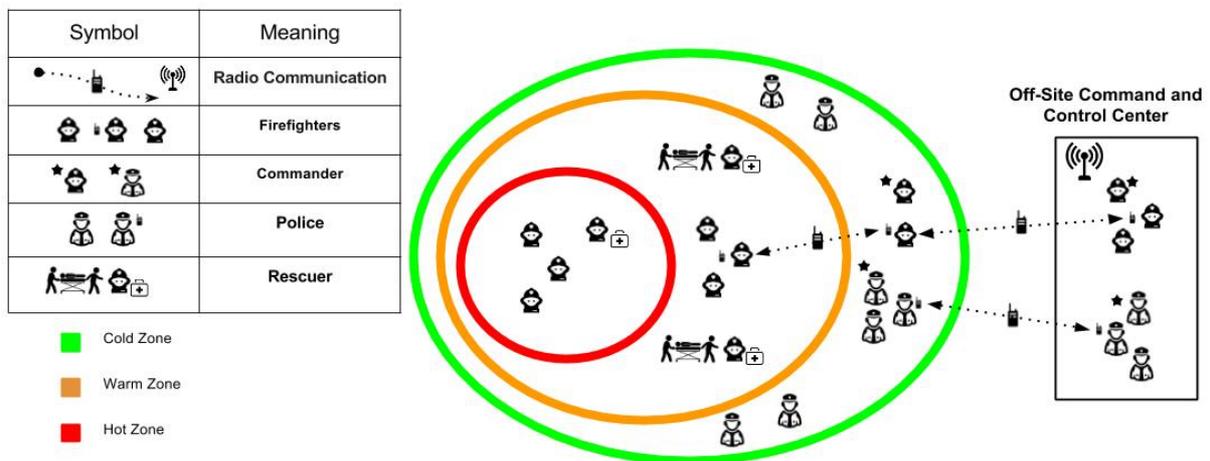


Figure 11: Conceptual organisation of the workforces during a fire incident in a football stadium in Brazil

The firefighters act mainly in the hot zone of the incident. Those in the hot zone lack access to mobile equipment (e.g., smartphones or tablets). They communicate verbally or through signs and give priority to take affected people to the warm zone and combat the fire. One of the officers in the hot zone can communicate with the local command through radio to give or receive updates about the situation.

The off-site command centre is contacted in order to take knowledge about the incident and to provide support to the on-site command centre. The off-site command does not take control of the

operation, even when there is an officer with a higher patent than the local commander. The off-site command supports the on-site command by sending information that they may need or request. The off-site command maintains contact with the public authorities and the press keeping them informed about the status of the incident. They also coordinate actions taken around the incident perimeter and send reinforcements to the incident place.

In the proposed scenario, the first action of the police is to isolate the perimeter. The team closest to the incident performs this task, without the need of a specific (superior) order. The police cannot help on the fire combat. Once the perimeter is isolated, this workforce will provide help to ensure that the firefighters can execute their tasks without worrying about events like robbery or crowd panicking. The off-site commander of the police can help the emergency management by sending reinforcements.

A specific team of the firefighters compose the rescue forces in Brazil. They act on the warm and cold zones, removing the injured people and providing first aid. The rescue forces do not have doctors. In exceptional cases, they can enter in the hot zone to provide assistance to the firefighters in removing injured people. They are supported by the public health care, requested by the local (on-site) commander or the off-site commander. The doctors are responsible for moving injured people to hospitals, asserting the deaths at the place of the incident and providing more specialized health care.

4.3.3 RESCUER on Large-Scale Event

The large-scale event scenario share the same challenges presented in Section 4.1. Therefore, it can also benefit from the solutions and features proposed in that section.

5. Emergency Communication in Industrial Parks

This chapter gives a preliminary definition about the way that emergencies are communicated in industrial parks. This information will be further detailed in the next iteration (Deliverable 4.1.3) and will also be added information regarding large-scale events.

5.1 Brazil

The information in this section is based on interviews performed with COFIC representatives and on our experience participating in the annual emergency management simulation realized in the Industrial Park of Camaçari, Brazil, in October 14, 2014.

Some factors influence how the emergency is first communicated when it is detected. They are: the presence of employees in the area of incident and the technological equipment (e.g., sensors, cameras) which can vary among the companies. This way, the first communication comes from a human agent (e.g. company employee) or is automatically generated through a monitoring system.

When informed about the beginning of an emergency, the emergency coordinator triggers the company alarm. This is the main way to inform the emergency to the employees at the industrial plant. An alarm can also be automatically triggered if a problem is detected by a monitoring system.

During the emergency, the operational communication (e.g. Emergency Committee and Emergency Brigade, Emergency Committee and Evacuation coordinators) is done via radio channels. The Crisis Committee deals with external communication, mainly to companies' stakeholders, public authorities, community volunteers and press. The companies' stakeholders will be informed by the industrial companies' representatives using multiple means (e.g. phone, email). The public authorities will be informed by the Committee Leader and the Committee Coordinator through phone calls. The community volunteers will be notified by the committee leader using a SMS notification. Finally, the press organisations will be notified by the Public Communication Coordinator as they seem fit (e.g. television or radio interviews). The Crisis Committee will also release periodic public reports, through email, informing major developments (e.g. status of emergency, conducted protective actions).

5.2 Europe

In case of an incident, the communication is very important. Therefore, planning procedures are used and, depending on the severity level of the emergency, different actions can be taken.

The crisis committee consists of decision-making representatives of the biggest companies of an industrial park. Each company representative is allowed to nominate an assistant who is responsible for communication in the company, especially for the execution of orders.

In case of an incident, the crisis committee maintains contact with the on-site commander via radio and arranges everything that is out of the responsibility of the on-site commander. In any other events, it arranges actions to avoid and reduce risks and to limit their consequences. It also cooperates with external crisis committees and representatives of the public authority and is responsible for internal as well as external communications.



The committee nominates a person, who is responsible for public relations. This person is a representative of the affected company; otherwise, he/she shall be a representative of the company that is leading the QESH (Quality, Environment, Safety & Security, and Health) team.

The local fire brigade also has its own communication. They have direct phone connections and prepared phone lists of all-important authorities and nearby companies. Direct lines from the crisis room to the press room as well as fax and e-mail provide internal communication. The fire brigade also handles extraordinary events like threatening calls, kidnapping, and extortion, with predefined forms, where detailed actions for these events can be found.

Note that the internal crisis communication (in a global view) of a company depends on whether the company is directly affected or not, and also on the impact of the incident.

6. Conclusions

This document identified and analysed organisations and stakeholders involved in an emergency situation and their information needs. The aspects that make a challenge to establish the required communications and the collaboration between the different organisations have also been described and related to the RESCUER system, presenting the features that RESCUER has to offer to address the identified challenges. The results of this research reflect what RESCUER project should cope with and take into account for further designs.

The coordination of workforces is described from the point of view of Brazilian and European organisations, allowing the identification of the differences between the two scenarios, and of tasks that can be supported by RESCUER. In order to develop the Emergency Response Toolkit, it is essential to understand how the involved organisations work during the incident, how they make decisions, their information needs and how they coordinate.

Furthermore, we have identified the initial aspects of how emergencies are communicated in the industrial area, both in Brazil and Europe. This will be further explored in the next iteration of this deliverable.

A workshop with emergency management personal for large-scale events in Brazil (CICC-BA) and Europe (FireServ) will be held in order to improve information regarding the involved organisations and coordination of workforces during emergencies in large-scale events. It is expected that this workshop will allow a better comparison between both contexts (Brazil and Europe), similarly to the workshop with industrial park representatives.

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