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Investigating the Use of Indicators for Cooperation at Incident Scenes

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Abstract

In complex emergency situations, there are many times when the rescue service, the police and the medical service must cooperate. To improve the cooperation Samverkan Östergötland has developed ten measurable indicators regarding cooperation to investigate and increase the cooperation between the different organizations. They are then used when the participants of the network Samverkan Östergötland meet two to seven times a year to discuss different local accidents and investigate how and if the indicators were applied during the work at the incident site. The purpose of the study was to investigate how the indicators are used and how there could be improvements regarding the indicators. The study was conducted by applying descriptive statistics and thematic analysis regarding all the protocols from the 14 meetings. The study was based on protocols where a total of 24 incidents were discussed. The result was corroborated by the coordinator of the Samverkan Östergötland by conducting a semi structured interview. The result indicated that the indicators were fulfilled to varying extent. The findings suggest that more structure regarding documenting and communication is needed, and common training needs to be increased in order to improve the cooperation in accordance of the use of the indicators.

Keywords: Indicators, Cooperation, Learning Organization, Multi Team Systems, Emergency Training, Social Disturbance

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1. Introduction

It was an ordinary afternoon on Drottninggatan in Stockholm, the capital of Sweden (SVT, 2018). People were strolling down the street, some of them were on their way back home from work or school, while others were enjoying a visit in the capital. 7 April 2017 become a turning point in Swedish history, as a hijacked truck was ruthlessly driven down the street by a terrorist. People were running for their lives along the narrow street in an attempt to escape; the noise of screams were rising from the frightened crowd, and several people were hit by the truck. The deadly journey ended as the truck crashed into a store and the perpetrator fled but was later that same day arrested by the police. A total of five lives were taken this day, and several persons were injured.

The medical service, the rescue, and the police all worked hard to deal with the situation this day (Stockholms läns landsting, 2017). The work adjacent to the attack was later evaluated by different organizations, and different proposals of improvement were highlighted (Stockholm Fire Department, 2017; Stockholm läns landsting, 2017). Stockholm Fire Department (2017), which also was working on Drottninggatan this day, took the initiative for an external evaluation of the organization's efforts during the attack. It was concluded that the shared situation awareness at the incident site was relatively inadequate, partly because of potential threat, but also regarding different organizations' plans and actions. For example, when the rescue service was working at the incident site, the police sometimes pointed guns towards some of the firefighters, as the policemen were uncertain whether they were real firefighters or terrorists. Mainly, it was the actions and conduct of the police that had been experienced as messy, but it was also hard to identify the policemen because of the lack of uniforms and markings. A suggestion was made that there should be a nationwide uniformity regarding uniforms and marking of organizations at the incident site, to minimize confusion. Another contributing reason to confusion, according to the evaluation, was that there was no on-sight command post for the commanders of the organizations to gather at and to share a common operational picture. It was highlighted that a joint plan for actions was needed.

Samverkan Östergötland, which is a strategy in the county Östergötland (Samverkan Östergötland, n.d.b), have developed ten indicators in order to improve the cooperation between the organizations. The indicators are to be followed at the incident scene when at least two organizations of the rescue service, the medical service, and the police are alerted (Vikström & Jonsson, n.d.; E. Bengtsson, personal communication [Documents from meetings by email], March 19, 2018)

To evaluate the use of the indicators at the incident scene, Samverkan Östergötland gathers about two to seven times a year, to discuss incidents that are jointly chosen for discussion using the indicators.

The purpose of the study was to evaluate the use of the indicators that is applied within the meetings of Samverkan Östergötland. The study was conducted by analyzing all the protocols from the meetings of Samverkan Östergötland. Thematic analysis and descriptive statistics were applied to analyze the result, which then was verified by a semi-structured interview with the coordinator of Samverkan Östergötland.

The research questions during the study are:

1. How are the indicators used?
2. Could the use of the indicators be improved? And if so, how?

The report is structured as follows; Firstly, different theories are presented of definitions of information and knowledge, and the concepts of shared situation awareness, learning organization and multi team systems are presented. Then background information is given about the indicators, the use and the training of them. After the theory chapter, the methodology for gathering and analyzing the data are presented. The next chapter includes the result, it is where the result from analyzing the protocols is presented in accordance to the research questions. After the result, the discussion is presented where the results are discussed, and a conclusion is offered. At the end of the report Appendix A can be found, which consists of a translation of words regarding emergency, between Swedish and English.

Some delimitations were made during the study. The study only involved what was done in accordance to the indicators at the incident scene by the rescue service, police and medical service. There are also actions at the fire station, police station and hospital during an emergency, but this was not part of the study. Neither was any other organization involved in the study, which otherwise is included in the background.

2. Theory

In this section theories relevant for the study are presented, such as learning, what characters define a learning organization and the benefits of being a learning organization. Further shared situation awareness is defined and the importance of archiving shared situation awareness at incident sites is presented.

2.1 Learning

Receiving information is essential and fundamental for learning (Zull, 2006). Although learning is a very complex concept, it can be defined as the process of acquiring new or modifying existing knowledge, behaviors, skills, values or preferences (Gross, 2010). It is not possible to directly observe learning as a process, but it is noticeable through observable behavior. For example, if a person's performance of a task differs from the first time to the second time, learning might have taken place.

2.2 Learning Organization

Learning organization can be defined as an organization that continuously learns from its own mistakes to solve the tasks in a better way (Nationalencyklopedin, n.d.). The concept is central in the working life and is an expression of an ideal state and consists of five characteristics (Senge, 2007):

- *Systems thinking*. The framework makes it possible to study business as objects. System thinking means that all five characteristics must be involved in an organization, in order to be defined as a learning organization. If any of the characteristics are missed out, the organization is not a learning organization. Events are separated in time and space but are at the same time parts of the same pattern and entirety. Work is a complex network that is held together by a network of contacts, where the components cooperate and generate long-term results. When being in a network, it is hard to see the development of patterns, as it is easy to only see snapshots of individual parts, which in turn makes it hard to find solutions to important problems.
- *Personal mastery*. Being in control and mastering skills, which includes being aware of what is most important in every single situation. The commitment that an individual has towards the learning process. In this part the connection between the individual and the organizational learning, the reciprocal measures between human and organization are interesting. Learning cannot be forced upon an individual that is not susceptible to

learning, and therefore it is important that a culture within the organization is developed where personal mastery is practiced.

- *Mental models*. The assumptions that are held by the individuals and the organizations. To become a learning organization, the assumptions that are held by individuals and organizations must be challenged, as individuals tend to espouse theories which they intend to follow, but also have theories-in-use which are the theories that are followed. For example, if a coworker dresses up elegantly, it might generate an assumption that the person lives in a finer neighborhood, but if a coworker dresses carelessly it might generate an assumption that the person is inapprehensive. To change the way of thinking, it is a good idea to start reviewing oneself and to start questioning what believes one stands for. That means that one's values must be subject to the assessments of others.
- *Shared vision*. It is important to develop a shared vision to motivate the staff to learn, as it further creates a common identity that brings focus and energy to learn. Shared goals have been, and still are, important to inspire organizations. It gathers humans around a common thought and a common goal. When there is a strong common vision people develop, and that is not because someone tells them to do so, but because they want to. People tend to want high goals, that demand efforts.
- *Team learning*. The state where team members think together to reach common goals. It is an extension of shared vision but adding the element of collaboration. In sports, theatre, sciences and sometimes also in business, there are examples of where the intelligence of the group by far exceeds the intelligence of the individuals, and where the groups have developed an outstanding ability to cooperate. When groups learn and develop, in addition to good results the members of the groups also develop faster than if they had learned all by themselves. It all starts with a dialogue, where the members cooperate with an open mind and to learn together, which brings insights that the group members would not have had otherwise. Team learning is necessary as training in modern organizations is performed in group and not individually. The main issue is that if the group does not develop, then the organization is not developing either.

These five concepts differ from other concepts by being personal concepts (Senge, 2007. All five concepts consist of how humans think, want, and cooperate with each other. Applying a model is not the same as mimicking a model. It is not possible to build successful

organizations by copying other successful organizations, nor is it possible to gain personal greatness by mimicking a great personality.

2.2.1 Organizational norms.

Members of an organization come and go and leadership changes, but the memories of organizations preserve certain behaviors, mental maps and values over time (O'Keeffe, 2002). Learning occurs when organizations first synthesize and then institutionalize the members' intellectual capital, learning, memories, culture, knowledge systems, routines and core competence. When an organization addresses and solves problems to survive, an organizational structure is built which becomes a repository for what has been learned. It also creates core competencies that represent the collective learning of the members, past and present. When members leave the organization and new members join and socialize, both competence and knowledge are transferred across generations of learning. It is possible to create a learning environment that can overcome resistance to change, by challenging values and beliefs through replacing "confrontal attitudes" with "open team-based culture" (McHugh, Groves and Alker, 1998). It is also important to inform the personnel, as the lack of information might lead to frustration and decreased motivation (Jacobsen & Thorsvik, 2010).

2.3 Multiteam System

The definition of Multiteam System (MTS) is "two or more teams that interface directly and interdependently in response to environmental contingencies toward the accomplishment of collective goals" (Mathieu, Michelle, Marks & Zaccaro, 2002, p. 289). Further a team is defined as two or more individuals that have defined roles and that depend upon each other to accomplish a goal that is shared by the team (Salas, Dickinson, Converse, & Tannenbaum, 1992, quoted in Salas, Reyes & Woods, 1997; Mathieu, Michelle, Marks & Zaccaro, 2002). The boundaries of MTS are defined by the fact that all teams within the system, while at the same time trying to achieve different proximal goals, share at least one common goal (Mathieu, Michelle, Marks & Zaccaro, 2002). This means that they by doing so, also exhibit input, process and outcome interdependence with at least one other team in the system. MTSs can further be described in terms of goal hierarchies, the nature of the operating environment, teams' interdependence and how the teams operate over time in an episodic framework. The shared mental models, leadership, information technology and reward systems have a critical influence on the effectiveness of MTSs.

Further the conception of MTSs consists of five distinguished characteristics:

- MTSs consist of two or more teams that interact with each other. The teams, which are referred to as component teams, are nonreducible and distinguishable with interdependent members and proximal goals.
- MTSs are unique entities that are wider than teams, but at the same time smaller than the larger organization, within the teams are embedded. For example, an emergency response where units from different organizations cooperate, and where even the traditional organizational boundaries of MTSs may be crossed. Also meaning that MTSs differ from ordinary teams and organizations in the architecture and functioning.
- All component teams get input, process, and outcome interdependence with at least one other team in the system.
- MTSs are open systems which have configuration stems from the performance requirements of the environment and the technologies that are used. Further the performance requirements create a goal hierarchy that guides the actions of the MTSs.
- The MTS component teams share a common goal or a set of goals but may not share proximal goals. All the component teams have a common overall goal that is vested, which could be to save lives. Thus, there is a goal hierarchy present during the work.

2.4 Shared Situation Awareness

The police, the rescue service and the medical service each create their own understanding of the situation at the incident scene, partly through the information that is needed to solve the problems that the individual organization is facing (Nilsson & Kristiansson, 2015). There is always a risk that the organizations create different understandings of what is relevant at the incident site. The most important situation in which to reach a common understanding is when the organization's goals must be prioritized against each other's. This is when it is the most important to have an understanding for the perspective of the other organizations. Situation awareness (SA) is defined as "The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future", which is illustrated in 1 (Endsley, 1988, cited in Endsley, 1995b.)

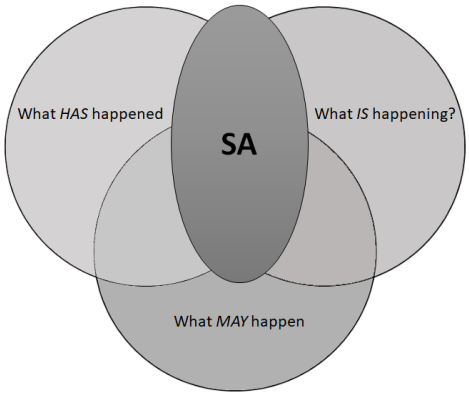


Figure 1: A model of Situation Awareness. Adapted from Reilly &Markenson (2011).

This means being able to perceive critical factors in the environment and having an understanding about what the factors mean, especially when the factors are integrated with each other in the personal goal (Endsley & Jones, 1997). It also means to have a understanding of what will happen in the environment soon. Situation awareness allows decision makers to function in a timely and effective manner and is essentially possessed by the individual as it only exists in the individual's cognition. Situation awareness can as a matter of fact also exist in teams and between teams that are involved in achieving a common goal. When defining a team there are three features that are critical: a common goal, interdependence and specific roles, and where each member in the team has sub goals in accordance to their own specific role which is part of the overall team goal (Endsley & Jones, 1997). Every team member must have situation awareness of her or his requirements in order not to become the weakest link of the chain (Endsley 1995a.). Team situation awareness can be described as "the degree to which every team member possesses the SA required for his or her responsibilities" (Endsley, 1995a., p. 39). There is also some overlap between each team member's situation awareness, as can be seen in Figure 2. To establish team situation awareness, the members of the team must share knowledge about the situation (Endsley 1995a.). Each member of a team needs to establish the situation awareness needed for the own individually duties, in order to be successful as a team (Endsley, 2015). It is not enough if a team member has situation awareness, but the information is not successfully transmitted to other team members that need the information. The information must be shared in order to prevent critical error to occur. The subset of information is the greatest part of the team coordination and can for example occur as verbal exchange or as a duplication of displayed information, such as looking at the same display and individually and independently acquiring the information.

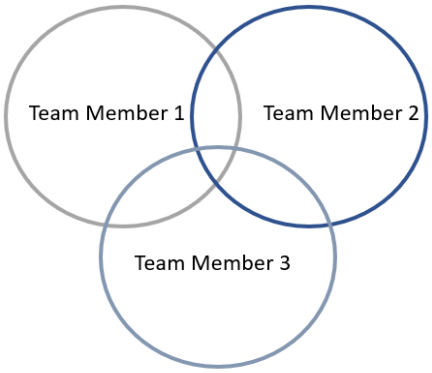


Figure 2: A model of Team Situation Awareness. Adapted from Endsley (1995a).

In a functional team, each member shares a common understanding of what is happening regarding the common elements of situation awareness (Endsley & Jones, 1997). That is a related concept called shared situation awareness and defined as "the degree to which team members have the same SA on shared SA requirements" (Endsley & Jones, 2001, p. 3). Meaning that team members do not need to share all that is known about the situation, but only share the information that is needed to have in common as a function of the overlapping goals, as can be seen in Figure 3. Giving to much information might instead lead to mental overload. The only information that should be given is the information required to establish and obtain shared situation awareness.

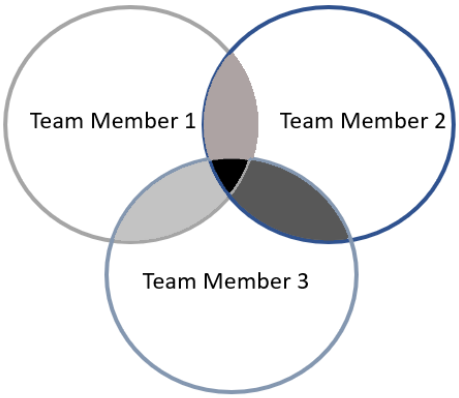


Figure 3: A model of Shared Situation Awareness. Adapted from Endsley & Jones (2001).

There are different states of shared situation awareness (Endsley & Jones, 1997). For example, two team members may have the same situation awareness, both of which are correct, but the team members may also have the same situation awareness, and both be incorrect. The team members may even have different pictures of the situation, one being correct while and the other incorrect, or they could both be incorrect in different ways. As shared situation awareness is concerned with the elements that are common to the team members, it is essentially impossible for the two team members to share situation awareness and both be correct but

different. The goal with shared situation awareness is obviously that both team members should have the right situation awareness. This can be reached by good communication and supporting technologies, as different situation awareness may be revealed and make it possible to reach a correct shared situation awareness.

3. Samverkan Östergötland

Samverkan Östergötland is a strategy consisting of authorities, townships and organizations that are involved in the emergency preparedness of the society in the county Östergötland, as can been seen in Figure 4 (Samverkan Östergötland, n.d.b).

"The purpose of the cooperation is to use the resources effectively and responsibly. The cooperation is characterized by openness and mutual exchange between organizations in order to create security, safety, and health for the people living, staying, or working in Östergötland" (Samverkan Östergötland, n.d.b, p.7. author's translation).

Figure 4: Organizations in Samverkan Östergötland (Samverkan Östergötland, n.d.b)

3.1 Cooperation

"Cooperation is the function that, through the agreement of actors, provides for the orientation and coordination of available resources" (MSB, 2017, p.199. author's translation). The purpose of cooperation must always be to establish focus and coordination, because if this is not the purpose, there is no cooperation. Agreements are an important part in cooperation, as agreements occur when individuals work beside each other with focus and coordination, which means that none of the individuals are using any existing mandate or in any other way making decisions about anyone else. Dialogue is therefore a prerequisite for attaining cooperation. There are four explicit principles for cooperation for all organizations within Samverkan Östergötland (Samverkan Östergötland, n.d.b):

- all organizations shall act proactive, take initiatives and contribute to cooperation when needed
- all organizations shall have a holistic view and understanding of the perspective when it comes to, for example, sharing information
- all organizations participate in accordance with their own conditions. Samverkan Östergötland does not take over the responsibility for any of the involved organizations
- cooperation shall be characterized by openness, absence of prestige, trust, respect, commitment, and participation

3.2 Command and Control

Command and control is the function that is attained as an organization decides and achieves focus and coordination of available resources (Nilsson & Kristiansson, 2015). It requires the person or persons in command to have the mandate to led, or that it is done based on agreement between parties. Mandate can be of varying degrees and strength, as the strongest mandate is based upon forcing demand and can lead to sanctions if the directions are not followed, while mandate of a weaker kind does not consist of forcing demand. The commanders at an incident site are the ambulance incident commander, the chief of rescue services and the police incident commander, who are all responsible for leading their own organization at the incident scene.

3.3 Social Disturbance

A definition of social disturbance is the phenomenon and happenings that are threats and have harmful effects on what is aimed to be protected in society (Samverkan Östergötland, 2017). The term serves as a tool for a broader approach and creates the conditions for a common focus and coordination for the organizations, while dealing with threats. There is an urgent need for the organizations of the society to identify the need of a common management early on. Even if the phenomenon and disturbance do not necessarily fit within the framework of accidents, crises, and war. Instead social disturbance could also be contaminated food, risks for tempests and gun fire between rival groups in society.

4. The Indicators of Cooperation

There are different goals to be fulfilled regarding cooperation between the organizations during an emergency, these goals are described as indicators by Samverkan Östergötland.

The indicators were first used as an individual evaluation during training and as a method to ensure quality in prehospital care management (Rüter & Vikström, 2009; Ödmansson & Vikström, 2006). Today measurable collaborative indicators are used as quality assurance in various moments during an emergency (Region Östergötland, 2018; E. Bengtsson, personal communication, April 12, 2018). Using common measurable indicators is also a way to support early identification of holistic goals at an incident site (Nilsson & Kristiansson, 2015). When an incident is reported to SOS Alarm, various organizations are alerted in accordance with predetermined incident plans (Rüter, Nilsson & Vikström, 2006). When traffic accidents, hazardous materials or fire occur, the rescue services, police, and medical service are always called out. It has been decided that when at least two of the three organizations are called out at the same time, the indicators for cooperation shall be applied (E. Bengtsson, personal communication, April 12, 2018).

4.1 Presentation of the Indicators

Regarding time the indicators have two starting points, the first starts when SOS Alarm is notified about an incident (Nilsson & Kristiansson, 2015) and the other one starts when the first unit arrives at the incident site and shall report the current situation to other organizations on the way to the incident site. The first three indicators focus on communicating through RAKEL and all share zero point regarding timeline (Figure 5). During the two first indicators, SOS Alarm has the overall responsibility to actively make sure that the received emergency alarm goes out to the concerned organizations SOS Alarm is a nationwide organization that is contacted by everyone living or residing in Sweden, when needing urgent assistance (SOS Alarm, n.d.).

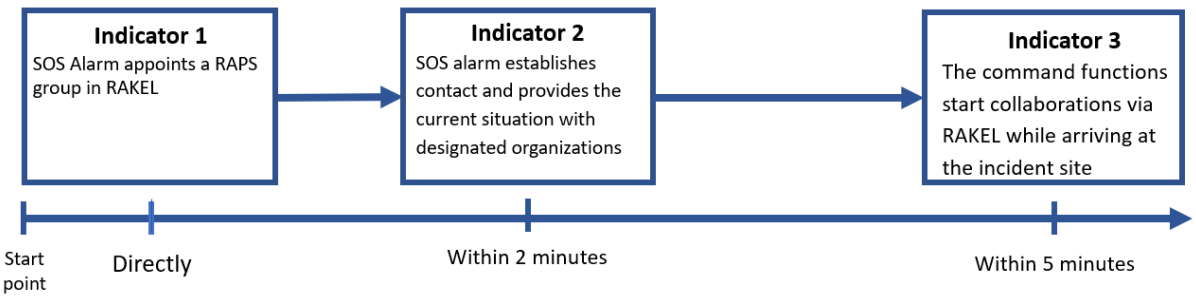


Figure 5: A flow chart visualizing the first three indicators.

When the organizations have arrived at the incident scene there is a new zero point and the organizations at the incident scene shall fulfill the rest of the seven indicators within 25 minutes as can been seen in Figure 6.

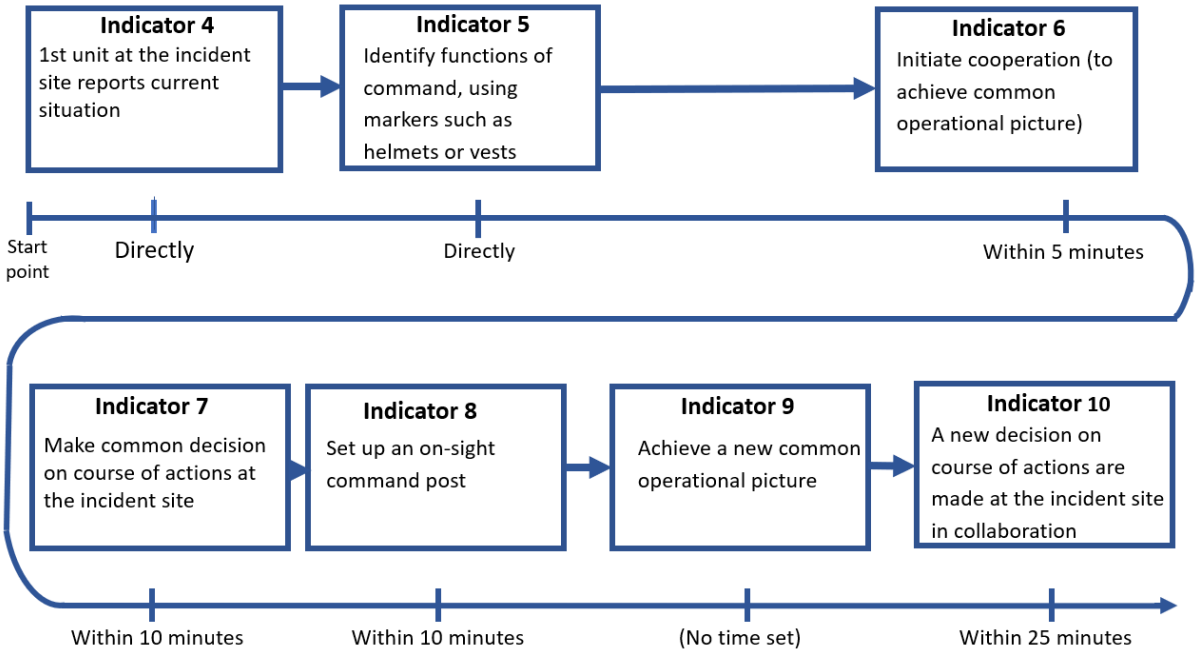


Figure 6: The seven indicators that shall be fulfilled by the organizations at the incident site.

When SOS Alarm has received an urgent call about an incident that demands the cooperation of at least two of the organizations of the police, the rescue service or the medical service, then the first indicator is applied (E. Bengtsson, personal communication, April 12, 2018). The first indicator consists of SOS Alarm deciding a so-called RAPS group in RAKEL, which shall be done directly by SOS Alarm. The word RAPS consists of the first letter in the Swedish words Räddningstjänst, Alarm, Polis, Sjukvård (Region Östergötland, 2015), which means Rescue Service, Alarming, Police, Health Care. The term is used as a designation for a talkgroup, which is a group of participants that can communicate as a group, through talking and listening using the device RAKEL radio visualized in Figure 7 (MSB, 2014a). The organizations within the different talkgroups are predetermined (MSB, 2017) and matched by SOS Alarm to lead the most suitable resources to an incident (SOS Alarm, 2013).

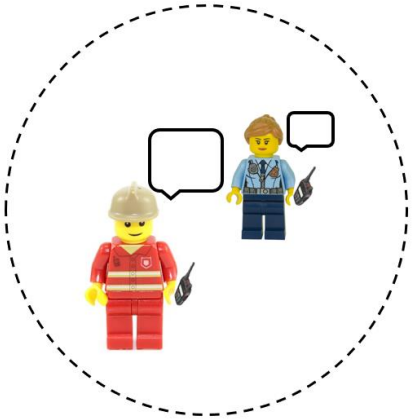


Figure 7: A talkgroup consists of predetermined organizations.

RAKEL, which stands for RAdioKommunikation för Effektiv Ledning in Swedish (Region Östergötland, 2015), which means Radio Communication for Efficient Command and Control, is a system for communication (MSB, n.d.). RAKEL is used to achieve safe and secure communication between workers for operations of societal importance. By Samverkan Östergötland it is used as a primary way to communicate between the organizations involved regarding incidents (Region Östergötland, 2015).

Figure 8: Photograph of a RAKEL radio unit.

To use the RAKEL system a RAKEL radio unit is used, as can be seen in Figure 8. The RAKEL radio unit is similar to an ordinary mobile phone but has some physical differences, such as long antenna and an emergency button (MSB, 2014b).

The second indicators consists of SOS Alarm establishing contact with designated organizations within the talkgroup within 2 minutes and supply the current situation by using ETHANE as structure. ETHANE is an international standard as a structure and means that certain information shall be given from a predetermined structure (NHS Trust, n.d.):

- Exakt location of the incident
- Type of incident
- Hazards present and potential
- Access

- Number (Approximate) and type of casualties
- Emergency services

In Sweden ETHANE is translated into Swedish, but still consists of the same information as the English version (Figure 9).

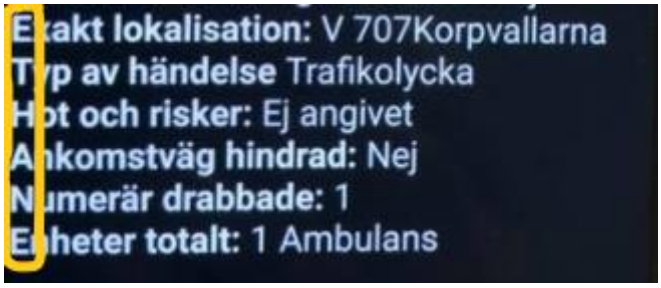


Figure 9: Information in Swedish about an incident using ETHANE as structure.

From the third indicator the responsibilities shift from SOS Alarm to the addressed organizations. According to the third indicator, the lead functions of the involved organizations shall start the collaboration via RAKEL, while heading for the incident scene. During this stage a decision is commonly made about where the preliminary rendez-vouis point shall be located, what to focus on at the incident scene and how to collaborate.

When the first unit of an organization has arrived at the incident site, the forth indicator shall be fulfilled, which is to leave a window report within two minutes to SOS Alarm, the other involved organizations, and units in the RAPS talkgroup (Nilsson & Kristiansson, 2015). The structure of the report differs between different organizations, as the organizations use different structures (E. Bengtsson, personal communication, April 12, 2018). It is important that there is a structure and a time limit, as the first report is important and crucial for the venture, but also for giving the victims the best possible outcome (Nilsson & Kristiansson, 2015). One of the staff in the first arriving ambulance become the ambulance incident commander (AIC) (Rüter, Nilsson & Vikström, 2006), and is supposed to give a window report using the METHANE structure (Nilsson & Kristiansson, 2015). METHANE consists of the same elements as ETHANE but includes an “M” in the beginning, which stands for “Major Incident” (NHS Trust, n.d.). Figure 10 shows how METHANE is used in Swedish. If there is a “Yes” next to the words “Major incident”, it gives a clear signal that the information shall be spread to a wider extent (Nilsson & Kristiansson, 2015).

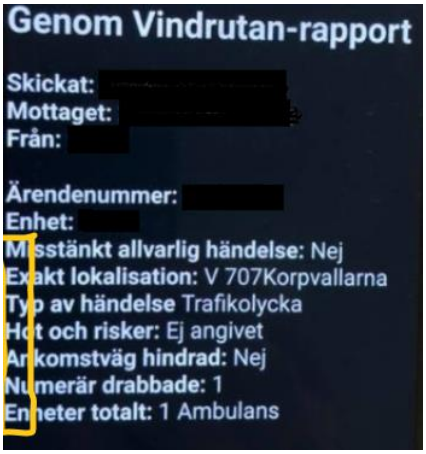


Figure 10: Visualization of a window report in Swedish by METHANE as structure.

When the units arrive to the incident site it might be chaotic and busy, leading to high workload (Nilsson & Kristiansson, 2015). Therefore, it is important to mark all the functions of command and control. The first unit of the medical service that arrives to the incident site is supposed directly to identify themselves as ambulance incident commander and medical incident commander (MIC) (Rüter, Nilsson & Vikström, 2006). The ambulance incident commander takes control of the situation by leading her or his organization and cooperating with the other organizations. The person with the most extensive medical experience becomes the medical incident commander, often a nurse, who commands, categorize, and performances the triage, meaning prioritizing the need of healthcare of the wounded persons at the scene. When the rescue service arrives, the firefighters are already marked as they have certain roles within the own organization. The organization of the police has one overall commander on the shift, but if the commander is not at the incident scene, one of the police personnel that first arrives to the accidents scene becomes the police incident commander.

The sixth indicator consists of initiating cooperation aiming to reach common operational picture, which means getting clarification about what has happened, what has already been done, how the situation develops, the security on the incident site, how to reach the incident site and if there are any restrictions. Visualization is a tool to provide a common operational picture (COP), that might help to achieve shared situation awareness (Nilsson & Kristiansson, 2015). For example, a simple piece of a map can be used combined with additional information.

The seventh indicator involves making a common decision within 10 minutes about the intent. That means deciding if the intent should be on rescuing, securing, evacuating and/or identifying injured persons. The aim with the decision is to make sure that all organizations work towards a common goal (Nilsson & Kristiansson, 2015). Cooperation is therefore of the

utmost importance to making an effective decision. The decision directs the organizations to focus on the goal and share the actions that must be done by each organization. If the decision is to evacuate, the rescue service may guide affected persons out of the danger zone, while the police may guide the persons to an assembly area and the ambulance personnel take care of wounded persons at a collection area.

The eighth indicator contains of creating an on-sight command post within 10 minutes. Often the command post is located near where the commanders' vehicles are parked (Rüter, Nilsson & Vikström, 2006). The ambulance incident commander, the chief of rescue services and the police incident commander have meetings at this location to exchange information about the situation and to make decisions (Nilsson & Kristiansson, 2015).

The ninth indicator, which has no time limit, is about achieving an updated common operational picture contains of creating a new shared situation awareness. That includes deciding on a collection area, deciding what the medical orientations are, how to handle the media, and crisis support.

After 25 minutes a new decision on course of action at the incident site is supposed to be made in collaboration. This tenth indicator is also the last indicator to be fulfilled.

4.2 Training of the Indicators

Education, training and practice are needed to make sure that the rescue service, the medical service and the police understand each other's needs and can cooperate to a larger extent (Nilsson & Kristiansson, 2015). The measurable indicators are used in the training of cooperation in simulated so-called CBRNE incidents, where all functions of management cooperate and train together. CBRNE is an abbreviation of the words Chemical, Biological, Radiological, Nuclear, Explosive. For an incident to be called a CBRNE incident, at least one of the components must be included (Region Östergötland, 2018). The training takes place once or twice a year at The Centre for Teaching and Research in Disaster and Medicine Traumatology (H. Lidberg, personal communication, May 4, 2018). The goal is that every person from the medical service, the rescue services, and the police who might become commanders of their respective organization at an incident site, shall be trained to work in accordance with the indicators.

4.3 The Meetings of Samverkan Östergötland

To ensure quality, Samverkan Östergötland come together and evaluate how the application of the indicators has worked in different incidents (E. Bengtsson, personal

communication, April 12, 2018). The incidents are jointly chosen by the organizations involved in the meetings, based upon different reasons, such as the indicators having been fulfilled to a high extent or because there has been trouble fulfilling the indicators. During the meetings the main issue is to discuss the chosen incidents relating to the indicators of Samverkan Östergötland (E. Bengtsson, personal communication [Documents from meetings by email], March 19, 2018). Before and during the meeting there are some predetermined guidelines to consider:

- the perspective of cooperation is important
- it is not necessary with "full scale" complex incidents
- the focus is on the work around the incident
- the indicators are the focus of the discussion
- all organizations and participants have a responsibility to report incidents as topics for the upcoming meeting, to the person responsible for the meeting. If several proposals of incidents are received a joint decision is taken about which incident to choose (E. Bengtsson, personal communication, April 12, 2018). The person responsible for the meeting further tells the participants that were involved in the chosen incident to bring information regarding the incident to the next meeting (E. Bengtsson, personal communication [Documents from meetings by email], March 19, 2018).
- the organizations that were involved in the chosen incident are responsible for bringing relevant information to the meeting.

4.3.1 Protocols.

During the meetings the incidents are methodically discussed, indicator by indicator (E. Bengtsson, personal communication, April 12, 2018). In order to document what has been discussed a template of the ten indicators is used during the meetings, in which the coordinator of the meeting writes down information about what has been discussed and issues that are brought up to discussion regarding each indicator (Figure 11). At the meeting there may also be a discussion about upcoming events such as festivals and concerts which may require extra resources. These have not been subjects for the study, as the indicators are not applied in these cases.

Indicators	**Time limit**
SOS Alarm appoints a RAPS group in RAKEL	Directly
SOS Alarm establishes contact and provides the current situation with designated organizations by using ETHANE as structure	Within 2 min
The command functions start collaborations via RAKEL while arriving at the incident site *Consists of: Preliminary rendez-vouis point / Path of action / decision regarding alignment taken in cooperation*	Within 5 min
1st unit at the incident site reports current situation *Contains: "Through the windshield report" Structure?*	Directly
Identify functions of command, using markers such as helmets or vests	Directly
Initiate cooperation (to achieve common operational picture) *Content: What has happened / What has been done / The progress / Security / Access / Restrictions*	Within 5 min
Make shared decisions about the intent at the incident site *(Ex: Rescue / Secure / Evacuate / Identify severely injured persons)*	Within 10 min
Set up an on-sight command post	Within 10 min
Achieve a new common operational picture *(For example: Collection area / Medical orientations / Organization of transports / Handling of media / Crisis support*)	
A new decision on course of action is made in collaboration	Within 25 min

Figure 11: The template in which the notes are made regarding the ten indicators during a meeting.

5. Method

The study was conducted in three phases, as can be seen in Figure 12. Firstly, background information was gathered. Secondly, protocols from meetings where different accidents had been discussed, regarding the application of the indicators, were analyzed through thematic analysis and by using descriptive statistics. The results from the thematic analysis were then corroborated by interviewing the coordinator of Samverkan Östergötland from the organizations.

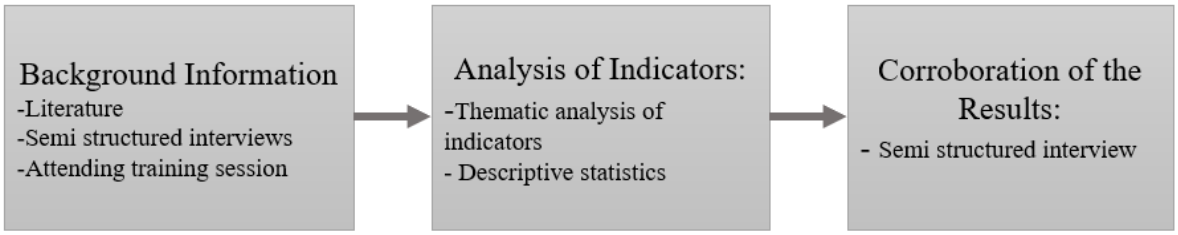


Figure 1: The phases of the study.

5.1 Background Information

To reach a deeper understanding of the indicators, semi structured interviews were conducted. The coordinator for the meetings of Samverkan Östergötland was interviewed to get an insight into how the indicators were discussed at the meetings regarding chosen incidents. Then two persons that work within medical service, but also train personnel within the police, rescue service, and medical service to work in accordance with the indicators at the incident site, were interviewed. The aim was to get information about the practical use of the indicators at the incident scene, but also to get information regarding training and learning about the indicators. To reach a deeper understanding how the indicators were created, a semi structured interview was conducted with one of the researchers that was involved in the development of the indicators. The data were then transcribed without marking pauses and prosody, and thematic analysis was applied to analyze the data. Besides interviews, a morning was spent attending a training session of special care management.

5.2 Semi Structured Interview

Using semi structured interview is suitable if wanting to expand the conversation as new information is brought up (Aspen, 2011). The interview is based on some predetermined themes, but during the interview the themes is put aside for a while and the focus is on what is said in the conversation. The advantage by using semi structured interviews, was that it makes it possible to have an open conversation about the topics and ask additional questions when

needed. This was especially suitable when conducting research in a new domain which the respondents held a lot of information about.

5.3 Protocols

The study was based upon protocols from the 14 meetings that were held between May 2012 and December 2017, where the indicators were applied. A total of 24 incidents were discussed at the meetings. The number of meetings has been two to seven per year, and at each meeting one to three incidents were discussed.

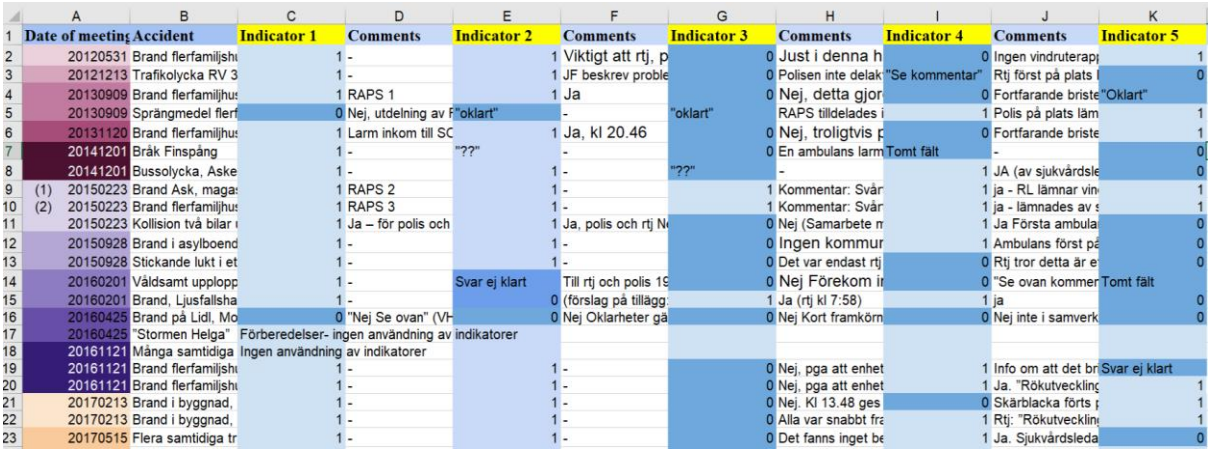
5.4 Thematic Analysis

The analysis of the data from the protocols was done by applying thematic analysis. The method emphasizes pinpointing, examining and highlighting patterns within qualitative data (Clarke & Braun, 2006). When applying thematic analysis, the analysis is done in six phases:

1. The initial phase consists of becoming familiar with the data. This is done by actively reading the data to create an overview, and at the same time taking notes regarding topics that are relevant to the research question.
2. In the second phase codes are created. This means generating an initial list of phenomena that are reoccurring in the data that are relevant to the research question.
3. During the third phase the data is searched to find themes. The themes are combined with codes and relationship is considered between different themes.
4. The themes are reviewed in the fourth phase to refine the themes, as some themes may be overlapping, and other themes may be broken into smaller pieces. The focus in this phase is interesting aspects of the codes.
5. The fifth phase consists in defining and naming themes. That means identifying which aspects of the data that are presented, what is interesting about the themes and why.
6. The last phase is producing the report, while deciding on themes that contribute to answering the research question.

During the analysis by the author, the protocols were first read, and notes were taken about dates of meetings and what kind of accidents that were discussed. In the second phase the notes from the protocols were written down in an excel sheet. If the indicator had been fulfilled “1” was written, if not fulfilled “0” was written. If it was uncertain whether the indicator had been fulfilled or not, the space was left blank and the text was read once more in order to investigate whether the indicator had been fulfilled or not. If it still was uncertainty,

the line was left blank. The text that had been written in the protocols was also written in the column. Other information that had been noted in protocols regarding the indicator and the accident was also noted under a tab marked “Comments” (Figure 13).



	A	B	C	D	E	F	G	H	I	J	K
1	Date of meeting	Accident	Indicator 1	Comments	Indicator 2	Comments	Indicator 3	Comments	Indicator 4	Comments	Indicator 5
2	20120531	Brand flerfamiljshu	1	-	1	Viktigt att rtj, p	0	Just i denna h	0	Ingen vindruterap	1
3	20121213	Trafikolycka RV 3	1	-	1	JF beskrev proble	0	Polisen inte delak	"Se kommentar"	Rtj först på plats	0
4	20130909	Brand flerfamiljhus	1	RAPS 1	1	Ja	0	Nej, detta gjor	0	Fortfarande briste	"Oklart"
5	20130909	Sprängmedel flerf	0	Nej, utdelning av F	"oklart"	-	"oklart"	RAPS tilldelades i	1	Polis på plats läm	1
6	20131120	Brand flerfamiljhus	1	Larm inkom till SC	1	Ja, kl 20.46	0	Nej, troligtvis p	0	Fortfarande briste	1
7	20141201	Bråk Finspång	1	-	"??"	-	0	En ambulans larm	Tomt fält	-	0
8	20141201	Bussolycka, Aske	1	-	1	-	"??"	-	1	JA (av sjukvårdsle	0
9	(1)	20150223 Brand Ask, magas	1	RAPS 2	1	-	1	Kommentar: Svår	1	ja - RL lämnar vin	1
10	(2)	20150223 Brand flerfamiljhus	1	RAPS 3	1	-	1	Kommentar: Svår	1	ja - lämnades av s	1
11		20150223 Kollision två bilar	1	Ja – för polis och	1	Ja, polis och rtj N	0	Nej (Samarbete m	1	Ja Första ambula	0
12		20150928 Brand i asylboend	1	-	1	-	0	Ingen kommur	1	Ambulans först på	0
13		20150928 Stickande lukt i et	1	-	1	-	0	Det var endast rtj	0	Rtj tror detta är e	0
14		20160201 Våldsamt upplopp	1	-	Svar ej klart	Till rtj och polis 19	0	Nej Förekom i	0	"Se ovan kommer	Tomt fält
15		20160201 Brand, Ljusfallsha	1	-	0	(förslag på tillägg	1	Ja (rtj kl 7:58)	1	ja	0
16		20160425 Brand på Lidl, Mo	0	"Nej Se ovan" (VH	0	Nej Oklarheter gä	0	Nej Kort framkörn	0	Nej inte i samverk	0
17		20160425 "Stormen Helga"	Förberedelser-	ingen användning av	indikatorer						
18		20161121 Många samtidiga	Ingen användning	av indikatorer							
19		20161121 Brand flerfamiljshu	1	-	1	-	0	Nej, pga att enhet	1	Info om att det br	Svar ej klart
20		20161121 Brand flerfamiljshu	1	-	1	-	0	Nej, pga att enhet	1	Ja. "Rökutveckling	1
21		20170213 Brand i byggnad,	1	-	1	-	0	Nej. Kl 13.48 ges	0	Skärblacka förts p	1
22		20170213 Brand i byggnad,	1	-	1	-	0	Alla var snabbt fra	1	Rtj: "Rökutvecklin	1
23		20170515 Flera samtidiga tr	1	-	1	-	0	Det fanns inget be	1	Ja. Sjukvårdsleda	0

Figure 2: Excel sheet used during the analysis.

All the data regarding the accidents and indicators were then written on a sheet. The data was then divided into groups of fulfilled, not fulfilled and uncertain if fulfilled. Patterns were then noted, such as between the indicators and the outcomes.

When applying thematic analysis there are issues to beware of. The analysis is affected by the experience and knowledge that the person who interprets the data has, in this case the author writing a master thesis in cognitive science, leading to the analysis of the data may be made with a cognitive view. It is also hard, if not impossible, to notice traces in the data of phenomena that are not known by the person who interprets the data.

Another phenomenon that may affect the result is not being a regular participant at the meeting and having the same knowledge about emergency. The protocols were written to make it possible for persons that usually attend the meetings. This may have led to misunderstandings in the analysis. Being aware of this issue, the coordinator for the meetings of Samverkan Östergötland was interviewed in order to corroborate the result. During the corroboration none of results was removed, instead further explanation was given by the coordinator about the result. The only thing that was removed was an expression made by the coordinator, that was misunderstood as being a fact about the organizations.

The protocols are based on what is remembered by the people who worked at the different incident scenes. Human memory itself has been questioned several times during the history of science and has also been said to be the head reason for mistaken identification in

trials, which is the leading cause of wrongful convictions (Rattner, 1988). Mistaken identification is so common that it is the major cause for wrongful convictions. By mentioning that, it might not seem to be the best idea to base a study on people's memory, but in fact it has also been found that experts recall more than novice do (Vicente & Wang, 1998). The staff from the rescue service, the medical service and the police are all experts in their domain and are therefore the most reliable sources to find when analyzing what has happened at the incident scene.

5.5 Corroboration of the Result

When the thematic analysis and the descriptive statistics were done, the findings were brought up for discussion with the coordinator of Samverkan Östergötland, who is also responsible for the meetings of Samverkan Östergötland, in order to validate the result. A semi structured interview was applied, and the data were transcribed.

5.6 Ethics

When the interviews are conducted, the participants are informed that the interviews are voluntary, and that the participant could end the interview at any time if wanting, and that the information will not be available to anyone that was not involved in the research.

During the corroboration of the result, the coordinator was asked if there was anything that should be withdrawn from mentioning regarding the result because of ethical issues.

6. Results

As the result regarding how the indicators are used today and how the work regarding the indicators could be improved is related, the results to both research questions are presented together under respectively indicator in this chapter. Then recurring findings for several indicators are presented, which is followed by a summary of the result.

6.1 Overview of How the Indicators are Used

Today the indicators are supposed to be used at the accident scene and are later evaluated in collaborative meetings through selected accident. It is decided that the issues found at the meetings shall be brought back to the concerned organizations as information to learn from.

The indicators are fulfilled to varying degrees. Generally, it does not seem as the indicators overall are fulfilled to a large extent. If looking at the result during the years, as can been seen in figure 14, where the numbers in brackets stand for how many accidents that were evaluated during each year, the degree of fulfilling the indicators vary. It seems though as the number of evaluated accidents have increased during the years, as it in 2012 were two evaluated accidents per year and 2017 it has increased to seven evaluated accidents.

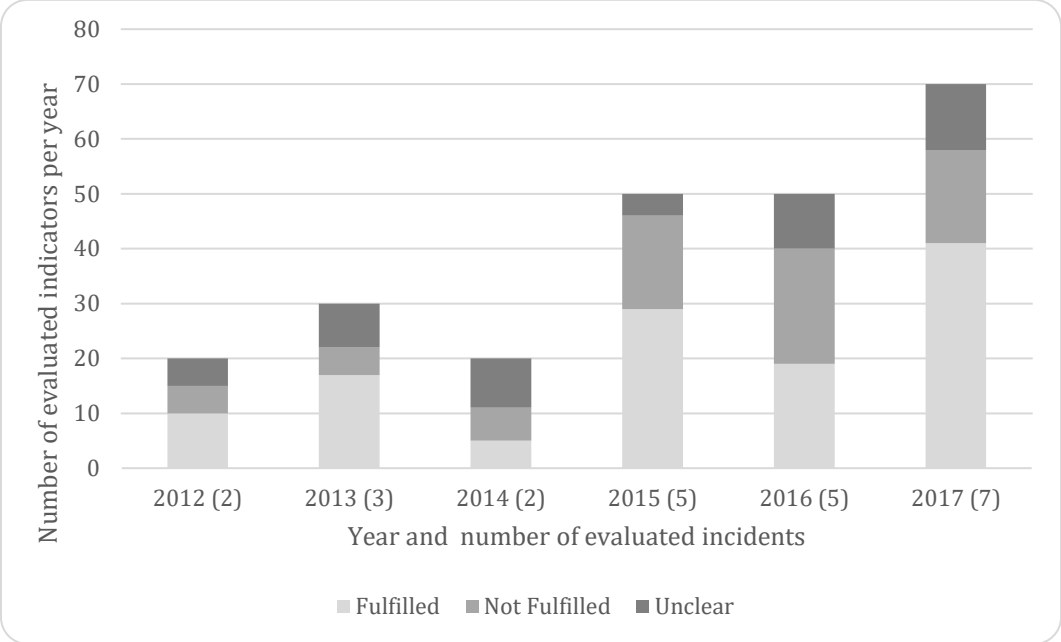


Figure 3: The quantity of when the indicators was fulfilled, unfulfilled or when it was uncertain if the indicator was fulfilled per year during 2012-2017.

The most fulfilled indicator was indicator number one, which consists of SOS Alarm appoints a RAPS group in RAKEL, which was fulfilled 22 times out of 24 (Figure 15). The least fulfilled indicator was indicator number three, which consists of the command functions starting collaborations within 5 minutes via RAKEL while arriving at the incident site, as it was only fulfilled three times out of 24.

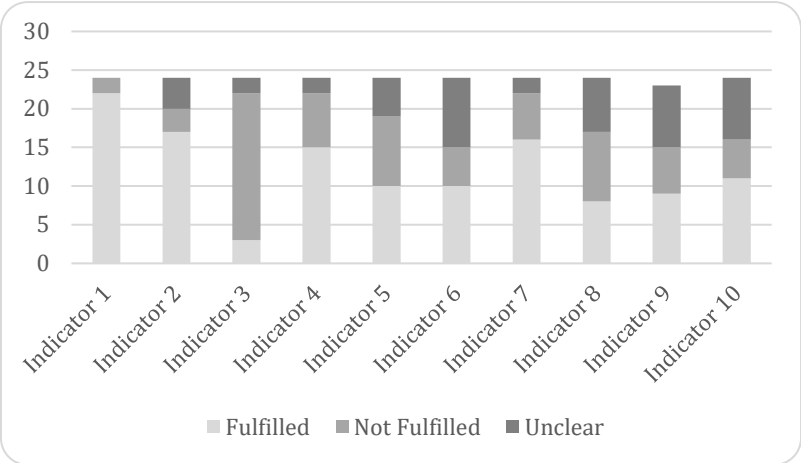


Figure 4: The quantity of each indicator being fulfilled, unfulfilled or when it was uncertain if the indicator was fulfilled during 2012–2017.

Then the results were divided into two groups, as it was hard to compare the result from one year to another because of the different number of evaluated accidents per year. The first group groups consisted of the first twelve analyzed accidents that occurred between the years 2012 and 2015, and the other second group of the last 12 accidents that occurred between 2016 and 2017. When examine the result there seems to be more uncertainty during the first years and more not fulfilled during the last years (Figure 16 and Figure 17).

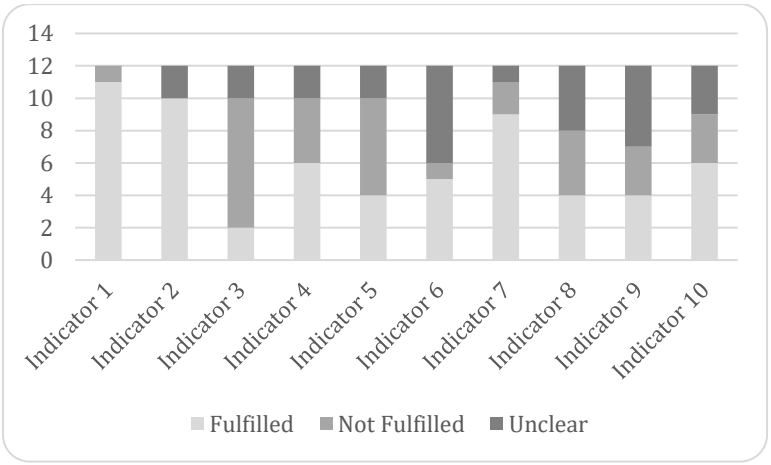


Figure 5: The quantity when each indicator was fulfilled, unfulfilled or it was uncertain if the indicator was fulfilled during 2012–2015.

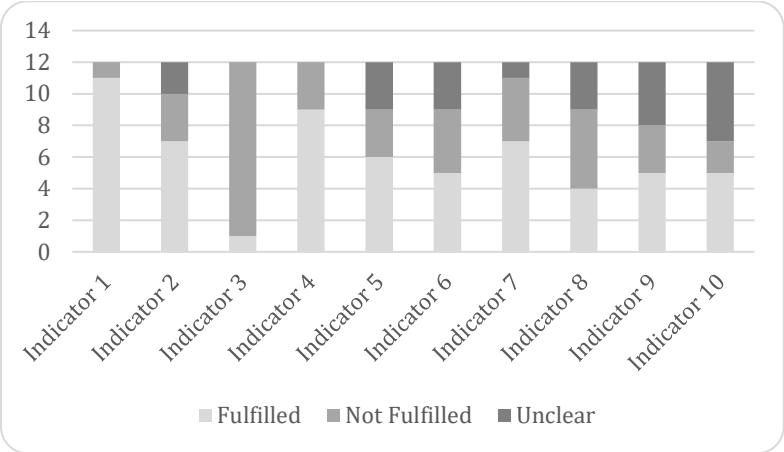


Figure 6: The quantity when each indicator was fulfilled, unfulfilled or it was uncertain if the indicator was fulfilled during 2016–2017.

As the incidents discussed at the meetings were chosen for different reasons, such as the indicators being fulfilled to a high degree or there have been troubles fulfilling the indicators, it is hard to assume that it exclusively depends on the acting at the incident site. Instead it seems to show that the group at the meetings have become more familiar with the indicators and therefore have found a way to apply them when analyzing incidents.

6.2 Indicator One: SOS Alarm Establishes Contact and Provides the Current Situation with Designated Organizations by Using ETHANE as Structure

The indicator had been fulfilled a total of 22 times, and twice it had not been fulfilled. In one case the RAPS group was not decided directly. The importance of choosing a RAPS group was pointed out at the meeting to reach the needed organizations. In another case a policeman dialed “wrong number” to SOS Alarm. The police had been called about a fire in a store, but that there also was a person inside the building. As the police did not call the right number, the call ended up not being given the attention that it should have had. According to the representative from SOS Alarm, it meant that it also took a longer time for SOS Alarm to handle the call. When an emergency alarm finally was made about a fire in a building, it took some time before the medical service also was notified. Because of the uncertainties about the talkgroup, the first unit from the rescue service drove all the way up to the store, where they saw the police with drawn weapons. In one case where the indicator was fulfilled there was instead a technical issue noted, that led to the medical service not being involved in the RAPS group. In this case the medical service was on the scene 7 minutes after SOS Alarm received the emergency alarm, and therefore did not ask for RAPS Group. It was pointed out at the

meeting that every organization shall actively ask for RAPS group, if having been given the information by SOS Alarm. SOS shall also send a request if the medical service have not answered the notification.

The first indicator dictates that SOS Alarm immediately shall decide a RAPS group in RAKEL. In the two cases where indicator one was not fulfilled, lead to not fulfilling indicator two and indicator three either. This highlights the importance of the first indicator being fulfilled, as it has an impact on the outcome of the two following indicators. At the same time this indicator is the indicator that is fulfilled to the highest extent, which is positive as it has such an impact on the outcome of two the following indicators as well. As there was no recurring reason to why the indicator is not fulfilled no improvements is advised.

6.3 Indicator Two: Establish Contact and Supply Current Situation With Designated Organizations by Using ETHANE as Structure

Indicator two consists of SOS Alarm establishing contact and delivering current description of the situation by using ETHANE as structure. In total, the indicator was fulfilled 17 times while not fulfilled three times, and four times there was uncertainty to whether the indicator was fulfilled or not. Indicator two is dependent on the first indicator, meaning that if it does not fulfill the first indicator, which consists of SOS Alarm deciding a RAPS group in RAKEL, it automatically results in not fulfilling the second indicator.

In another case the rescue service responded to a call about “a fire on a bridge” and the police responded at the same time about “help to police”. Only after 22 minutes was the medical service also alerted. The importance of SOS Alarm carefully considering the needs of healthcare at the scene, was pointed out at the meeting.

In one case the rescue service and the police were firstly notified and given information by ETHANE as structure. Soon even the medical service was notified, but the information through ETHANE was missed out. It was discussed whether SOS Alarm could have had a discussion directly with the involved unit.

At one meeting a suggestion was made about adding “to quittance” to the second indicator. It was pointed out that when SOS Alarm establish contact, it is important that the receiver sends a quittance to SOS Alarm. Information about the emergency alarm goes out in the RAPS group after SOS Alarm has received the quittance.

In one occasion there was explicit mentioned in the protocol that indicator number two was not fulfilled, without any further description or discussion of why. In two other cases there

was uncertainty if the indicator had been fulfilled or not, without expressing what the uncertainty depended on.

Even if the indicator was fulfilled there was some discussion about listening to the assigned RAPS Group, which the representative from the police felt that the police could improve and would inform the organization about. It was also discussed that different units in the rescue service had different time to get away when being notified. SOS Alarm would bring that up for discussion with concerned stations, to minimize what was seen as unnecessary calls that may limit the capacity of SOS Alarm. At another meeting the police brought up the fact that the police received the information regarding a RAPS Group late. In one case even 6 minutes later than the other organizations. The police would investigate the problem, to see what could be done.

Lastly, this is the indicator that is fulfilled to the second highest extent. It does not seem as there are any recurring reasons to why the indicator was not fulfilled.

6.4 Indicator Three: The Command Functions Start Collaborations via RAKEL while Arriving at the Incident Site

The third indicator involves the lead functions starting to collaborate within 5 minutes via RAKEL, while going to the site. Indicator three is the indicator that was the least fulfilled of all ten indicators. In a total of 19 cases the indicators were not fulfilled, in 2 cases it was uncertain if the indicator had been fulfilled, and only in 3 cases was the indicator fulfilled.
As mentioned before, not fulfilling indicator number one resulted in not clearly fulfilling indicator number two, and it seems as not fulfilling indicator one even affects the fulfilling of indicator three. Indicator number three was not fulfilled eight times because the scene was too close to the station which led to a minimum time for cooperation before entering the scene. This is also the most common reason for not fulfilling indicator three. Sometimes it works out fine not to start the cooperation before entering the scene, but sometimes there are negative side effects, in one case a unit of the medical service ended up arriving at the scene from different directions not being able to have visual contact with each other. And in some cases, instead of actively deciding a rendez-vouis point, there just happened to be one, and in other cases there never was one. Even if it sometimes worked fine with no communication before arriving at the scene, it was highlighted that it should be a habit to listen to the established RAPS group and to start cooperating while arriving.

In three cases it was expressed explicitly that there was no need for communication via RAKEL while entering the scene. Even though it seemed unnecessary, in one case a rendez-

vouis point was decided in the talkgroup for the unit of the rescue service. During the meeting it was clear to many of the representatives that it would have been good to inform the other organizations about a rendez-vouis point, because the fire was in an area of terraced houses. There were many units that had been dispatched, and it ended up being crowded and as an arrival route never was decided, several streets and cycle paths were blocked in the area. In another case skipping the cooperation while driving to a scene led the rescue service ending up beside an explosive tank. Even the first arriving medical service unit drove up to the tank, before driving back to a safe place. Even if it is not clear during the meeting why the medical service was not informed as it arrived later than the other organizations, there should have been updated information. During the meeting all representants present agreed on the need of sharing the available information at an early stage as arriving at the scene. Deciding rendez-vouis point is of importance to prevent units going all the way up to objects that are in risk of explosion.

On one occasion the medical service was notified when the police already were at the scene. The medical service tried but failed, to get into contact with the police using the RAPS group. The reason for the failure was that the police had the habit of leaving the group when arriving at the scene. This also led to not fulfilling indicator three, were the lead functions shall start to collaborate while arriving at the scene. It was noted by the group at the meeting, that it shall be possible to communicate through the RAPS group. The representant from the police would after the meeting investigate if there should be a revision of the guidelines for the police.

When the organizations were notified at different times, there was no communication while entering the scene. The first organization on the scene instead informed the arriving organization, as in one case the police informed the rescue service about where to stop and that the police needed assistance with blocking streets. When the medical service later was notified, it was given the information where to stop.

On one occasion there was uncertainty as to whether the indicator had been fulfilled or not, without the text in the protocol expressing what the uncertainty depended on.

Two times when indicator three was fulfilled, it was noted that it was hard for the rescue service to fulfill the indicator, as there were two emergency alarms at the same time regarding two houses in the same town being on fire. Even though it was hard to fulfill, it was handled successfully.

If summarizing the information, the most common reason why the third indicator was not fulfilled, was that the station was too close to the incident scene, followed by the reason that it was not necessary to start communicating and cooperating while arriving at the scene. As mentioned before the attitude that it did not seem necessary to communicate was changed

at the meeting when looking back at the occasions, and realizing that it should be a habit to listen to the established RAPS group and to start cooperating while arriving at the scene, not failing in situations where the scene is not located close to the stations, but also because it is hard to know how much space there is for the vehicles as it might get crowded and hard to work. The biggest issues affecting how well the indicator was fulfilled was time and willingness, as it often is not prioritized. The question is if the outcome of not communicating, that was brought into light during the meetings, reaches the persons that are working at the incident site. If the cause and effect are discussed in each organization after the meeting? Otherwise it might be a good idea to inform the members working at the incident site, to reach an understanding of the benefits of fulfilling the indicators.

6.5 Indicator Four: First Unit at the Incident Site Reports Current Situation

The forth indicator consists of the first unit arriving at the incident site reporting current situation, containing a through the windshield report and it shall be done immediately. It was fulfilled 15 times, not fulfilled 7 times and 2 times uncertain if fulfilled.

In total five cases there is no explicit reason why indicator four was not followed as decided. In one case information was only given to the first organization, but later spread to arriving organizations. The importance of leaving a windshield report was pointed out at the meeting, and two times it was mentioned that it also is highlighted in the CBRNE-course, and that the information shall be brought back to the organizations after the meeting. In one case a part-time force was first to the scene but did not communicate via RAKEL. Instead the medical service that arrived later left a complete through the windshield report. In another case the rescue service was called to the scene regarding a smell of smoke in a stairwell. The firefighters arrived at the scene imagining it to be a routine case and entered the building, firstly not sensing any smell at all, but suddenly they got overwhelmed by a strong smell of smoke described as “like a punch in the face”, which resulted in headaches and affected mucous. The medical service was then dispatched and transported four firefighters to the hospital. The information that the “smell of smoke” was more intensive than reported should have reached the arriving unit from the medical service and police. The lack of information led to the crew from the medical service thinking that it was just “smell of smoke”. It was discussed at the meeting if SOS Alarm should have informed the arriving organizations about the updated information about the smoke.

In one case there was no through the windshield report given by the first arriving unit. The rescue service arrived at the scene of an apartment block on fire. The unit was met by a

crowd of people on the scene, rushing toward the arriving unit. There was also a great panic. Reinforcement was required, which was seen by the representatives at the meeting as a "signal" itself that it was a fire of a larger dimension. Regarding the case, there were two emergency alarms created by SOS Alarm, which led to not giving all units within the healthcare the digital reports as should have been given. This should, according to the members of the meeting, be avoided at all costs. A representative would bring the issue about structure for report further to the group leading RAKEL in the area but would also discuss possible overload of the net of RAKEL. In the end the importance of giving a through the windshield report was brought up.

When the police, rescue service and the medical service were dispatched at different times to the same accident there was no need for through the windshield report. When other organizations were dispatched to the scene, the organizations that were already at the scene gave relevant information.

Even if the through the windshield report is left when arriving at the scene it still can become better, it was said at one meeting. Someone pointed out that the units from the small stations were better at leaving reports than the larger ones. In another case, information about the risk for explosion was left and "Halvhalt" was announced. It was discussed at the meeting if the word "Halvhalt" should be used. It was believed that the term was not used in all organizations. The term "rendez-vouis point" on the other hand, was used by all organizations. In the protocol there was a note referring to a document where "Halvhalt" was described as a temporarily stop to get the vehicles in the right order into the damage area. It should not be confused with "rendez-vouis point" which is the place that has been decided for gathering while waiting for duties.

When summarizing, indicator number four was fulfilled 17 times, not fulfilled five times and uncertainty about it being fulfilled occurred two times. Unfortunately, there was no reason given in five of the cases why the indicator had not been fulfilled; instead the side effects were described. Perhaps there should always be a note regarding why the indicator was not fulfilled, to make it easier to find the underlying reason for the trouble of fulfilling it. Indicator number four is without doubt an important indicator as much could go wrong if not fulfilled. For example, the firefighters that ended up at hospital because they were not given the information needed to stay safe. Shared situation awareness is clearly needed at this point, for all units to stay safe, but also to get the best start up at the incident site which the further work relies on.

It is also important to make sure that all organization use the same expressions or at least are aware of the definition, such as “Halvhalt”, to decrease the risk of misunderstandings at the incident scene.

6.6 Indicator Five: Identify Functions of Command, Using Markers Such as Helmets or Vests

The fifth indicator consists of marking functions of management, to be done immediately when at the scene. It was fulfilled in 10 cases, not fulfilled in 5 cases and in 5 cases there was uncertainty whether the indicator had been fulfilled or not.

The most common reason why the indicator was not fulfilled was a practical issue, as the police cannot always mark the commanders of the organizations at the scene, if the commander itself is not at the scene. The commanders from the police lacked markings on six occasional in total. The representative would bring the question up for discussion with the organization. At another meeting it was pointed out that it was important to present oneself as arriving at the scene, even if not wearing a vest. In a small accident area, it might not be as important as if it would be in a large area where several units arrive. It was also highlighted that it was important for the rescue service to ensure that several firefighters do not wear wests or jackets marked with commander when shifting commanders.

The rest of the cases where the marking of commanders was not fulfilled or was uncertainty as to whether the indicator had been fulfilled, the reason was not given.

In one case it was discussed whether there are issues when commanders are shifted within the rescue service. It is noted that it is of importance that there is only one function for leading. It is not as important when the accident is relatively minor, whereas it is very important for major accidents.

The most common reason why the indicator was not fulfilled was a practical issue, as the police were not always able to mark the commanders at the scene, if not the commander itself is at the scene. This indicator is problematic, because if the police are involved, and not are able to mark their commanders at the scene, the indicator simply will not be fulfilled, unless the actual commander is at the scene. It has, as mentioned before, led to confusion and more demands on the policemen involved in accidents to present themselves. A clear visual marking of the commander at the scene would not only make it easier for the different units to identify the commander from the police, but even remove the extra task to present oneself to the involved units, which might even have to be done more than once to each person because of a dynamic situation.

When documenting what has been discussed at the meeting, it would be good to make future investigations regarding the indicator. For example, it would be good to describe whether the indicator has or not has been fulfilled or if there is uncertainty if the indicator has been fulfilled. It would also be good to have a reason to why the indicator was not fulfilled, to understand underlying problems or if there have been other issues. It might lead to important information to improve the work around the indicators and the system.

6.7 Indicator Six: Initiate Cooperation (to Achieve Common Operational Picture)

The sixth indicator consists of initiating cooperation to create a common operational picture at the scene. That includes what has happened, what shall be done, the progress itself, security, access and restrictions. It should be done within 5 minutes of arriving at the scene. Indicator number six was fulfilled 10 times, not fulfilled 5 times and uncertain if fulfilled 9 times.

In three cases the individual organization had a operational picture towards the situation, but it was not spread between the organizations. Which led to the organizations instead working in separate tracks. The common operational picture between different organizations, was, according to the participants at the meeting, in two cases never reached while in another it was hard to decide whether it was reached. It was pointed out at the meeting that it is important to make a reconciliation.

In one case there was uncertainty about whether the indicator had been fulfilled or not. The police arrived at a house on fire and began with life-saving actions before the rescue service arrived. Persons from the rescue service at the meeting, pointed out that there must always be an experience or a risk awareness about the personal safety regarding opening doors when a house is on fire, without the rescue service at the scene.

Cooperation occurred at the scene in one case between the medical service and rescue service, but it was not done through predetermined structure. A participant at the scene later described it as easy to cooperate when there a few persons at the scene in the beginning as necessary questions are being handled smoothly.

When summarizing, it seems like there is a lack of communication between the organizations. There is no reason mentioned to why there is a lack of communication, but it should be clarified to understand how to ensure that all organizations share the same awareness of the situation. A clear improvement should be to start a dialog about the common operational picture at the scene.

6.8 Indicator Seven: Make Shared Decisions About Intent at the Incident Site

The seventh indicator consists of make a common decision about the intent at the scene within 10 minutes. Indicator number seven was the indicator which the police, the rescue service and the medical service fulfilled to the highest extent. The indicator was fulfilled 16 times, not fulfilled 6 times and 2 times it was uncertain if the indicator had been fulfilled or not.

There was not much said about the six cases where the indicator was not fulfilled. In two cases it was explicitly mentioned that there were never any discussions between the organizations about what the intent would be. In one case where it was uncertain if the indicator had been fulfilled, there was also uncertainty as to whether the intent was ever discussed between the organizations.

During the meeting it is pointed out that saving lives is always the objective. The organizations involved in an accident never felt that it was necessary to even speak about that, which led to a discussion at the meeting about whether the definition “decision on course of action” was the right definition to be used. There was divided opinion about it, as someone thought that decision that are made directly should be called “decision on course of action”, while another member of the meeting thought that “decision on course of action” is a decision made as a long-term decision. It ended up by the meeting going back to the material for the CBRNE-course, where the participants learned that decision on course of action is the first decision to be made.

When summarizing, there was not much written about the six cases where the indicator was not fulfilled, except for two cases where it was explicitly mentioned that there were never any discussions between the organizations about the intent. At the meeting it was pointed out that saving life is always the primary goal at the incident scene. The organizations involved at the incident scenes never seem to have felt that it was even necessary to speak about the intent. Indicator number seven therefore seems to be easy to fulfill, as it is stated that the primary intent at the scene is to save lives, but even when there is no life to save it seems as the organization work beside each other effectively. The next step is to start talking about the intent with each other, to create an outspoken decision about common intent.

6.9 Indicator Eight: Set Up an On-sight Command Post

The eighth indicator concerns of creating an on-sight command post within 10 minutes. The indicator was fulfilled 8 times, not fulfilled 9 times and 7 times there was uncertainty whether the indicator was fulfilled or not.

In five cases it was explicitly expressed that there was no need of creating an on-sight command post. It was motivated by two different reasons:

- In one case an on-sight command post was not be needed as there was so few organizations at the scene made it easy to get in touch with each other.
- In three cases it was expressed that it was not needed to create an on-sight command post, because it was possible to see all the incident scene. In one of the cases there was a car accident where two cars were involved, and it was expressed that the scene was so small that everyone involved was able to oversee the area of the accident.

In two cases there was an on-sight command post created but it was not shared by all involved organizations. In one case the information was given by the police to the rescue service that the on-sight command post was at a bus stop. Unfortunately, the information was never given to the ambulance incident commander**.**

In another case the police and the rescue service were in the accident area, while the ambulance incident commander was standing at the rendez-vouis point. The rescue service communicated with police and ambulance incident commander occasionally, while the police and the ambulance incident commander never communicated.

When it was uncertain if there was an on-sight command post created it was done according to different reasons. The most common reason, which was mentioned four times, was that it ended up being an on-sight command post as it felt like a natural step to take. The problem according to the members of the meeting, was that it was not certain if it was an active decision to create one or if it just happened and was not in all cases as organized as it should have been. In another case members from one of the organizations said that an on-sight command post was created, while another member from another organization said that it was never done. While in another case it was hard to get all organizations to the on-sight command post as the ambulance incident commander sometimes was hard to get in touch with. In yet another case the police, rescue service and the medical service was dispatched to a scene including explosive chemicals. An on-sight command post was decided, and all organizations were gathered to discuss the situation, except the ambulance incident commander, who was still at the rendez-vouis point**.** The rescue service was the organization that mostly

communicated with the ambulance incident commander. As there was no need of health care for the moment, the rescue service had a thought that it would be safer for the crew from the medical service to stay at the rendez-vouis point instead of being near the explosive tank. After discussing the situation at the meeting all members though it would have been better to gather all organizations at the same on-sight command post**.**

It seems like there is an assumption in some cases, among the organizations, that the indicator is not needed at what is seen as a smaller incident, but that the indicator should be fulfilled in preparation for a major accident. It seems as if an on-sight command post is needed anyway, as it often is created out of the blue without explicitly deciding to create one. If looking at the result of Stockholm Fire Department (2017) investigation, which was done after the attack at Drottninggatan in Stockholm, a contributing reason to confusion at the incident site was that there was no on-sight command post for the commanders of the organizations to gather to create a shared situation awareness. This indicates that creating an on-sight command post is important for reaching shared situation awareness. When an on-sight command post is decided, it seems as if the medical service is often the organization that tends to not be present at the on-sight command post when there is one decided. It is important to be aware of this to make sure that the medical service is present in the future.

6.10 Indicator Nine: Achieve a New Common Operational Picture

The ninth indicator consists of creating a new shared situation awareness. That includes deciding a collection area, deciding what the medical orientations are, how to handle the media and crisis support with no decided time limit**.** The indicator was fulfilled 9 times, not fulfilled 6 times and 9 times it was uncertain whether the indicator was fulfilled or not.

In two cases it was expressed that there was no need for a new shared situation awareness as the intent in one case was the same all the time, and in another case the situation was solved.

In one case where it was uncertain if the indicator was fulfilled or not, it was pointed out that it was hard to communicate using RAKEL at the scene. Each organization would need two RAKEL, one to communicate with other organizations and one to communicate within their own organization. It was decided at the meeting that there was a need for looking into it and that options would be discussed at a different meeting. It was pointed out that if the commanders of the organizations are not at the scene all the time, then it is important that an alternative way to communicate is decided, and that a new time is decided when the

organizations shall meet at the on-sight command post. In one case it led to there being more ambulances called out than actually was needed.

This indicator has no timeline set regarding when it shall be fulfilled. A question is if it affects the outcome? The indicator involves of deciding for example: collection area, medical orientations, organization of transports, handling of media, crisis support, but this is not explicitly discussed at the meeting. None of the incidents that were discussed during the meetings was defined as being major, but media was around at one incident. Perhaps all these subareas should be discussed at the meetings to be prepared when an incident of major size occurs.

6.11 Indicator Ten: a New Decision on Course of Action is Made in Collaboration

The tenth indicator consists of making a new decision about the common intent of the operation within 25 minutes. The indicator was fulfilled 11 times, not fulfilled 5 times and 8 times it was uncertain whether the indicator was fulfilled or not.

In four cases there was expressed no need to make a new decision in common about what to focus on, because the common goal was fulfilled. For example, the persons involved in a car crash had been transported to the hospital, and in another case all persons being in a house on fire were already evacuated.

When there was uncertainty if the indicator had been fulfilled or not, there was on two occasions no clear outspoken common decision. In one case it led to more ambulances being called to the scene, even if the rescue service at that point knew that there was no need for more ambulances.

In two other cases were there was uncertainty if the indicator had been fulfilled, it was discussed that the municipality was never informed. It was discussed at the meeting if it was needed and wanted, and finally it was said that it should be done and that there must be a discussion about how to make sure that the municipality gets the information that is needed. If there is a need for crisis support it is a prerequisite that the municipality is notified about the accident, even if there are different routines for crisis support in different municipalities.

When summarizing, in four cases there was expressed to have been no need to apply indicator ten, as the common goal was fulfilled. This means that the indicator is not always applicable, as in accidents where the cooperation does not last for 25 minutes. This on the other hand should not be seen as not fulfilled in the same sense as if failing to fulfill the indicator. In two other cases where there was uncertainty if the indicator had been fulfilled, it was brought up for discussion that the municipality was never informed. It was discussed whether it was

needed and wanted, and finally it was said that it should be done and that it must be discussed how to make sure that the municipality gets the information that is needed. If there is a need of crisis support it is a prerequisite that the municipality is notified about the accident, even if there are different routine for crisis support in different municipalities. The issues that are discussed are both interesting and important. It would also be interesting if the information was updated with how the question was brought forward and what was decided. Feedback of how or if the questions are solved. Another interesting issue is that in three cases when the indicator had been fulfilled there was even an explicit wish in the protocol about a better documentation about it. It seems like it is hard for the persons attending the meeting to figure out what had been done at the accident scene.

6.12 General Findings

During the analysis some recurring findings from several indicators were found, which will be pointed out. For example, different organizations seem to have different issues to deal with, but it also seems as the indicators bring safety to the actors working at the incident site.

6.12.1 The police.

Even if the responsibilities are jointly divided between the organizations and the focus is cooperation, there seem to be issues that have been more often derived from a specific organization, rather than a general phenomenon. For example, the police seem to have had two greater issues according to the protocols. Firstly, it seems like the communication through RAKEL had been up for discussion. Several times there seem to be discussions about the communication through the RAPS Group. As mentioned before the reason for the failure reaching the police in the RAPS group, was that the police leave the talkgroup while arriving at the scene. It was noted by the group at the meeting, that it must be possible to communicate through the RAPS group. The representative from the police at the meeting would after the meeting investigate if there should be a revision of the guidelines for the police. In another case the police were not involved in the communication while arriving at the scene. It also happened that the police received information regarding the RAPS Group late. In one case 6 minutes later than the other organizations. The police would investigate the problem. Over all the listening to the assigned RAPS Group could be improved, as the representative from police said at a meeting and would inform the organization about. Secondly, the marking of the police incident commander is the major reason why indicator five is not fulfilled. There was also criticism two times about the police not presenting themselves at the scene. This was also mentioned in the

result of the Stockholm Fire Department (2017) investigation about the attack at Drottninggatan, as it was hard to identify the policemen because of the lack of uniforms and markings. A suggestion was made in the investigation that there should be a nationwide uniformity regarding uniforms and marking of organizations at the incident site, to minimize confusion. That highlights that it is a wide problem, that the policemen are not marked at the incident scene.

6.12.2 The medical service.

It seems as the organizations often became divided at the accident scene. Almost exclusively the police and the rescue service cooperated while the medical service worked on its own.

Three times it is mentioned how the police and rescue service discuss with each other, while the medical service is not included. In a fourth case the medical service concentrate on life saving actions while the rescue service and police discuss how to proceed. In a fifth case the medical service got stacked at the rendez-vouis point, waiting for information. The information was never given, but the unit never actively asked for information either. In a sixth case the medical service was deliberately left at the rendez-vouis point, as the Chief of rescue considered that there was no ambulance needed and that it was too risky at the accident scene. Being aware that the medical service is not always included, could make it easier to make sure that all organizations are included at future discussions and decisions at incident scenes. The issue was brought up to discussion with the coordinator of Samverkan Östergötland, to try to understand why the medical rescue so frequent was not present at the on-sight command post. She thought that a reason could be that the chief of rescue and the police incident commander are often persons that are selected, hired and trained to be commanders as their professions, while ambulance incident commander becomes one of the crews in the first arriving ambulance. Even if all the paramedics are trained to take the role as ambulance incident commander, their main profession is to take care of injured persons.

As persons come and go in the organizations, there may always be someone who has not attended the training as the training takes place once a year. As most of the training is done in the own organization, it might take 5-8 years before a person is trained again in cooperation with other organizations and applying indicators. The lack of experience might lead to insecurity regarding handling the role as a commander, and instead leaving the command to the chief of rescue and the police incident commander that are more experienced. Even if the paramedics are feeling insecure compared to the other commanders, it is important to step

forward and take command to make sure that the own organizations' interest is brought up for discussion.

6.12.3 The rescue service.

The information regarding the through the windshield report should be given by using a structure, in accordance to indicator four. While the medical service leave window reports in accordance with METHANE, which also the police try to use, the rescue service should use OSH (Objekt, Skada, Hot in Swedish, meaning object, harm and threat in English) as structure. While the rescue services from the minor fire stations often leave detailed information, the rescue services from the larger fire stations leave inadequate information, meaning that the information lacks structure and is confusing to other arriving organizations to understand and to get a picture of what is happening.

6.12.4 Fulfilling indicators minimize risky situations.

The situations where staff from the different organizations ended up in dangerous situations had one thing in common, it happened when indicators were not fulfilled. In those cases, the information about the situation was not shared between the organizations, which led to them not sharing situation awareness, and not being aware of the danger at the incident site, for both rescue service and medical service ending up next to an explosive tank because it did not seem to be any need of cooperation between the organizations while driving to the accident scene. In another situation the medical service ended up in situation where the police had drawn weapons, because of confusion about which talkgroup to use for cooperation. In another situation a policeman alerted SOS Alarm about "smell of smoke" in a staircase and not "overwhelming smell of smoke", which led to several firefighters breathing dangerous smoke and being rushed to the hospital.

6.12.5 Limited process regarding information within and between organizations.

Regarding the process of information about the indicators, there is only one element that is documented. That is the information that is discussed at the meetings regarding how the indicators have been fulfilled at the accident scene, and which is documented in the protocols (E. Bengtsson, personal communication, May 8, 2018). It has been decided that the information then shall be brought back to the concerned organization in order to inform the coworkers. There is no way decided about how to do so. It might be done in several ways such as written and orally, some may discuss the issues during meetings while others just

might leave a note in communal space. Sometimes questions are brought up for discussion during the meetings, that need to be brought back to the concerned organization. There are no decided guidelines or way of documentations about how to deal with the issues, and nor is there any feedback returning to the meeting or any of the other organizations regarding what has been decided or said about the issue that may affect the work of all organizations.

6.13 Summary

The indicators are fulfilled in varying degrees. The most fulfilled indicators are the two first indicators, where SOS Alarm has the overall responsibility, which is positive as the outcome of the first indicators affect the outcome of the aftercoming indicators. The most problematic indicator to fulfill seems to be indicator number three, where the command functions shall start collaborations via RAKEL while arriving at the incident site. There are varying reasons why the indicators are not fulfilled, as in some cases it is practical impossible to fulfill the indicators. In other it seems as it does not seem necessary to fulfill the indicators, even though the indicators are supposed to be used at the accident scene.

Commonly selected accidents are later evaluated in meetings of Samverkan Östergötland that takes place two to seven times a year. The number of evaluated incidents has increased during the year and it also indicates that there is less uncertainty when evaluating the incidents, which both are signs that the group at the meetings has learned how to analyze the incidents in accordance of the indicators. Further it is decided that the issues that are found at the meetings shall be brought back to the respective organizations as information to learn from, but there is no documentation about how or when it is done. Or is it even done? Questions that are brought up during the meeting are taken back to respective organization, but that are no signs of feedback in the protocols or further discussions about what has been said or decided.

Improvements regarding the indicators could be done at different levels. First there could be more dialogue at the incident sites between the organizations and the documentation at the meetings could become more detailed and transparent. The organizations also have different issues to deal with, for example the police lacking vest to mark themselves at the incident site and the medical incident commander should become better in stepping forward and take the command and control with the chief of rescue and the police incident commander. The rescue service could from the larger fire stations could improve the information by using OSH as structure when leaving through windscreen report.

The indicators should be seen as important as they, except for measuring the quality of the work at the incident scene, bring safety to the staff that are working at the scene.

7. Discussion

In this chapter a discussion of why situation awareness is not established at the incident site is first presented, then a proposal of how Samverkan Östergötland could become a better learning organization by using the indicators is presented. The discussion is ended with comments on the methodological choices.

7.1 Why Is Not Shared Situation Awareness Established?

Many times, it was described that it did not seem necessary to cooperate. It could be that when units from the three organizations arrive at an incident scene, they all have different views of what must be done, as they all have three different missions in accordance of an MTS. For instance arriving at a house on fire with people in it, the fire fighters should first try to bring people out of the house and later put out the fire, the police should make sure no one enters the house and guide persons that are brought out of the house by the fire fighters out of the danger zone, while the medical service are to make ensure that the right persons are prioritized and given appropriate care. At the same time the missions have different length. In this case the fire fighters stay at the scene until the fire is put out. This is of course simplified, but it gives a good example of how the different organizations have different missions and goals, but at the same time share wider overall goals, meaning that the different teams also have different number of goals and different timings to take into account. The units can be seen as a multiteam system, as there are three teams that interface directly and interdependently in response to environmental contingencies toward the accomplishment of common goal. All units have different goals, they all cooperate to solve the situation at the incident site, where saving human lives has the highest priority. That is when the teams go beyond being just three different teams through cooperation, as they share goals and are interdependent of each other. For example, to save lives, the medical service is dependent on the fire fighters to bring the hurt people out of the burning house, as it would be too dangerous, if not impossible for themselves to enter the house. The firefighters need the police to prevent people from coming too close to the fire and letting the fire fighters work in peace. Cooperating goals can be blurred by different goals that are conflicting. Conflicting goals may arise from the lack of dialog and lead to taking things for granted, such as arriving at an incident scene where it is too narrow to park all vehicles, while all units rush to the scene to fulfill the own goal. It might end up messy and put the common overall goal in danger as the unit that is needed first might end up far from the scene and extra time might be spent on moving the vehicles. The goals of the different organizations are conflicting, but training cooperating could decrease the number of times it occurs.

7.2 A Proposal on How to Become a Better Learning Organization

The result indicates that there are several improvements that need to be done at different levels of the organizations, and in some cases even in different organizations. That means not to be blinded by to what extent the indicators are fulfilled, as a product of what is happening at the incident scenes. There is much more to it than that, and an appropriate division would be to break it down into three parts to facilitate system thinking to become a learning organization, where the first part consists of what is happening at the incident scenes, where the critical situations occur. The second part consists of the meetings, where the application of the incidents is discussed and analyzed, and where the information and questions are brought back to the organizations. The third part consists of the organizations and where the decisions are made regarding, if and how to act upon the information or issues presented. These decisions and guidelines should then be brought back to the persons who work at the accident scenes or are present at the meetings, in order to make the organization learn. It is important that all persons are informed, as the lack of information might lead to frustration and decreased motivation.

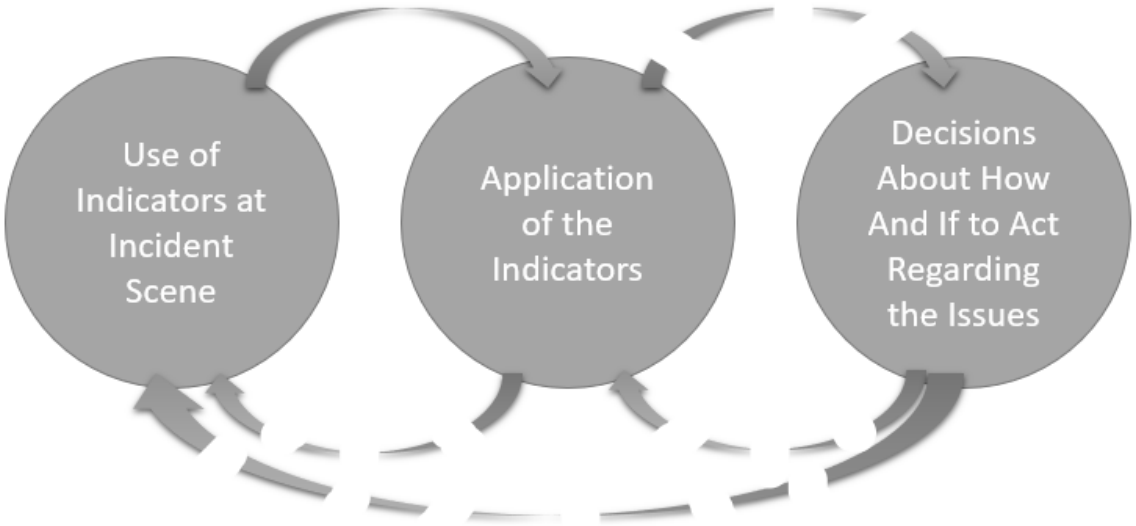


Figure 7: An illustration of how the information flows between different stages.

The only step that is documented today regarding the application of the indicators is the information that is taken from the scene of the accident into the meetings where the protocols are written, as has been illustrated in Figure 18. It is decided that the information from the meetings shall be brought back to the individual organization to inform coworkers, but there is no specific way decided for doing so. It might be done written or orally, some may sit

down and discuss the issues with the coworkers while others just might leave a note in communal space. During the meetings there are sometimes questions that need to be brought back to the concerned organization. There are no guidelines or documentations about how it should be done, and nor is there any feedback from the organizations to the meeting or the other organizations about what has been decided or said about the issue that may affect the work of all organizations.

7.2.1 At the incident site.

As mentioned before, the aim is that everyone that may end up being commanders of their own organization at an accident site is trained at CBRNE-course where the indicators are applied. As persons come and go in the organizations, there may always be someone who has not attended the training. As the training takes place once a year and it might take 5 to 8 years until the same person is trained again in cooperation and in accordance with the indicators, the lack of practice might lead to the person feeling insecure when ending up in the role as a commander of her or his organization. This may partly explain the poor result of the indicators which could be improved by training. Another part that may explain the result is that there could be poor feedback back to the organizations from the meetings and a lack of understanding of why the indicators are used. The underlying reason could be that the indicators are not prioritized because it is not prioritized in the organizations. To become prioritized the commanders of the organizations should highlight the importance of the indicators, given that the commanders themselves know the importance and the advantages of using the indicators. The training where all organizations participate in accordance with the indicators should also be increased.

7.2.2 At the meetings.

Trying to sort out what has happened at the incident site and what had been done and by whom, was not always easy at the meetings. The accidents were discussed and as the discussions proceeded notes were made in a file with the ten indicators. Sometimes if the indicator had been fulfilled there was a “Yes” written in the protocol, and if not fulfilled there was a “No” written. This is quite clear, but when there was uncertainty whether the indicator had been fulfilled it was sometimes written “Uncertain” or “??”, and sometimes there was a note written which leaves the reader to interpret the meaning. Often there were additional notes made in the area where the indicators are described. Sometimes there was nothing written at all, just a blank column and no additional notes made. As mentioned before, the

protocols are written for persons that are usually involved in the meetings, meaning that persons that usually attend the meetings, should be able to understand what has been discussed, and understand whether the indicators have been fulfilled or not. It might at first sound like a good idea, but when rethinking it, makes is clear that it makes the documentation of the indicators quite weak, as it does not lead to transparency. It makes it hard for persons that do not ordinary attend the meetings to evaluate the indicators, but it also makes it hard for new members at the meetings to get an insight into the evaluated incidents. A suggestion is to be influenced by the use of the indicators, where nothing should be taken for granted. Tentatively a document and a standardized manner of documenting should be developed to make the analyzing and the documentation of the incidents as similar as possible, but also more transparent. It should for example also include who brings questions back to the organizations and what is decided or said by whom in the organization and if needed, that every organization is informed. A standardized manner of how to inform the persons that need to know the information, should be developed to make sure that information is spread in the organizations.

Several times when there was uncertainty during the discussions in the meetings about topics such as what word to use at the scene or what should be done in a specific situation, the material from the CBRNE-course was used as a guideline to reach an answer to phenomena that were discussed. For example, the general knowledge across the organizations about the word “Halvhalt” was discussed. After having discussed the definition back and forth, the definition was cited from the material used during the CBRNE-training. The current information was cited in the protocols and sent out to the organizations. This makes it important to ensure that the material is up to date, so it will not lead to confusion.

7.2.3 At the head of the organizations.

The questions and issues that are brought back to the organizations after the meetings, to be solved or discussed, should be prioritized and handled in a standardized manner, which also should make sure that the information reaches the members of the meetings and the persons working in the organizations that need to know. The number of times when the organizations train together should increase to improve the cooperation, which would make sure that the organizations are learning, but there should also be an interest in checking that improvements are made regarding fulfilling the indicators. As changed behavior indicates learning, and learning should further change the results of the indicators. Therefore, the result from the meetings should be compiled and discussed periodically. If improvements are not

made, then there should be further investigations and discussions. Much of the work to become a learning organization starts at this level, as norms within organizations affect the outcome, it is important that it is clear that the indicators are prioritized and that an open and warm climate is ensured. Even if learning cannot be forced upon an individual, it is important that a culture within the organization is developed where personal mastery is practiced. To become a learning organization, the assumptions that are held by individuals and organizations must be challenged, as individuals tend to espouse theories which they intend to follow, but also have theories-in-use which are the theories that are followed. An example is the individual ability to take the command at the incident scene as a medical incident commander. It is also important to develop a shared vision to motivate the staff to learn, as it further creates a common identity that brings focus and energy to learn. Meaning to get the staff to feel importance about cooperation and sharing information.

7.3 General Discussion

The research questions about how the indicators are used and how the use of the indicators can be improved, have been discussed. Further, improvements of the indicators do not ensure that the indicators actually are improved. Imagine a speedometer in a car. The speedometer itself is not the speed, instead it is an indicator of the speed. If the speedometer does not represent the speed in a correct manner, it is not valid and reliable. This is also true about the indicators of Samverkan Östergötland. It is therefore important to make sure that the indicators are measuring what they are suppose to measure.

7.4 General Conclusion

The result indicates that the indicators are fulfilled in varying extent whereof the reason of being so is in some cases clearer than in others, for example, the lack of ability to identify oneself at the incident scene as a police incident commander is quite clear, as the police do not have the ability to physically mark themselves. The reason “unnecessary” was brought up several times as an explanation to several cases where the indicator was not fulfilled. This is interesting as the result indicates that the indicators are important, not only to ensure quality, but also for the safety for the staff at the incident scene. It suggests that the staff do not understand the importance of the indicators and the benefits from fulfilling them. In several cases there was an understanding afterwards, at the meetings, of the importance of fulfilling the indicators, when evaluating the work in accordance to the indicators. Still the same indicators keep not being fulfilled. It should therefore be ensured that the information and

questions from the meetings reach all concerned persons in the organizations, and that information also flows back to the meetings. Another way to establish a deeper understanding and to ensure that the work at the incident scene is done in accordance to the indicators, is to increase the common training. The aim is that every person that may become a commander of his or her organization is trained in accordance to the indicators, but it might take years before a person is trained again regarding cooperation in accordance to the indicators. The organizations are experts in their own domain, and do not hesitate to do their job at the incident site. Both in accordance to the own goal and the overall goal, but there is a lack of a common understanding about how to cooperate together and to make sure that shared situation awareness is established.

7.5 Recommendations

To increase the effect of the indicators in order to become a better learning organization some recommendations are presented. First, there should be more research regarding the implementation of the indicators at the incident scene by applying a system approach, including all levels of the organizations, as one level affects other levels. In order to do so, following crucial findings from the study are highlighted.

Standardization. There should be a standardized and transparent way of documenting what is discussed and decided at the meetings, and a standardized method about how to inform others of what have been discussed at the meetings. It is also important to make sure that questions that are brought up during the meetings, reach the right persons in the organizations and that the information then is brought back to the concerned persons in the organizations.

Another standardization that should be ensured is that all organizations use the same words and that it is also ensured that the words have the same meaning in all organizations.

Increase the training. More training where all three organizations train together in accordance with the indicators would probably improve the cooperation. Tentatively there should be determined how often each person should train and that it is documented when each person was trained in order to make sure that the ability of the staff is updated. Perhaps it should be considered to already begin the training while the persons are in basic training to become police, fire fighter, or paramedic. It would be a natural step to take as cooperation between the organizations is routine.

Updated sources. It is important that the material of the CBRNE-course is up to date, as it is not only material for the training, but also used during the meetings of Samverkan Östergötland when there are discussions and questions about definitions and meanings.

Periodical evaluations. It is important to establish an overall organizational understanding of why the indicators are used and the benefits of using them. Perhaps there should be reoccurring structured evaluations of the protocols, not only to ensure quality but also to give feedback to the organizations in order to notice recurrent issues.

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Appendix A: **Translations.**

English	**Swedish**
Cooperation	Samverkan
Command and control	Ledning
Social disturbance	Samhällsstörningar
Talkgroup	Talgrupp
Ambulance incident commander	Sjukvårdsledare
Medical incident commander	Medicinskt ansvarig
Through the windshield report	Vindruterapport
Rendez-vouis point	Brytpunkt
Decision on course of action	Inriktningsbeslut
On-sight command post	Ledningsplats
Collection area	Samlingsplats
Incident site	Olycksområde (blåljuspersonal arbetar)
Incident scene	Olycksplats (geografisk)
Rescue services	Räddningstjänst
Medical service	Ambulans
Chief of rescue	Räddningsledare
Police incident commander	Polisinsatschefen