

# **The work at an Emergency Call Centre: Comparison between the Operator Perspective and a Communication Model**

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**Abstract**

The purpose of this study was to identify important aspects of the work at an emergency call centre during large-scale incidents, according to the operators who work there. As communication has been regarded as an important factor in complex situation, this study will also investigate to what extent the work at the call centre can be understood as communication. To determine this, semi-structured interviews have been conducted, asking 14 operators about their work at the emergency call centre. The recorded interviews were transcribed, unitized and coded on a content model and a tool for communication, ISBAR. The content model was developed on the basis of a bottom-up thematic analysis, and consists of 12 sub-themes arranged into six themes. The content model accounted for 93.6% of the total amount of statements, and the remaining 6.4% were irrelevant statements for the work at the call centre during large-scale incidents. Hence, this may imply that the content model still present all the important aspects of the work at the emergency call centre during large-scale incidents according to the operators who work there. ISBAR tool of communication account for 10% of the total amount of statements, which imply that the work at the emergency call centre is complex and consist of several factors in addition to communication. This implies that the work at the call centre during large-scale incidents is more complex than just dealing with communication. This study contributes to understand the work at emergency call centre during large-scale incidents, and elaborate the complexity of this work.

### **The work at an emergency call centre**

Many large-scale incidents have occurred during the last few decades that have caught our attention. The September 11 attacks in New York, the terrorist attacks in Madrid (2004) and in London (2005), the bombing in Boston (2013) and the hurricanes on the west coast of United States are some examples. Also, in Norway there have been several emergencies such as the sinking of the speedboat Sleipner in 1999, the train-incidents in Lillestrøm and in Åsta in 2000, the plane crash in Kebnekaise in 2012, several floods and landslides, and most recently the terror attacks in Oslo and Utøya in 2011. These extreme events have a great impact on the world at the time they occur and for a long time afterwards in terms of loss of lives, damage to the environment and the economy. Whether people or nature cause these types of accidents, situations like these are not easy to manage because of uncertainty, unpredictability (Janssen, Lee, Bharosa & Cresswell, 2010), incomplete information (Carver & Turoff, 2007) and urgency (Quarantelli, 1993). Thus, each incident to some extent is unique (Dugdale, Darcy & Pavard, 2006). Human control and emergency management are needed in order to limit the consequences, but because of the unpredictability that is a challenge.

It is essential to understand the processes and responsibilities within the emergency services as well as the complexity of the situations, in order to improve the emergency management.

Rouse, Cannon-Bowers and Salas (1992) claims that complex situations have six characteristics. First of all, the environment is highly dynamic and everything changes fast. Consequently, priorities and goals shift, decisions are made faster and often based on incomplete information. To handle large-scale incidents, teams are involved with different roles and responsibilities. The Ministry of Justice and public security define a large-scale incident as

“an incident such as a major spill, a fire or an explosion in relation to an activity in an organization that develop uncontrolled which immediately or later provide harm on people or property inside or outside the organization, and where hazardous chemicals are involved” (Storulykkeforskriften, 2005).

These complex situations require human control and emergency management with the mission to limit the consequences (Dunn, Lewandowsky & Kirsner, 2002), and as Rouse et al. (1992) claims that a team of people from different domains need to cooperate in these kinds of emergency situations (Carver & Turoff, 2007, Ministry of Justice and public Security, 2012).

A major part of emergency management and most roles are carried out closely to the incident site, but “one of the most important roles in emergency systems is the provision of intelligent feedback on the local requirements for handling an on going situation” (Carver & Turoff, 2007). This responsibility belongs to the operators at the emergency call centre, as they dispatch and organize the preferred resources. It is important not to forget the significant work they do as part of the emergency management. With the goal of increasing safety for citizens, limiting the loss of lives and damages by improving the emergency management, it is essential to understand the work they do at the emergency call centre.

As the call centre is organized differently within the different emergency services, a description of one of the emergency service’s call centre follows. The mission of a centre is to receive and register emergency messages, alert sufficient emergency resources, and communicate as a link between the emergency resources and the caller, related to a specified geographical area. (Norwegian Directorate for Civil Protection, 2012, Brann- og eksplosjonsvernloven, 2002, Forskrift om organisering og dimensjonering av brannvesen, 2002). The geographical areas differ within the emergency services. Additionally, the call centre needs to be staffed with qualified personnel so the emergency messages are received, registered, and monitored the best way (Norwegian Directorate for Civil Protection, 2012, Forskrift om organisering og dimensjonering av brannvesen, 2002). Complex situations require a cooperative effort, and the emergency call centre need to coordinated with call centre related to the other emergency services (Norwegian Directorate for Civil Protection, 2012, Forskrift om organisering og dimensjonering av brannvesen, 2002).

The task of coordinating with operators at other emergency centre requires cooperation between operators at that specific centre as well as with the emergency teams in the field and the caller. As the coordination of an emergency situation involve many different people, it is important to develop a common understanding of the situation (Leonard, Graham, & Bonacum, 2004) so that everyone can communicate efficiently. The team of people working together in emergency situations differ related to the location and situation, so a basic understanding of the organization, as well as roles and responsibilities related to emergency management are essential (Ministry of Justice and Public Security, 2008, Frisch, Røsjarde, Lea, Bjørneboe & Refvik, 2007).

This is one example displaying the knowledge and skills required to manage tasks at an emergency management. Procedures and how to operate their technical system (Glickman, Zimmer, Montero, Guerette & Campbell, 1987, Dunn et al., 2002) are other examples. Task-specific factors (Dunn et al., 2002), task work (Glickman et al., 1987) or technical knowledge

(Flin & Maran, 2004) are different expressions used for these types of knowledge and skills. In addition, skills that are related to function effectively as a team member (Glickman et al., 1987) are important. Non-technical skills (Flin & Maran, 2004) or teamwork skills (Glickman et al., 1987, Dunn et al., 2002), including cognitive and social skills (Flin & Maran, 2004), are also important for managing and improving emergency management (Flin & Maran, 2004).

As the management of emergencies depends on people from different domains to work together, the variety in background and perspectives may lead to different understandings of the situation. To create a more comprehensive picture of the complex situation, sharing of information is essential. It applies between people in the field and the operators, both within and between different agencies. The operators depend on their understanding and evaluation of the situation as they dispatch and organize the preferred resources.

Another challenge regarding the exchange of information between emergency services is the fact that Norway is a long and hilly country with sparsely populated areas (Rake, 2008). Rescue services in these areas such as the police, healthcare and fire departments have a greater distance between responders who need to cooperate. Due to these sparse locations of emergency services and the fact that the governments are responsible for emergency management (Comfort, 2005, Petak, 1985), they depend on a nationwide volunteer effort. There are many factors involved when trying to manage large-scale incidents.

The information must be frequent and accurate to help everyone acquire a better understanding of the situation. With the importance of communication in mind, to what extent can the work at an emergency call centre be understood as communication?

### **Communication**

The importance of communication was described in the report from July 22 (Office of the Prime Minister, 2012). An example is a “sticky note” with a description of the terrorist and his vehicle, given from an employee at the switchboard to an operator at the emergency call centre. Thus the content of the information was crucial but the process of how the information was exchanging was not satisfactory. It took nearly 20 minutes before anyone was aware of the note before it was forwarded to the emergency crews in the field.

Within high-risk industries such as aviation, military, the nuclear industry, the acute medicine and other emergency first respondent services, failure in communication during crisis situations has led to major consequences (Værnes, 2003, Kozlowski & Ilgen, 2006). As all of these industries depend on technology, safety is critical and mainly teamwork-based (Parush, Kramer, Foster-Hunt, McMullan & Momtahan, 2012), and the most important way



of managing unexpected and unpredictable situations is effective and good communication (Værnes, 2003). Effective and good communication has shown to be essential in team performance (MacMillan, Entin & Serfaty, 2004).

The importance of communication has been the focus especially within the military and the aviation industry. The importance of good communication is also well known within healthcare (Davies, 2005). Communication is linked to patient safety and anesthesia, with the goal of saving lives. Sharing information between nurses and doctors has been seen as a challenge as they are trained to communicate in different ways (Leonard et al., 2004), and small inaccuracies may cause fatal consequences. Exchange of information related to patients during hand-offs in an operation-context and in the emergency department is a situation where accurate and essential information are important (Parush et al., 2012). The industry focuses on communication skills both within the education of medicine and research (Marshall, Harrison & Flanagan, 2008, Finnigan, Marshall & Flanagan, 2010, Marshall, Flanagan & Harrison, 2007). The healthcare-industry is inspired by the military and aviation, where they started training programs regarding interpersonal skills, group dynamics and human errors. Due to accidents, focus on structured communication was seen as a way to improve the quality of information exchange (Marshall, Harrison & Flanagan, 2009).

Communication between team members is just as important regarding emergency management of large-scale-incidents (Dunn et al., 2002, Ministry of Justice and public Security, 2012). Exchanging information is the purpose of communication in order to get an understanding of the situation. The timing and content of the information is vital (Værnes, 2003). Particularly in the acute phase, where everything is very uncertain about what has happened and what is the scale of the situation (The Directorate of the Police, 2011). When the exchange and flow of information is inadequate, people do not know how to react and become reluctant (The Norwegian Directorate of Health, 2012, Office of the Prime Minister, 2012). Thus, it is important that the information is exchanged effectively during this phase (Frisch et al., 2007). During large-scale incidents, there will be a continuous need for updating information as the situation develops, and that need should not be underestimated (Frisch et al., 2007).

**Effective communication**

The concept of communication and effective communication in this context is that the message from the sender intends to provide a common understanding of the situation to the receiver (Værnes, 2003). In connection to the intention of the communication is the fact that the sender needs to encode the message and the receiver needs to decode the message, so they both can understand the content of the message in the same way (Rommetveit, 1972). The word defined as itself, does not have any meaning. The message is created in the context of the situation and between the sender and the receiver (Værnes, 2003). Thus, the importance of both sending and receiving information, and understanding the content of the information are related to effective communication (Blakar & Nafstad, 2004).

Even thus, exchange of information is important, forwarding all available information may result in information overload (Bharosa, Lee & Janssen, 2010, Janssen et al., 2010). Too much information may lead to loss of information, misinterpretation of the message and the information may not reach the correct receiver. Thus, it is important for the sender to consider what is the right information at the right time to the right person (Carver & Turoff, 2007). In the evaluation-report from “Øvelse Oslo 2006” it says the competence related to evaluating the need of information could be improved (Frisch et al., 2007). As the need of information is present at all times during a large-scale incident, the right time for information is as soon as possible in the acute phase and further ongoing. The right person depends on the situation and what kind of information that person request or need (Carne, Kennedy & Gary, 2012).

However, the loads of tasks in an emergency situation are major. Stressful situations often lead to handling complex environments badly (Værnes, 2003, Leonards et al., 2004). To improve communication during these types of situations simple rules and processes are valuable (Leonards et al., 2004, Marshall et al., 2009, Finnigan et al., 2010) and “order information in a logical and coherent manner and prevent important information from being forgotten” (Marshall et al., 2008, pp. 860). In the evaluation report from “Øvelse Oslo 2006” they concluded that they missed standards for information in the sense of how they exchanged and recycled information during the exercise (Frisch et al., 2007). In the report from July 22 they highlighted informal and inaccurate information, which made the emergency management more challenging (Office of the Prime Minister, 2012). Stout, Cannon-Bowers, Salas & Milanovich (1999) found that teams who used more efficient communication strategies performed better than teams that used less efficient communication strategies in segments characterized by high workload. The emergency services have developed regulations for both internal and external communication (The Directorate of the Police,

2009), which shows they recognize the value of effective communication during emergencies.

It is essential to pass on information in a simple and concisely manner during large-scale incidents, as the amount of information often is major. A fixed structure for communication ensures all essential content is delivered consistently. To use a particular tool is a way to exchange information efficiently. Thus, ISBAR, a tool for communication is an example of this, and will be presented in the next section.

### **ISBAR tool of communication**

In the 1980 the aviation industry discovered that a large percentage of air crashes were caused by human errors due to communication failures between crewmembers (Leonard et al., 2004, Helmreich, Merritt & Wilhelm 1999). A process of training crewmembers started, and several generations of training programs were designed to manage errors by developing non-technical skills among crewmembers (Powell & Hill, 2006, Helmreich et al., 1999). In the beginning focus was with cockpit crews, but extended to other groups within airlines as well as the military and other high-risk industries (Powell & Hill, 2006, Helmreich et al., 1999). As they focused on non-technical skills, concrete system processes and standardized tools for communication were developed to help manage errors. Implementing them showed great success (Powell & Hill, 2006), and is now widely used within an even larger number of domains such as air traffic control, the merchant navy, the nuclear power industry, and teams on offshore oil and gas installations (Mearns, Flin & O'Connor, 2001).

The health care industry was specially inspired by this mentality in the late 1990. A concrete tool for improving communication of critical information was developed by the US Navy and implemented by a team of health care providers (Monroe, 2006). They learned about different human factors experience during aviation, and focused on standard tools and behaviors to improve safety and to ensure effective communication between doctors and nurses (Leonard et al., 2004). Their intention was to improve patient safety by getting a common understanding of the situation (Leonard et al., 2004). ISBAR is a tool that structures the communication, and can be seen as a template to follow for exchange of information. The tool is now focus in hospitals and medicine research across United States (Cunningham, N. J., Weiland, van Dijk, Paddle, Shilkofski & Cunningham, N.Y., 2012), Australia (Thompson et al, 2011), Sweden (Sveriges Kommuner och Landsting, 2010) and Denmark (Trier, 2012).

The original SBAR-tool (Leonard et al., 2004) has been adapted to become ISBAR (Marshall et al., 2008), and consists of Identify, Situation, Background, Assessment and Recommendation.

*Identify*: your name, who you are/you occupation, your location, identify the incidents location

*Situation*: what is going on at the current time, what is the problem.

*Background*: what is the background or context of the situation, state the history.

*Assessment*: analysis and evaluation of the problem

*Recommendation*: what could you do to correct the problem, advice, suggestions and solutions

### **Crew Resource Management**

The focus on communication within the airline industry was one of the six non-technical skills included in the development program of “Crew Resource Management” (Mearns et al., 2001). Communication may be seen as “the key component of any successful CRM program” (Powell & Hill, 2006, pp. 185). And, communication underpins all the other CRM elements (Mearns et al., 2001). The importance of communication may be seen in connection to other components such as decision-making, teamwork, situational awareness, personal limitations and leadership. These were all regarded elements related to the management of human errors (Mearns et al., 2001, Powell & Hill, 2006, Helmreich et al., 1999, Hohenhaus, S., Powell & Hohenhaus, J. T., 2006). The fact that several factors seems to be important for managing complex situations leads to questioning the significance of communication, hence that communication may be one dimension of emergency management.

### **Questioning of the significance of communication**

As the goal of emergency management is to protect the citizens from harm, the performance of their work is important. To improve their performance, continuous improving of the system is needed. Traditionally the focus for a safer system has been discussions concerning previous mistakes or what could potentially go wrong (Hollnagel, 2011). Since communication has been presented as an important non-technical or team skill where things have gone wrong and improved, emergency management are complex and thus consists of several factors. Dunn et al. (2002) claims that both good task work and teamwork are required for optimal performance. This may imply that these complex environments consist of more than just the parts alone that lead to the fact that things go wrong, it is the interaction in the organization that makes the system complex.

The system theory assume that it is the impact that the parts have on each other that makes a system, thus no part can be complete by itself (Meister, 1999). All parts need to interact with each other to fulfill the overall goal of the system; the complexity of the system is a fact. An example is the airline industry, where an organization consists of more than the planes and the pilots (Meister, 1999). As well as the planes, the pilots and their technology in the cockpit, the organization consists of the passengers, the crew on board and their equipment, the leadership of the company and their commercial objectives, the ticket inspectors and the ground-crew, the aircraft mechanics, the air traffic controller and their procedures, and so on. Thus, to understand the airline industry you will have to consider all of these parts in a relationship and as one system all together.

A perspective that focus on the system as a whole are the resilience engineering perspective. This perspective helps cope with complex situations and how to succeed under these conditions by understanding the performance of the whole system (Hollnagel, 2011). To understand how it fails and how to improve it, it is not enough to focus on negative outcomes. In addition, it is essential to review positive outcomes. As most scenarios have positive outcomes, it is important to also focus on these positive outcomes (Hollnagel, 2011). This perspective claims that by increasing things that go right more than things that go wrong will automatically reduce negative outcomes (Hollnagel 2011). So, to understand the system it is vital to review all parts of the system, and both its positive and negative outcomes.

The report from July 22 (Office of the Prime Minister, 2012) describes this important aspect in relation to the perspective of managing complex situations. As it is easy to accuse the cause of failure to human error, deficient systems may be the actual cause (Office of the Prime Minister, 2012). Focus on the interaction between people in the system, or as a part of the system, should not be missed. However, it is also essential to understand the separate parts the system consists of to properly understand the big picture (Office of the Prime Minister, 2012). Further, the report concludes there are many conditions that require improvement (Office of the Prime Minister, 2012), implying the complexity of emergency management.

With that in mind and in order to protect the citizens from harm by increasing their safety, the focus of this thesis is to understand the big picture of emergency management at an emergency centre. Because the work during large-scale incidents seems to be complex and to consist of many topics, a further investigation are thus needed to get an understanding of the work at the emergency call centre during large-scale incidents. Communication has been regarded as one important factor in complex situations, but the question is the significance of this topic.

### **The present study**

*The aim of this study is to identify important aspects of the work at an emergency call centre during large-scale incidents according to the operators who work there.*

As communication has been regarded as an important factor in complex situations, this study will also focus on communication as a part of the work at the centre, and thus:

*Investigate to what extent the work at the call centre can be understood as a communication.*

To determine this, semi-structured interviews have been conducted asking the operators about the work at the call centre during large-scale incidents. The interviews followed a SWOT-structure, which gave the operators an opportunity to speak freely and open about their thoughts. The interviews have been transcribed and unitized into statements, and a bottom-up thematic analysis of the material has been conducted. All of the statements have been coded according to the themes in the content model aligned from the bottom-up thematic analysis, and a communication tool, ISBAR. Statistical analyses were conducted, to see the distribution of the themes. For further description of the method, see the method section. The following hypothesis will test to what extent that is the case.

The results from the bottom-up thematic analysis describe themes that are important factors regarding the work at the call centre during large-scale incidents. As the operators only talk about the work at the call centre during large-scale incidents and the bottom-up thematic analysis covers all of these topics, the hypothesis are as follows:

Hypothesis 1: There is no significant difference between the total number of statements and the number of statements captured by the content model.

As communication is regarded as an important factor in complex situations, it may also be an important factor for understanding the work at an emergency call centre during large-scale emergencies. The ISBAR communication-tool is a tool to improve communication of critical information and thereby ensure effective communication (Leonard et al., 2004). Therefore the communication-tool ISBAR should account for a majority of the total amount of statements.

Hypothesis 2: There is no significant difference between the total number of statements and the number of statements captured by the ISBAR communication-tool.

If the themes in the content model cover all of the aspects important for the work at the call centre and the work can be seen as a communication-process, then there will be no differences between the amount of statements covered by the content model and the ISBAR communication-tool. Therefore the hypothesis will be as follows:

Hypothesis 3: There is no significant difference between the number of statements captured by the content model and the number of statements captured by the ISBAR communication-tool.

As the themes from the bottom-up thematic analysis expect to cover all aspects important for the work at the call centre during large-scale incidents, statements that fall outside these themes will be regarded as irrelevant for the work at the call centre during large-scale incidents. An additional assumption regarding the hypothesis to be investigated in this study will be:

Statements not covered by the content model or ISBAR do not account for the work at the call centre during large-scale incidents.

## **Method**

### **Project Background**

This thesis was written in connection to the research institution SINTEF, and their EU-funded project BRIDGE. SINTEF is the project coordinator, and collaborate with other research institutions, universities, technological firms and domain experts. The goal of the project is to increase the safety of the citizens of Europe, by developing technical and organizational solutions to improve the management of crisis and large-scale emergencies (BRIDGE, 2012). The project intends to focus on coordination and collaboration between and within emergency services and national borders. The project started in April 2011, and is expected to last until 2014.

### **Understanding the domain**

To understand the domain of emergency, different documents were studied. Some of the documents are common to all of the emergency departments, while others are specific to one emergency service. Strategically documents (Official Norwegian Reports, Reports to the Storting), Standard Operational Procedures and operational manuals (Politiets Beredskapssystem 1, Medisinsk Operativ Manual, Felles sambandsreglement, Håndbok for redningstjenesten), laws (Brann- og eksplosjonsvernloven, 2002), reports from exercises (TYR, Øvelse Oslo 2006, SkagEX11) and large incidents were read through, as well as an earlier thesis on the domain.

The researcher observed an exercise arranged by the Norwegian Railroad. The incident was a fire in a train inside a tunnel, with all the emergency units present, and the observation were done from the closest point to the incident. This gave the researcher a rich understanding of the operational work at an incident, and how the emergency response teams cooperate and communicate with each other.

The researcher also had the opportunity to observe a whole shift at the emergency call centre, talking to both the head of the department and several of the operators. This gave the researcher rich information about the daily work at the call centre, and how they use their support tools.

Through the connection with SINTEF, the researcher had the opportunity to attend at a seminar arranged by SINTEF regarding the support on decision-making during accidents. Speakers and participants from different domains participated, and this gave a rich supplement and insight to inexperienced parts of the emergency field.

### **Participants**

Participants in the study were operators in an emergency call centre in a larger city in Norway. As this was done as a case study of the call centre, 14 of 17 (82.4%) operators with a permanent position were interviewed. Four of them were permanent head of their team, five of them functioned as a substitute if a team member was sick, on vacation or training, and the rest function as operators. They had from 0.25 to 9 years of experience as full time operators ( $X=4.78$ ,  $SD=2.55$ ). Additionally, some had worked as a part time operator before they start working as a full time operator. The job as an operator requires education and experience in operational service, and everyone had experience from operational services either part time or full time service. Most of them had worked in full time service, and they had from 0 to 33 years of experience ( $X=15.93$ ,  $SD=9.6$ ). Some of the operators had worked in part time



service as well. Almost all of the operators was originally educated within handy professionals.

### **Data collection**

**Preparation.** Interviews were chosen as method to collect data, and were conducted by two researchers. To improve their interviewing skills, the researchers had conducted a three-day course to learn the PEACE-model (Clark & Milne, 2001). This model provides a framework for interviewing, and the five stages are as follows: planning and preparation, engage and explain, account, closure and evaluate. This model was used for preparation for the interviews.

**The interviews.** In front of the interviews the researcher had a meeting with the head of the department, and participated at a leader meeting with all of the team managers present. Information letters were sent by e-mail, and handed out to all of the operators in front of the interview. (See Appendix A). The two researchers developed an interview guide in common (See Appendix B), and the interviews were qualitative semi-structured interviews based on a SWOT approach. The SWOT-method examines the strengths (S), weaknesses (W), opportunities (O) and threats (T) regarding the topic in interest (Hoff et al. (2009). In the beginning of the interview the researchers asked demographical questions, as their former profession, years of experience from the field and as operator at the emergency call centre, and continued with the main questions: which strengths/weaknesses/opportunities/threats could you see regarding the work at the emergency call centre during large-scale incidents. These questions encouraged the informants to speak freely and open about their own thoughts and reflections regarding the work at the call centre, with minimal guiding from the interview guide. The intention is that they talk about topics that interest them, and what they find meaningful for the work at the call centre during large-scale incidents. Follow-up questions were asked to get additional information and to clarify statements, such as ‘Could you give me an example of that’ and ‘Could you specify what you mean by...’.

The two researchers conducted the interviews, one asked the initial questions and the other one observing and asked follow up questions. Every second interview, they switched roles. At the start of each interview, the operators were given the information letter once (See Appendix A) again and the two researchers briefly explained their project and that the interview were recorded. A consent form (see Appendix C) was signed, and the interview was initiated. To ensure the informant’s integrity and dignity, the researchers ended by asking if

they were okay.

**Conducting the interviews.** The interviews were conducted from November 26 until December 11, 2012, and they lasted approximately 44 minutes ( $R=20-74$ ,  $SD=13$ ). All of the interviews were conducted during the operators working time, in a meeting room in connection to the room where they work. All of the interviews were conducted in Norwegian to avoid language barriers.

### **Mixed model design**

The analysis was conducted following a mixed model design, which combines qualitative and quantitative research techniques, methods, and approaches (Johnson & Onwuegbuzie, 2004). The collection of the data was qualitative, conducting open-ended questions following the SWOT-structure. Then the data was transcribed, unitized and made quantitative through labeling the statements with numbers and coded according to the content model resulting from the bottom-up thematic analysis. Finally, statistical analysis was conducted to test the hypothesis.

### **Transcription**

All of the interviews were recorded, and transcribed liberal verbatim into Office Word by the researcher who observed the interview. The transcribing followed a procedure made by the two researchers (See Appendix D). The procedure stated that all incomplete sentences were not transcribed, just meaningful sentences (Poland, 1995). Demographical variables, practical information in the beginning of the interview and “mmm” and “ehh” were left out of the transcription. If unclear words were spoken, the researchers did not interpret the meaning (Poland, 1995). During the transcription the researchers listened and read through every part of each interview to ensure correct transcriptions.

### **Unitizing**

The transcription was unitized into meaningful statements, following a procedure developed by the two researchers (see Appendix E). The goal for the unitizing was to isolate text into meaningful statements that tell anything about an operators' daily work. A meaningful statement was defined as a unit large enough to carry out one meaning and small enough to be feasible (Krippendorff, 2004). A statement needed to be as short as possible, but it still had to be meaningful. In the beginning the two researchers unitized a defined parts

together, followed by a separate unitizing of the next part. The inter-rater agreement after the first comparison was at 60%. The test was based on Zarghooni's (2011) adaption of Boyatzis' (1998) percentage of agreement of presence (P.A.P.). After a clarification of the unitizing procedure and more unitizing, the second comparison showed an inter-rater agreement at 76,5%. Once the researchers had compared the differences, the majority were examples. Then the researchers discussed how to unitize examples, before they went on with unitizing the rest of the interviews separately. During this process the two researchers kept a close dialogue, and met regularly to discuss challenges and to clarify procedure to ensure maintenance.

### **Analysis**

**Bottom-up thematic analysis and Coding.** After unitizing all of the interviews, the statements were imported to SPSS for a bottom-up thematic analysis. The aim of a bottom-up thematic analysis is to discover patterns and further themes out of the material, without being theoretically bounded. The analysis was based on the framework described by Braun & Clarke (2006) for a thematic analysis. Preparation for the thematic analysis was done by taking notes about interesting themes that appeared in the data material, while the researchers did the unitizing and the transfer to SPSS (Braun & Clarke, 2006). Then the two researchers met and merged their themes to 15 initial codes. The researchers worked systematically through 150 statements separately and calculated the inter-rater reliability. To make the inter-rater reliability even better, they reviewed the initial codes and merged some of them. After this review they had 14 codes, and coded another 150 statements separately. After another calculation of the inter-rater reliability and times of reviewing the codes the researchers ended at 60% agreement, and reviewed the initial code another time. Then they started to work through the entire data set (Braun & Clarke, 2006), dividing the material between them and coded all statements into the codes. Through this process the researchers edited the codebook (See Appendix F), and ended with 12 codes and one code for statements that did not fit any code (residuals). The codes were given numbers from 1 to 12, and all statements were tagged with the number associated with the code in SPSS.

Following Braun & Clarke (2006), the next step in the procedure was to "sort the different codes into potential themes" (Braun & Clarke, 2006, pp. 89). As recommended by Braun & Clarke (2006) the researchers used visual representations to sort and figure out the relationship between the different codes or sub-themes. They reviewed the themes a few times, where some themes showed not to be a separate theme and were merged into another theme, while others needed to be broken down into separate themes. The two researchers read

through all the statements including a theme, to check the connection and if they made a coherent picture of the themes. They also read through the entire data set, and looked for statements that had been put in the wrong code. Some smaller adjustments were made, and they did as Braun and Clarke (2006) recommended and stopped the adjustments because they felt that more refinement would not add any more benefits. The researchers ended up with six themes and a set of residuals where the themes embraced equally large amount of areas regarding the work at the call centre. The themes were given numbers from one to six, and all statements connected to codes that were included in a theme were given the right number (See Appendix F). All statements were connected to the right theme in SPSS, for further analysis.

To clarify, the bottom-up thematic analysis resulted in a content model consisting of 12 sub-themes arranged into 6 main themes, and one theme for statements not relevant for the work at the emergency call centre during large-scale incidents. For further description of the sub-themes and themes, see the result section.

The same units were then coded regarding the ISBAR-tool. The categories were operationalized and defined based on the original article (Leonard et al., 2004) and the adaption of ISBAR by Marshall et al. (2008). All statements in the SPSS-file were coded into the five categories and the one category for residuals, according to the codebook (See Appendix G). After coding all of the statements, the codebook was slightly reviewed and the statements with codes were read through again to ensure the interpretation and the coding of the statements. All statements were tagged with the related number in SPSS for future analysis.

As “analysis is not a linear process of simply moving from one phase to the next” (Braun & Clarke, 2006, pp. 86), it was found more appropriate to code on the ISBAR again and make the variable dichotomous. In other words, the statements were coded either as ISBAR-statements or not as an ISBAR-statement according to the operationalization of the ISBAR-tool.

**Statistical analysis.** After the statements were coded and given numbers in SPSS, the statistical analysis was conducted. Since the intention of this study was to identify important aspects of the work at an emergency call centre during large-scale incidents, statements were chosen to be the level of analysis. It was considered to choose operators as level of analysis, but this was not found appropriate in terms of the aim of the study. Descriptive statistics, as frequency and percent, were performed to understand the data-material, and paired-samples t-tests were conducted to test for hypothesis 1, 2 and 3. T-tests were chosen to test if the

differences in number of statements were significant. To measure the magnitude of the results, the effect size was calculated following Field (2009), and evaluated using Cohen's  $d$  (1988) and Pearson's  $r$ . A Bonferroni adjustment was considered to control the overall Type 1 error because multiple tests were carried out (Pallant, 2010). However, Perneger (1998) state that a Bonferroni adjustment for multiple tests is unnecessary and may create more problems than solutions, thus it was decided not to conduct that adjustment.

### **Ethical considerations**

Prior to the interviews, the informants were given information about the purpose of the interviews and that it was voluntary to participate. Prior to the interview and during the interview, the informants had the opportunity to end the interview at any time, without providing any reason. However, the interview and the research do not assume to harm the informants in any way. The informants were given information that the interview were taped with a voice recorder, and that only members of the BRIDGE team at SINTEF were the one with access to the recordings. The recordings will be deleted after the BRIDGE project ends in 2014. The focus of the importance of anonymity were communicated to the informants, especially in relation to the transcription, to ensure that statements not could be traced back to a specific informant.

In addition to the information given prior to the interview, this information was repeated at the start of each interview, and the informant gave their informed consent to participate in the project. (For information letter see Appendix A, and for consensus form see Appendix B).

As this research is a part of the BRIDGE project, the Norwegian Social Science Data Services has given SINTEF permission to gather and store data connected to the BRIDGE project (Project nr 28066).

### **Results**

The aim of this study was to investigate the work at an emergency call centre during large-scale incidents, thus the focus has been twofold. The first mission was to identify what operators regard as important aspects of their work, and second to what extent the work at the call centre can be understood as a communication. Through semi-structured interviews and a bottom-up thematic analysis we ended up with a content model consisting of 13 sub-themes, which emerged from the interviews with the operators at the call centre. The sub-themes were further arranged into six main themes, and one theme for residuals, including statements that

did not fit into any of the other sub-themes. The sub-themes will first be presented, then the main themes ending with an analysis of the residual theme. Further, descriptive statistics will be presented, as well as the results of the hypothesis testing.

### **Description of sub-themes**

The sub-themes are as follows: (1) Characteristics as Operator, (2) Drills and Exercises, (3) Experience and Competencies, (4) Selection and Recruitment, (5) Organization of the Emergency units, (6) Resources, (7) Support Systems, (8) Relations, (9) Communication and Information flow, (10) Overview of ongoing incidents, (11) Operational Support, (12) Adaptability and Preparedness and (13) Residuals. Now follows a detailed description of the sub-themes.

**1. Characteristics as Operator.** This sub-theme captures the individual differences regarding the operator, as the job as an operator is not suitable for all kind of people. To do a good job at the call centre, you need to have the right motivation and be interested in actually doing a good job. Personal aptitudes are also included in this sub-theme. The work at the call centre may be stressful at times. It is important for operators to possess the skills and the abilities to handle stressful situations, to be attentive, and to maintain staying calm under pressure. The following is a quote that explains the fact not everyone is suitable for the job at the call centre:

*“That is a part of working here. Either you deal with it, or you don’t.”*

**2. Drills and Exercises.** The importance of developing and acquiring skills and competencies are included in this sub-theme. Having drills and exercises, both inside and between units, are ways to developing skills. In this respect you will need to practice both existing as well as new procedures. The slogan “train as you fight” is an expression that means always follows the same blueprint when handling incidents, regardless of the magnitude of the incident. Education, to develop and acquire skills and competencies, are also captured by this sub-theme. The following quote is an example of a statement regarding drills and practicing:

*“I believe that practicing and drilling, are the most important.”*

**3. Experience and Competencies.** This sub-theme regards both earlier and present experience and competencies. This may be experience from an earlier profession or from operational duty. Knowledge of the city, its specialties and the local area are included, as well as knowledge and skills to efficiently use the support systems and tools. The operators have a wide variety of experiences and competencies, statements regarding the importance of utilizing the variety is captured by this sub-theme. The following quote gives a description of how the informants value their background:

*“I believe that your background from the field are quite important.”*

**4. Selection and Recruitment.** This sub-theme regards recruitment practices and the selection process of operators to the call centre. Relevant criteria for selection, and other challenges related to recruitment are captured by this sub-theme. An explanation of relevant criteria for recruitment is as follows:

*“The optimal operator would be technically savvy with computers and have definite experience from the field”*

**5. Organization of the Emergency units.** This sub-theme includes levels from different organizations, the call centre, the department and all other emergency units. Statements about the organization at the call centre capture topic regarding roles and responsibility, physical environment, the learning and development structure, and the organization of the operators as a resource. Statements about the organization of the department regard the fact they are a municipal organization and that they are depending on the economy of the municipality, which impacts the availability of resources etc. Local cooperatives and statements about the co-locations of the call centre are captured in this sub-theme. Statements regarding the organization of the emergency units are about the cooperation between the units and how they are organized differently. The emergency units have different goals and practices, but they still need to cooperate together as a team often. Many statements are about the co-location of the emergency call centre and the current public discussion of having common emergency call centre. Statements about other countries and units regarding strategies to develop the organization are also captured by this sub-theme. The following statement is an example of the co-location of emergency call centre:

*“I believe the co-location of the emergency call centre, would be a cooperative advantage”*

**6. Resources.** This sub-theme includes the availability of personal and materials at the call centre and in the field. Regarding personal and materials in the field, statements are about the variety of resources available to the operators. Statements about the operators at the call centre as a resource capture the balance of operators vs. the strain on them. The following statement explains the availability of resources the operators are controlling:

*“We have an endless amount of resources available when a large-scale incident occurs.”*

**7. Support Systems.** This sub-theme is about the technical and organizational support of systems available at the emergency call centre such as the communication network, standard operational procedures and maps. Statements explain positive and negative aspects of these systems, and outline the potential improvements to make them more efficient. An example of a benefit from their computer-system is how it allocates resources, and suggests the closest and best type of cars based on severity, type of incident and location. The following statement is an example of that:

*“When an incident including dangerous goods are happening, there is a list of wanted cars available in our computer system.”*

**8. Relations.** The importance of good relations is captured by this sub-theme. The operators at the call centre interact with both each other, with operators at other call centre, their crew in the field and callers, and it is with those they need to have a good relation to. Chemistry and trust are highlighted topics. An example of this is when the operator tells the caller to stay inside the apartment because of the smoke; it is essential the caller actually trusts the operator and does as told. The next statement addresses the importance of good relations:

*“When you know people, it is much easier to ask for help. Especially when a lot of things are happening around you.”*



**9. Communication and Information flow.** This sub-theme captures the importance of communication and how information flow between people the operators connect with. There is a lot of information that flows in and out of the call centre, it is important to get the important and correct information, and ensure it is sufficient. It is also important to know how to communicate the information efficiently. Guidelines for communication and information exchange, and documentation are also included in this sub-theme as well as examples of important information.

*“It is important to differentiate information that is critical and important, and what is not.”*

**10. Overview of Ongoing incidents.** This sub-theme captures statements regarding the situations overview and the awareness at the call centre and at the incident site. To stay updated you need to have distributed attention and recognize important aspects in the situation. It is not sufficient to update yourself, as an operator you need to cooperate with the other operators to create situational overview together. Statements regarding their implicit knowledge of roles and tasks to get overview are also captured by this sub-theme. The importance of providing the leader with the opportunity to withdraw and monitor are also included. The following statement is an example of the leaders possibility to get an overview:

*“As an opportunity for the future I am thinking of the leader at the call centre and the importance of having the possibility to withdraw and get that total overview. He does not have that possibility today.”*

**11. Operational Support.** This sub-theme is about predicting the development of an incident, be proactive and come up with novel solutions. The operators and crew on site are mutually dependent of each other and they both need to support each other. The operators have to respond to requests from the operational personnel and give them information from the incident site so the operators can act accordingly. Being proactive by providing material and personal upon request, the whole operation saves time and lives. The following statement is a description on how they support each other and work as a team:

*“In a hectic situation at the incident site, it could be that the leader in the field does not think too far ahead. Since we know what is going on, we may come with tips and support the leader.”*

**12. Adaptability and Preparedness.** This sub-theme regards the importance of having the ability to adapt quickly and always be prepared for responding to the needs of the citizens. The operators have the freedom to evaluate the severity of the incident and to manage resources they find necessary for any incident. They also may choose not to follow the procedure to solve the incident in a better way. They need to maintain an overview of the recourses, and if needed they may conserve or redistribute resources to ensure they are prepared if a new incident happens. To meet the goals of the citizens by responding to their needs, it is important for the operators to cooperate. The following quote highlights the topic of adaptability:

*“The strength is that I have the opportunity to adapt, according to the seriousness and type of incident, the need of resources and the availability of resources.”*

**13. Residuals.** This sub-theme captures statements that are **not** about work at the emergency call centre during large-scale incidents. These topics will be further analyzed under the theme *Residuals*.

After organizing the statements into sub-themes and describing them, we found commonalities between some of sub-themes. This was in accordance with the recommendations from Braun & Clarke (2006) of sorting sub-themes into overarching themes regarding the content and relationship between the sub-themes. Thus, our 13 sub-themes were arranged into 7 themes, which will be presented in the next section. Some themes consist of four sub-themes, while other themes consist of two and one sub-theme. The systematization of the sub-themes into themes are inspired by Meisters (1999) system for categorizing variables as general, structural and behavioral.

## **Description of themes**

The themes are as follows: (1) Skills and Competencies, (2) Organization of the Emergency units, (3) Resources and Support systems, (4) Relations, (5) Information and Overview, (6) Operational goals, (7) Residuals. Now follows the description of the themes.

**1. Skills and Competencies.** This theme includes four sub-themes, *Characteristics as an operator*, *Drills and Exercises*, *Experience and Competencies* and *Selection and Recruitment*. All of these sub-themes capture topics regarding the operators at the call centre as a person, and are fundamentally important for the work at the emergency call centre during large-scale incidents.

**2. Organization of the Emergency units.** This theme is a theme that covers the organization of the call centre, the organization of the department, and the organization of the interaction between the different emergency units. See sub-theme number 5 above for more information of this theme.

**3. Resources and Support systems.** This theme consists of the two sub-themes *Resources* and *Support systems*. Both of them are physical conditions necessary to make the job at the call centre easier.

**4. Relations.** This theme highlights the importance of the operator to know others they are working with at the call centre and the individual they are talking to on the phone. For a further description of the theme, see sub-theme number 8.

**5. Information and Overview.** This theme consists of two sub-themes *Communication and information flow* and *Overview of ongoing incidents*. These sub-themes capture the importance of having information and knowledge about the situation to understand and create an overall image of what is going on.

**6. Operational goals.** This theme covers the two sub-themes *Operational support* and *Adaptability and preparedness*. Both of these themes capture topics regarding the overall goals when responding to the needs of citizens as well as being proactive and flexible for anything to happen.

**7. Residuals.** As some statements did not relate to work at the emergency call centre during a large-scale incident, they did not belong in any of the presented themes and were put into this theme. Statements about the operators past work and how they are working in the field are included in this theme. They also explain how they work in other departments and included other external factors but did not regard their work at the call centre. Some statements are about how they used to work at the call centre in the past, these are included in this theme as long as it does not have impact on the work at the present. The operators also shared information about their personal lives that do not influence the work at the call centre; these are excluded from the other themes. Several of the informants are interested in the definition of large-scale incidents, and they often explained about how they'd define it. Some of the statements included in this theme are answers to clarify ambiguities, words and expressions.

### **Descriptive statistics**

The 14 transcribed interviews were unitized into 3115 statements ( $R=80-348$ ,  $M=222.5$ ,  $SD=89$ ), and were the foundation of the analysis. Our content model accounted for 2916 statements (93.6% of the total amount of statements), while 199 statements were residual (6.4%).

The distribution of statements across the content model at sub-theme level is presented in table 1. As table 1 shows, there is not an even distribution of the sub-themes. Sub-theme 5 and 12 has the largest number of statements that included 518 (16.6%) and 499 (16%) statements. Sub-theme 1 and 4 stand out as having the lowest number of statements, they included 38 (1.2%) and 45 (1.4%) statements.

Table 1

*Distribution of statements across the sub-themes from the thematic analysis*

Sub-themes	n	% of total
1: Characteristic as operator	38	1.2%
2: Drills and Exercises	156	5%
3: Experience and Competencies	236	7.6%
4: Selection and Recruitment	45	1.4%
5: Organization of the Emergency units	518	16.6%
6: Resources	200	6.4%
7: Support systems	377	12.1%
8: Relations	133	4.3%
9: Communication and Information flow	356	11.4%
10: Overview of ongoing incidents	207	6.6%
11: Operational support	151	4.8%
12: Adaptability and Preparedness	499	16%
Sum content model	2916	93.6%
13: Residuals	199	6.4%
TOTAL	3115	100%

The distribution of statements across the main themes is presented in table 2. As the sub-themes were arranged into main themes, they account for 2916 statements or 93.6% of the total amount of statements, while 199 statements or 6.4% statements was residuals (Theme 7). Table 2 indicates there is a relatively even distribution, except in theme 4. This theme only accounts for 133 (4.3%) statements. It was decided that *Relations* should be an independent theme, since statements regarding this topic did not fit into any of the other themes. *Operational goals* hold the highest number of statements, including 650 (20.9%) statements. The rest of the themes range between 475 (15.2%) and 563 (18.1%) statements.

Table 2

*Distribution of statements across the main themes*

Themes	n	% of total
1: Skills and Competencies	475	15.2%
2: Organization of the Emergency units	518	16.6%
3: Resources and Support systems	577	18.5%
4: Relations	133	4.3%
5: Information and Overview	563	18.1%
6: Operational goals	650	20.9%
Sum content model	2916	93.6%
7: Residuals	199	6.4%
TOTAL	3115	100%

The ISBAR-tool conducted for 313 statements or 10% of the total statements, and 10.8% of the statements accounted for by the content model. ISBAR and the content model accounted for 93.6% of the total amount of statements, with an overlap of 10% of the same statements. No statements were unique for ISBAR. Table 3 presents the distribution of statements accounted for by the ISBAR tool.

Table 3

*Distribution of statements accounted for by the ISBAR tool*

	n	% of total
Not ISBAR	2802	90%
ISBAR	313	10%
TOTAL	3115	100%

The distribution of ISBAR across the themes is presented in table 4. The table shows the two themes *Information and Overview* and *Operational goals* account for 90% of the total amount of statements regarding ISBAR. The *Relations* theme accounted for the last number of statements regarding ISBAR, with 1 statement (0.3%).

Table 4

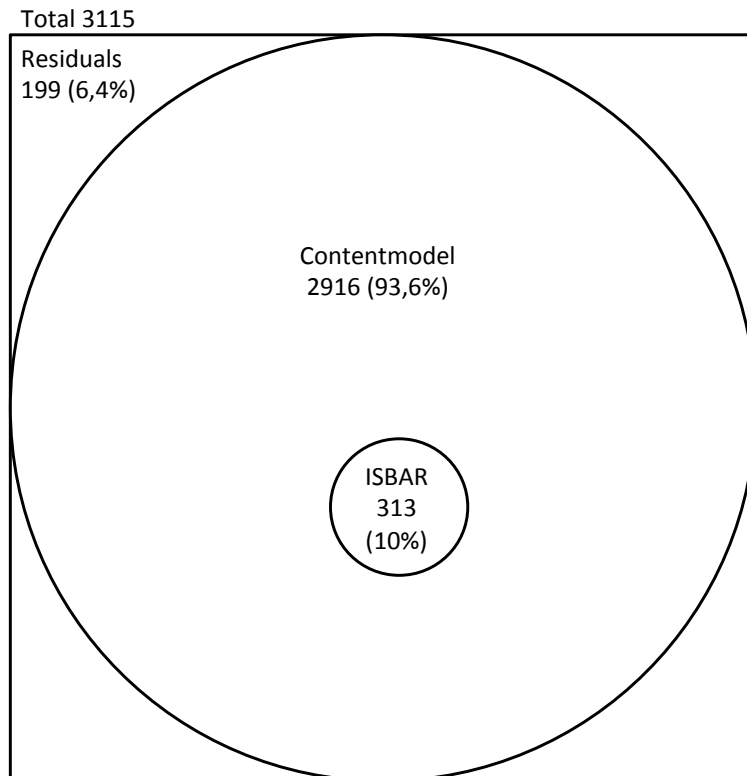
*Frequency distribution of ISBAR-statements across the themes in the content model*

Themes	ISBAR		Not ISBAR		TOTAL
	n	% of ISBAR	n	% of not ISBAR	
1: Skills and Competencies	6	1.9%	469	18%	475
2: Organization of Emergency units	11	3.5%	507	19.5%	518
3: Resources and Support systems	25	8%	552	21.2%	577
4: Relations	1	0.3%	132	5.1%	133
5: Information and Overview	130	45.1%	433	16.6%	563
6: Operational goals	140	44.7%	510	19.6%	650
TOTAL ISBAR	313	100%	2603	100%	2916
7: Residuals	0	0%	199	6.4%	199
TOTAL of content model	313	10%	2802	90%	3115

As Figure 1 illustrates, the content model accounts for 2916 (93.6%) of the total amount of statements, while ISBAR accounts for 313 (10%) of the total amount of statements. 10% of the statements were accounted for by both the content model and ISBAR. None of the statements are unique for ISBAR, while 83.6% are unique for the content model. 199 (6.4%) statements were residual, and are not accounted for in either of the two models.

Figure 1

*Illustrates the overlap between the content model and the ISBAR tool of communication*



*Figure 1.* The relationship between statements accounted for by the content model and the ISBAR tool of communication. The content model accounted for 2916 (93.6%) statements of the total 3115, while the ISBAR tool of communication accounted for 313 (10%) of the total number of statements. Shared contribution is 313 (10%) statements, unique contribution of the content model is 2603 (83,6%) statements, while there is no unique contribution from ISBAR.

### **Hypothesis testing**

Hypothesis 1 predicted that there is no significant difference between the total number of statements and the number of statements captured by the content model. A paired-samples t-test was conducted to compare the total number of statements and the number of statements captured by the content model. The t-test showed that there was a statistical difference,  $t(3114) = 14.58, p < .0005$  (two-tailed). The effect size ( $d = .5$  and  $r = .24$ ) shows a medium effect, due to Cohen's (1988) guidelines of a medium effect size ( $d = .5$  and  $r = .3$ ). Thus, the hypothesis was rejected. However, this result must be considered in light of the additional assumption investigated in this study, presuming that statements not covered by the content model or ISBAR are irrelevant for the work at the emergency call centre during large-scale



incidents.

Hypothesis 2 predicted that there is no significant difference between the total number of statements and the number of statements captured by the ISBAR communication tool. A paired-samples t-test was conducted to compare the total number of statements and the number of statements captured by the ISBAR communication tool. The t-test showed that there was a statistical difference,  $t(3114) = 167$ ,  $p < .0005$  (two-tailed). The effect size ( $d = 5.95$  and  $r = .95$ ) shows a large effect, due to Cohen's (1988) guidelines of a large effect size ( $d = .8$  and  $r = .5$ ). Thus, the hypothesis was rejected.

Hypothesis 3 predicted that there is no significant difference between the number of statements captured by the content model and the number of statements captured by the ISBAR communication tool. A paired-samples t-test was conducted to compare the number of statements captured by the specific model and the number of statements captured by the ISBAR communication tool. The t-test showed that there was a statistical difference,  $t(3114) = 125.8$ ,  $p < .0005$  (two-tailed). The effect size ( $d = 4.5$  and  $r = .91$ ) shows a large effect, due to Cohen's (1988) guidelines of a large effect size ( $d = .8$  and  $r = .5$ ). Thus, the hypothesis was rejected.

The additional assumption to be investigated in this study presumed that statements not covered by either the content model or ISBAR are irrelevant for the work at the call centre during large-scale incidents. A total of 199 (6.4%) statements, were coded as residuals. An overall content analysis was conducted, indicating that these statements are not relevant for the topic of work at the call centre during large-scale incidents. This may imply the content model presents all the important aspects of the work at the emergency call centre during large-scale incidents according to the operators who work there.

## Discussion

The aim of this study was to investigate the work at an emergency call centre during large-scale incidents, and to identify what operators regard as important aspects of their work. As communication has been regarded as an important factor in complex situations, this study also investigated to what extent the work at the call centre could be understood as communication. Semi-structured interviews, following a SWOT structure, were transcribed and unitized into a total number of 3115 statements. Further, we created 12 sub-themes from the bottom-up analysis. These were arranged into 6 themes and one theme for residuals, which are topics the operators at the call centre, points out as important aspects of their work during large-scale incidents. (See the result section for further elaboration of the sub-themes

and themes.) These themes formed our content model, which accounted for 2916 (93.6%) statements. 2603 statements were unique for this model, as the ISBAR tool of communication accounted for 313 (10%) of the total number of statements. 199 statements were not captured neither by of the models, these were statements not regarding the work at the emergency call centre during large-scale incidents.

Hypothesis 1 was: *There is no significant difference between the total number of statements and the number of statements captured by the content model.* The intention was to test if the content model could account for the total number of statements, thus to find out if the content model presented all of the important aspects of the work at the emergency call centre during large-scale incidents according to the operators who work there. The content model accounted for 2916 or 93.6 % of the total number of statements. The frequency distribution across the main themes (presented in Table 2) showed *Relations* stands out as the theme with the lowest amount of statements (133 and 4.3%), while *Operational goals* stands out as the theme with the highest amount of statements (650 and 20.9%). The t-test showed there was a statistical difference between the total number of statements and the number of statements captured by content model, which means the result most likely is not a coincidence. The effect size ( $d = .5$  and  $r = .25$ ) shows a medium effect, due to Cohen's (1988) guidelines of a medium effect size ( $d = .5$  and  $r = .3$ ). A medium effect size indicates the result is not fully substantial, and the content model cannot account for all of the statements from the operators, and the hypothesis was rejected.

However, this result must be seen in light of the additional assumption investigated in this study, presuming that statements not covered by the content model or ISBAR are irrelevant for the work at the call centre during large-scale incidents. This may imply the content model actually present all the important aspects of the work at the emergency call centre during large-scale incidents according to the operators who work there. Even thus these statements were not relevant for the topic of work at the call centre during large-scale incidents, some of the topics in the residual-theme are still of general interest and will be discussed in connection to the discussion of the themes.

Hypothesis 2 was: *There is no significant difference between the total number of statements and the number of statements captured by the ISBAR communication-tool.* The intention was to test if the ISBAR communication-tool could account for the operator's statements regarding the work at the call centre during large-scale incidents. ISBAR accounted for 313 statements or 10% of the total number of statements. The distribution of ISBAR across the themes (presented in Table 4) showed the two themes *Information and*

*Overview* and *Operational goals* accounted for 89.8 % of the total amount of statements, while only 10.2 % were accounted for by the other four themes. The t-test showed there was a statistical difference between the total number of statements and the number of statements captured by the ISBAR communication-tool, this means the result is most likely not a coincidence. The effect size ( $d = 5.95$  and  $r = .95$ ) showed a large effect, due to Cohen's (1988) guidelines of a large effect size ( $d = .8$  and  $r = .5$ ). A large effect size indicates the result is substantial. Thus, the ISBAR cannot account for work at the call centre during large-scale incidents, and the hypothesis was rejected.

Hypothesis 3 was: *There is no significant difference between the number of statements captured by the content model and the number of statements captured by the ISBAR communication-tool.* The intention was to test if the content model and the ISBAR could account for the same number of statements. The two models accounted for the same 313 (10%) statements. The content model had a unique contribution of 2603 (83.6%) statements, while the ISBAR had no unique contribution. The t-test showed that there was a statistical difference between the total number of statements accounted for by the content model and the number of statements accounted for by ISBAR, which means the result most likely is not a coincidence. The effect size ( $d = 4.5$  and  $r = .91$ ) shows a large effect, due to Cohen's (1988) guidelines of a large effect size ( $d = .8$  and  $r = .5$ ). A large effect size indicates the result is substantial. Thus, the content model and ISBAR cannot account the same amount of statements, and the hypothesis was rejected.

### **Discussion of the sub-themes (1-12) and the themes (1-6)**

The intention of the bottom-up thematic analysis was to identify and systematize topics that the operators talked a lot about and thus found important regarding their work at the emergency call centre during large-scale incident. The analysis resulted in 13 sub-themes and 7 themes, where the last sub-theme and the last theme were residuals. Considering we had so many different factors representing the work at the call centre implies the work at the centre during large-scale incidents is complex. As well, it implies that communication as a factor is not enough to present management of large-scale incidents at an emergency call centre. Observations done by the researchers at the emergency call centre and from exercises indicated the result found in this study, although the observations was not a part of the underlying data material in this study. The complexity of the work and the relationships between the sub-themes and themes are discussed in the following section.

The complexity of the work at the call centre during large-scale incidents made the

development of the sub-themes and the themes a challenge. Several of the sub-themes are closely related to each other, and may correspond with more than one theme. The statements were arranged into sub-themes according to the codebook developed by the two researchers.

Even though the content model at first sight did not seem to cover all statements, the statements not covered by the content model or ISBAR are irrelevant for the work the centre during large-scale incidents. This may imply the content model actually present all the important aspects of the work at the emergency call centre during large-scale incidents according to the operators who work there. The content of the statements not captured by the content model will be discussed later in this section.

Many of the topics were mentioned by several of the operators, but some operators were more concerned with different topics than other. This shows that they have quite a similar experience of the work at the call centre during large-scale incidents, but also that they have their special field of interest that they talk a lot about. It could be because they have different areas of responsibility, and find that special area interesting and thus important to talk about.

In order to understand the big picture of the work they do at the call centre, each sub-theme must be seen in relation to their main theme and the other sub-themes. In the next section follows the discussion of the themes and sub-themes.

Starting with theme one, *Skills and Competencies*, which has the lowest percent of statements related to sub-themes. All of the sub-themes in this theme consist of relatively small numbers of statements. The sub-theme *Characteristics as operator* is the smallest sub-theme of all. The operator may take these characteristics for granted as working in the field. Since they all have experience from the field they take these characteristics as granted as an operator, and that might be why they do not talk that much about it. However, the topic is important enough to be mentioned by the operators. As it is well known that people are different and react different to emergencies, it is vital that the people working with emergency management have personal aptitude to handle the complexity of emergencies.

*Drills and Exercises* are a sub-theme with not the least yet not the most number of statements, thus an important part of the preparation for emergency management (The Directorate of the Police, 2011). As the report from July 22 highlights, the preparation-phase are essential for the emergency management (Office of the Prime Minister, 2012). Further, the report concludes that there have not been sufficient exercises within many areas. Drills and exercises are especially important for the perception of risk and the collaboration. The actions are based on their perception of risk, while collaboration and interaction are an

important non-technical skill. Training and exercises are the best way to improve the interaction between emergency crewmembers (Waugh & Streib, 2006, Office of the Prime Minister, 2012, Ministry of Justice and Public Security, 2008), and result in practical experience and increased knowledge (Office of the Prime Minister, 2012). This shows that there is a connection between exercises, and the content of the sub-theme *Experience and Competencies*, as drills and exercises leads to increased experience and competencies. The importance of experience and competencies is provided by the law (Brann- og eksplosjonsvernloven, 2002, Norwegian Directorate for Civil Protection, 2012, Forskrift om organisering og dimensjonering av brannvesen, 2002). The law state that the people need to be qualified so that the emergency messages are received registered and monitored in a required way. As the sub-theme *Experience and Competencies* are the largest sub-theme within the main theme *Skills and Competencies*, this describe that the operators find experience and competencies important for the work at the call centre. The importance of experience working with emergency management are described in the report form July 22, as the operators on duty at the time the bombing happened had various experience from the field and as operators at the call centre (Office of the Prime Minister, 2012). Experience from these domains is highlighted by the operators as well.

The sub-theme *Selection and Recruitment* are mostly based on the sub-themes mentioned above, and are closely related to the theme *Organization*. Before selecting and recruiting employees it is vital to know what kind of needs you want the new employee to fulfill, in relation to the mission, vision and values of the organization. This sub-theme is one of the sub-themes with the smallest number of statements, which imply the operators are not that concerned about it. However, the fact that some of the operators talk about selection and recruitment may be seen in relation to personal interests, roles and responsibilities.

The theme *Organization of the Emergency units* includes the sub-theme *Organization of the Emergency units*. This is the sub-theme with the most numbers of statements, thus it includes several levels and the complexity of the organization of the emergency services. The complexity of the society and the increasing need of dependence between different domains, require cooperation between the services and the emergency call centre. This is also stated by law, saying that every part involved in emergency management is responsible for cooperating with other relevant partners in the best way (Ministry of Justice and public Security, 2012). The mission with this principle is to exposit needed and available resources in the most appropriate way (Norwegian Directorate for Civil Protection, 2012), which also applies to the emergency call centre who need to cooperate (Brann- og eksplosjonsvernloven, 2002). This

seems to be important and commonly known to the operators, since they talk much about the organization and cooperation within the emergency services. The organization may be seen in relation to several of the other topics, like the total sum of resources and competencies regarding the other services. With the need of cooperation follows the need of information exchange, and for that flow to be appropriate a common understand of roles and responsibilities are essential (Frisch et al., 2007). The co-location of the call centre of the three different emergency services in Drammen is an example of that, and how their co-location made the cooperation and the emergency management much easier on the July 22 (Norwegian Directorate for Civil Protection, 2012).

The theme *Resources and Support systems* are the second largest theme, consisting of the sub-themes *Resources* and *Support systems*. The sub-theme *Resources* is not one of the largest sub-themes but either one of the smallest. The content of this sub-theme regard resource in the field and at the call centre, and the informants often have clear and concise statements about this. Regarding the availability of resources in the field, the operators find that satisfying most of the time. The reason might be contracts of cooperation between the different geographical regions (Brann- og eksplosjonsvernloven, 2002) and their demand for emergency response (Brann- og eksplosjonsvernloven, 2002), in order to always be prepared and to exposit the total amount of resources (Brann- og eksplosjonsvernloven, 2002). The report from July 22 (Norwegian Directorate for Civil Protection, 2012) supports that the available amount of resources in the field were satisfying related to the emergency management in that relation. Regarding the appropriate numbers of operators at the call centre during large-scale incidents, there is an ongoing discussion regarding the risk, probability and frequency of large-scale incidents compared to the cost of staffing the call centre (Norwegian Directorate for Civil Protection, 2012). The law states that the call centre should be staffed in a way to handle its responsibilities in a good manner, but how to know what's sufficient numbers of operators when the emergencies they manage are so unpredictable. Thus, the question regarding staffing the call centre may be seen in relation to the organization of the unit, the control and use of their support systems, and the complexity of emergency management of large-scale incidents. *Resources* relates to *Support systems* in the sense that the support systems relief the people, so they can focus on other tasks. The operators talk relatively much about their procedures and computer-programs, and to what extend that they rely on it. The computer with its facilities and the phone is their daily tool and where they work, so it is essential that it provide a smooth and usable extension of their work. An example of the usage and adaption are to be seen in relation to July 22, when the emergency

network in the different areas did not correspond with each other (Office of the Prime Minister, 2012).

The theme *Relations* consists of the sub-theme *Relations*, both a small sub-theme and the smallest theme. This topic was not found to belong within any of the other sub-themes, however important enough to be developed as a separate theme. Even thus there are not much statements regarding relations, it is important for the effectiveness of the work at the call centre (Janssen et al., 2009, Carver & Turoff, 2007). As the operators at the specific call centre, operators at the different call centre and their crew need to work together in a team to manage the emergency, the literature on teams show that trust affect how effectively each individual contribute (Bandow, 2001). The relationships between the operators at the specific call centre are referred to as good, that may be due to the fact that they interact face-to-face much of their working time. The good relationship between the operators who worked the July 22, are described in one of the reports from that day (Norwegian Directorate for Civil Protection, 2012). The operators had been colleagues for many years, and knew each other well. It is different with the interaction with operators at other call centre and the crew working in the field. When people have little time for face-to-face interaction, they will need more time to develop good relations (Bandow, 2001). When team members have developed good working relations and feel that they know each other to some extent, they know what to expect from each other and may focus on other things (Bandow, 2001). One topic highlighted by the operators regarding this theme, is the fact that they communicate easier with their crew due to their experience from the field. As they used to interact with them face-to-face, they know each other. Further, they feel freer to make suggestions for solutions that can be helpful for the emergency management in the field. In that sense the sub-theme *Relations* may be seen in connection with the sub-theme *Communication and information flow* and *Operational support*.

The theme *Information and Overview* consists of many statements, and includes the sub-themes *Communication and Information flow* and *Overview of ongoing incidents*. Separate the two sub-themes consist of a medium number of statements, thus they are important for the work at the call centre. Earlier in this thesis the concept of communication has been introduced and put in the context of emergency management. Communication is essential for several of the factors influencing the work they do at the emergency call centre during large-scale incidents. They need to communicate with other people handling the emergency and exchange information in order to get a common understanding and overview of the situation and to know what will be their responsibility during the incident. As the right

information need to be given to the right people at the right time (Carver & Turoff, 2007), an understanding of the organization, roles and responsibilities are essential (Ministry of Justice and Public Security, 2008). In that way are the sub-theme *Overview of ongoing incidents* are linked to *Communication and Information flow*, as updating information about the situation is necessary in order get an overview of the situation. To achieve that, the operators need to cooperate with people outside the call centre, but most importantly is it that the operators at the call centre help each other to recognize cues in the situation. In that way another operators may snap information that one may overlook, consequently they both have more detailed information about the situation. In addition to the human cognition, the operators use their support systems to constant have an overview of their resources so that they are prepared to order the closest and most appropriate resources if a new incident happen.

The theme *Operational goals* are the theme with the most number of statements of all themes. *Operational support* are the first sub-theme this theme consist of, and this is a not that large sub-theme. Thus, the importance of predicting and supporting are essential for the emergency management. As the operators have experience from the field, they may take operational support for granted. Without the support between the call centre and the crew in the field, there will be a continuous update of the need of resources. As the two parts are mutual dependent, they need to help each other to anticipate and predict the development of the incident (Carver & Turner, 2007). In that sense the operational support are related to their past experience from the field and as operators. Because of their experience they have the ability to predict what might happen, so they can be proactive and prepare for action before absolutely required. But, as emergencies are uncertainty and unpredictability (Janssen et al., 2010) they can never be sure that what they predict actually will happen. Due to that fact, *Adaptability and Preparedness* is vital for the work at the emergency call centre. This sub-theme includes many statements, and may be seen as the most important and exciting part of the job they do at the call centre. All the time they need to be prepared for whatever may happen, and they have the responsibility and opportunity to be flexible enough to allocate resources in the most appropriate way (Forskrift om organisering og dimensjonering av brannvesen, 2002). As emergencies are unpredictable (Janssen et al., 2010), they need to adapt, improvise and be creative to fit the circumstances in the best way (Waugh & Streib, 2006, Carver & Turoff, 2007). The importance of adaptability and preparedness are to be seen in one of the reports from the July 22, as the call centre had the authority to allocate and adapt the resources in the best way regarding the incident and to be prepared for any other incidents (Norwegian Directorate for Civil Protection, 2012).



The discussion of the themes and sub-themes imply complexity of the work at the call centre, and that there are relationships between the themes. Several of the sub-themes and themes are closely related to each other, and often to more than one theme. Next to be discussed are the residuals, theme 13.

### **Discussion of residuals – theme 13**

The intention of including these statements in the analysis was to ensure that the statements could be a part of the coding. As the results showed, all statements in the theme *Residuals* (7) do not regard the work at the call centre during large-scale incidents. On the other hand, some of the topics are of interest and may indirectly affect the work at the emergency call centre during large-scale incidents. The topics of the residuals are now to be discussed.

The operators' thoughts about the definition of large-scale incidents differ a bit, but several of the operators talk about large-scale incidents compared to normal incidents. In varying degrees, they do not have a strict separation between the two types of incidents. The operators' jobs are almost the same when they send three cars for a normal incident, as when they send nine cars for a larger incident. They use the same computer-program, but choose to send 9 instead of three. Their additional jobs differ in a larger degree. More action in the field leads to more talk in the radio, more phones from the media, increased need for operational support and more challenging to have an overview of the total situation.

Since the operators have different years of experience from the call centre, may it be that they have not experienced a truly large-scale incident and rather refer to a not that large incident but still the largest one they have experienced. After July 22, may it be that they do not think of incidents that were large-scaled before July 22 as large anymore.

Another topic in the residual-theme is the fact that they talk about how they work in the field and tell stories from their time in the field. Probably, a large part of their "heart" belong in the field, in the sense that they still feels like crewmembers. Even though either of them works in the field anymore, but at the emergency call centre, they are a part of the team. Not just a part of the team as a prior crewmember, but as an important team player in the role of an operator. They are proud both of their crew in the field as well as the job they do from inside the call centre.

## Discussion of ISBAR

The intention of testing the ISBAR tool of communication in relation to the work at the emergency call centre, was to investigate to what extent the work could be understood as communication. All statements from the operator were regarded as either an ISBAR-statement or not ISBAR-statements. The results showed that 10% of the total amount of statements was ISBAR-statements, which means that a small part of the work at the call centre during large-scale incidents can be understood as communication according to ISBAR. However, communication is not insignificant for the work at the call centre. This implies that the work at the emergency call centre during large-scale incidents is complex and consists of several factors in addition to communication.

Regarding the distribution of ISBAR-statements, all ISBAR-statements are accounted for by the content model as well. In other words, there are no statements unique for ISBAR. This implies that everything within ISBAR are included in the content model, and that all important aspects of the work at the emergency call centre are taken into account by the content model.

As the result from the bottom-up thematic analysis implies, there are many topics related to the work at the call centre during large-scale incidents in addition to communication. Nearly 90% of the ISBAR-statements belong within the two themes *Information and Overview* and *Operational goals*. Since ISBAR is a tool for concrete communication, this may imply that the operators communicate a lot about topics related to these two themes. That is naturally, since these two themes regard information that is important to exchange during large-scale incidents. Theme 5, *Information and Overview*, consists of the sub-theme *Communication and information flow*, which includes examples of important information and thus increase the number of ISBAR-statements. Still, a lot of statements from theme 5 and 6 are not ISBAR-statements.

Nearly 10% of the ISBAR-statements are distributed between theme 1, 2, 3 and 4, which leaves a small percentage distributed between these themes. As ISBAR intend to “improve communication of critical information” (Hohenhaus, 2006), it will not be many ISBAR-statements in theme 1-4. That is because these themes are more fundamental inputs that needs to be met before the information exchange may be performed, and thus do not contains communication of critical information.

So, what about the rest that is not ISBAR-statements? As already mentioned, the work at the call centre during large-scale incidents is complex and the work at the call centre consists of more than just communication. Some of the topics in the themes are inputs that

may have impact on the communication and on the exchange of critical information. As the themes are connected and influence each other, several of the themes are important for communication during management of large-scale incidents.

Skills and competencies are basic factors that need to be present for the operators to understand what is going on and what kind of information to communicate to each other. Without experience and knowledge about what is happening at an incident site, it is much more challenging to know what to communicate.

Knowledge about the organization of the call centre and roles and responsibility are important to know who is in charge to provide information about what and to whom. Clear and specific descriptions of task may make that job easier. It do exist a set of overall and general rules of how to communicate through the emergency network (The Directorate of the Police, 2009), but a more specific set of rules and structure could make the communication between the emergency units more effective.

Resources and support systems, specially the systems, are important factors for communication to happen. Without an emergency network that function properly, the communication between the operators and their crew in the field will not be possible. A directly telephone line between the different call centre are necessary for them to communicate, and a system for exchanging written information between the operators are essential.

Good relations built on trust and chemistry is important to understand each other, especially in a stressful situation. Operators has expressed that if you know a person and know how they react in different situations, you may get a lot of extra information from between the lines based on how they act, what they say or not say, and how they say it.

### **General discussion**

The results from this study imply that the work at an emergency call centre are complex and consist of many topics. These topics are arranged into themes, which form a content model of important aspects of the work at an emergency call. The discussion of the themes indicates relationships between the themes, and the complexity of the work at the call centre imply that communication are just one of several important factors.

The emergency services constantly have to be prepared for new incidents to happen, and need to coordinate and cooperate with each other. In this context, leverage the overall strengths of the services in the best manner is an important way of managing emergencies (The Directorate of the Police, 2009). Planning, training and exercises are ways to leverage

the resources and essential for the preparation (The Directorate of the Police, 2011). However, the complexity of emergency management leads to a challenge of not exactly knowing what to prepare for. Thus, learn from the past and try to predict what may happen in the future, can be the basis for exercises, training and education.

By exercising, training and educating you develop your skills and further the management of emergencies. As exercises are to be a copy of a real incident and as incidents are complex, several skills are to be trained during exercises. A variation of team related skills and task related skills needs to be trained and developed, both within and between services. Within services means that both the crew in the field and the operators at the call centre participate, as well as within the emergency call centre. Between services include training and exercises across services, as two or three services are involved.

Exercises between the different domain, operators and crew in the field and between the services, may lead to a greater understanding of each others domain and how they interpret different situations (Office of the Prime Minister, 2012). As this type of understanding are requested for by the operators and in the report from July 22 imply that it is important. There is no point in cooperating and communicating if they do not understand their different roles and responsibilities, and focus in the same direction. However, the fact that the services have different responsibilities is not to be forgotten.

The more often people meet related to exercises and training, the better develops relationships and understanding between people. As the operators work at their specific call centre with geographical distances, it is a challenge to meet in physical. Another benefit of having physical contact is the flow of information. The test project in Drammen, where all of the three emergency services call centre are co-located, has showed to be successful (Office of the Prime Minister, 2012). Thus, both exercises and information flow may be seen in connection with the organization of the emergency services in Norway. Co-location of call centre and a common emergency phone number are much-debated topics. There are several alternative solutions for co-location and a common emergency number (Ministry of Justice and public Security, 2009), but the importance of getting in touch, knowing each other, a greater opportunity for cooperation and exercises leads to faster and better help for the caller who needs help.

**Limitations**

This study has limitations that may have influenced the results and the interpretation of the result. The sample, the interview, transcription, unitizing and analysis and coding are sources which may have limited the study, are to be presented and discussed in the following section.

**The sample.** Fourteen operators from one emergency call centre were interviewed. This can be argued not to be a sufficient amount of informants to generalize the result to other emergency call centres. However, this was not the intention of the study. By interviewing almost everyone who works at the call centre, this study can be seen as a case study. The study explores the work at an emergency call centre, and gives a thorough and in-depth description of the work at this particular call centre (Willig, 2008).

**The interview.** Open-ended interviews, based on a SWOT structure, were conducted with the intention to get the informants to talk freely about their work at the emergency call centre. To achieve that mission, it is important to make the informants feel comfortable and wanting to tell the reality. Hence, the interviews started with some informal talk, and they were encouraged to freely tell about their work, as they were the experts. As the interview questions were open and general, the answers were in some contexts also general. This may have affected the result regarding ISBAR, as they were not that specific. The two researchers conducted the interviews and to achieve the goal of similar conditions, the interview followed an interview guide (See Appendix C). This guide included the introduction, the interview questions and suggestions for follow-up questions. Both of the researchers participated in the interview, and specific roles were declared to avoid confusion. As the researchers switched role as conductor and observer, the interviews differ in minor degree. The two researchers had some differences in field of interest, which may have affected the follow-up questions. It was mended by following the interview guide, as well as the observer also having the opportunity of asking follow-up questions.

**Transcriptions.** The recordings of the interviews were conducted in quiet surroundings, which made the listening and writing of the speaking clear. When in doubt, there was no interpretation. Additionally, procedures for transcription were made and followed by the two researchers (See Appendix D).

**Unitizing.** As classifying text into meaningful units may be a subjective mission, the two researchers discussed and agreed on the definition of a meaningful unit. Additionally, a procedure for unitizing were formed and followed to seek similarity in unitizing. The first time of unitizing were done in common by the two researchers to be sure that the procedure were interpreted the same way. Further, the unitizing were done separately but of the same text snippet, with the intention of comparing the unitizing. This was done in several stages, with clarifying of ambiguities between each stage to improve the next stage. According to the available time, the comparing and clarifying had to stop. The agreement ended at 76,5 %, which were found to be satisfying according to the limited time.

**Analyzing and Coding.** The process of analyzing and coding are not a linear process, thus moving between the different phases is needed. The sub-themes were aggregated from the statements, and to do that is a subjective mission. To overcome the fact that this was done by two researchers with different interpretations, a codebook were made with rules for what each sub-theme should contain. To obtain an equal interpretation of the coding, sections of text were coded separately and then compared. The two researchers were agree on 60% of the coding, and according to the limited time this were found to be satisfying. However, several stages of coding, comparing and clarifying could have been conducted to increase the agreement. When it comes to the coding of ISBAR, the codebook made the coding quiet clear for the researcher. Even thus the codebook clarify and operationalize the parts of the model, the subjective interpretation of the researcher will affect the analysis.

The fact that the content model seems to cover all statements regarding the work at the emergency call centre during large-scale incidents imply that the model gives a good representation of the work at an emergency call centre. However, some of the statements from the operators are of interest and may seem to influence their work even thus they are not included in the content model and may not directly affect the work they do during large-scale incidents. This may be seen as a limitation, as the content model may seem not to be a perfect representation of the topics that the operators talk about in the interview.

Regarding the choice of communication and ISBAR as the way of understanding the work at the emergency call centre, this is one of many possible alternatives. To be seen in the context of Crew Resource Management (CRM) and non-technical skills, decision-making, teamwork, situation awareness, personal limitations and leadership could be other elements in focus. Thus, other models within the domain of communication could have been explored, and models within the other elements of CRM.

**Future studies**

There is much research on the topic emergency management and emergency call centre, but as the Norwegian emergency services are uniquely organized, more research on the domain is needed. This study can be seen as a starting point of elaborating the work at emergency call centre, and suggestions for further studying of the domain will follow.

First, other method for collecting data may be one suggestion of future research. As the method influence the information gathered, other methods might examine the domain in a different way. Group interviews or conducting surveys could bring out new aspects of the work at emergency call centre.

Second, an extension of the sample of informants could be a proposal for getting a broader understanding of the emergency call centre. People from several of the other emergency services can make the sample. To elaborate the cooperation between parts that the call centre interact with, people working in the field could be an extension of the sample.

Third, a closer elaboration and research on the different themes in the content model may be a suggestion for future research. There is research on the topics by themselves, but they need to be seen in relation to the emergency call centre. Focusing on just one of the themes will give an in-depth understanding of how that theme influences the emergency call centre.

Fourth, more research on ISBAR in relation to emergency management need to be elaborated. There is already much research on ISBAR in relation to the health industry, which has shown great potential. Thus, using ISBAR within emergency management could absolutely be an opportunity and the focus for future research. Other types of communication model may also be appropriate.

A last suggestion for future studies is to elaborate the topics from the theme *Residuals*, in order to understand how they are related to the work at the emergency call centre during large-scale incidents.

### **Conclusions**

This study has evolved a content model that identifies important aspects of the work at an emergency call centre during large-scale incidents, according to the operators who work there. The content model implies that the work at the call centre is complex; hence consist of many topics that are related to each other. Additionally, communication as a theoretic topic has been tested regarding ISBAR, a tool for communication. The results imply that this model for communication account for 10 % of the total amount of statements, hence that communication are just one part of the complex work at the emergency call centre. This study contribute to understanding of the complexity of emergency management, and state that factors affecting complex environment need to be seen in relation to each other. However, more research on this domain are still needed in order to get an ever broader understanding of the work at emergency call centre during large-scale incidents.



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## Appendix A: Information letter

Takk for at du har vist interesse for å delta i dette forskningsprosjektet. Vi er to masterstudenter innen Arbeids- og Organisasjonspsykologi ved Universitetet i Oslo som skriver oppgaver for SINTEF. I forbindelse med våre masteroppgaver ønsker vi å intervjuere operatører ved sentralen om hvordan de arbeider ved større hendelser.

*BRIDGE-prosjektet:* BRIDGE ledes av SINTEF, og er et EU-finansiert prosjekt som har som mål å øke sikkerhet gjennom å utvikle tekniske og organisatoriske løsninger for å forbedre håndtering av kriser og katastrofer. Fokuset ligger blant annet på samarbeid på tvers av etater og landegrenser ved store krisehendelser som terroranslag, naturkatastrofer og industriulykker. Prosjektet skal medføre økt sikkerhet og trygghet for befolkningen i Europa gjennom fler-faglig nødetatskoordinering og ledelse ved storskala akutthendelser. For mer informasjon om BRIDGE-prosjektet, se <http://www.bridgeproject.eu/>.

*Mål med forskningen:* Vi vil se på hvordan du i samspill med dine kollegaer jobber på sentralen ved større hendelser. Formålet er å vurdere prosedyrer og «best practice» og hvordan vitenskapelige modeller passer med disse.

*Hvordan du kan forberede deg:* Vi er interessert i dine personlige meninger og erfaringer når vi intervjuer deg, ikke andres tanker. Vi ber deg forberede deg på følgende spørsmål:

- *Hvilke styrker ser du ved måten dere på sentralen jobber på ved større hendelser i dag?*
- *Hvilke svakheter ser du ved måten dere på sentralen jobber på ved større hendelser i dag?*
- *Hva mener du på sikt kan være utfordringer knyttet til måten dere jobber på ved sentralen ved større hendelser?*
- *Hvilke muligheter ser du for måten dere arbeider på ved sentralen i fremtiden?*

*Deltakelse:* Intervjuet vil foregå på norsk. Vi vil begge være tilstede ved intervjuet, der en intervjuer, og den andre observerer og kommer med eventuelle oppfølgingsspørsmål. Intervjuet vil bli tatt opp på bånd, og deretter transkribert. Dette vil gjøre det lettere for oss å analysere data i ettertid og sikre korrekt gjengivelse av det du sier. Deler vil også oversettes til

engelsk. Vi regner med at intervjuet vil ta ca. 30-45 min

Din deltakelse i studiet frivillig og du kan når som helst trekke deg fra intervjuet og studiet uten å oppgi noen grunn. Du har også rett til å be om at lydopptaker blir stoppet/startet, samt om å slette deler av lydopptaket hvis dette er ønskelig. Sletting av data vil gjennomføres så langt det er mulig. Samtykkeskjema vil bli utlevert til leder torsdag 22.11.12 og distribueres videre til operatørene. Samtykkeskjema signeres i forkant av intervjuene.

*Personvern og databehandling:* Alt datamaterialet vil bli behandlet konfidensielt i overensstemmelse med det Europeiske databeskyttelsesdirektivet (95/46/EF 1998). Prosjektet har blitt meldt inn til den Norske Samfunnsvitenskapelige Datatjeneste (NSD), personvernombudet for forskning i Norge, og godkjent med referanse 28066.

Merk at personopplysninger vil bli behandlet fortrolig og kun vil bli delt mellom BRIDGE-medlemmer tilknyttet SINTEF. Datamaterialet vil bli anonymisert før bruk i analyser. Data vil bli oppbevart på, og delt gjennom sikre serverløsninger, og tilgang til dataen vil kun bli gitt til medlemmer av BRIDGE prosjektet. Under ingen omstendigheter vil tilgang til den innsamlede dataen gis til utenforstående som ikke er involvert i prosjektet. Data vil bli anonymisert før bruk i rapporter, presentasjoner, publikasjoner, samt i de to masteroppgavene, slik at de ikke inneholder noen opplysninger som kan identifisere enkeltpersoner. I noen tilfeller kan publikasjoner og presentasjoner gjøre bruk av anonymiserte sitater. Ved prosjektslutt i 2015 vil personidentifiserbar data bli slettet. Anonymisert data kan beholdes på ubestemt tid.

Hvis spørsmål angående intervjuene eller masterprosjektene, vennligst ta kontakt med masterstudentene Hilde Brennsund ([hildeeb@student.sv.uio.no](mailto:hildeeb@student.sv.uio.no) / 91695703) eller Karoline Etholm ([karoliet@student.sv.uio.no](mailto:karoliet@student.sv.uio.no) / 47482368), eller vår veileder ved Psykologisk Institutt, Universitetet i Oslo, Cato Bjørkli ([c.a.bjorkli@psykologi.uio.no](mailto:c.a.bjorkli@psykologi.uio.no) / 91609044).

Hvis spørsmål i forhold til BRIDGE-prosjektet og behandling av dataene, vennligst ta kontakt med prosjektleder Jan-Håvard Skjetne ([jan.h.skjetne@sintef.no](mailto:jan.h.skjetne@sintef.no) / 22067871 / 93409191).

Vennlig hilsen Karoline Etholm og Hilde Brennsund, på vegne av BRIDGE forskningsteam.

## **Appendix B: Interview guide**

### **Introduksjon før intervjuet:**

Kort om oss og masteroppgaven.

Vårt samarbeid med SINTEF, som leder BRIDGE-prosjektet.

Kort om BRIDGE: fokus på tekniske og organisatoriske løsninger for å forbedre håndtering av større hendelser.

Har du fått lest informasjonsbrevet?

Og nå kan du signere samtykkeskjema.

### **Om operatøren:**

Hvor lang erfaring har du som operatør? Her, og evt andre sentraler?

Hva slags bakgrunn har du? Antall år?

Annet, hva og antall år.

### **SWOT:**

De to første spørsmålene gjelder nåtid, de to siste gjelder fremtid. Det kan være at du må gjenta noe, det viktigste er at informasjonen kommer frem.

### **Arbeid på sentralen ved større hendelser**

#### **Nåtid**

- Jeg vil først høre om hvilke styrker ser du ved måten dere på sentralen jobber på ved større hendelser i dag?
- Jeg er fortsatt interessert i å høre om hvordan dere arbeider per i dag, men vil gjerne at du forteller om hvilke svakheter ser du ved måten dere på sentralen jobber på ved større hendelser i dag?

#### **Fremtid**

- Hva mener du på sikt kan være utfordringer knyttet til måten dere jobber på ved sentralen ved større hendelser?
- Hvilke muligheter ser du for måten dere arbeider på ved sentralen i fremtiden ved større hendelser?

**Avslutningsvis:**

Er det noe du vil legge til eller utdype?

Hvordan synes du det har gått?

**Forsterkere:**

Hva mener du med..?

Kan du spesifisere/utdype/forklare hva du mener med...

Har du et eksempel på det?

Du nevnte....., kan du si noe mer om det/utdype det/gi et eksempel på det?

Du har allerede nevnt noen styrker/svakheter/positive/negative sider ved....., hvilke andre S/W/O/T gjelder her?

**Appendix C: Consensus form**

Ved å signere dette skjema bekrefter du at du har mottatt informasjon om prosedyrene og detaljer rundt prosjektet, at du har fått tilstrekkelig mulighet til å vurdere denne informasjonen, og at du frivillig vil delta i prosjektet. Du vil motta en kopi av dette samtykkeskjema.

- Jeg bekrefter at jeg har lest og forstått "Informasjonsbrev masterprosjekt, november/desember 2012".
- Jeg har hatt muligheten til å vurdere denne informasjonen, og fått tilfredsstillende svar på spørsmål vedrørende forskningen.
- Jeg sier meg villig til å delta i forskningsprosjektet og forstår at min deltakelse er frivillig.
- Jeg forstår at jeg når som helst kan trekke meg som deltaker, uten å måtte oppgi noen grunn for dette.
- Jeg er inneforstått med at informasjonen jeg gir kun vil bli delt mellom medlemmer av prosjektet.
- Jeg er innforstått med at informasjonen jeg gir vil bli behandlet konfidensielt av alle forskerne.
- Jeg tillater at mine svar blir tatt opp på lydbånd.
- Jeg forstår at all data som samles inn vil bli behandlet anonymt.
- Jeg tillater at dere refererer til meg som «operatør ved nødsentral».

NAVN (vennligst bruk blokkbokstaver):

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ADRESSE:

---

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SIGNATUR til deltaker: \_\_\_\_\_

DATO OG STED: \_\_\_\_\_

## Appendix D: Transcription procedure

### De overordnede retningslinjer for transkribering er:

1. Tilpasse transkribering til formål med undersøkelsen
2. Konsistens (reliabilitet)
3. Åpenhet (vi beskriver hva vi har gjort)

### Når det gjelder selve transkriberingen er det disse retningslinjene som gjelder:

- Vi skriver ikke ned navn eller annet som kan identifiseres (F.eks. Hoff et al., 2009). Stedsnavn og andre demografiske identifiserbare data erstattes med [by]/[distrikt] eller lignende
- Vi skriver på bokmål, dvs. ingen dialekt.
- Vi skriver det som blir sagt, men rydder opp i den grammatiske strukturen uten å endre meningsinnhold. (Poland, 1995).
- Vi setter punktum ved naturlige pauser

Pauser, og andre verbale uttrykk som latter, hosting etc. blir ikke markert fordi dette er ikke er relevant meningsinnhold og heller ikke sentralt for formålet med undersøkelsen (Poland, 1995).

- Dersom noe er uklart markeres dette med **uklart tidspunkt** i bold
- Vi frastår fra å gjette/tolke hva som blir sagt (Poland, 1995).
- Vi skriver IKKE inn «Mmm» og «Eh» når dette er markert
- Vi noterer IKKE «...» når en person tenker eller ikke fullfører en setning.
- Ved tilfeller hvor flere snakker samtidig markeres dette med uklart dersom det ikke lar seg gjøre å forså hva som blir sagt, ellers transkriberes det som blir sagt slik at det den ene sier først skrives helt ut for så å transkribere det den andre sier helt ut (heller enn å bryte opp setningene i små og mindre forståelige deler)
- Intervjuer markeres med Int.1 og Int.2, etterfulgt av innrykk
- Respondent markeres med forkortelse for operatør – OP etterfulgt av innrykk

**Tillegg:** Notere et tidsstempel for hvert femte, tiende, femtende, osv. minutt. Tidsstempelet noteres i nærmeste snakkebytte mellom intervjuer og intervjuobjekt (nærmest hvert femte minutt), samt ved begynnelse og slutt av intervjuet. Format (tt.mm.ss)

## Appendix E: Unitizing procedure

### Mål med unitizing:

Målet med unitizing er å isolere meninger fra hverandre. Meningsfulle ytringer må forstås i seg selv. Vi må forme kortest mulige enheter, med deler av eksempel/spørsmål for å klargjøre poenget. Vi vil skille ut hvert enkelt statement som sier noe meningsfullt i seg selv om hvordan operatørene opplever arbeidet ved sentralen.

### Definisjon meningsfylt ytring:

Så korte utsagn som mulig, men fortsatt meningsfulle. «The best content analyses define their context units as large as is meaningful (adding to their validity) and as small as is feasible (adding to their reliability)” (Krippendorff, 2004, pp. 102).

### En unit er et separat statement hvor man har:

- Tematisk brudd, nye poenger, nye meninger
- Nye aktører
- Nye sider ved saken. Eksempelvis: Har du vært ute så tar du ting fortere, og [har du vært ute så] er du interessert
- Separate handlinger/operasjoner
- Tidsmessig skifte mellom fortid, nåtid og fremtid.
  
- Vi deler statements så langt det er mulig å dele uten å miste mening for å forme kortest mulig enheter.
- Eksempler og beskrivelser av ting som de er unitizes for seg selv, og nyanseres ved tematisk brudd
- Summary statements unitizes for seg selv
- Dersom et poeng gjentas, skal dette unitizes separat dersom gjentakelsen er meningsgivende i seg selv.

Ved store, generelle temaer lager vi også mindre statements av undertemaer:

- Eksempler er:
  1. Store/generelle temaer: planverk
  2. Mindre statements: spesifikke prosedyrer, fareskilter, kartverk, organisering,

Premisser for et kommende eller allerede uttalt poeng/ytring (eksempelvis bakgrunnsinformasjon/kontekst, premisser som understøtter et poeng) unitizes også for seg selv.

- Eksempel: «Vi har [utstyr].» Hvordan det påvirker samhandling/beslutning blir gjerne utdypet. Premisset/konstateringen unitizes for seg selv for et eget statement, og poengene som følger premisset unitizes også som separate statements. Premisset kan inkluderes i utsagnet for å gjøre det mer forståelig.

### **Samme unit når:**

- Setningen bindes sammen av «fordi», «dermed», «dersom», «derfor» og lignende bindeord. Hvis det er tematisk brudd på hver side av bindeordet, skal det likevel unitizes hver for seg.
- Hvis «det» eller «da» erstattes med samme ordlyd som foregående setning, velger man å legge alt i en unit.
- Eksempel som kun inneholder ett tema, unitizes som en unit selv om disse kan bli lange

### **Gjennomføring av unitizing**

- Hele teksten skal fargekodes i enheter, men unntak av det intervjuer sier.
- Les først gjennom transkripsjonen en gang og del opp i units, les deretter gjennom en gang til for å få helheten og sile ut eventuelle «ekstra-units»
- Legg til informasjon fra spørsmål/eksempler i setninger rundt i parentes for å klargjøre meningsfulle ytringer.
- Hvis det refereres til «det/den/dette» o.l., må det eksemplifisere med klamme, for eksempel ved svar på spørsmål må det refereres til deler av spørsmålet stilt.
- Statements som ikke gir mening, f.eks. ufullførte setninger, og statements som ikke er av relevans for analysen, «sola skinner jammen i dag», unitizes på samme måte som andre statements, og kodes som residual.
- All tekst (med unntak av det som ble sagt av intervjuerne og ja/nei svar på oppklaringsspørsmål) unitizes.
- Introduksjonen til intervjuet unitizes ikke, unitizing begynner etter første intervju spørsmål og avsluttes etter at informanten har hatt anledning til å utdype eller legge til informasjon etter siste intervju spørsmål.



## Appendix F: Codebook Content model

A bottom-up thematic analysis was performed based on the framework described by Clark and Braun (2008). After several revisions of the codes, main themes were outlined and the final categories placed under appropriate themes. The unitized statements from the interviews with the operators were then coded on to the following framework, outlining the emergent themes in the data set. Each unit of text was only coded in to one code. Statement units that did not fit in any of the categories are coded as *Residuals*.

### Theme 1: Skills and competencies

The theme comprises four sub-themes, 'Characteristics as operator', 'Drills and exercises', 'Experience and competencies' and 'Selection and recruitment'. All statements that this theme capture regards the operators that works at the call centre during large-scale incident. The sub-theme 'Characteristics as operator' contains personal characteristics that describe the operators, as interest and motivation to do a good job, and their ability to handle stressful situations. The second sub-theme 'Drills and exercises' include the importance and their attitude against developing and improving their skills. 'Experience and competencies' capture the operators former experience on the field, both on the field and at the call centre, following their knowledge about their own personnel and department as well as knowledge and skills to use their support systems and tools. The last sub-theme 'Selection and recruitment' capture statements regarding criteria and procedure for selection and recruitment of operators, and challenges according that. In summary, this theme is concerned with skills and competencies regarding the operator, what is important and how to improve that.

#### 1. Characteristics as operator

- Interest in the work and motivation to do a good job at the call centre
- Personal aptitude – ability to handle stress, have distributed attention, and keep calm under pressure and when communicating with callers

**Description:** this code contains topics regarding the operator, and his personal skills and abilities. The operator must be fit to work at the call centre, and be able to handle high pressure.

## 2. Drills and exercises

- Train as you fight – always follow the same blueprint when handling incidents, regardless of the magnitude of the incident. No major changes when large incidents occur.
- Always practice procedures
- Practice new procedures
- Drills and exercises – the importance of practicing
- Training- education

*Description:* Topics regarding development and acquiring new skills and competencies. Practicing, learning, developing.

## 3. Experience and competencies

- Experience from operational duty as well as experience as operator
- Knowledge about local area
- Other relevant experiences
- Skilled users of support systems and tools
- Teams composed to contain a wide array of competencies and previous experience

*Description:* The importance of previous experience from operational service, knowledge about the organization of the emergency unit, knowledge of local area, ability to use support systems and tools efficiently, the benefit of teams that consist of operators with different experiences.

## 4. Selection and recruitment

- Practices with regard to recruitment and selection of operators to the call centre – relevant criteria for selection
- Challenges regarding recruitment

*Description:* Who should work at the call centre, how to recruit candidates. Challenges with regard to recruitment.

## Theme 2: Organization of the emergency units

The theme comprises the sub-theme ‘Organization of the emergency units’. It is a comprehensive theme, and incorporates the organization of the call centre, organization of the

department, and the organization of the cooperation between the different emergency departments. Regarding the organization of the call centre, the theme captures statements about working-conditions and location, organization of the operators and their shift, and the lack of formal description of the work at the call centre. Organization of the department contains how the call centres are located and how they cooperate with each other, and how the organization affects their economy. Organization of the emergency departments concerns the cooperation between the department and how their goals/focus affect the cooperation. It also includes statements regarding a common emergency call centre. Finally, inspiration and openness to development of the current state and policies are captured. In summary, the theme is concerned with organization of the call centre, and organization inside and between departments.

## 5. Organization of the emergency units

- Organization of the call centre:
  - support to other call centres, lack of formal descriptions of tasks at the call centre/need for more regulation, time spent solving non-emergency tasks (roles and responsibilities)
  - physical working conditions at the call centre, e.g. indoor climate, safety, co-location with station (physical organization)
  - follow up mistakes/evaluation of near misses at the call centre, structures that support learning (organization of learning/development)
  - organization of shifts and influence on availability of operators (organization of resources)
- Organization of departments: Municipal organization of call centres, local economy impacts availability of resources etc., local cooperation initiatives, co-location of call centres
- Organization of emergency departments: cooperation between the units, different organization of each emergency department, different goals/focus, different procedures and practices, co-location, common emergency call centre
- Organizational development: openness to reorganizing/developing the call centre, the departments and organization of emergency departments

**Description:** statements regarding the organization of work at the call centre, in the

department and in the other emergency departments.

### **Theme 3: Resources and support systems**

The theme comprises the two sub-themes 'Resources' and 'Support systems'. These are conditions that are necessary and make the job at the call centre more coherent. The sub-theme 'Resources' contains human and material resources that are available for duty, including both people at the call centre and people in the field. Statements regarding strain on resources due to limited resources are also captured by this theme. The second sub-theme 'Support systems' contains technical tools the operators use to support their work, as computer-systems, standard operational procedures and communication network. Strengths, weaknesses, opportunities and threats regarding these tools are also captured by this theme. In summary, the theme is about fundamental conditions necessary to conduct the work at the call centre.

#### **6. Resources**

- Availability of resources, human and material
- Number of operators
- Examples of resources
- Strain on resources: replying to unnecessary inquiries, time pressure in the first phase

*Description:* statements regarding the availability of resources that the operators can allocate, the number of operators at the call centre and various types of strain on these resources. Examples of resources are also provided during the interviews.

#### **7. Support systems**

- Technical and organizational support systems at the call centre (vision, locus, tetra, SOP's, maps etc.)
- Weaknesses of the systems
- Potential to make work more efficient
- SWOT (involve end users, poor alignment of systems)
- Culture for adapting SOP's and routines\*

*Description:* statements regarding the support systems available at the call centre. Strengths, weaknesses, opportunities and threats are outlined in this category.

\*General adaptation/development in the organization falls into category 5, specific adaptation/development of routines fall into code 7

#### **Theme 4: Relations**

The theme comprises the sub-theme ‘Relations’. This theme contains the importance of relations, particularly the topics trust and chemistry. The operators at the call centre develop a relation, in varying degrees, with people they interact with. So, the theme include the relationship between the operators at the call centre, between the operators and others in the department, relations between the emergency departments, and between the operator and the caller. In summary, the theme is concerned with the importance of relationship between people.

#### **8. Relations**

- The importance of trust, chemistry and relations
- Relations at the call centre – teams at the call centre
- Relations in the department – management
- Relations across emergency departments
- Relations to caller

*Description:* the importance of relations

#### **Theme 5: Information and Overview**

The Theme comprises two sub-themes, ‘Communication and Information Flow’ and ‘Overview of ongoing Incidents’. These themes capture statements regarding the following aspects of the work at the call centre during large-scale incidents: Communication between operators, between operators and own department (on site personnel), operator and caller, operator and other emergency agencies and operators and other stakeholder. Further, the theme captures such features as which information to obtain and disseminate, how, why and when to obtain/disseminate it and through whom. The second sub-theme captures topics revolved around maintaining overview of a situation. The content in this sub-theme is concerned with what to maintain overview of, and how to do it. In summary, the theme is concerned with knowing what’s going on and knowing what to respond to.

#### **9. Communication and Information flow**

- Important information

- Getting the right/sufficient information from callers
- Information overflow
- Managing information flow
- Guidelines for information flow
- Availability of information within the department
- Availability of information across emergency departments
- Information lost in transfer
- Documentation of information
- Communication – getting information, disseminating/providing information
- Communication with the public and press
- How to communicate in a good way

*Description:* descriptions of information and information flow, and statements regarding communication

#### **10. Overview of ongoing incidents**

- Knowing what is going on at the call centre and at the incident site – keep updated, listen/read logs
- How to get overview
- What needs to be monitored
- Knowledge of who does what/automatic distribution of tasks at the call centre – implicit knowledge of roles and tasks
- Cooperation – creating situation overview together
- Recognizing cues in the situation/information provided –recognizing important aspects
- Detecting new incidents while large incidents are in progress
- Leader has overview – importance of providing the leader with the opportunity to withdraw and monitor

*Description:* statements regarding the importance of gaining situational overview, how it is done and what is done.

#### **Theme 6: Operational goals**

The theme comprises two sub-themes, ‘Operational Support’ and ‘Ability and Preparedness’. ‘Operational Support’ contains statements that regard the specific work to support goal

attainment during incidents, while the second sub-theme, 'Adaptability and Preparedness' contain more general goals of maintaining, improving and developing the ability to respond to and resolve threats and incidents. The first sub-theme contains statements regarding the role of the operators as supporters of the crews at the incidents site. More specifically, statements regarding working as one team with the crews on site, supporting the operational commander from the rescue services, as well as supporting the overarching operational goals and maintain flow in the operation by providing various kinds of support and by pushing additional resources when needed. The second sub-theme contains more general goals of maintaining preparedness and ability to respond. Statements regarding the need to be flexible and adaptive, both in a given situation and in general fall into this sub-theme. In summary, this theme is about knowing how to handle situations that arise in order to achieve the goals of the system.

### **11. Operational support**

- Predict – support – prepare - ease
- Predict development – proactivity – come up with novel solutions
- Reply to requests from operational personnel
- Support operational personnel – social and practical support
- Examples of proactive/supportive behavior
- Mutual dependence
- Prepare for action before personnel reaches incident site

*Description:* the support provided by the operators to the staff on the incident site, the operators' role in the handling of the ongoing situation.

### **12. Adaptability and preparedness**

- Overarching goals (strategic goals) guide the actions taken at the call centre – respond to as many requests as possible
- Adapt tasks to goals
- Assess – expect – allocate resources – adapt/prioritize – decide
- Flexibility and adaptation
- Necessary freedom to carry out points above
- Cooperate to achieve overarching goals
- Preparedness – maintain overview of available resources – conserve resources
- Always expect a serious incident – low threshold for response
- Prioritize tasks – redistribute/postpone less important tasks

*Description:* statements regarding how operators work to achieve the overarching goal of responding to the needs of the general public.

**Theme 7: Residuals**

**13. Residuals:**

- Unrelated topics
- Responses to clarifying questions from the interview



### **Appendix G: Codebook ISBAR**

In the following codebook are the content of the different parts of the model/ tool ISBAR.

The original SBAR-tool (Leonard et al., 2004) has been adapted to become ISBAR (Marshall et al., 2008), and consists of Identify, Situation, Background, Assessment and Recommendation.

*1: Identify:* your name, who you are/you occupation, your location, identify the address of the incidents

*2: Situation:* what is going on at the current time, what is the problem.

*3: Background:* what are the background or context of the situation, state the history.

*4: Assessment:* analysis and evaluation of the problem. How serious is it?

*5: Recommendation:* what could you do to correct the problem, advice, suggestions and solutions