

You Talk the Talk – But What Do You Talk About?

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ABSTRACT

Post-crisis analysis of transboundary crises in Sweden is problematic due to limited documentation. We believe that there is a need to find tools to better understand the command and control, and to understand how the information sharing that takes place during larger crises works. This paper presents the results of an ongoing research, as well as findings about how the TETRA system is used for information sharing in transboundary crises. The data used was collected from two large emergency exercises, where Swedish, Finnish and Norwegian TETRA systems were merged. Communication in 10 shared talk groups was recorded, transcribed and analyzed. The communication in shared TETRA-talk-groups mostly focused on information about the accident, the recourses and first respond units, as well as the actions of each unit. The research also exemplifies and shows that communication within TETRA-talk-groups in transboundary crisis can give new insight into how command and control works.

Keywords

Command and Control, Common Operational Picture, Talk-Groups, TETRA, Transboundary Crisis.

INTRODUCTION

In recent years, Sweden has been hit by large crises that have put the entire societal crisis management capacity to the test. The terrorist attack on Drottninggatan in 2017 (Myndigheten för samhällsskydd och beredskap, 2018), the forest fires of 2014 (Skogsbrandsutredningen, 2015) and 2018 (Statens offentliga utredningar, 2019) are examples of such crises. The aftermath of the crises often leads to criticism as problems and a lack of collaboration between authorities are revealed. The analysis of a large crisis, like the forest fires that hit Sweden in 2014, relies on existing documentation, official records, and the memory of participants. There was severe criticism in the aftermath of the forest fire in 2014 (Myndigheten för samhällsskydd och beredskap, 2016; Skogsbrandsutredningen, 2015), where lack of documentation, records, as well as other information from the actual period of the crisis, which affected the possibility to fully evaluate the crisis. It was difficult to completely understand what really happened in the command and control environment, and how certain units acted on decisions taken in the command and control. After the event itself, it was difficult to understand what activities really took place. The forest fire in 2014 affected several authorities and can be defined as a transboundary crisis. The challenges of a transboundary crisis are the same as for a traditional crisis. *“What sets transboundary crisis apart, however, is that they create a need for extreme adaption and unprecedented cooperation under conditions in which these are most difficult to achieve – when the capacity and authority for response is distributed across multiple organizations and jurisdictions and when the crisis itself creates difficult patterns of interdependence among the actors involved”* (Ansell, Boin, & Keller, 2010, p. 204).

During the forest fire in 2014 the overall command and control was organized temporarily from a large conference hotel, where all actors set up a command and control structure. Even well-working temporal command and control functions rarely leave any official documents for evaluating purposes. Other data that is used for evaluating purposes is often interviews with those involved after the crisis has taken place, where they reflect on their actions. During large crises, information sharing is extremely important to build a common operational picture (Borglund, Landgren, & Lintzen, 2014). Implicitly, this means that if you want to understand how a common operational

picture was established afterwards, you also need to be able to recreate how information was shared and what information was shared. In situations like the forest fires in 2014, where the command and control was managed from temporal locations, much of the information sharing was done via radio or telephone.

In this paper, we argue that a transboundary crisis is even more challenging to fully understand afterwards than a traditional crisis, mainly because of the characteristics of the transboundary crisis. *“We speak of a transboundary crisis when the functioning of multiple, life sustaining systems is acutely threatened. A transboundary threat is characterized by the potential to cross geographic and functional boundaries, jumping from one system to another”* (Boin & Rhinard, 2008, p. 4). In a large transboundary crisis it is difficult to predict e.g. who will participate in the crisis and to proactively prepare for the capturing and documenting of information sharing amongst participants to enable analysis when the crisis has ended. During the 2018 forest fires, foreign firefighters, helicopters and water bomb planes were used to beat the many fires, resulting in a complex transboundary information sharing situation (Statens offentliga utredningar, 2019). In 2018, the rescue services claimed that an important area of improvement is how to document and capture e.g. decisions, activities, information about units, pictures and video material during and after the crisis (Statens offentliga utredningar, 2019).

Based on the above we argue that there is a need to find tools to better understand the command and control, and to capture the information sharing that takes place during larger crises that can be defined as transboundary crises. In the literature, it is difficult to find methods on how to assess a transboundary crisis (with some exceptions e.g. Dore, Lebel, & Molle, 2012). In Sweden, the majority of the assessment and analysis of the previously mentioned large crisis was done after the crisis ended. As several reports indicate, there was a huge lack of official documents that could bring clarity about e.g. common operational pictures, command and control, and tactical and strategical decisions (Myndigheten för samhällsskydd och beredskap, 2016, 2018; Skogsbrandsutredningen, 2015; Statens offentliga utredningar, 2019).

Since 2016, Norwegian and Swedish emergency actors have been able to communicate via shared talk groups using their own radios. In 2019, Finland entered the collaborative platform for shared talk groups within the TETRA system, thereby emergency actors in Norway, Sweden and Finland could communicate using their own radio systems. TETRA (Terrestrial Trunked Radio) is a global standard for digital trunked radio, which was previously a European standard. The TETRA system is used by emergency units for communication and provides a secure voice and data transmission. Never before had three countries connected their domestic TETRA systems used for national crisis communication, which was what happened in 2019, when the Swedish Civil Contingencies Agency (MSB), the Norwegian Directorate for Civil Protection (DSB), and State Security Networks Group Finland (Erillisverkot) enabled transboundary communication through the national TETRA networks in Sweden, Norway and Finland.

This paper presents the first findings from an ongoing research project with the long-term aim to understand how information is shared across boundaries during transboundary crisis to establish a common operational picture, and how a common operational picture is established based on this information. The aim of the paper is to present findings on how the TETRA system is used to share information across boundaries. It is only in Scandinavia that countries have established shared talk groups using the TETRA system, and it is the first time ever for three countries to share talk-groups in the TETRA system as mentioned above. This knowledge will be a contribution to the understanding of how command and control works during transboundary crisis. The long-term goal of this research is to provide a tool that can be used for analysis after a crisis, but preferably during a crisis, if appropriate.

RELATED RESEARCH

There is limited research to be found about information sharing amongst first responders. Norri-Sederholm, Paakkonen, Kurola, and Saranto (2015) is an exception. In their research they have identified critical information categories used for situation awareness, which was shared and communicated by paramedic field supervisors needed for multi-authority missions. The categories were Incident Data, Mission Status, Area Status, Safety at Work, and Tactics. Interesting is that the majority of the identified information categories were shared primarily by using the TETRA radio system, and secondly by using mobile telephones. Norri-Sederholm et al. (2015) focus on communication where paramedics were one node in communication. In Sweden, paramedics are never in command of a crisis, the role of command is either managed by the police or the rescue services.

Molino (2006) concludes that an emergency manager needs to manage what is called the 5 C's, namely command, control, communication, coordination, and cooperation. Command is about being in charge and leading the work; control is to actively control the situation; communication should include both sender and receiver; coordination includes both at the accident scene as well as higher levels; cooperation is necessary as the majority of a crisis cannot be solved by a single authority.

A transboundary crisis is a crisis that threatens a larger part of society,. a type of crisis that is likely to become

more prevalent in the future (Ansell et al., 2010; Boin, Busuioac, & Groenleer, 2014). The transboundary crisis comes with its own challenges: 1) National authorities have difficulties making sense of the crisis; 2) It is difficult (almost impossible) to coordinate across borders; 3) It is difficult to establish legitimacy for the response (Boin et al., 2014). The transboundary crisis crosses borders; it can cross national borders, as well as functional and temporal borders. One characteristic and consequence of a transboundary crisis is that it rarely has a clear beginning, and is difficult to pin-point in time (Boin, 2009). In the literature it is difficult to find any explicit proposals on how to analyse transboundary crises. Boin, Kuipers, and Overdijk (2013) present 10 executive tasks for crisis management that could be used for subsequent evaluation purposes: Task #1: Early Recognition; Task #2: Sensemaking; Task #3: Making Critical Decisions; Task #4: Orchestrating Vertical and Horizontal Coordination; Task #5: Coupling and Decoupling; Task #6: Meaning Making; Task #7: Communication; Task #8: Rendering Accountability; Task #9: Learning; and Task #10: Enhancing Resilience.

RESEARCH METHOD

The findings presented in this paper are based on a qualitative research approach (Myers, 2009; Myers & Avison, 2002). The data collection for this paper has been carried out during two large emergency exercises. The first exercise took place in Meråker municipality in Norway on 16 November 2016. The exercise was the final exercise in a greater project where the Norwegian Nødnett-system¹ and the Swedish Rakel-system² were permanently connected to increase the possibility of cross border collaboration during small and large crises. It was a large-scale field exercise involving many first respond units from both Sweden and Norway, as Meråker municipality is a border municipality. The scenario used was that two buses had collided and one of them had tipped over when the driver tried to avoid a frontal collision. In both buses several passengers were stuck and hurt. The emergency units at site for this exercise were units from the fire department, medical/health services, the police, and civil protection.

The second exercise took place during the Barents Rescue in Kiruna in September of 2019. The biennial Barents Rescue is a multi-lateral crisis management exercise under the framework of the Barents cooperation. The Barents Rescue exercise was also the event where the Norwegian Nødnett-system¹, the Swedish Rakel-system², and the Finnish Virve-system³ were permanently connected, thereby enabling cross-border communication between the three Scandinavian countries. It was the first time ever that three TETRA systems were connected. The Barents Rescue exercise consisted of several events, but the main event took place on 25 September and consisted of three field exercises. The data collection for this research used the large exercise “river”. The scenario used for the “river” was a traffic accident where a bus and a minivan collided. The minivan went upside down into the river with several seriously injured. Units at site of the “river” accident were primarily units from fire department and medical/health service units. They came from Sweden, Norway, Finland and Russia. The only police units at the “river” site were Swedish.

Both exercises had mini-scenarios embedded into the main scenario to involve all actors at the site. For example, the Barents Rescue exercise also included a fire on a remote island, and a canoe accident.

The data collection method applied in both exercises was identical: a set of talk-groups were available for cross-border collaboration on the TETRA system. The communication between different actors is called talk-group communication in the TETRA system, which enables half duplex communication. Half duplex communication means that one user is speaking (transmitting) while the others in the same group listen to the person that is transmitting.

During the Meråker exercise five of these talk groups were recorded, covering the entire exercise that lasted for 4 hours. The majority of the communication took place within a space of three hours. During the Barents Rescue, five talk groups were also recorded for the entire exercise, lasting for 8 hours, and the most of the use of the talk-groups happened in the first 4.5 hours. The TETRA talk-group recordings were transcribed and analyzed afterwards. The transcription was made by a contracted service, while the analysis was carried out by one of the researchers using content analysis (Hsieh & Shannon, 2005) to understand what kind of information was actually shared within the cross-border talk-groups. The categories detected were developed based on the data, as opposed to defined beforehand. During both exercises, one researcher was present at the field exercise site, to observe the use of the TETRA system and study the activities by first responders, and afterwards detect what activities were communicated over the TETRA system. At the site the focus was to capture how the first responders seemed to be communicating with each other and others. The findings from the on-site study was compared and added to the findings from the talk-group analysis. The talk-groups studied were those presented

¹ The Norwegian national TETRA system

² The Swedish national TETRA system

³ The Finnish national TETRA system

by the Swedish Civil Contingencies Agency for use during the exercise, i.e. those based on the communication plan. At both exercises there were national talk-groups that were used that we did not cover, those that were used for communication primarily within one type of organization, e.g. the police.

RESULTS

The results presented here are the result from the first review of the transcripts, where we primarily focused on what information was shared in the shared TETRA talk-groups during the two exercises. We present the findings using descriptive categories. The findings from the field observations from the exercises are presented separately.

The communication taking place in the TETRA talk-groups was short and often consisted of concise messages. The absolute majority of the calls totalled less than 15 words, most of which were shorter than 10 words, even if there were some exceptions.

Information about the incident

One central category of information shared in the talk-groups is information about the incident, i.e. information pieces shared to establish a common operational picture. During the exercise in Meråker as well as the Barents Rescue, the first information about the situation came from the dispatch central using a talk-group that reached all involved actors. The dispatch central in the Barents Rescue first conveyed an alarm in national talk-groups and then moved the communication to a shared talk-group where they repeated the information:

“The only information we have is that it is a bus that has crashed and there is another vehicle involved at the bridge” [translated from Swedish]. When the dispatch central had received more information from people involved in the situation at scene (victims) they shared this with all units:

“Additional information from dispatch. We’re getting confirmation of at least 25 people in the larger of the two buses and several caught under the bus. Over.”

When the first respond units arrived at the scene it only took a few minutes before they responded:

“Situation report from Laxforsen. The object is a bus and a minivan that have collided. We have found that approximately 25 people are in the bus, 6–8 people in the minivan, 2 people were found in the river, and 3 people are stuck under the bus and cannot get out, over” ...[The communication was in English]

The first information, called the window report, is very important for the dispatch central as well as the command and control, to be able to decide whether enough units have been activated. The window report also gives the dispatch central the first components to establish the common operational picture.

Later in the scenario:

...“There were five dead on the island, and one found dead in the water” [translated from Swedish].

During the Meråker exercise the same kind of information sharing structure was used. First, general information was sent out to all units, which was information about what the dispatch central knew from the start.

“This is the Norwegian police dispatch central, we know that it is a road accident and it’s two buses that have collided. There are several people in the buses and we have asked the Swedish authorities for official assistance” [Translated from Norwegian]

Information about the units and their work

It is important for all actors involved in a crisis to be aware of what other units are also involved in the management of the crisis and what they do. Much of the information about units comes from the dispatch central that reports what units have been assigned to the job and what they are expected to do. During both the Meråker exercise and the Barents Rescue exercise the target of this information was primarily the commander at the site, but all units using the talk-groups did receive the information.

During the exercise in Meråker the actors often began their radio communication by introducing themselves to make it clear for all actors listening to the talk-group.

“AMK Nord-trøndelag to Trondheim unit reporting themselves as available, over” [translated from Norwegian]. They did not use any national call signs, or special call signs for cross-border collaboration.

“Swedish police group leader to commanding officer. I’ve arrived with 8 officers to the road accident. We’ve

parked our vehicles east of the accident. I will join you by foot, over and out.” [translated from Swedish]

During the Barents Rescue exercise the actors used call signs that referred to their country. However, the call signs were not interpretable without a description or list of the call signs:

“– Sierra 2... Sierra 23 from Sierra 213. Over./.../– What was our call sign? 210? 210 listening. We have not been given any task yet...” [translated from Swedish].

For anyone without detailed contextual knowledge it would be difficult to understand who was talking with whom in the above excerpt. In the talk-group for only medical units during the Barents Rescue, the units’ identification was much clearer:

“– Sector B to in charge of medicine, – In charge of medicine listening” [translated from Swedish].

Information about operational decisions

Coordinating units at the site of the (exercise) accident was done over one of the talk-groups aimed for cross-border communication. This is a good example from the Barents Rescue exercise of how the commander in charge at the site reported back to the command and control about how he used the arriving units:

“Yes, that’s good. We have decided that the sector bus will be the Russians’ responsibility, ROMEO. The sector minivan will be November’s task. November will also contribute with units for work in water later. Sierra manages the traffic control and the roped off area.” [translated from Swedish].

Information about where different units were allocated and what assignments they were given was shared regularly amongst the actors and the dispatch central in the two exercises. When something new happened, information was immediately shared about various forms of operational decisions.

Information about safety issues

Making rescue workers on site aware of safety issues was also one of the categories found in the analysis. A good example is from the exercise in Meråker.

“Information to all health resources, information to all health resources. The traffic will no longer be stopped. Traffic will now pass on both sides of the road. Pay attention, pay attention. The traffic is no longer stopped.” [translated from Norwegian].

Information about geographical/physical position

An important piece of information shared over talk-groups during both exercises, in Meråker as well as the Barents Rescue, was geographical positions. However, this was a real challenge as the position often referred to physical positions, and not all units were familiar with the area. E.g. they referred to situations on the site of the accident in the following way:

“We have received the correct position for the canoe accident. It should be on the island upstream the traffic accident in Laxforsen. A long island upstream, over.” [The communication was in English]

Use of Nødnett and Rakel on site during the Meråker exercise

Before the day of the exercise in Meråker, the involved actors were gathered in Ånn, a military camp, for two days to prepare and discuss how to apply the communication plan established by the Swedish Civil Contingencies Agency and the Norwegian Directorate for Civil Protection. At the site of the exercise, coordination and orders were given face to face. The scenario was designed so that the Norwegian first responders were responsible for the situation. This was quite clear when the Swedish first responders arrived at scene. There was personal contact between the Swedish first responders and the officer/s in charge, where the Swedish first responders reported to them for duty, and/or reported what they had done. Communication between units on the site of the accident did not use the shared talk-groups on the Swedish Rakel-system and the Norwegian Nødnett-system. Information sharing and therefore implicit sharing of a common operational picture was done during these physical meetings. The command and control, which was Norwegian, was not physically at the site, it was established at the regional dispatch central. The information that was the basis of the common operational picture from the police, fire fighters, and paramedics was shared in face to face meetings at the site. The Norwegian officers in charge then delivered this information to the command and control center using radio or cellular telephone.

The use of Nødnett, Virve and Rakel at the site during the Barents Rescue exercise

The Barents Rescue exercise began with a training day, where seminars, short lectures and presentations of some of the participants' competences took place. One of the lectures targeted all first responders that were going to be involved in the field exercise where the Norwegian Nødnett-system, the Swedish Rakel-system, and the Finnish Virve-system were going to be able to communicate with each other for the first time and be tested. The lecture contained information about how to use the TETRA talk-groups, how to use and communicate in TETRA talk-groups and other practical issues related to the use of the TETRA systems during the exercise.

At the site of the field exercise the first responders from Norway and Finland could not adjust their own radio to find and use the shared talk-groups that were established for the cross-national and cross-authority collaboration during the exercise. The communication between Norwegian, Finnish, and Swedish first responders using the TETRA system was limited because the first responders were unable to use the shared talk-groups. Therefore, the majority of the communication was done in Swedish in the talk-groups, and Norwegian and Finnish first responders went physically to the commander on site for new instructions and to share information and to update the general common operational picture, as well as be updated about the common operational picture. The information sharing was partly done by an assigned a person that was similar to a military orderly. The commander in charge at the site was the one responsible for updating the command and control center that was located at the Fire Department headquarter in Kiruna.

CONCLUSION AND DISCUSSION OF PRELIMINARY FINDINGS

Comparing the information categories found by Norri-Sederholm et al. (2015) Incident Data, Mission Status, Area Status, Safety at Work, and Tactics with our findings, there is a part of our data that strongly supports what they found. Information about the incident and what is going on is an information category that was also found in this research, and which was the most frequent information category. In the category "mission status" by Norri-Sederholm et al. (2015), you find parts of what in this paper is described and categorized as information about units and their work. Information about units and their work is one of the most important information categories in this research. For Norri-Sederholm et al. (2015), Area Status focused on the medical status of the situation. This is shared in the talk-groups in this research as well, but most of that information is shared among the first responders at the site. Safety at Work and Tactics was only mentioned to some extent in the data used in this research. However, the paper from Norri-Sederholm et al. (2015) shows that the information shared in the talk-groups during these two exercises corresponded with the critical information categories they presented.

We also found support in the results of this research for Molino (2006) and his 5 C's that were crucial tasks an emergency manager should be able to carry out. Command, communication, and coordination were partly fulfilled and exemplified by the information shared in the talk-groups. As much of the information shared in the talk-groups referred to the 5 Cs we interpret it as communication between actors during transboundary crisis being crucial.

A common operational picture is possible to define as a selection of available information units (Borglund et al., 2014). The use of talk-groups for transboundary collaboration during these two exercises indicates that the primary content of what can be interpreted as a common operational picture consists of the following:

- Information about the accident and the situation, where the number of involved vehicles, people, injured and dead are in focus. Information about the accident itself also includes geographical positions of the situation.
- Information about recourses and first respond units. Information about their competencies, and if they have brought certain equipment with them.
- Information about what each unit is doing. Could be actual ongoing work but also if units are approaching the site or leaving the site. If the latter, information about where to is also shared.

The aim of this research was to understand how the TETRA system is used for information sharing across boundaries. We have found that the information shared in the TETRA system and the shared talk-groups does not differ from other research efforts in the field; there are similarities and support found in other research efforts in the field, research where they have studied how radio is used to share information in general and not primarily across boundaries. A likely explanation as to why the information sharing does not differ in the transboundary crisis context studied in this research is that experience of how to use the TETRA system is new for the emergency actors studied. E.g., the Barents Rescue exercise was the first time Norway, Finland and Sweden could use shared talk-groups. We believe it is important to train and educate on how information sharing can be more efficient across boundaries. In the data from this research we also argued that an effect of this research would be to be able

to present a method for analysis of transboundary crises.

We argue that recording communication serves as a new analytical tool to understand what has happened during a crisis and how TETRA systems are used to mediate the operational picture between actors. When we face transboundary crises, it might be even more relevant as it could be more problematic to get a complete and trustworthy picture of what has happened after a crisis by using traditional analysis tools. There is of course much that needs solving before TETRA talk-groups can be recorded, like in these two exercises. Nevertheless, the findings of this research thus far, indicates that the effort might be worth it. When at least two transboundary crises in Sweden, the forest fires in 2014 and 2018, were criticized for a lack of documentation that could be used for analytical purposes (Myndigheten för samhällsskydd och beredskap, 2016; Skogsbrandsutredningen, 2015; Statens offentliga utredningar, 2019), suggesting analysis of people's communication when handling the crisis could add something new to the analysis process of large transboundary crises.

Even if we face increasingly advanced digital technology in the domain of emergency and crisis management, TETRA systems provide emergency actors with a great tool for information sharing across boundaries. The TETRA system enables one-one communication, one-many, and many-many, which has not been studied or analyzed in this research, but which opens up for further research.

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REFERENCES

- Ansell, C., Boin, A., & Keller, A. (2010). Managing Transboundary Crises: Identifying the Building Blocks of an Effective Response System. *Journal of Contingencies and Crisis Management*, 18(4), 195-207. doi:10.1111/j.1468-5973.2010.00620.x
- Boin, A. (2009). The New World of Crises and Crisis Management: Implications for Policymaking and Research. *Review of Policy Research*, 26(4), 367-377. doi:10.1111/j.1541-1338.2009.00389.x
- Boin, A., Busuioac, M., & Groenleer, M. (2014). Building European Union capacity to manage transboundary crises: Network or lead-agency model? *Regulation & Governance*, 8(4), 418-436. doi:10.1111/rego.12035
- Boin, A., Kuipers, S., & Overdijk, W. (2013). Leadership in Times of Crisis: A Framework for Assessment. *International Review of Public Administration*, 18(1), 79-91. doi:10.1080/12294659.2013.10805241
- Boin, A., & Rhinard, M. (2008). Managing Transboundary Crises: What Role for the European Union? *International Studies Review*, 10(1), 1-26.
- Borglund, E., Landgren, J., & Lintzen, M. (2014). *Lägesbilder: Att skapa och analysera lägesbilder vid samhällsstörning [Common operational pictures: To create and analyze common operational pictures during large crisis]*. Stockholm: Myndigheten för samhällsskydd och beredskap.
- Dore, J., Lebel, L., & Molle, F. (2012). A framework for analysing transboundary water governance complexes, illustrated in the Mekong Region. *Journal of Hydrology*, 466-467, 23-36. doi:<https://doi.org/10.1016/j.jhydrol.2012.07.023>
- Hsieh, H.-F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research*, 15(9), 1277-1288. doi:10.1177/1049732305276687
- Molino, L. N. (2006). *Emergency Incident Management Systems: Fundamentals and Applications*. Hoboken, New Jersey: Wiley.
- Myers, M. D. (2009). *Qualitative research in business & management*. London: SAGE.
- Myers, M. D., & Avison, D. E. (2002). *Qualitative Research in Information Systems : A Reader*. London: Sage.
- Myndigheten för samhällsskydd och beredskap. (2016). *Ansvar, samverkan, handling : åtgärder för stärkt krisberedskap utifrån erfarenheterna från skogsbranden i Västmanland 2014 [Responsibility, collaboration, action: measures for enhanced crisis preparedness based on the experience of the forest fire in Västmanland 2014]*. Stockholm: Myndigheten för samhällsskydd och beredskap.
- Myndigheten för samhällsskydd och beredskap. (2018). *Utvärdering av hanteringen av attentatet i Stockholm 7 april 2017: Redovisning av regeringsuppdrag Ju2017/05643/SSK [Evaluation of the attack in Stockholm April 7, 2017]* (MSB1193 – april 2018). Retrieved from <https://rib.msb.se/filer/pdf/28471.pdf>
- Norri-Sederholm, T., Paakkonen, H., Kurola, J., & Saranto, K. (2015). Situational awareness and information flow in prehospital emergency medical care from the perspective of paramedic field supervisors: a scenario-based study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, 23(1), 4. doi:10.1186/s13049-014-0083-x

- Skogsbrandsutredningen. (2015). *Rapport från Skogsbrandsutredningen. [Report from the Forest Fire Investigation]*. Regeringen [Swedish Government].
- Statens offentliga utredningar. (2019). *Skogsbränderna sommaren 2018 (SOU 2019:7)*. Stockholm: Elanders Sverige AB, .