

False alarm? Effects of reducing unnecessary dispatches by fire and rescue services

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Abstract:

Fire and rescue services in Norway dispatch more often to false and unnecessary alarms than to real fires and accidents. In 2016, 60% of the emergency dispatches were conducted on the basis of false or unnecessary alarms. These unnecessary dispatches are costly in terms of time and resources spent, and can in some cases lead to a weakened preparedness towards real incidents. Also, the risk for traffic accidents increases when big vehicles rush through the streets on their way to where the alarm was triggered. Hence, there are good reasons to work to reduce the number of these kind of dispatches. On the other hand, one may also argue that there can be some positive effects of a certain number of mobilizations for the fire crews. Based on interviews with relevant actors connected to fire and rescue services, as well as on statistics collected through the BRIS reporting system, we will discuss possible consequences of reducing the number of false and unnecessary alarms and potential effects of implementing measures for decreasing unnecessary dispatches.

INTRODUCTION

Fire and rescue services in Norway dispatch more often to different types false or unnecessary alarms than to real fires and accidents. In 2016, 59% of the emergency dispatches were conducted on the basis of false or unnecessary alarms (DSB 2017). The numbers are increasing, from 20 000 in 2013 to 50 000 in 2016. An interesting point is that the number of emergency dispatches conducted on the basis of false or unnecessary alarms varies a lot between different municipalities in Norway, some have 40% and some as high as 75% (numbers from 2010). There is currently little knowledge about why this is so.

Unnecessary dispatches are costly in terms of time and resources spent, and can in some cases lead to a weakened preparedness towards real incidents. Also, the risk for traffic accidents increases when big rescue vehicles rush through the streets on their way to where the alarm was triggered. Hence, there are good reasons to work to reduce the number of these kind of dispatches. On the other hand, one may also argue that there can be some positive effects of a certain number of mobilizations for the fire crews.

As a response to the increasing number of false alarms, several fire departments in Norway are seeking to develop measures to reduce these numbers. This includes different technical measures and operational measures as well as fines for building owners. We will discuss the effects of these

measures, both in terms of reducing the number of unnecessary and false alarms, but also how they may affect the overall safety.

This paper is based on interviews with firefighters and other relevant professionals as well as on existing statistics and reports. We will discuss the effects of false alarms from an organizational perspective. We will also discuss DSB's (Directorate for Civil Protection and Emergency Planning) reporting system BRIS, which was introduced in 2015 and contains all assignments registered at the alarm centrals. With these data as a starting point we discuss how projects to reduce the number of unnecessary dispatches may be designed in a directed manner so as to retain the positive effects of these dispatches in terms of training and reduction of risk and avoid negative effects of implemented measures in terms of the response to real events.

BACKGROUND

The following section will give some facts about the background of the paper and the kind of information and data it is built upon. It will give the definitions of false alarms and unnecessary dispatches, describe the new reporting system BRIS and also describe the qualitative data collected in order to give a deeper understanding of the data collected in the BRIS reporting system.

Definitions and terms

Several different terms and concepts are used to address the issue of unnecessary and false alarms. In English literature it is more common to talk about 'false alarms' for all alarms resulting in unnecessary dispatches (Chagger and Smith 2014, Karter 2013). In Norway, the use of this term is considered unprecise, and it is recommended to distinguish between 'false alarms', intended unnecessary alarms, and 'unnecessary alarms', unintended unnecessary alarms. The use of the term 'alarm' can result in some confusion, so the preferred way of referring to this issue is by talking about the need for reducing 'unnecessary dispatches'. Since the fire brigades respond to all types of alarms, reduction of unnecessary dispatches must involve the reduction of both unnecessary and false alarms. In Denmark, it is also common to use the term 'alarm', and not 'dispatches', but there they differ between 'false' and 'blind' alarms (blind alarms being the same as unnecessary alarms). This paper, however, will mainly use the term 'unnecessary dispatches' when addressing this issue. We have also chosen to use the term 'dispatch' and not 'response'. The term response covers a range of actions instigated because of the alarm, while we in this paper only want to concentrate on the response dispatch – when fire and rescue services vehicles rush out due to an alarm. Common practice in Norway is for the alarm central to dispatch a basic fire response unit, a standard vehicle with four firefighters, who will investigate the incident at site, irrespective of their expectations of whether the alarm is genuine or not.

Another term that will be used frequently is Automatic Fire Alarm systems or AFA-systems. An AFA system is an installation comprising detector units connected to a central. This is in contrast to a smoke alarm, which is a standalone unit. The AFAs described in the current paper are also connected to an alarm central¹, which enables them to immediately, or after some preset delay, transfer the alarm, which in turn leads to a dispatch from the local fire and rescue service. AFA-systems are

¹ In Norway, these alarm centrals are called 'the 110-centrals', and their primary task is to address emergency messages for the fire and rescue services, alerting and calling out crews, establishing connections between relevant emergency actors and logging events.

mandatory in a number of buildings where there are many people, such as nursing homes, schools and public buildings. In addition, companies voluntarily choose to install AFA-systems that are directly connected to the alarm central.

BRIS – Reporting system

DSB, the Norwegian Directorate for Civil Protection, introduced the reporting system BRIS (acronym for the Norwegian words for Fire, Rescue, Reporting and Statistics) with effect from the first of January 2016. BRIS is a national reporting system gathering information about the Norwegian fire brigades' assignments. The overarching goal of this system is to give the fire brigades a good foundation for developing targeted measures in their preventive work, develop the emergency work and increase the data quality in order to give local and national decision makers a better knowledge base for learning and improvement. Another goal with the system is to get a more suitable user interface that allows reporting already at the event site or in the fire truck on the way back to the station.

Over the last years, DSB and Norwegian fire brigades have become aware of the high and increasing number of false and unnecessary alarms which leads to unnecessary dispatches. With BRIS they have got better statistics and also data on what causes these alarms. Still, there are issues to be sorted out in terms of data quality, as the BRIS data depends on the categorization of the dispatches, and in this respect there are some differences between fire departments and alarm centrals. Later on it will be shown examples on how fire brigades can use these data on developing measures for increasing the of unnecessary dispatches.

Data collection

This paper uses the some of the statistics from BRIS which can tell us something about the situation about false and unnecessary alarms and unnecessary dispatches. In addition we have collected qualitative data from one large fire brigade; emergency departement, alarm center (110-central) and preventive departement, and in two small fire brigades; observation of one emergency exercise, and interviews with the two fire chiefs officers. In addition we have followed the work in a project group in a large fire and rescue service, established for developing measures for reducing the number of unnecessary dispatches. This paper also builds upon the knowledge gained in earlier projects; on the organisation of norwegian fire brigades, and on measure development for reducing the number of fatal fires amongst vulnerable groups (Fenstad et al, 2013; Storesund et al. 2015, Gjørund et al. 2017, Gjørund & Almklov 2016, Halvorsen et al. 2016).

UNNECESSARY DISPATCHES AND ITS CONSEQUENCES

The situation in Norway

Data from BRIS shows that 60% of the Norwegian fire brigades dispatches are unnecessary. In average, the fire brigades in Norway had 137 unnecessary dispatches each day. The number of emergency dispatches conducted on the basis of false or unnecessary alarms varies a lot between different municipalities in Norway, some have a proportion of 40% whereas others have as high as 75% (numbers from 2010). There is currently little knowledge about why this is so, but it can be due to variation in number of buildings that are directly connected to the alarm central or the emergency controllers could have different formal procedures and different assessments of response to

incoming alarms. Also, the variations in demographics, housing stock and municipal organization may count for some of the variation.

Norway consists of more than 400 municipalities that range in population from 200 inhabitants to 650 000 (Oslo). The municipalities are highly diverse in terms of demographic profile, organizational structure and available resources. Equally diverse are the fire and rescue services, in terms of ownership, management and organization. Some municipalities own and run their own fire and rescue services, while others collaborate with neighboring municipalities about all or parts of the services. The large fire brigades consist of mostly full time employees, while the small fire brigades have most part time employees with other main jobs. It is 335 fire and rescue service brigades and 620 fire stations, but we see a trend for merging brigades in order to get larger and more specialized services. In Norway, the fire and rescue service is the only emergency agencies that are municipal. It has higher density, clear demands to response times, and thereby shorter response time compared to the police and health service.

Most of the alarms resulting in unnecessary dispatches typically come from automatic fire alarm (AFA) systems going off due to different perturbations or errors, smoke detectors reacting to cooking, steam or dust or people triggering alarms by error or, in some cases, intentional triggering. Not surprisingly there is a correlation between the size of the municipality in terms of number of inhabitants, and relative number of unnecessary alarms due to AFA-systems, and the main reason is most likely that small places have fewer objects directly connected to the alarm central than larger places do.

Comparison with Denmark

In Denmark, they have a reporting system very much like BRIS. It is called ODIN (acronym of the Danish words Online data registration and reporting system), and the latest version with registration of information about AFA-systems was released July 2015. This means that the first year of complete data is 2016, the same as in Norway. In Denmark, 44 % of the dispatches were to false or unnecessary alarms, and 42% out of all alarms came from AFA systems. Of these AFA alarms, only 9% were real, the rest were categorized as. In 2016, there were dispatches to over 6000 addresses. 143 addresses had 2507 dispatches alone. This means that 2,3% of the addresses had 16,3% of the dispatches.

As in Norway, the blind alarms (or unnecessary dispatches) are unevenly distributed throughout the country. The variation is probably an expression of uneven distribution of institutions, and thereby buildings with AFA-systems, throughout the country (Beredskabsstyrelsen 2017). Not surprisingly, the amount of blind alarms from AFA-systems have also increased from 9 000 in 2007 to 15 500 in 2016. The interesting thing is that even if the absolute amount of blind alarms has increased, the relative amount of blind alarms has decreased, from 8 blind alarms in 2007 tilt 5,7 in 2016 out of 1000 detectors (Beredskabsstyrelsen 2017). This can mean that the AFA-systems in general are more reliable than they were 10 years ago. We have not been able to find good data on how many AFA-systems that are in use at any time in Norway², and how many of these are connected to an alarm

² It may be possible to get approximate numbers by contacting all the alarm centrals in Norway, but his has not been part of the project's scope.

central, but it is likely that there is a relative decrease in the amount of unnecessary alarms from AFA-systems in Norway as well.

The big increase and uncertainty in categorization

As mentioned, there has been a large increase in unnecessary dispatches in Norway, from 20 000 in 2013 to 50 000 in 2016. It is reasonable to think of at least three reasons for this increase: 1) The increase correlates with the number of detectors connected to the alarm centrals, and explains the majority of the increase, 2) The introduction of the BRIS registration system has led to a more accurate and systematic registration of not only real alarms but also of the unnecessary alarms and dispatches, and 3) There are uncertainty about how to categorize in the BRIS system, at systematic interpretation can occur. E.g. there may be different assessments of whether an alarm is unnecessary when the alarm is a result of smoke related to making food. In interviews with firemen and employees at alarm centrals, we have been told that it can difficult to categorize cases in the border line, at that it can occur systematic tendencies in the way of reporting. One concrete example of concerns food making - If the dish is eatable the dispatch is to be categorized as unnecessary, and if it is not possible to eat the food, the dispatch is to be categorized as necessary, even in cases where there is no fire since it can then be seen as a preventive dispatch. But who is to decide if the food is eatable or not? Further – is the dispatch unnecessary if it prevented further development of the situation of if the dispatch reduced the probability for this kind of scenario to happen again?

Since the complete BRIS data is available only for 2016, it is not yet possible to determine how much of the increase in unnecessary dispatches is due to these different variables. In a few years, however, it will be possible to evaluate the numbers and variables available in this registration system.

Consequences of unnecessary dispatches

The negative consequences of unnecessary dispatches are both well-known as well as the background for trying to reduce number of these dispatches. First of all, it is resource demanding, as an unnecessary dispatch takes a crew and a vehicle away from other duties such as training, maintenance and makes them unavailable for other call-outs. In the case of part time personnel, it also costs additional money, since the crew is paid extra for dispatches. There is also a direct risk connected to the traffic hazard posed by vehicles speeding with blue lights through traffic. A longer term negative effect is the possibility, and a concern noted by several of our informants, of a cry wolf – effect, both in the sense of a delayed evacuation of the concerned buildings but also for the fire brigade.

SOME FINDINGS IN NORWEGIAN FIRE BRIGADES

While it has been generally recognized that a large and increasing amount of the dispatches for the Norwegian Fire and Rescue services have been unnecessary, the introduction of the national BRIS database represented a step change in the documentation of dispatches. In BRIS, all call outs from the alarm centrals are given a preliminary code by the operator, and later on it is given a final code by the responding unit. While there are limitations to this database as well, particularly when it comes to how to categorize the different dispatches, something we will discuss later on, it has laid the foundation for directed efforts to reduce the number of unnecessary dispatches, both on a national level and for the individual fire services. The statistics clearly demonstrate that a majority of the dispatches, particularly for urban fire brigades, are triggered by automatic detectors, and that in the vast majority of these cases there are no fire triggering them.

Developing and implementing measures

There have been increasing concerns in the fire community about unnecessary dispatches over the past years, but it is after the implementation of BRIS the reporting and the statistics have become more accurate, and it has been possible to get facts about the actual causes of the unnecessary dispatches. Based on these data, the directorate of Civil Protection (DSB) has requested the local fire brigades to try to find ways to reduce these unnecessary dispatches, and several fire brigades have started this work. Since the complete BRIS-data are quite new, there are not so many measures that are implemented yet.

Large fire and rescue services

We know that a large fire and rescue service in a large city in Norway introduced an increase in the fines for unnecessary dispatches from 5500 to 8000 NOK. They hoped this would motivate house owners to better maintain their alarm systems in order to reduce the unnecessary alarms. After 8 months, there was not registered any improvements, but they still hope for long term effect. There is however a fear that increasing fees may result in lower fire safety, which will be discussed later on.

Another big fire brigade in Norway, appointed a project group to develop measures which would reduce the amount of unnecessary dispatches with 20 % by the end of 2018. The average of the dispatches that were unnecessary in Norway in 2016 was 59 % while the average in this fire brigade was as high as 64 %. They had in several real fires experienced that persons living in the building did not evacuate or follow instructions because they had lost respect for fire alarms due to too many unnecessary alarms. Through BRIS-data they found that dispatched almost 2400 times to unnecessary or false alarms throughout 2016, and less than 10 % out of them were a result of false alarms. Further they found that a majority of the unnecessary dispatches were to addresses with Automatic Fire Alarm (AFA) installed. There were 532 unnecessary responses to only 63 addresses, between 5 and 28 dispatches to each address. This is the same tendencies that were found in Denmark, where a large amount of the dispatches were to a few addresses with AFA-systems installed. In TBRT they found that the most common cause for unnecessary dispatches were: wrong use or placement of detector (34 %), technical or unknown error in the AFA-system (19 %), intentional false alarm (11 %), dust due to construction work (8 %) and water steam (7,5 %). The project group in TBRT therefor decided to concentrate and target the measures towards these worst cases, and if they succeeded with them, they alone would make them reach the target of 20 % decrease in unnecessary dispatches. The project group developed targeted measures for reducing the unnecessary dispatches. The three most important are: 1) Information and guidance of house owners/residents in how to avoid unnecessary alarms, 2) Focus on unnecessary alarms under the fire and rescue services supervision of AFA-systems, and 3) Particular and direct follow-up on the worst cases³.

Small fire and rescue services

None of the small fire and rescue brigades we talked to had started to work with measures for reducing unnecessary dispatches. In contrast to the big fire and rescue services, they did not see the same need for reducing them either. The main reason for this was that the total amount of alarms

³ These number and facts are taken from BRIS-database and from a presentation the mentioned project group held in Forum for Fire Safety, 14th of November 2017.

was not very high. When the total number of dispatches is low, they do not get the same opportunity as in large fire brigades with many dispatches to maintain their skills up to date. Since most of the fire men in the small brigades were part time firefighters, the unnecessary dispatches are an important part of their training, and much more that it is for the full-time fire fighters which meet and train together each day. If the number of unnecessary dispatches were reduced, they were afraid that their skills would decrease. Part time fire personnel can earn as little as 20 000 N.kr a year, even if it is a requirement that they have the same skills as full time fire fighters, but they earn extra for each dispatch. Even if it is an assumption that small fire brigades are reluctant for reducing the amount unnecessary dispatches because of the earnings, this was never mentioned as a reason by the small brigades.

The regulation of the dimensioning of the fire department scales the size of the brigade depending on the size of the population. From places/municipalities with less than 3000 inhabitants and small fire brigades consisting of part time personnel without fixed schedules, to big cities with only full time personnel. For the small fire brigades, it is very difficult to possess the same and as much specialized knowledge and skills as the big fire and rescue services with full time employees have. But, one advantage the public services in small places have is their situated and local knowledge. Part time fire personnel have knowledge about houses and people from their regular jobs, as well as through neighbors and friends living in the small place. They are very much aware of this advantage, and they also try to strengthen it. In the interviews, they said that the unnecessary dispatches are a valuable source for gaining even deeper local knowledge about the special objects and people in their neighborhood.

UNINTENDED IMPLICATIONS?

As we have seen, the overall goal for the Norwegian Directorate for Civil Protection (DSB) is to decrease the numbers of unnecessary dispatches. Also, for large fire and rescue services this is an explicit goal, and they have started to develop and implement measures in order to reduce these kinds of dispatches. There are, however, some questions that are necessary to reflect upon when it comes to decide which kind of dispatches are to be reduced, and also if some measures can have unintended negative consequences.

Possible positive consequences of unnecessary dispatches

An important question to ask when considering measures to reduce the number of unnecessary dispatches is whether there are also some positive effects of them. In some cases, one may expect that a certain number of mobilizations for the fire crews can be useful for training. As long as the dispatches are not too repetitive, they may provide the organization with important training and expose it to a variability of scenarios that strengthens its resilience beyond what normal training does. This is especially important for smaller fire and rescue departments with part time employees and few dispatches. Since real fires are rare, everything they can learn about emergency preparedness and risk is considered useful, and the unnecessary dispatches are used for training basic skills in the mobilization phase and catching up with colleagues. In large fire and rescue services, on the other hand, where the employees are together with their brigade each day, the unnecessary dispatches are seen as disturbing. The positive effects of the unnecessary dispatches are therefore more obvious in small than in large brigades.

Also, many of the unnecessary alarms are triggered in buildings (such as care centers for elderly) and areas where the fire risk is high, or where there are vulnerable groups, so the dispatch to these locations might provide useful knowledge for future scenarios. It might provide information regarding incumbent risk, as in Turner's (1976:381) "incubation period", strong or weak signals that might trigger preemptive measures or other forms of learning for the fire department. As such it might help the fire crews prepare for future genuine alarms and it can also be a way to prevent false or unnecessary alarms in the future. It can also be considered as an exercise for people who has to evacuate buildings. Studies has shown a reduction in evacuation times through repetition of evacuation drills (Hamilton et al. 2017).

Thus, though a dispatch may be unnecessary seen as an isolated response, it might contribute to reducing risk in some ways, in some cases. Measures towards reducing the numbers of unnecessary dispatches must be seen in light of these possibilities for learning and risk reduction, as well as the cost and risk associated with the dispatches.

Possible negative consequences of measures

It is possible that measures implemented to reduce unnecessary dispatches may directly or indirectly harm the emergency preparedness or the response time to some types of fires. Fines may, for example lower the threshold for disconnecting automatic sensors, or for not installing them in the first place. As mentioned above, if the measures are successful in buildings where it is greater probability for a fire to start, like buildings housing vulnerable groups (Gjøsund et al. 2017), the measures for reducing unnecessary dispatches can indirectly result in loss of valuable knowledge, possibilities to detect fire hazards and chances to suggest and implement fire preventive measures amongst vulnerable groups and exposed houses.

Because of the reporting system BRIS, it has been possible to develop more appropriate and targeted measures for reducing unnecessary dispatches. Since the measures from the large fire and rescue services are in an early phase, and because BRIS was implemented relatively recently, there are no clear results on the measures impact or implications of the measures. What is certain, is that the reporting system BRIS will be a useful tool when analyzing the results of the measures implemented and their implications.

CONCLUDING REMARKS

By developing measures like the one of the large fire brigades did - towards the "worst cases", those with several unnecessary alarms due to dysfunctional AFA-systems, the chance of succeeding is greater than if you do not target the measures. It is also likely this strategy for reducing unnecessary dispatches will have effects on the recurring incidents that will not give valuable knowledge, while the dispatches which can give valuable knowledge about for instance vulnerable groups or local and demographic knowledge are more likely to persist.

One should not regard unnecessary dispatches as a homogenous category and implement measures blindly aiming for reducing the numbers. Rather, the detailed statistics in BRIS gives opportunities for more targeted and more effective reduction measures, by which one can also avoid some possible pitfalls that might lead to an increase in overall risk. We have suggested two such categories

1. Measures may lead to increased fire related risk if they lead to responses on the user side to reduce the number of alarms, for example by removing sensors altogether, by reducing their sensitivity or increasing the time before they are triggered.
2. Measures may lead to a decrease in dispatches that are unnecessary in the sense of putting out an actual fire, but that may have other positive consequences in terms of training for the personnel, or as they may contribute to a better knowledge of vulnerable buildings.

Still, as our case study has shown, this leaves many unnecessary dispatches to be eliminated. The project we studied addressed frequently recurring dispatches to certain buildings in a targeted manner, dispatches that clearly did not fall under these categories where side effects might be negative. In sum, then, we conclude that measures to reduce the number of unnecessary dispatches is important, but that they should be implemented based on careful evaluation of the potential negative effects they may have. Evaluating the different categories of reported data in terms of these positive and negative effects that measures have on a total fire risk, both likelihood and consequences, is an important first step.

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