On the Need for a Paradigm Shift in the Dutch Command and Information System for the Acute Phase of Disasters

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By and large, scientists agreed on what should be the output of a good command and information system in the acute phase of a disaster. The public needs fast and accurate information and fast 'meaning-making' if they are to be as self-reliant as possible and to be in the best possible position to cope with the shock of the disaster. Operational units need decentralized command and sometimes fast strategic decision-making. Despite this, classical command and information systems such as the three-tier system required by law in the Netherlands fail to deliver in this regard. We sketch an analytical framework which when applied to the Dutch system predicts its failure. We also present a different command and information system, already used in the Drenthe Safety Region, which satisfies the analytical framework. Early experience with the Drenthe system shows the potential of the new system but also shows that no system is better than the people in it.

1. Introduction

Since the 1980s, disasters and other crises in the Netherlands have been managed under the supreme command of the mayor of the municipality most affected. To aid him in this task, he has a multidisciplinary three-tier command structure whose key purpose is to bring about the coordinated deployment of the emergency services, which in the Netherlands are organized on a regional basis. Coordinated deployment here means that priorities are set and measures are coordinated accordingly (Scholtens, 2008).

This three-tier command structure can be found in many countries. According to Dynes, writing about the United States, and van Lochem and Scholtens on the situation in the Netherlands, it stems from the military origin of civil emergency response (Dynes, 1994a; Van Lochem, 2007; Scholtens, 2008). Often the levels are referred to as gold, silver and bronze (Arbuthnot, 2008).

Although originally this never was a primary function of the command structure, nowadays all command structures have an important role in deciding upon the flow of information to the public. Academics have long argued that the information function of the disaster management structure is a crucial one, and in this article, we acknowledge this importance by defining a 'command and information system' (also abbreviated to 'C&I system') to be that part of the disaster management structure that is supposed to control the actions of all parties concerned, both in physical terms and as regards the provision of information to the public.

For years, evaluations of incidents in the Netherlands have shown that the multidisciplinary three-tier C&I

 DOI: 10.1111/1468-5973.12035

system leads to delayed and suboptimal decision-making and public information (Scholtens, 2008). This has not, however, led to any fundamental discussion about the C&I system in the Netherlands, or about the principles governing it. In 2010, the organizational part of the C&I system was even enshrined in law, in what at face value was a contradictory response to the many evaluations that had shown that it was failing, in the hope that a legal basis would lead to improvement.

However, at least neither the failure of the three-tier C&I system nor the reluctance to have it changed is unique to the Netherlands (Groenendaal, Helsloot, & Scholtens, 2013). The international debate on this theme is presented in the introduction to this special issue Incident Command Systems, so in this article we shall refrain from a detailed description of it.

Even so, in one region in the Netherlands a process was initiated to bring about fundamental adjustments to the C&I system. The aim of the process was to develop an entirely new C&I system, thinking 'outside the box' but still based on scientific insights, that might offer a solution for the constant sticking-points associated with meeting at three levels to achieve coordinated deployment.

In this article, we present the analytic framework that was developed by the authors for the Drenthe Safety Region.[1] As we shall show, this framework predicts the failure of the classical Dutch C&I system. We also explain why in the Netherlands change is hard to achieve unless there is a 'policy window', such as arose in Drenthe. The new C&I system developed by Drenthe to fulfil the demands of the analytic framework is then described, including initial experiences with the system in operation.

As a conclusion of this introduction, we focus on the regional organization of disaster management. One consequence of this is that we pay little or no attention to disasters that are of such magnitude that current policy mandates command on the national scale. In the Netherlands, we are fortunate in that no such disaster has yet befallen the country. National exercises have consistently demonstrated complete failure of the national command system (see, e.g., Helsloot 2005 and Helsloot, Scholtens, & Warners, 2009). Whether such a thing as national command in the acute phase of a disaster can exist at all may be questioned using the framework presented but it is an issue that will not be addressed here.

2. What is needed in the acute phase of a disaster: an analytic framework

In this section, we present an analytical framework consisting of five design principles for the C&I system of the disaster management structure in the acute phase of a disaster. The acute phase of a disaster is the first hours in which life-saving action has to be taken. Here, we follow Quarantelli (1998) by defining a disaster in terms of a variety of features. Disasters

(1) Are sudden-onset events
(2) Seriously disrupt the routines of collective units
(3) Cause the adoption of unplanned courses of action in order to adjust to the disruption
(4) Have unexpected life histories delineated in social space and time, and
(5) Pose danger to valued social objects.

In any disaster, people have a tendency to take care of themselves while at the same time saving most of their fellow citizens in need (Perry, 1985; Quarantelli, 1993; Dynes, 1994a; Dynes 1994b; Quarantelli, 1999; Perry & Lindell, 2003; Helsloot & Ruitenberg, 2004; Bonanno et al., 2007). However, in order to take care of themselves people have to be provided with 'valid' information to base their decisions on. Without accurate information, people may take decisions that they may consider meaningful and appropriate from their own local point of view, but which can be regarded as sub-optimal from a global (i.e., government) perspective (Helsloot & Ruitenberg, 2004). Social media technology makes the almost instantaneous spread of information from authorities to the general public possible (Veil, Buehner, & Palenchar, 2011 and especially for Twitter Groenendaal & Helsloot, 2013). The sticking-point is therefore the release of factual information in the possession of the authorities to the all media, including social media. If this information is only shared hours after the disaster occurs, it is clearly of no use for the rapid public decision-making needed in the acute phase of a disaster. Rapid communication is of the essence. We would suggest a maximum of half an hour: that is the time within which the authorities must be able to provide accurate and meaningful information about the disaster to those who are directly affected as well as the general public. When authorities take more time to inform the public, people will start to act based upon information spread by others.

This adds up to the following design principle (DP):

DP 1: The C&I system should enable rapid information provision to the general public within no more than 30 minutes after the disaster occurs.

At first sight, the term 'factual information' may seem tautologous, but we use it to make a clear distinction between the act of meaning-making. People need meaning-making by a public figure in disaster situations to overcome the 'cosmological episode' associated with any disaster. According to Weick (1993, p. 633), a cosmological episode occurs 'when people suddenly and deeply feel that the universe is no longer a rational, orderly system'. In a cosmological episode, both the sense of what is occurring and the means to rebuild that

sense collapse together. In a cosmological episode of this kind, members of the society overcome this collapse by looking to their leaders for an interpretation of the situation and what they plan to do to restore a state of normality (Boin, Kuipers, & Overdijk, 2013). Leaders are expected to provide 'authentic hope and confidence' (Leonard & Howitt, 2009). They can thus impose a dominant 'frame' through which events are viewed and interpreted (Edelman, 1985). A good leader thus offers a clear interpretation of the crisis and explains how they intended to lead their community out of it (Boin et al., 2013).

Again, the act of meaning-making has to be performed as soon as possible because once it takes hours for a figurehead to come into the open the frame will have already been formed by other actors. We would therefore suggest to take an hour as the maximum.

This adds up to the following design principle:

DP 2: The C&I system should enable meaning-making by a public leader within an hour after the beginning of a disaster.

The disaster management structure will have to come into 'real' action to care for those victims who cannot cope for themselves or who cannot be rescued by their fellow citizens. Here, there are theoretically two possible perspectives to take on the quality of decision-making: there is a need for decisiveness, i.e., fast decision-making; and a need for coherence, that is to say the actions of different actors should be coherent, i.e., in accord with each other.

Based on naturalistic decision-making theory (NDM) and empirical observations (e.g., Scholtens, 2008), we take the stance that decisiveness should be supported first as it is the most natural reflex of professional emergency responders. NDM describes the way experienced decision-makers such as firefighters, naval officers and fighter pilots operate and make decisions in situations characterized by severe time pressure, ambiguous information, high stakes, and uncertainty (Zsambok & Klein, 1997; Cannon-Bowers & Salas, 1998). NDM proposes that professional emergency responders, when confronted with extraordinary events, will decide to do what they always would do in ordinary situations (Klein, Calderwood, & Macgregor, 1989; Weick, 2001). That is to say: they will put out the first fire they come across; they will provide medical care to the first victim they see, and so on. This means that they cannot be expected to wait for instructions from higher echelon decision-makers when they are confronted with a situation in which large numbers of people need help. According to NDM, rapid decision-making is supported when professional emergency responders with direct access to the situation at hand are required to take immediate action (Weick, 2001).

This adds up to the following design principle:

DP 3: The C&I system must allow decentralized operational decision-making.

Decentralized decision-making often interferes with attempts at multidisciplinary coordination because multidisciplinary coordination requires the (at least temporary) centralization of decision-making in order to adjust activities between the emergency response structures involved in the disaster response. Even when a great deal of effort is devoted to centralizing decision-making (in order to achieve some extent of multidisciplinary task adjustment), it is still hard to gain the accurate overall view required for adjusting front-line activities. Distributed decision-making (DDM) provides a useful approach for understanding the difficulties of centralized coordination in large-scale emergency situations (Rasmussen, Brehmer, & Leplat, 1991; Brehmer, 2000). DDM assumes that that it is impossible to understand and control all the varied and complex aspects of dynamic organizations through a centralized decision-making process (Schneeweiss, 2003). Because a single individual unit can only cover a restricted area and process a limited amount of information, DDM proposes that complex problems should be divided into smaller components and that the size of these components should be matched to the individual's information-processing abilities. Because different individuals may attempt to resolve a larger problem in different ways, it becomes almost impossible to identify a global pattern or to forecast how an intervention by one actor will affect the decision-making of other individual response units in the field (Rasmussen et al., 1991). DDM therefore proposes that each individual unit should make its own decisions as independently as possible within the main outlines of the overall goal (Rasmussen et al., 1991).

This adds up to the following design principle:

DP 4: The C&I system must favour monodisciplinary command over multidisciplinary coordination.

However, on the level of this 'overall goal', rapid decision-making by tactical or strategic decisions may be required in specific situations. First, sometimes 'tactical' decisions need to be made by someone with a better overview of the situation than local operational commanders. According to NDM, operational commanders operating under time pressure are likely to base their decisions on rapid recognition of locally available information, which may lead to decisions that are optimal at a micro level but suboptimal at a macro level. Second, sometimes a strategic decision has to be made about what to do and what not to do, especially when the need for help exceeds the response capacity. To be valuable at the operational level, however, these strategic decisions should be made rapidly – we would suggest within 10 minutes – from the moment the need

for a strategic decision has become clear, for example because a decentral operational leader asks for it.

This adds up to the following design principle:

DP 5: The C&I system should make it possible for strategic decisions needed by the operational command to be taken as soon as possible, but no later than within 10 minutes from the moment the strategic decision is needed, in order to be of any value in the acute phase.

3. The Dutch command and information system

The Dutch C&I system is partly regulated by law (Wet veiligheidsregio's 2010 and Besluit veiligheidsregio's 2010) as far as the organizational elements are concerned, partly by non-binding national guidelines for the modus operandi. We shall first describe the three core organizational elements: the municipal or regional disaster policy team (GBT/RBT), the regional tactical team (ROT) and the local operational command team (COPI). This three-tier system has been in existence since 1985 but was first enshrined in law in 2010. The description is based on the explanation given by the law (see e.g., Helsloot, 2006) and on the numerous guidelines published by the government since the 1980s (see, e.g., Ministerie van BZK, 2003; Multidisciplinaire werkgroep GRIP, 2006). For a detailed description see NIFV (2010).

3.1. GBT/RBT

Parliament has placed supreme command in the hands of the mayor of the municipality hit by the disaster or the largest municipality in the region if more than one municipality is affected. As Commander in Chief, he alone has the power to give orders to anyone participating in the management of the disaster. It is therefore the mayor, supported by a municipal or regional disaster policy team, who is expected to set priorities, take important decisions, provide the operational leader with the necessary directions, and, after consultation, resolve any differences of opinion within the disaster policy team. The disaster policy teams consist of the directors of emergency services and in the case of an RBT also of all mayors involved, supplemented with the chief district prosecutor (in charge of the public prosecution office) and the dykereeve ('dijkgraaf' i.e., chairman of the regional water board).

3.2. ROT

The operational leader referred to above has the task of overseeing operational coordination. He exercises his authority under the responsibility of the mayor and within the limits defined by the mayor. The operational leader takes care of the 'technical' coordination between the various services; thus it is he who chairs a meeting of senior officers of all the emergency and other services involved, the ROT. He also heads the ROT and brings any disputes arising to the attention of the mayor. Those in charge of the services involved with disaster management remain responsible for the tasks assigned to them and they determine who and what will be actually deployed and how. The operational leader thus has no powers of his own.

As the operational leader is formally the operational contact for the mayor – after all, the other participants in the GBT and RBT are administrators and directors – one important task of the ROT is to translate operational issues into policy issues and vice versa.

The ROT is also in command of the COPI and the various monodisciplinary regional operational action centres (see Figure 1). In particular, the ROT commands the communication action centre which keeps the media and the public at large abreast of developments. This communication action centre may either be organized on a literally regional basis or it may in turn command several municipal action centres which then have a subcentre for communication. What information is actually communicated is considered a policy decision of the GBT/RBT.

In general, the ROT will be housed some distance from the incident site, but usually also some distance from the GBT. Over the years, it has become customary for the COPI to focus primarily on the source area (see caption Figure 1), whereas the ROT takes operational responsibility for the effect area. There is as yet no national solution for the fact that the operational leader is supposed to participate in both GBT/RBT and ROT.

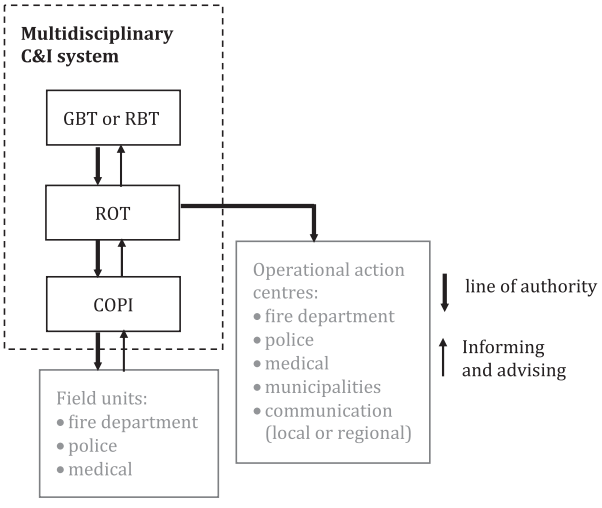

Figure 1. Organizational Chart of the Multidisciplinary C&I System as Designed in the Netherlands in Full Escalation and also in Relation to the Implementing Field Units and Action Centres.

3.3. COPI

The key task of the operational command team at the disaster site (COPI) is to coordinate operational command of all emergency and other services working at the site. The COPI is expected to keep the ROT informed and to implement orders given by the ROT. The team is under supervision of a COPI leader. This one-man leadership by the COPI leader is not regulated by statute but is based on informal regulations. The COPI leader is not involved in the substantive operational responsibilities of the disciplines involved, and therefore has no formal commanding power other than that of passing on orders issued by the mayor.

The three-tier C&I system is summarized in Table 1.

Depending on the nature and size of the disaster and the need for leadership and coordination of the actions by the three emergency response services and the municipality or municipalities involved, various parts of the C&I system will be called upon (this is called scaling up or escalating in four levels, see Table 2) (Multidisciplinaire werkgroep GRIP, 2006).

Figure 1 shows how the four teams in the C&I system relate to each other in terms of hierarchy, in the case of full escalation.

3.4. Modus operandi

Despite the formal hierarchical relationships described, it is important to bear in mind that to a large extent the disaster management organization is 'nothing more than' a project organization. After all, the teams consist of representatives of various autonomous services and organizations that have temporarily joined forces to 'do

Table 1. Composition of the Teams in the C&I System in Drenthe and in the Other Safety Regions

Team (Drenthe)	Key occupation (Drenthe)	Key occupation (other regions)	Team (other regions)
COPI	– COPI leader – Fire officer – Medical officer – Police officer – Press officer – Information manager – Plotter	– COPI leader – Fire officer – Medical officer – Police officer – Press officer – Information manager – Plotter	COPI
n/a	n/a	– Operational leader – Senior fire officer, supported by a fire department section – Senior officer emergency medical services, supported by a medical section – Senior police officer, supported by a police section – Municipal officer, supported by a municipality section – Information officer plus information section – Plotter – Information manager	ROT
Crisis team	– Mayor – Operational leader – Communication adviser – Policy adviser	– Mayor – Chief magistrate – Fire service director – Director of emergency medical services – Police chief – Municipal director – Information officer	GBT

COPI, operational command team at the disaster site; GBT, municipal disaster policy team; ROT, regional tactical team.

Table 2. Criteria for Escalation. The *Source* Area is the Area Where the Emergency Response Services Implement the Direct Management of the Incident. The *Effect* Area is the Area Outside of the Source Area, Where the Incident Affects the Wider Environment

Escalation level	Scope of the incident	C&I system interpretation
1	Source area	COPI
2	Source and effect area	COPI + ROT
3	Threat to the wellbeing of a large section of the population	COPI + ROT + GBT
4	More than one municipal area, any shortages (water etc.)	COPI + ROT + RBT

COPI, operational command team at the disaster site; GBT, municipal disaster policy team; RBT, regional disaster policy team; ROT, regional tactical team.

a job' together. The modus operandi of the C&I system is therefore in essence 'holding meetings until agreement is reached'. There is a national consensus that to achieve this, all three teams must follow the 'BOB' model: people are taught to jointly form a collective understanding of the situation ['Beeld' (picture)], followed by a shared situation assessment ['Oordeel' (judgement)], after which it is possible to arrive at a well-informed integrated decision or resolution ('Besluit').

The realization that the different schedules for each team's meetings should be coordinated to create a more logical sequence led to the creation of a single meeting schedule which now puts the different meetings of the teams involved into an order that streamlines the operations of the entire command structure.

Operational information from the field must be communicated upwards via the 'formal line'. More precisely, this means that the information is shared and coordinated in the COPI, after which the COPI leader informs the GBT or RBT via the ROT again.

4. Why the Dutch command and information system has failed to live up to expectations

In this section, we analyse the Dutch command and information system by reference to our analytical framework. We shall show that in theory it will never be able to meet the design principles, and from there we go on to look at how in practice those involved in the disaster management structure cater for such a predictable failure. For example, they may be compensating by using informal short cuts. Our examination of this interesting question is based on the incident evaluations that have been routinely carried out since the end of the 1990s (for an overview see the literature list). Unless explicitly stated, all the claims made below can be seen in all these evaluations.

Our reasoning is as follows: in an ideal situation, each of the prescribed BOB steps will take at least 5 minutes. It follows that even in an ideal situation these three steps will together add up to at least 15 minutes. Let us further assume that meetings on different levels fit together seamlessly. Thus the cycle

- collecting information and formulating questions by COPI →
- assessing information and formulating advice by ROT →
- decision-making and formulating policy by GBT/RBT →
- translating policy into operational command by ROT →
- interpretation of commands by COPI

will take five times 15 minutes, i.e., an hour and a quarter. Note that by law the ROT has to assemble in 45 minutes, while the GBT/RBT has to assemble within an hour, so the first time this cycle is run it will probably take longer because of a later starting time.

4.1. DP 1: Rapid dissemination of factual information

4.1.1. In theory

Following the above reasoning, the dissemination of factual information coming from the disaster area (COPI) to the public by the ROT's action centre and approved by the GBT/RBT will take at least an hour and thus will not satisfy the first design principle.

4.1.2. In practice

Formally approved factual information is never disseminated within 2 hours in the disasters evaluated. On the other hand, it is clear that, in particular, communication professionals at the communication action centre tend to put out unapproved information simply because they feel the need to say something, probably because they are the ones who are most exposed to the constant public demand for information. The fastest examples of this show a reaction time of nearly an hour. In most cases, the unapproved factual information presented in this way is quite adequate but very often an interpretation is placed on it by the communication professionals that is inconsistent with what operational officers actually believe to be the situation.

4.2. DP 2: Fast meaning-making

4.2.1. In theory

Following the above reasoning, the cycle would take at least three-quarters of an hour to complete. This means that if a mayor decided to make a public announcement as soon as possible he could theoretically meet the second design principle. However, as by law the GBT/RBT has to assemble within an hour this will be problematic. The system's modus operandi, however, which is much more focused on the mayor's role as commander-in-chief than his role as meaning-maker, means that it highly likely that fast meaning-making will not be a top priority. There is thus no guarantee that the second design principle will be met.

4.2.2. In practice

The design principle of an hour is never met. Nevertheless, the Netherlands has its fair share of mayors who are considered to be good meaning-makers even if they first addressed the public 2.5–3.5 hours after the beginning of the disaster. Evaluations of examples such

as the fireworks disaster in Enschede in 2000, the attack on the Queen Beatrix in 2009 or the shopping mall shooting in Alphen aan de Rijn in 2011 invariably show that these mayors understood the importance of meaning-making and precisely for that reason acted more or less against advice and procedures.

4.3. DP 3: Decentralized operational decision-making

4.3.1. In theory

Formally, the Dutch C&I system does not allow of decentralized multidisciplinary decision-making as only the mayor has the power to decide across the boundaries of organizations. As the modus operandi is aimed principally at achieving multidisciplinary coordination, the third design principle is not met.

4.3.2. In practice

All evaluations show that front-line commanders and units reach their own operational decisions after waiting only briefly for commands from the ROT, which are always late (see DP 4 and DP 5).

4.4. DP 4: Favour monodisciplinary command before multidisciplinary coordination

4.4.1. In theory

The Dutch modus operandi very much favours multidisciplinary coordination. It is the duty officers responsible for monodisciplinary implementation in the field who also take part in the COPI meetings that are designed to deliver a multidisciplinary plan of action. That means that these officials have to arrive at their own judgement of which task should be given priority: taking part in COPI meetings or providing leadership to their own organization. They cannot do both at the same time. The fourth design principle is thus not met.

4.4.2. In practice

Not all evaluations pay attention to the difference at the operational level between monodisciplinary and multidisciplinary coordination. Very often, only multidisciplinary coordination is considered as reflecting the importance the Dutch modus operandi attaches to multidisciplinary coordination. In those evaluations that do focus on this (for example those of the fire at De Punt in 2008 and the so-called Polder Crash of a Turkish Airlines airliner near Schiphol airport in 2009) shows that, as a result of their education and training, operational commanders in the field tend to focus so much on multidisciplinary coordination that they have virtually no monodisciplinary command, i.e., lose all grip on their units.

4.5. DP5: Strategic decisions must be taken almost instantly

4.5.1. In theory

Following the reasoning above, it is clear that no strategic decision can be made within an hour and a quarter. The fifth design principle is thus not met.

4.5.2. In practice

The evaluations show that during the acute phase of sudden unanticipated disasters no strategic decisions are taken simply because uncertainty at the higher command levels causes them to spend so much time searching for more information that by the time they find it (or abandon the search), the original operational situation no longer exists. Another reason is that the GBT/RBT rarely focuses only on the most pressing matters. One reason for that, in turn, is that the ROT has difficulty playing its intended role: rarely, for example, does it ever get round to giving the GBT/RBT any real advice. As a result, the GBT/RBT itself goes off in search of operational information, after which it concentrates on resolving operational sticking points. This mechanism is sometimes referred to as the 'operational suction' suffered by the GBT/RBT.

4.6. Another reason why the Dutch C&I system fails

The Dutch C&I system fails to perform as well as it should is to some extent the result of the way exercises are conducted. Exercises are never easy to begin with, since disaster management drills in which the entire C&I system is exercised require a great deal of logistical preparation, meaning that they cannot take place often. Over the years, this has led to an exercise regime that is to a large extent divorced from reality. For instance, teams usually practise joint decision-making individually. Mutual interaction between teams (such as information provision and/or command between teams) is hardly practised at all, whereas this mutual interaction is a crucial element in the C&I system. Moreover, in most exercises, the focus is on the BOB model which means that coherence is trained instead of decisiveness.

5. Why the Netherlands has not changed but Drenthe has

As already observed, since the fireworks disaster in Enschede in 2000, the Netherlands has established a tradition of evaluating incidents which includes review of the performance of the C&I system. The evaluation system includes both evaluations by the Public Order and Safety Inspectorate (now called Inspectorate for

Safety, Security and Justice), and those conducted by academics and commercial consultancies (see the overview of incident evaluations). All these evaluations conclude that the C&I system has not been functioning as it should.

The recommendations from most of these evaluations are of the first order, meaning that they press for better preparation by means of education and training or for better support by means of information systems. In recent years, various initiatives have also been introduced to bring about an incremental improvement in the working of the C&I system. An example is the statutory requirement to monitor both the composition and the operational readiness of the various teams as a means of achieving the desired level of coordination more rapidly and hence in good time. Exercises now include 'meeting clocks' and teams' adherence to role. At the same time national 'netcentric work' based on network-enabled capabilities has been introduced with the aim of making sure that all teams receive the same information at the same time. In theory, this means that all teams are connected to one IT-information system in which all teams enter their information and tasks. In addition to this, the coordinating role of the dispatch centre is strengthened by adding a coordinating officer to its team. So far, however, these moves have yet to lead to an observable improvement in performance: information officers, for example, appear to be too busy entering their own information to read and absorb the information provided by others (see for example POSI 2013: 154, 155; Boersma et al., 2012; Scholtens, van Staalduinen, & Helsloot, 2012; Scholtens & Helsloot, 2013).

Since 2007, two of the present authors have been trying to initiate a public debate in the Netherlands on a fundamental review of the multidisciplinary C&I system [e.g., Scholtens & Helsloot, 2008, plus their inaugural lecturers (Helsloot 2007 and Scholtens 2008) which received a fair amount attention in the media and elsewhere]. Their argumentation is summarized in the core statement of this article, viz. that the three-tier C&I system is not in accord with scholarly insights found in the literature of NDM and DDM.

Such a fundamental review has been avoided by both policy makers and professionals in the field. According to Helsloot (2007), one of the main barriers to such a review is the fact that disasters are so uncommon, so that on the one hand, preparation for truly effective disaster control receives too little priority from government while on the other hand, professionals have no experience other than that gained from exercises. True enough, the average safety region does not suffer a disaster more often than about once in a decade. Symbolic promises for better disaster management by constantly including new statutory requirements for planning and practice seem in the perception of administrators to be all that is needed. The result has been that the general preference for the status quo rather than change has been able to remain dominant (Boin, Hart, Stern, & Sindelius, 2005, McConnell & Drennan, 2006, Hansén, 2008, Birkland, 2006).

In the Drenthe Safety Region, however, a number of coinciding random events led in 2009/2010 to a willingness to debate the C&I system and invest in ways of improving it.

The first of these coincidences was three serious accidents that took place within the span of a year: a possible contamination with an unknown substance or biological agent in a pet shop in 2007 (COT, 2008), a downburst in Hoogeveen, also in 2007 (Drenthe Regional Fire Services, 2007) and a fire in 2008 in which three firemen were killed (Commissie De Punt, 2009). In all three of these events, the operational sticking points mentioned earlier made themselves felt. In the case of the De Punt fire, the result was manifestly inadequate care for the victims, followed by fierce reactions in the local media.

The second coincidence was the first time the national Public Order and Safety Inspectorate had a major exercise organized and evaluated in Drenthe. The verdict was scathing: in almost every aspect Drenthe had failed to comply even with conventional disaster management planning. This was considered to explain the fact that all the usual sticking points were once again in evidence (POSI, 2009). Major investments, it was concluded, would be needed to be able to comply with all these requirements.

The third coincidence was the emergence of the Drenthe Safety Region as a new statutory partner for, e.g., individual local fire brigades. To the new management team of the region (of which one of the present authors is a member), a fundamental change in direction, far from being a threat to existing positions, was an opportunity to make its mark on the structure of disaster management in the region without the usual obstacles getting in the way.

6. The multidisciplinary C&I system in Drenthe: theory and practice

In Drenthe Safety Region, the five design principles have been taken as the basis for a newly developed C&I system which was launched in mid 2011 (Drenthe Safety Region, 2011; Drenthe Safety Region, 2012).

The C&I in Drenthe consist of the following two levels/teams (see Figure 2):

- A coordination forum for the operational leaders in the field, referred to as COPI[2]
- An administrative crisis team consisting of the mayor and three advisers: a communications adviser, a policy adviser and the operational leader.

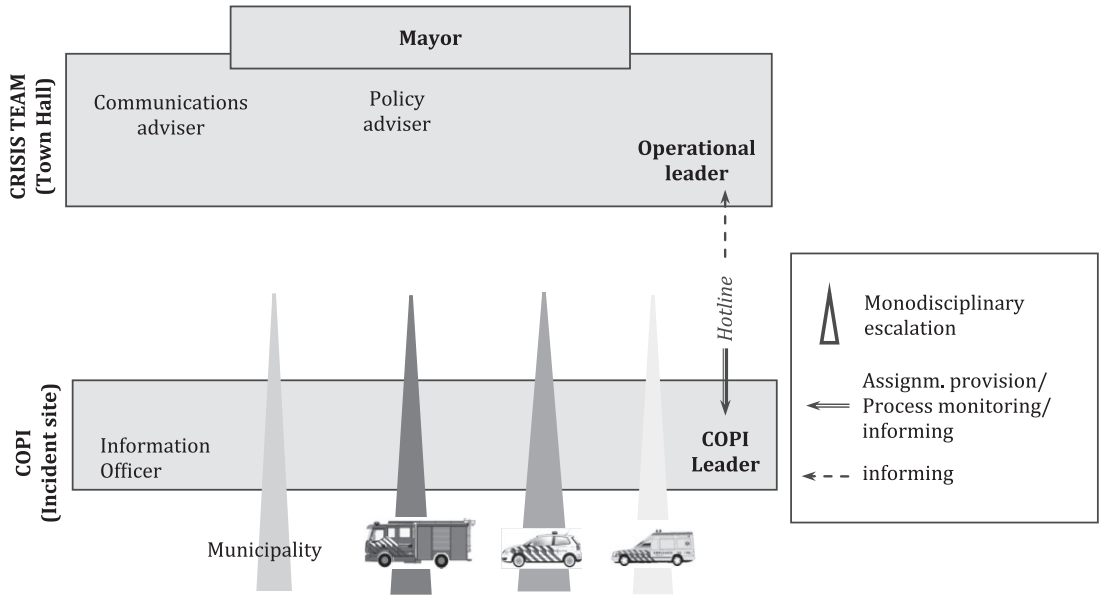

Figure 2. Schematic Representation of the C&I System in Drenthe in Relation to the Monodisciplinary Command Line.

The operational leader represents the three emergency services and municipal services.

6.1. Incident site

The emergency services and municipal services play their part in disaster management as independently as possible, as in normal situations, each having its own information system and line of command. In the first phase of the disaster, emergency service officers coordinate their efforts only in brief bilateral meetings and only where necessary.

6.2. COPI

As soon as the incident permits, coordination takes place in a more structured manner. To this end, the officers in charge of the emergency services, optionally supplemented with the operational leadership of other organizations taking part in the management of the disaster, form a COPI. However, interdisciplinary coordination should never be at the expense of monodisciplinary command and control. For this reason, there is a guideline limit of 2 hours before proceeding to structured consultation. Where possible, the COPI leader will refrain from interrupting monodisciplinary operations, confining himself to the task of facilitating operations:

- By taking urgent multidisciplinary operational decisions or by submitting them instantly via the hotline to the operational leader. The hotline in this case is that between the COPI leader and the operational leader, enabling them to speak to one another at any time – i.e., even when one of the two is already engaged in consultation.
- By calling in extra officers where necessary so that additional tasks can be performed.

6.3. On-site public information spokesperson, municipal communications action centre

Within 30 minutes following the first report of the incident, and every 30 minutes thereafter, the duty spokesperson and the municipal communications action centre will provide an initial outline of the visible facts thus far. They only make statements independently about visible known factual information. This information is aimed primarily at helping those involved to act self-reliantly.

6.4. The crisis team: the mayor and his three advisers

In the initial acute (life-saving) phase, the mayor's options for centralized direction are limited: he will focus mainly on his role as figurehead. This calls for him to make a public appearance within an hour, when he endows the disaster with some meaning: in short, he helps his audience and the wider public to make sense of events. He repeats this after an hour and every 2 hours thereafter, as long as the situation demands. The communications adviser supports the mayor in establishing the meaning-making message and is supported in this by a municipal crisis communications action centre.

In his function as the most senior decision-maker, when asked to do so the mayor takes urgent strategic decisions within 10 minutes. Problems passed on to the operational leader by the COPI leader via the hotline are at once submitted to the mayor together with an operational recommendation. The mayor takes a decision within 10 minutes.

Operational information necessary for meaning-making in general and urgent decision-making is brought to the attention of the mayor immediately.

The policy adviser (e.g., city manager) oversees the decision-making process so that the mayor is able to make a timely decision. He does this, as in normal situations, by separating primary and secondary matters.

Acting on behalf of the mayor, the operational leader has operational command and sees to it that decisions taken by the mayor are immediately forwarded to the COPI leader or, if necessary, to one or more of the highest monodisciplinary officers whose duties include monitoring their implementation. The COPI leader, in turn, ensures that the decisions are forwarded to the various operational leaders in the field.

Table 1 shows the composition of the two teams, also compared with the C&I system in the other regions. It is striking that:

- There are no longer any directors of the emergency services at the mayor's table, 'just' three advisers. Policy decision-making is the exclusive province of the mayor and there is no team of directors who have their own interests to look after.
- The ROT has gone.
- Operational leadership is located in the town hall near the mayor on behalf of the emergency services, so that any problems arising can be presented immediately.
- The COPI handles both source and effect area.
- Coordination between the various operational services is confined to the disaster area and is no longer on three levels.

7. Experience with the new C&I system to date

The proof of the pudding is in the eating, so the question is how the new C&I system is functioning in practice. Since the formal implementation in May 2011, there have been three types of events that provide insight into the functioning of the new C&I system.

Part of the implementation was five system tests held between mid 2010 and mid 2011 in which the whole system, excluding only the field units, was put to the test. The last test was assessed by an independent observer who is a fire chief in another region. Special attention was paid to whether the familiar sticking points had resolved in the new system. The summary report on these tests states that (Drenthe Safety Region, 2011):

- The available factual information was provided within 30 minutes. Communication professionals, however, found it difficult to confine themselves to giving only factual information, and regularly gave the public incorrect information based on an erroneous perception of the situation.
- The mayor was able to give meaning to the disaster within the agreed time of an hour based on aggregated operational information given by the operational leader. The contents of the meaning-making message still need some attention, but this has no bearing on the performance of the system itself.
- The hotline between COPI and crisis team worked well, so that strategic decisions could be made within the agreed time of 10 minutes. However, when faced with uncertainties some mayors found it difficult to arrive at decisions, as a result of which they failed to take decisions within the stipulated time.

During the tests, only the performance of the system was reviewed. However, the tests did reveal that participants in the C&I system require rigorous training and practice to accustom themselves to the demands of the new system. For example, the emphasis is no longer on formal meetings in which information is exchanged, but on taking responsibility as operational commanders to ensure the rapid gathering and forwarding of what is always going to be limited information. Learning and acclimatizing to this new regime often proved difficult.

Since 2011, there has been one actual incident in which the C&I system was activated: on 15 July 2011 – a fortnight after the new C&I system was implemented – a 200-metres-high television mast collapsed as a result of a fire. Another incident took place just before formal implementation. This was a heath fire on the Fochteloërveen which very nearly necessitated the evacuation of a prison. In both cases, only an internal evaluation was conducted as both events were considered to be too close to the implementation date to find anything other than the findings of the system tests. These internal evaluations did indeed come up with the same findings as the analysis of the system tests.

Since implementation, the entire C&I system has been tested monthly. The exercises test almost the entire disaster organization – field units being omitted. This is much more easily achieved with the new 'lean and mean' system than with the classical system. An important added theoretical benefit is that the participants are now able to practise their interaction with each other.

No systematic or independent evaluation of these exercises took place, so in 2013 two large-scale exercises that also included front-line units and communication sections and were independently evaluated were awaited with some anxiety by both administrators and professionals. These were a forest fire drill in which a camp site with 125 real guests had to be evacuated and a so-called statutory self-test based on a scenario in which the water supply was deliberately contaminated with a toxic substance. Both exercises were observed and evaluated by an independent group of evaluators overseen by the Public Order and Safety Inspectorate.

The extra strain on the operational command from having real units and 'real' victims may be expected, as a result, to put a strain on the entire command and information system. In both cases this extra strain showed. It was concluded that an associated serious sticking point prevented the system working as it should: on all levels, decision-makers had trouble applying fundamental principles of command: decision-makers found it difficult to prioritize, give clear commands, and then monitor whether these orders had actually been carried out.

However, what did work well in both cases was the direct hotline between the COPI leader and the operational leader. This amounted to a shared picture between mayors and field commanders. This in turn made it possible for the mayors to give meaning to the incidents in close to an hour. For instance, it has become an unwritten rule to ask the operational leader, en route to a press conference, to ask the COPI leader about the latest state of affairs. However, since operational field commanders regularly turned out not to have an accurate picture themselves, neither did the COPI leader, and the result was that both operational leaders and mayors only had a partial understanding of the situation.

Here again, the provision of factual information proved to be a sticking point because information professionals felt it to be their duty to give not only the factual information as such but also an interpretation. This they were not able to do well, the result being inaccurate advice and hence a loss of coherence in the functioning of the C&I system.

8. Conclusion

In this article, we have presented an analytical framework consisting of five design principles for the C&I system to be used as part of the disaster management structure during the initial acute phase of an unfolding disaster. We have shown that the Dutch C&I system fails to meet the requirements of this analytical framework and that this is one reason why in practice the system is failing.

An alternative C&I system is then presented which is used in one region of the Netherlands that does meet the requirements of this analytical framework. Initial experience with this system gives a mixed picture, but it is fair to say that depending on the abilities of those operating it, in many ways it works quite well. This not surprisingly adds up to the preliminary conclusion that the ability to work in any command system calls for a degree of familiarity with the way it works and with a number of basic but imperative rules on commanding.

The biggest advantage of using a C&I system such as the Drenthe system that is based on our analytical framework, might thus be that it is better attuned to the way people think and act as well as being simpler in its design, less explanation and fewer basic rules are needed than with the classical Dutch C&I system. Nevertheless, it will always be necessary to strike a balance between learning the basic rules on the one hand and the effort that a region is prepared to put into the system to prepare effectively for such rare events on the other. The success of any C&I system will always depend on how well that balance is achieved.

Further empirical research, when the Drenthe system is longer operational and/or if other regions adopt the Drenthe system, should furnish more insight into whether the analytical framework really describes the core elements of a good C&I system and whether, in systems such as that in Drenthe that are based on the analytical framework, the resolution of the remaining sticking points depends on the level to which participants are taught and trained or on further refinement of the system itself.

Notes

1. A safety region is a geographical area in which various authorities and services work together in the field of fire control, disaster management, crisis management, medical assistance and maintaining public order and security. The 400 municipalities in the Netherlands are divided into a total of 25 safety regions (see also Boersma et al. 2012).
2. It was decided that this coordination forum should also be given the name COPI, for reasons of recognition in other regions where a COPI is also used at the incident site.

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