Division of responsibility

Report

Forms of interaction, division of responsibility and preparedness between actors responding to disasters at sea

1 September, 2006

BalticMaster
maritime safety across borders

Project part-financed by the European Union

Content

Background - problem focus

In the BM-brochure we can read that:

> The Baltic Sea is one of the world's most heavily trafficked waters. Transport by sea is expected to increase dramatically in the next few years.
>
> The export of oil is increasing. The oil is often carried in older vessels where safety is inadequate.
>
> Oil terminals in the Eastern Baltic are being expanded rapidly. On average, the Baltic Sea is the scene of one major oil related accident every year.
>
> The oil tanker Prestige, carrying a large amount of oil, sank off the coast of Galicia in Spain in 2002. On her way she passed through the Baltic Sea.
>
> This environment is fragile with a limited water flow from the Atlantic. It takes 25-30 years to renew the water of the Baltic Sea.
>
> The use of the sea and the coastal zones is increasing. Shipping, fishing, tourism, offshore wind power plants, oil drilling and other interests are operating in the same area.
>
> In the event of a major accident, the coastal and local regions will have to bear most of the consequences – like polluted beaches, a decline in tourism and the collapse of the fishing industry.
>
> Regional and local governments have a very little influence on matters concerning maritime safety.

According to the same brochure, one main objective of the Baltic Master is:

> To increase preparedness for preventing and managing a catastrophe, through integrating local and regional zones in the planning and implementation processes.

Continuing with the purpose of WP 1:

> Two heavy oil tankers collide somewhere in the Baltic Sea in severe weather. Who is in charge of doing what? Who will suffer the consequences? Are we prepared for this? As a first part, the Baltic Master creates a worst case scenario and determines who is responsible for the various aspects of managing the consequences of a major ship accident involving more than one country. In a later stage, guidelines on local and regional preparedness will be presented.

Purpose of the report

According to the contract the title of WP 1 is “Preparedness and division of responsibility regarding disasters at sea”. Its strategically focus is “Forms of interaction, division of responsibility and preparedness between actors responding to disasters at sea”. Planned results are “Increased knowledge about the division of responsibility within as well as between nations of the SBSR and guidelines for local and regional participation in the existing structure of preparedness.” Outputs are a “report of responsibility and liability together with guidelines for local and regional preparedness”. Key words of the WP 1 are preparedness, division of responsibility, forms of interaction and disasters at sea.

The field of interest for The Baltic Master with respect to WP 1 is how single countries can cope with big accidents at sea concerning environmental problems. These accidents are supposed to stress the cooperation within authorities and countries as well as between authorities and countries. Of interest is also the local and regional levels. WP 1 is supposed to give an understanding of the nature of the cooperation in case of an big accident at sea. This understanding is in turn intended to be used to policy recommendations. Thus WP 1 is concerned with an description of the preparedness, an analysis of the preparedness and guidelines for how to change the preparedness when necessary.

Delimitations

WP 1 is delimitated to the South Baltic Sea region and to Denmark, Germany, Poland and Sweden representing this region. Furthermore, Baltic Master focuses on accidents with environmental consequences rather than personal injuries like e.g. the Estonia accident. Concerning the accidents, the focus is primarily on big ones and the smaller, often deliberate, releases are left out. Accidents resulting from terror attacks are also excluded.

The commission of this report is to describe and to analyse the structure of the preparedness for big accidents with environmental consequences. It should be possible to connect the report to the subsequent considerations on guidelines for local and regional preparedness.

Outline of the report

After some important points of departure have been laid down, the report will look like this: The next chapter will account for the socio-legal theory that determines the perspective and much of the concepts used later on. The theory also determines much of the methods used to collect and to analyse the empirical data. Chapter 3 will account for the methodological considerations made, the methods used, present an overview of the empirical data and the scenario used for collecting data. Chapter four presents the data structured according to a norm-

model. The model is divided into three major parts: driving forces, cognition and system conditions. These data are close to raw data. Chapter five presents the data analysed from a action point of view. How is the driving forces, the cognition and the system conditions structured when making up actions? The last chapter is devoted to some reflections on how possible change should be done. As a appendix to the report is a matrix over the four countries studied. The matrix focuses on the formal rules.

Theoretical considerations

The WP 1, Milestone 2 talks about a matrix of responsibility for disasters at sea. The key words are preparedness, division of responsibility, forms of interaction and disasters at sea. The field of interest for The Baltic Master is previous and future accidents at sea concerning environmental problems. These accidents are supposed to stress the cooperation within authorities and countries as well as between authorities and countries. Another focus is local and regional levels. The matrix is supposed to give an understanding of the nature of the cooperation in case of an big accident at sea. This understanding is in turn intended to be used to policy recommendations. Thus the matrix is supposed to serve three purposes: as an description of the cooperation, as an analysis of the cooperation and as a tool for how to change the cooperation if necessary.

Hitherto the Baltic Master concepts of ‘preparedness’, (division of) ‘responsibility’, and ‘interaction’ have been used to describe the field of interest and problem focus. In order to carry out a scientific study, other - scientific - concepts have to be used. The Baltic Master concepts concern very much actions (who will act, who is responsible if there is no action, the nature of the action between several actors). A focus on actions need however some sort of operalisation of these concepts. A common sense understanding of the Baltic Master concepts would be: *who*, will do *what*, *when* and *how*. If we can answer these questions with reference to big accidents at the Baltic Sea, we will be able to make a simple, yet useful description of the preparedness. Therefore, these questions make up the basis for the matrix in the appendix. It is also these kind of questions that are the focus in compilations like the response manuals from Helcome.

These kind of compilations normally answer the question who will do what, when and how according to a plan, a manual, a legislation, an international convention or any other kind of formal set of rules. However, it does not answer the question who will *actually* do what, when and how. To describe who will do what, when and how according to formal rules is certainly not the same thing as a description of what measures persons or organisations will actually take. The former question take its starting point in an analysis of a set of rules while the later question is concerned with empirical studies of actual behaviour like statistics of operations, exercises, in depth studies of big cases etc. Furthermore, questions on who does

what, when and why lack another important question crucial for analysis and for the suggestions for changes - namely the question *why*.

From a sociology of law perspective, this problem of interest can be interpreted in two different ways. It can on the one hand be understood as the study of a set of rules that gives assignments, instructions and competence to certain actors or organisations to act in a certain way. On the other hand can it be understood as a set of informal norms that actually guide the actions observed. The difference between these to perspectives is commonly known as the difference between 'law in books and law in action'. The basis for these two perspectives is the numerous observations showing a clear difference between formal rules and actually applied rules: the observance of rules can vary from close to total observance to close to no observance at all, all depending on context and various reasons. The important question is then how to explain the high level of observance as well as how to explain the reasons for those actions with low level of observance. Put simply: why do we follow the law, and what is the rationale for not following the law?

In sociology of law the difference between what the law says and what people actually do - be it lay people or professional lawyers - can be theoretically understood and studied in different ways, see Cotterrell (1992) for an overview. When studying the legal profession, theories about professions or organisations is used, e.g. Max Weber and when studying ordinary people's law, Eugen Ehrlich could be used, taking two examples. The character of the field and the problem focus determines the theories and methods chosen as well as the purpose of the study.

Except for the matrix, the Baltic Master focuses on actions taken rather than the formal set of rules. When talking about the rationale for actions, we are presupposing a complex and broad perspective; the rationale for actions is theoretically a very complex question. The same is true when we try to understand the rationale for action in order to suggest changes, we have to use a complex and broad perspective and relevant methods to study this rationale. The reason is validity: if the suggestions for change are supposed to work, they have to consider the conditions that influence the actions in question. If we don't know about the past, we have little chance to successfully change the future. In sociology of law this is a commonly known principle: the success of a legislation is depending on the structure of social norms acting in the field. The more legislation is in touch with peoples social norms, the more successful it can be.

Traditional sociology of law focuses on one perspective at a time, e.g. professions. In Sociology of Law in Lund, however, a new paradigm in sociology of law is developing: the norm perspective. The socio-legal norm perspective was introduced about ten years ago and have been applied and developed since then (Hydén 1998). Today this perspective has been used in matters like sustainable learning, infrastructure conflicts and planning, sports, housing and cooperation. The idea of the perspective is to serve as a platform for three different tasks: to collect data, to analyse data, and to communicate within the socio-legal field and between this and other fields. The perspective is in principle integrating which

means that emphasis is put on synthesising different kinds of knowledge into a format that have its focus on actions.

The norm perspective has been used explicitly in several dissertations, e.g. Wickenberg (1999) and Baier (2003) as well as in many reports. "The Sustainable Island Ven" evaluation study of planning and conflicts on sustainable development was an integrating research project including disciplines from three different faculties at Lund University in cooperation with local practitioners (Tekniska förvaltningen, Landskrona kommun). "The Landskrona study 1970-2010" was also based on this norm approach integrating researchers and practitioners from different fields. The norm approach is also used in the scientific evaluation (2005-07) of the national and multidimensional national project "Barnahus" (Socialstyrelsen, Åklagarmyndigheten, Rättsmedicinalverket and Polismyndigheten). Other projects work with cooperation between different authorities and local NGO:s. The norm perspective has also been used in the multidisciplinary research application for a FAS-centre on work life, welfare systems and public health and thus integrating eight disciplines from five faculties at Lund University (this application is nominated from Lund University).

A study of formal rules thus differ from the study of norms. Formal rules are normally studied by jurists in general or by lawyers if the matter concerns an actual case or conflict. The result of such a study is directed by the question 'what are the rules concerning X', while the study of norms is directed by the question 'what do actors normally do and why concerning X'. This question is answered in terms of norms. The question is then how to describe norms.

First, the difference between rules and norms must be clarified. For an overview and a in depth discussion about norms and rules, see Baier (2003). (Formal) rules are a certain branch of norms that normally is defined as explicit norms with formal sanctions attached to them passed in an authoritative manner. Hence, the concept of norms used here include formal rules. The concept of norms is defined here as "anything that guide action". Of importance here is that norms in this sense are strongly associated with action. It is thus an empirical matter if and how norms exist, i.e. guide action and what are their content. In traditional sociology the concept of norms is limited to the social life, e.g. manners or etiquette. In the norm perspective however, the concept of norms is broadened. In fact, anything that guide action is considered as making up the norm. Therefore conditions for the economic life, taking one example, to a high degree is ‘normative’ and has the potential of guiding action.

This concept of norms can be visualised with the norm model, se further the chapter on method. The model is a heuristic tool that assumes that actions or patterns of actions, big cases and alike can be interpreted as a result of values, cognition and system conditions influencing the action in a certain way, as an example, see Baier (2003). The content of these factors and the dynamics of the norm formation process is a matter of empirical analysis. The analysis can start by identifying the value structure. Values like material success, solidarity, human safety, biological diversity etc. have to be discovered. Then this value structure

have to be analysed. Are there value conflicts, priorities etc.? A consensus about values are more likely to serve as a base for actions than conflicts about values. The way facts about the social and the natural world is looked upon is important. Do certain professions take certain knowledge for granted, is there certain ways to talk about problems, how is nature looked upon? The last factor is about system conditions. This part is about the subsystems of society and how they are normative when setting the rules of the game. It is e.g. important to ask what role economy play, how the political and legal system function etc.

The model is deliberately broad and different kind of data can be collected. At the same time it serves as a communication device with respect to other fields of science but also to non scientific institutions of different kinds. The primary purpose of the model is to serve as an heuristic tool for the analysis of the architecture of a certain norm or how it works. The existence of a norm is studied by ordinary social science methods like interviews, questionnaires, statistics or observations.

The matrix in the appendix is conceived as a set of formal rules and consequently studied as set of formal norms. This is considered to be the ‘top down aspect’ of the matrix, i.e. a rule-perspective assigning competence, duties etc to certain actors to act in a certain way. This perspective can answer question on who is supposed to act, when, and how. It is sometimes argued that such a description can be accompanied with an analysis or a comparison of other set of rules in for instance other countries. But to compare formal rules in different countries require a certain method - functional - to be successful. Still, such a functional comparison is always limited to the fact that we don’t know if the actors actually follow the rules. The socio-legal perspective instead takes a ‘bottom up-aspect’ and studies what actions actors really take in case of an accident together with the reasons for these actions. These actions are understood an looked upon in terms of norms.

Another focus of The Baltic Master is the local end the regional levels. Sometime national regulation is supplemented by regional and local regulations or supplemented on lower levels in a certain sector, environmental regulation. Thus, we often experience different normative centres instead of a logical top down regulation; the phenomena is known as the polycentricity of law. This fact calls for a non-national, non regulative perspective like the norm perspective. Another focus of the Baltic Master is big accidents. We can assume that the everyday, small release of oil is handled different and probably according to the regulations than the very big accident in the scenario. We can thus expect more ‘a-typical’ behaviour in case of an big accident that require much national and international cooperation. Although the rules for ordinary and extra-ordinary releases most often are the same, an organisation that has to cope with a extra-ordinary accidents is challenged in quite another way. Of importance here is the obvious lack of routine and the problems to perform exercises on this scale. It is very likely that different mechanisms influence the actions taken when a small and a major accident occur. Hence, it is motivated to study these to types of accidents in different ways.

Methodological considerations

The purpose of the study and the theoretical considerations accounted for above, provide the criteria for how to design this study. First of all, there has to be a description and an analysis of the preparedness for big accidents with environmental consequences, taking into account the delimitations given by Baltic Master contract. Second, it should be possible to connect the result to the subsequent considerations on guidelines for local and regional preparedness. The 'who will do what, when and why' - questions will be answered in one study and with one method and one type of data. The question of what will actually happen will be answered in a second study, with a second method and with a second set of data. We now need a framework that can handle these requirement as good as possible.

The overall framework is the norm perspective outlined above. This framework uses the concept of norms as key element for several purposes: It is possible to describe actions or patterns of actions in terms of norms. It shall be stressed that there are limits to e.g. rational choice as an explanation of actions or other explanations like affective behaviour. The limits between norm guided action and rational choice are normally that the former one is grounded in the past while the latter one is grounded in the future. Rational choice is normally studied on a individual level, while norm guided action often is studied on a aggregated level. Norms are general due to the similarities in social life while individual action can take different forms due to the different preferences on individual level. By traditional means of data collection, it is possible to track down norms that guide actions or behaviour. By means of the norm model, it is possible to study the architecture of the norm in question. The emergence of the norm, its function and how its key elements operate is possible questions to answer this way. These two parts concern description and analysis.

The last part of the norm perspective concerns the norms as a strategy. If we consider the time dimension of norms, we can see that norms are i) a trade off between different considerations regarding the future and the past ii) that the 'norm' itself guiding action emerges and iii) we can see the result of the norm as actions. If we consider all three parts of this 'cycle', the function of norms are to transform the past into the future; norms are in this sense not anything static. Knowledge about what norms that guide certain actions thus give information on the possibility how to change the actions. Such an analysis is far more likely to be successful than when just changing the rules.

It is now possible to sum up what kind of studies that has to be done in simple matrix. This way we get an overview of the different studies and the different data, but we can also put names on the studies.

	Purpose	Questions asked	Theoretical Framework	Method	Data
Study I	describe the formal preparedness	who what when why	norm perspective	analysis of rules, (legal)	compilations of formal set of rules (Helcome and other)
Study II	describe the actual preparedness	actually who what when why	norm perspective	tracking down norms	"actual" actions taken in case of a scenario
Study III	analyse the actual preparedness	why	norm perspective	analysis of norm structure	study II and additional sources

Study I

The focus in this report is not on the formal set of rules. One purpose of this study is rather a pedagogical one, to show how little significance these studies normally have if one wants to understand the reasons for why people act or how to change the way people act. It is however important for other reasons to look at the formal structure. In a bureaucracy are the formal rules often important for reasons of e.g. justice. It is also important to understand the formal set of rules to avoid ambiguity or to establish liability. Formal rules can of course be of different "quality" in the sense that a rule have to be clear, possible to observe, connected with power or resources etc. But it is normally not possible to evaluate a formal set of rules in terms of effectiveness without knowing anything about the social or economical context.

The study made here in this report is really not more than a compilation of already existing compilations normally based on information from each country or authority. Much more effort could easily be put to describe and analyse these country specific regulations. The regulations often have a top down character when national laws or EC-regulations are at the top, together with conventions, down via different decrees to instructions on an executive level. But to account for all this rules is a big task and in this instance not worth wile.

Study II

If study I is more or less traditional, study II needs more explanation when it comes to the realization of it. The purpose of study II is to get information on what actually happens when a big accident occur. One big problem with this question is how to retrieve data about such accidents. One strategy is to study real cases. The Baltic Master already includes one such case study - the Baltic Carrier accident. Normally, case studies are in depth-studies and the data is limited to this case. Another strategy is to study several accidents and try to generalise from them. One problem is however that there are too few big accidents, especially in the Baltic Sea. The third strategy, chosen here, is to simulate accidents and the subsequent measures taken.

When asking for what will really happen, two relevant type of answers are possible: Persons that have participated in an accident can inform about the actions taken and persons with no experience can inform about the actions that would have been taken. The scenario works as a common context for those with no experience and those with experience. The scenario thus generates the data that are retrieved at the scenario workshops, see the matrix for an overview of the scenario workshops. At the workshops, the scenario have been presented, and one basic question has been asked: what would you do now? The answers to this question have been to a various degree ‘exact’, often have certain aspects been discussed longer, while more simple aspects have been rather obvious. The data have thus been retrieved by means of interview, and in this case when several person have been interviewed at the same time, on the same question, this technique would be referred to as focus groups.

Country	Date	Nr of informants	Experience with major accidents	Scenario
Denmark	24th of april	7	Yes	Yes
Germany	22nd of june	1	No	No
Poland	27th of april	6	No	Yes
Sweden	20th of march	9	Yes	Yes
Sweden II	11th of april	Apx 60	Some	Yes

Baltic Master staff contacted each country and asked for the participation in the workshops. Different authorities decided to send one or more participants and in general, most aspects and authorities were represented. Most of the persons were senior officials and had an operative function. The list of all the participants will not be accounted for here. In the German case, just one person from the Havarikommando participated. In the second Swedish case, a scenario workshop was arranged by the Swedish Rescue Services Agency. The purpose of the workshop was educational, but part of the structure resembled the Baltic Master workshops. The second Swedish workshop thus served as an additional data source and the first Swedish case could be compared to this one. Due to the large number of participants, the second Swedish workshop also served as aggregated control data; otherwise, the workshops are cases in a qualitative design.

The scenario used was developed by the Swedish Rescue Services and adapted some to the Baltic Master context. It is a power point presentation where a 100.000 tons, double hull, age 15 oil tanker collides with a unspecified freighter just at the point where the EEZ of Denmark, Sweden and Germany coincide. The tanker carry heavy fuel oil with density of 950 kg/m3 and viscosity of 500 cSt at 10oC water temperature. Oil spill of 10.000 ton fuel oil. The ferry is carrying dangerous goods and the ships are badly damaged. The wind speed is 10 m/s and there is a 4 knots current towards land. After this basic information comes a short film showing the dynamic of the oil spill. The program Sea Track Web developed by the Swedish Meteorological and Hydrological Institute (SMHI) is used showing the calculated drift of the oil spill. There are three different versions: one for Denmark/Sweden, one for Germany and one for Poland based on different conditions. The drift is arranged so that there is a major oil spill drifting towards a substantial part of the land. The oil spill is drifting over more than one EEZ in the beginning.

The data retrieved from the scenario workshops will not be presented in length. The obvious reason is that it is to much material - every scenario lasted approximately 3-4 hours. A second reason is that this data could be interpreted as an evaluation of each country’s preparedness, something that is not the purpose of this report. Moreover, it is not possible to draw such conclusions from the data since the data from one single country is not valid in several aspects. The data is not valid in a quantitative sense and it can easily be argued that the persons interviewed would act in another way if an accident would occur.

Instead, the strategy of this study is qualitative. This means that the data is not statistically significant, on the contrary, the data is collected and interpreted to an analytic tool - the norm model that will be used as analytical tool in study III. The answers retrieved as raw data will thus be organised according the norm model. The qualitative character of the design has consequences for how the report can be used. As has been recently said, it is not possible to evaluate the four countries in any way. The data is instead used to describe the normative structure of the preparedness. Every country with its authorities has then the possibility to evaluate, assess or discuss its own preparedness with this structure as a

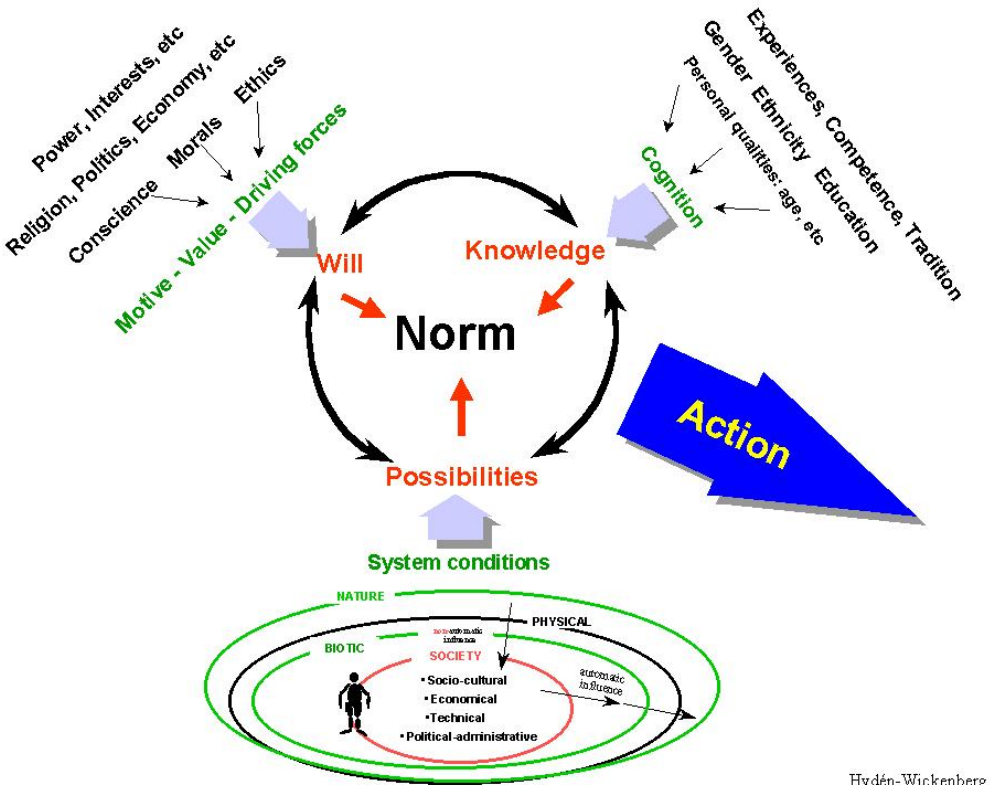
background. This way the structure is in itself important as means for formulating questions.

Study III

The last step is the analysis of the previously organised data. Again, the purpose of the report is to serve as a tool for further discussions on preparedness, and its format must therefore be suited to this purpose. After the organisation of the data, the analysis of its normative structure will take place. This part goes behind the mere description of the norms that guide actions, and analyses how the norms are configured. As has been pointed out before, the norms identified are just a symbolic representation of a larger process. As with legal statutes, there is a background of the norm that include considerations of very different kind. The big difference is that legal statutes are made deliberately, while the formation process of social norms seldom is explicit in that sense. A social norm can emerge over a long time and thus be a kind of generalised best practice (if you want to do certain thing, take a certain role etc) at the same time it considers available knowledge. One function of norms is actually to- reduce complexity; all the considerations done by many people in the past is passed on to other people but concealed in the formula ‘you should treat people well’, ‘at this company we...’ etc. Study III is about describing the configuration of the normative structure in terms of values, cognition and system conditions.

When describing the configurations of the normative structure, a heuristic has been used. The heuristic is made up from three components: values, cognition and system conditions. These components are in turn a result from the assumption that an action is guided by a will (there has to be a certain kind of intentionality behind an action except for habits, actions guided by emotional stress etc.). The action also has to take into account certain facts about the world, be it the social world or the physical world. Finally, the action has to be possible to carry out, i.e. the conditions of the social and natural systems has to be 'affirmative' regarding the action in question. The systems mentioned are e.g. economy or politics but also the natural systems. These systems are normative in the sense that they do not point out certain actions but effect actions that will be carried out; one metaphor is to say that they make up the infrastructure for actions. It is e.g. not possible to carry out many actions against the conditions of the economy; such an action will be 'sanctioned' by the economy and thus it will be uneconomically.

This heuristic can be summed up in a figure:


Power, Interests, etc
Religion, Politics, Economy, etc
Conscience
Morals
Ethics
Motive - Value - Driving forces
Will
Knowledge
Cognition
Experiences, Competence, Tradition
Gender Ethnicity
Education
Personal qualities: age, etc
Norm
Action
Possibilities
System conditions
NATURE
PHYSICAL
BIOTIC
SOCIETY
• Socio-cultural
• Economical
• Technical
• Political-administrative
automatic influence
Hydén-Wickenberg

Study I - the matrix

As discussed earlier, the purpose of this matrix is to describe the formal preparedness. The questions asked is who, is doing what, when and how regarding an extra ordinary accident. The data has mainly been collected via Helcome's Manual on Co-operation in Combating Marine Pollution, Vol I and the European Community Civil Protection, Community Information System (CIS). In some cases, national databases have been used.

The data collected gives a good picture of the who-question, at least on an overall level. In this report this part has been divided into responsibility at sea and on land. Left out from the matrix is the fact that in some cases ports and harbours are entities that have special administration, and often the harbour master or alike is responsible for the preparedness. Sometimes the responsibility includes the coast, but in practice (study II) the operative responsibility lies within the land based authorities. The coast is a problem, in the sense that it is a grey are between a clear at sea and a clear on land responsibility. One reason for this is that the land based organisation normally don't use boats or other sea vessels, but the boats and vessels used at sea, often have problems getting close to land and still maintaining their oil combating function. The problem is solved ad-hoc.

When it comes to the what-question, the data does not answer this question in a systematic way. In general, this part is not covered in this report when it concerns practical matters like how to deploy a boom, what kind of skimmers, pumps to use etc. Answers to this question will most likely be found in instructions to the operative functions, to the On Scene Commander or alike. The same is true for the when-question. But general instructions on what to do in terms of communication and responsibility between countries can be found in the Helcome Manual vol I. The manual covers mainly the cooperation at se.

This matrix concerns four countries. But since some time, the European Community has been active in the field and there is reason to mention two institutions. The main institution is the Community Mechanism for Civil Protection. The main role of the Community Mechanism for Civil Protection is to facilitate co-operation in civil protection assistance interventions in the event of major emergencies which may require urgent response actions. The Monitoring and Information Centre (MIC) is the operational heart of this mechanism.

The European Maritime Safety Agency (EMSA) is another important institution. The purpose of EMSA is to contribute to the enhancement of the overall maritime safety system in the Community. Its goals are to reduce the risk of maritime accidents, marine pollution from ships and the loss of human lives at sea. Besides this, EMSA has also chartered five oil pollution response vessels to "top up" the preparedness in the Baltic Sea. Two of theses ships participated in a exercise on the 5th of September this year.

On a general level, the Helcom organisation is important for the implementation of the Convention on the Protection of the Marine Environment of the Baltic Sea. Helcom manages e.g. exercises, monitors implementation, facilitates the international cooperation by setting a up framework for cooperation (Helcom manuals I and II). Besides providing information in the Maris databases, Helcom is not an operative organisation.

Study I	At sea	On land
Denmark	Operative: Ministry of Defence → Defence Command Denmark → Admiral Danish Fleet Administrative: Ministry of Environment and energy, → Danish Environmental Protection Agency	Operative: Danish Emergency Management Agency, Local authorities and others. Administrative: Regional/local Councils, Ministry of Defence (DEMA)
Germany	Operative: Federal Ministry of Transport, Building and Houses → Central Command for Maritime Emergencies Administrative: Federal Government + Coastal States → Federal Ministry of Transport, Building and Houses + Coastal St. Ministries	Operative: Coastal States → Local authorities Administrative: Coastal States Ministries
Poland	Operative: Ministry of Infrastructure → Maritime Search and Rescue Service Administrative: Ministry of Infrastructure → Directors of Maritime Offices	Operative: Local Authorities Administrative: no info
Sweden	Operative: The Swedish Coastguard Administrative: The Swedish Ministry of Defence	Operative: Municipal Authorities, Swedish Rescue Services Agency Administrative: Municipalities, The Swedish Ministry of Defence, The County Administrative Board

Study II

The purpose of this chapter is to describe who will do what and when in case of an extra ordinary accident at se. The data is retrieved from scenario workshops and the following description is the result from those workshops. The result is not accounted for country wise, but the description is a qualitative summary of the four workshops. In some instances examples from a certain country will be given just for pedagogical reasons.

The accident - the course of events

By way of introduction, I will here sketch some steps when there is an extra ordinary accident. Most of the ordinary oil spills are deliberate and result from cleaning the tanks. In such a case the oil spill is much smaller, from some tons of oil up to a thousand of tons. The extra ordinary case used as a scenario is not necessarily representative for all big accidents, it rather represents an extra ordinary accident with substantial environmental consequences. The ambition though has been to make the scenario realistic.

The accident in the scenario is caused by a collision between a 100 000 ton tanker and freight ferry. The ferry carries dangerous goods. The collision takes place somewhere at crossings of the Danish, German and Swedish EEZs. There is a 10 000 ton oil spill due to damages of the tanker’s hull. At first, the oil slick is drifting around, but quite soon it is spreading and drifting towards land. It reaches land and somewhat 50 km are affected. The kind of coast is not specified.

An extra ordinary accident like the scenario will result in a huge rescue operation. And it will certainly be considered as a potential catastrophe. A multinational rescue operation will start and all available resources will be taken into consideration when trying to cope with the accident and its consequences.

Who

In a case like this, normally the communication goes through the Marine Rescue Coordination Centre (MRCC) or a Joint Rescue Coordination Centre (JRCC), mainly because of the size and the nature of the accident; initially no one knows if there are casualties or injuries and it is reasonable to assume so. (Smaller oil spills can be reported directly to the contact point.) Some sort of assessment of the accident has to be done quickly in order to find out the nature of the accident, facts on the ships involved, position, weather and current, type of cargo, injuries, other ships in the area etc. An interview with the captain of the ship in question is made. The assessment is important in order to decide and direct proper resources.

The MRCC who is responding first also has to decide what country will initially be in charge of the operation. In most cases, the place of the accident determines this. The place of accident is matched with the borders of the exclusive economic zone (EEZ). When the accident is found to be within a country's EEZ, this country will be responsible for responding to the accident. Today it is possible to quite accurately determine the place of accident and borders of the EEZ due to different surveillance systems like global positioning system (GPS) or automatic information system (AIS) . Once a country is decided it is also 'lead country' and 'requesting party' according to the Helcome terminology. This means that this country is in charge of the operation, even though the oil slick is drifting into other countries' EEZ.

When the proper country is decided, the proper authority has to be decided. Often, there is an administrative and operative division between handling injuries, damages and environmental consequences. The search and rescue services (SAR) are administrated differently than the environmental accident. Each country arrange this differently and according to its own political and administrative structure, tradition, efficiency aspects etc. Some countries separate between this two functions, and some don't. (These different structures is not illustrated in the matrix). See also the Helcome response manual for more examples. One same authority can thus be responsible for both life and environment (e.g. Poland) or there might be a division between these tasks (e.g. Sweden). When it comes to an accident with environmental consequences, normally there is one authority that serves as contact point. This contact point might however be MRCC or a similar authority. This contact point then have to contact relevant authorities or functions. What is relevant is of course depending on the nature of the accident.

When the proper authority is alarmed, it will most likely request help from an aircraft in order to get an overview of the accident and of the oil slick. At the same time, some sort of emergency organisation will start to function or will be set up. This kind of accidents require many resources in terms of experts, information and communication equipment, practical things like food etc. Apart from the obvious functions like coastguard, marine, police, environmental experts, it is important that different interests are represented at the command central. If for instance the oil slick might have consequences for two countries, it is important for the assisting party to send an liaison officer to the central. Representatives from e.g. the ship owner or the insurance company might also be useful. One reason is that they often have necessary knowledge and contacts, but also the fact that they will perhaps have to stand economic liability. A media officer might also be very useful, since the media will keep in touch anyway. Often the media will try to get in touch with other officers and this way almost block the communication. (A sinking tanker perfectly match the media logic, as well as oil polluted birds.)

In case of a big accident, quite soon, the authority in country one will realise that help is needed. This country then can request help from other countries. One obvious reason for this is that other countries might have ships close to the location. Probably the operation might start with a first multinational force which

will be completed by other national or international forces. It is e.g. not possible nor desirable for one country to use all available resources at one point. There is a communication format in the Helcom manual regulating right and duties concerning assistance. Nearby countries tend to have more established forms for cooperation, especially when experienced a big accident. (According to the Helcome manual, still many countries lack agreements with its neighbours.) Nearby countries also have special agreements for transfer over boarders, custom etc. In these instances the cooperation tend to be better: “we like the X-country, but we don’t know much bout the Y-country”.

If the sea is a matter for international cooperation, national cooperation is crucial when the oil reaches the coast. Mostly, there is one organisation dealing with the operative matters concerning oil at sea (perhaps except for the question on how to decide a place of refuge), but in coastal zones the demand for cooperation increases. One obvious reason is that the equipment designed for use at sea only to a certain degree work in coastal zones. Big ships can seldom operate close to land and some countries have developed smaller vessels with the ability to operate close to land. Oil on land also have to be dealt with other techniques and they are still developing. The sea based organisation now need help by land based organisations.

Often it is quite hard to find information on what organisation that is responsible for the operation on land in case of an big accident. Obviously, at the municipal level there are organisations and authorities that will act. But the over all impression is that the accident have to be dealt with within ordinary structure for accidents, fire, car crashes etc. First, an operative organisation with a command centre have to be set up. Depending on the structure, this can be at a police station, a fire brigade station or alike. The need for a structure with experience to crisis management is clear. The police might need to block roads in order to prevent access to the affected coastline, the local fire brigade assist if their competence is needed or if they have suitable equipment. The challenge for a municipality is the different techniques that have to be used and often tested and the complex problems that have to be solved with reference to environmental consequences. Access to expertise on chemical issues, biological and ecological issues, technological issues etc have to be secured. In a small municipality, this might be problem. Another problem is the need for personnel. If relatively few people is needed at sea, the opposite is true for the land based organisation. Volunteers with some minimum knowledge have to be called in, trained and served with food etc. Often cleaning up beaches have to be done by hand and, furthermore, the oil now has increased in volume enormously. Therefore much labour is needed for transport of the oil, maintenance of equipment etc.

If the municipalities are small, there might be many municipalities that are effected in case of a big oil spill. This means that cooperation between the organisation at sea and several municipalities have to be established, a fact that calls for another level of cooperation. When a problem like this happens to several small municipalities, there is need for coordination. The different experts, the labour, technical resources etc also need to be prioritised. Different coastal types

are sensitive to different degrees and thus different measures have to be taken in terms of protection, clean up etc. Often can a clean up measure itself effect the environment to a certain degree. Some sort of regional or central command have to deal with these kind of questions. The cooperation is not very structured and more or less ad hoc based. Often is established contacts and communication channels used, even though they are less relevant: “do you know anyone that...”. There is clearly an uncertainty about the land based organisations and the way their preparedness is organised. One problem is the lack of communicative infrastructure between the organisations at sea and the organisations at land. In some instances the difference appear to bigger between sea and land than between different countries.

On land there is actually another level besides the coast. After the coast has been cleaned, the residue has to be taken care of. Thousands of tons of oil residues together with sand, stones etc have to be stored somewhere, then transported to some sort of plant that can take care of the residues, by separation, by burning or alike. Often is this part of the process complicated and requires much resources but needs also to be assessed in terms of environmental consequences.

To sum up: At sea there seem to be an established system of actors. The kind of organisation differs very much between countries but there is a clear understanding of who is responsible for certain actions. Contacts points are assigned according to the Helcome manual. When it comes to the coast, there seem to be uncertainty of who is responsible - either according to a formal set o rules or according to the norms (who will actually act). This is also the situation on land. This means that if communication has to go from sea, via coast, to land, there is a risk of some sort of communication disorder, especially under time stress.

Do what

Now knowing who, the following question is what will be done. There seem to be good knowledge about what to do at sea. The overall impression is that the measures taken is depending very much on the circumstances. If we assume that possible injuries have been taken care of, initial focus is on preventing the oil from leaking out into the sea. If a tank is leaking it is possible to pump the oil to another tank. It is also possible to pump the oil to another ship or tanker, if available. Almost immediately, a prognosis of the oil drift will be performed. This prognosis is made with help the of a computer based program and requires data about the oil, weather conditions, current, place etc. Thus, analyses of the property of the oil has to be done or reliable information about the oil might be available. The prognosis is quite reliable and gives a picture of how the oil slick will drift and subsequently what parts of the coast that will be hit.

At an early stage, it might also be relevant to move the ship to another place that gives shelter from wind and waves, or that is the better place from a

environmental perspective. If the ship is severely damaged, this operation - to find a place of refuge - requires one or more tug boats.

Next step is to try to contain the oil slick by means of boomers and thus prevent it from spread further or just to keep it available for the skimmers, the devices that remove the oil from the water surface. There is a range of mechanical devices suitable for different conditions. If the conditions are good, quite a lot of oil can be taken care of which stresses the ability to contain the oil and then transport it to land. Vessels that can contain the oil adequately is necessary, e.g. high viscosity oil has to be heated so it will be possible to pump.

What will be done is depending on the properties of the oil, the weather and sea conditions, the time elapsed, if a ship is sinking etc. If the weather is bad, much of the material cannot be used, the same applies to the wave height, or the swell. Some countries use detergents in order to make the oil spread easier and thus increase the weathering processes. It is also possible to burn some types of oil at an early stage.

Parallel to this work, other things have to be done. Often an criminal investigation have to be done. It is good if this is performed by an other organisation since the response organisation is depending on the cooperation with the ships master. A second important task is to document the accident, preferably with photos, for several reasons. A third important task is to document all measures taken by all parties especially with reference to its economic value since there will most likely be discussions about the extent of the liability. The legal processes can last for a long time if necessary costs are not well documented and thus a matter of dispute.

The primary task for the sea based organisation is to prevent oil from coming to the sea, prevent oil already in the sea to spread and to recover as much as possible. Another important task is to communicate the drift of the oil slick to coast organisations as early as possible so that they can be prepared for actions.

If a very big oil slick is drifting towards land, there is very little chance to prevent the oil from actually entering land. Handling oil at land is normally several times more complicated and requires much more personal of different kinds compared to at the early stage at sea. One reason is that the oil often emulsificates at sea and thus acquires a several times bigger volume; on land this volume is increased further when sand, stones and alike mixes with the emulsification. The oil also adheres to stones, cliffs and must be taken away by other means than at sea. The coast organisation thus has to prevent the oil slick from entering sensitive land areas if possible. This is done by booms, floating barriers. This way the damages can be reduced. The rest of the oil have to be taken care of somehow. There are different techniques for this, and as for the sea, the technique is depending on the circumstances. Amount of oil, type of cost like marsh, sand, rocks etc., length of the coast, temperature, level of salt etc. determines the effects of the oil and thus influences the choice of clean up method. Much oil can be recovered manually, with shovels, high pressure and hot water etc. while some oil best is left to disappear by biodegradation.

At land the remains of the oil have to be contained before transported to a plant where it can be taken care of. What will be done with the oil depends on the character of the oil and its properties at this stage. If the oil is too contaminated with water and e.g. sand, it can be difficult to refine or to burn it. Instead it might be necessary to try to separate the water from the oil. Much of these operation require special kinds of facilities and there are not so many of them. This is also a matter of environmental concern and might require special licenses or permits according to environmental regulation.

The overall impression is that this kind of practices are quite rare. Extra ordinary accidents do not occur often and the smaller ones might have another character when it comes to complexity, time stress etc. Staff with long experiences of combating oil has developed a know-how that is very important for the organisation. There is a certain degree of trial and error when combating oil and there are few opportunities to try new methods, new equipment etc under realistic conditions. The high level of contingence is characteristic for response to oil at sea and at the coast. There are manuals describing the characteristics of oil with different properties, how oil is behaving in water, how oil and water emulsificates etc. But to take the right decision at the right time is not easy and it takes experience to do that. One informant told about an oil slick that was combated and no oil could be detected, until an oil slick appeared far away some time later. The oil had acquired almost the same density as the water and went down in the water column for some time, only to come up to the surface when the temperature or level of salt changed.

In the scenario, a tanker collided with a freight ferry carrying dangerous goods. This condition where not considered to have any substantial effect on the operation. Later on, however, most participants stated that there is a lack of knowledge and experience when it comes to chemicals. The first problem is that it might be difficult to find out what kind of chemicals that is onboard the ship. Apart from bulk freighter, many container freighters might have a range of different kind of chemicals and substances on board. In case of a collision, containers might brake and contaminate the environment. This might severely complicate the combating operation and at least delay it. Liquid gas might evaporate and hinder any access to the freighter and the tanker. A fire might also start chemical processes that complicates the operation. The means and technique for solving those kind of problems seem not to be of current interest or practice. (There is however Helcom Manual vol II, devoted to chemicals.) The same can be said about knowledge about these kind of accidents.

Response to oil at sea, at the coast or on land also have to be done with respect for the environmental consequences. There seem to be little or unstructured knowledge on what the environmental effects are of certain actions taken. Mind, that decisions taken under stress at se most likely have environmental consequences at the coast or on land. In many cases the staff have to rely on assumptions about the total environmental effects of a combating strategy.

To sum up: The field of combating oil is contingent. There are several dynamic processes involved when oil mix with water and the result is depending on many factors. Similar problems can be identified when the oil hit the coast. The complex problem is more complicated when the discharge is very big. It seem to be difficult to state clear cut rules on how to cope with these problems. Instead it seem to be know-how that is important and experience thus plays an important role. A big difference could be noted between the informants in this respect. Furthermore, it seem to be as complex when it comes to other noxious substances and this kind of experience seem to be very rare. Finally, there seem to be no structured knowledge about the environmental consequences of the oil (or noxious substances).

When

It is important to act quickly when an accident occur. Many effects are strongly connected to dynamic processes that are irreversible and that causes severe damages. The difference between contained oil and oil in water is obvious and much of the actions taken later is more complicated and need more resources. Several accidents have had such a course of events that there was a chance to reduce the oil spill substantially if actions were taken at an early stage. Shifting the ballast or taking the ship on to a place of refuge could reduce the consequences significantly. One problem here is that it is difficult to get the right persons together to make such decisions - with the consent of the master of the ship.

Initially, the operation is focused on injuries or to evacuate people. The response to oil thus comes second unless there are resources and possibilities to do both. When the oil spill is a fact, the time before an operation can start is depending on how quickly an emergency operation can be set up. How people are on duty, and the stand by time for vessels and their deployment is of great importance. The number of vessels is also of importance. Today there is a mechanism called maritime assistance services (MAS), with the function of offering services to ships in a situation that might become dangerous. MAS can thus be alerted and while operating, the MRCC and other functions can be on stand by position.

Study III - why these actions?

The previous chapter described the preparedness as a result of the discussion at the scenario workshops. The purpose of this chapter is to analyse the reasons for the preparedness, to describe those underlying structures that are important for how the preparedness look like. The purpose of the chapter is to answer the question why. The question why will however be answered by a heuristic that is used to reconstruct and analyse normative structures. The model is presented above in the methodological section. Put simply, three questions direct the analysis: what do we want to achieve? (driving forces, values), what do we know about this? (cognition) and is it possible to do? (system conditions). The data used is the result from the scenario workshops as well as other sources like, books, reports, homepages, interviews etc.

Driving forces

What is the reason for response to oil? The question might look strange, but it is important to look behind the prima facie answer - the environment. Let say that we did not do anything and just let a ship or two meet their fate. Who would complain and for what reason? The first answer would most certainly be that human beings would suffer and perhaps die. We can call this value for ‘life’. Life is always priority number one and we have seen several examples of this. The search and rescue operation comes first if more than one operation cant be done. This means that at any occasion when there is a conflict between life and other values, life will come first. Although life is not the first priority for an oil response activity, rescuing lives will supersede the oil response.

Another value is general security at sea. If ships in distress are not assisted, there would be a general insecurity for all ships at sea, be it tankers, ferries, ropax etc. Ships in distress can also be a risk to other ships nearby, especially in the Baltic Sea where there are many narrow fairways. The entire transport system is depending on secure, reliable and punctual transports. Today, the industry is more than ever depending on a transportation system that is “just in time”.

Another values is property. Through the discussions it has been clear that there are properties with very big economical values at stake in an accident. The value of the ship and the cargo is counted in hundreds of million Euros. When an rescue operation or oil combating operation is going on there is a risk that some interests or values will conflict with that of property. This is one reason that representatives for ship owners and insurance companies want to follow the operation as close as possible. Some measures might risk the ship or the cargo and there might be discussions on what measures that will meet as many different interests as much as possible.

Another value is the environment. Prima facie, concern for the environment is the most important driving force for oil combating. This is also the starting point for

the several conventions on protection on the marine environment. There is a point in dividing the environment into the biotic system (including anything alive like birds, fish, plants etc), and the physical system (all things not alive like water, rock, sand etc). We have often seen a clear division between the two when it comes to oil discharges. One is that the public opinion prioritise animals that suffer from the oil. White sea birds full of oil is the typical symbol for this. A further question is if the environmental concerns are for the environment in itself or primarily as mean for the humans? The question is important for deciding how much money should be spent on oil combating. Are oil combating measures taken in order to protect the environment (life and nature), and if so are there other measures that can do this better and more?

Freedom is highly valued in general in our western society. On the sea, however, we can notice that this value is predominant due to a long tradition, Mare Liberum doctrine, but also due to lack of other conflicting values. Furthermore, it is also possible to exercise this freedom out on the sea and even in the narrow Baltic Sea, there are clear examples of the Mare Liberum-principle. Without going into details, in the EEZ the master of the ship is really the master and any measure that will be done with the ship have to be done with consent of the master (as a representative for the owner of the ship and the cargo). When it comes to rules, this freedom normally sets aside the powers of the nation-state which are bound to its territory and its territorial waters, but only to a small degree to its EEZ. International conventions are thus the instrument to organise the relations between ships and ship owners on the one hand and nation-states Many arrangements on insurances etc are unique for the shipping. At the same time are the effects of an oil discharge a public problem due to the externalisation of the consequences.

Having sketched the value structure, we can now ask some questions referring to the organisations working with response to oil disasters. The first question concerns the response organisation. Is it value based or is it rule based, i.e. are there a overt set of values operating in the organisation? We can assume a difference between a clearly value oriented organisation and an organisation that is rule based, a bureaucracy. The bureaucracy organises its work by means of rules and professional values like doing a good job are of importance. The value based organisation organises its work also by means of rules, but has also clear values explicated to the organisation. This means that in case of a rule conflict or the absence of clear rules, the value based organisation can operate and solve the conflict with reference to the values. We can find this situation when it is hard to formulate clear and simple rules that is possible to follow. It is not possible to say that one type of organisation is better than the other. But it is important to understand what kind of organisation we are dealing with, especially when the task for the organisations is defined in terms of solving the problem. Another aspect is the high degree of necessary cooperation with other organisations within and between countries.

Having discussed the bureaucracy versus the value based organisation, the subsequent question concerns the overt values. We can assume a difference between two value based organisations with differing value structure, yet the same

rules. Are they oriented to the environment or to material values, trade, economic success etc? We can thus ask how the implementation of e.g. the Helsinki convention and its response manual will work within an organisation under lets say the transport ministry compared to under the environmental ministry. Apart from its internal operations, we can assume that the cooperation between these two value based organisations might experience problems, despite the common set of rules. The ground for this assumption is the socio-legal first principle that rules are followed only to a certain extent and that other norms with reference to certain values can explain the discrepancy. It is important whether there is consensus on values in general or that they coincide in each case, or if there is a substantial difference concerning the value structure.

Another question concerns the organisations every day activity. Does the organisation have different tasks besides response to oil, and if so - do they refer to the same values or is there a risk of conflicting values within the organisation, between different sections of the organisation or even within one section. It is also clear that the response at sea need to be started immediately and decisions have to made quickly. Some bureaucratic organisations might experience a risk that the bureaucratic structure conflicts with the demand for speedy decisions. The values supporting bureaucratic decisions (equality, legality etc.) might conflict with other values.

Cognition

If norms in general and technical norms in particular are supposed to work sufficiently, the norm have to consider knowledge of different kind. This means that there has to exist knowledge to some extent about the problem or the field in question, be it how to achieve sustainable development, to function socially or how to tie a knot. Knowledge can be of different kind, e.g. academic produced in a scientific way, communicated via books, or common sense knowledge derived from trial and error and communicated by tradition. The way we relate to knowledge is important for the norm formation process. The notion that men are better suited to technology reinforces the gender norms about who will use the car, the drilling machine etc. How lack of knowledge is coped with is also of importance; does lack of knowledge hinder action or will things just ‘straighten itself out’. Moreover, how will cognition depend on and cooperate with the driving forces discussed above and the system conditions to be discussed below?

From the scenario workshops but also from looking through various readers in response to marine pollution, the over all impression is that the field is complex and complicated. There are several types of knowledge involved, like biology and marine biology, chemistry, physics, technique, hydrograph, ecology etc. To understand the fate of an oil discharge requires an ability to combine many different types of knowledge. Much of this knowledge is in its origin scientific but applied to this certain field.

We can distinguish between knowledge and information. ‘Knowledge’ refers to knowledge about general relations in nature or else, while ‘information’ is here referred to as the initial values (like in facts) that together with the relations will result in different outcomes. In order to act, of importance is of course how the oil reacts in water, what happens and why? Obviously, the oil will spread when leaving the containment. The oil can now follow wind and currents it will become an oil slick. Much as a consequence of the spreading of the oil, and quite soon after, the oil evaporate and lighter distillations turn into gas. This process changes the remaining oil slick as well as the evaporating gas might combust. The next process is emulsification. This means that, under certain circumstances, oil mix with water. The mix is a emulsion which means that that very small drops of the oil and water hold together, rather than form a new substance. The emulsion can thus revert. The emulsion increase substantially in volume, often several times. The process is rather quick, often a matter of hours. The oil slick and the water-in-oil emulsion can also disperse. This is the process when the oil droplets mix in the water. This process is much more slow, unless dispersants are used. Oil is generally lighter than water, but under certain circumstances - especially after emulsion - the oil can sink into the water column. One reason for this can be sedimentation, especially in shallow waters. Finally, oil can degrade through micro-organisms or oxidation or photo oxidation. These are very slow processes, especially the latter one.

These are the general laws of nature that make up knowledge considering the oil-water phenomena at open sea. Another part of the knowledge concerns the environmental impact of the oil. In general, the environmental impact assessment is based on resources at risk and their capacities to recover. We can notice impacts in the air, on the water surface, in the water column and on the coastline. When it comes to the air, the effects of evaporating oil fractions must be put in relation to the general condition in the air. No local effects on wildlife would be expected. Oil slicks can coat living organisms and thus have impacts on e.g. seabirds. Oil in the water column is dispersed and will effect living organisms differently. Of importance is also the loss of concentration down in the column. There might be impacts on animals like shell fish, or plankton or fish eggs, especially filter feeders. Ashore, the mechanisms are about the same, but now there is an accumulation of the oil and also a interaction with the bottom due to breaking waves. Molluscs, sea wed, sea birds and alike might suffer. Another assessment that have to be taken into consideration are the effects of the response actions themselves. A nil-alternative should also be assessed.

When it comes to the general effects at sea or ashore, these effects have to be calculated in a general way by means of statistics, long term observations and alike. Effects on certain populations require detailed knowledge on the risk but also on the locations. Priorities have to be made based on sensitivity, how resources are valued etc.

Another field that require knowledge is the socio-economic consequences. Extra ordinary accidents very often have substantial consequences on tourism, fishing industry, marinas, ports and harbours, industries that need fresh water, nuclear

power plants etc. Due to the oil spill but also the response actions, parts of the coast might be shut of entirely for a long time. The economic consequences will be calculated in terms of money or loss of profit. More complicated is it to evaluate loss of values like recreation, integrity, aesthetics, good-will etc.

It is obvious that the fields of knowledge accounted for above are very complex and dynamic. One important question in relation to norm formation processes is how to retrieve, keep and update this knowledge. The point of departure is that without sufficient knowledge, the actions taken are not rational. Instead, the steps taken will be random and in worst case contra productive and at the best based on trial and error and limited to some experience. The question is how to learn about this field and at the same time sustain the ability to act quickly. One way is to engage experts in different fields. The question is then how to arrange for access to these experts. Are they supposed to work within then organisation or be accessed to on a contract basis? What will this mean for the information and decision process, particularly with reference to the time factor but also to the organisation's dependency on external knowledge? Today there is the opportunity to describe parts of this knowledge in models. There are computer based programs that by using mathematical models can predict the fate of the oil discharge. It seems as the model is used mainly for purpose of predicting the oil slick drift. However, it is also possible to use it for describing the fate of the oil discharge still at sea. Due to powerful computers and internet technique, these programs can be used on different levels in the organisation and also on mobile entities. When it comes to the fate of the oil in water, still this knowledge is based on experience together with continuous observations.

To evaluate the outcome of all these relations, be it natural laws or social, we need initial values, what have been referred to as information. To begin with there is a need for information about the place of the accident and information about the ships involved and their cargo. When an oil discharge is noted, there is need for information on the rate of the outflow and certainly the properties of the oils (a collision might render more than one discharge, e.g. the cargo oil but also bunker oil and diesel). Facts on the weather, the current, and the waves are crucial to make a drift prognosis and a prognosis of how the oil slick will behave. These facts applied to the knowledge discussed above, make up the character of the 'problem' as it turns out at sea. Most of this information is available through established channels like telephone or radio. By combining different information channels, it is possible to develop multi layered tools that reduce the information access time considerably. The AIS system can thus be combined with a freight registry system (FRS) and this way present a simple yet informative picture of a vessel and its cargo useful for risk assessments.

However, the problem has consequences. There is thus a need for information on environmental characteristics primarily on the coast but also at sea. Concerning the coast, there are maps that point out environmentally sensitive areas. These maps can also be digitalised and accessed through computers. It is also possible to invoke more functions to such a program, e.g. demographic structure, road maps, real estate register combined with tools for calculating distances, areas etc. Such a

programme could this way facilitate an assessment of both the problem and its consequences. The over all function of such a tool is to reduce the complexity of the situation given the time stress.

System conditions

The last part of the analysis of the normative structure is the system conditions. Since norms are closely connected to actions, the societal subsystems that effect actions make up an important part of normative structures. Few areas are e.g. unaffected by economical conditions, conditions that are hard to ignore.

When it comes to economy, there has been no remark that this is a problem when responding to oil. Instead, some have pointed out that when the organisation turns to operative mode, money is no object. The organisations' ordinary budget is not used, instead there is an extraordinary account that is used. Thus there are no explicit considerations made whether e.g. to use a certain technique or to take certain steps related to their costs. In fact, the decision to shift from ordinary budget to an operative budget short circuits the otherwise strong economical incentives. However, implicit economical considerations have been noted. Expressions like "of course not to any costs" indicate that there are limits to what can be done in terms of economy, related to the goal. One reason for this is probably that the response organisation always have some ordinary everyday activity that influence the organisation even in the operative mode. There are also economical considerations made in the contingency planning phase. It is to costly to maintain preparedness for the worst case scenario when it comes to all possible techniques, best standby time, best training, best education, all kind of vessels etc. This fact is one reason for the cooperation between states in forums like the Helcom or the Bonn agreement.

Hence, of some importance for the contingency planning is the liability for the costs resulting from the accident. If the compensation system works well, this would probably effect the contingency planning and indirectly the quality and quantity of the preparedness. A direct consequence of the compensation system is the need to account for every measure taken by the response organisation. Simultaneously with the response operations, extensive book-keeping have to be done. This is due to the enormous costs of an big accident and the incentive to pay only necessary costs. Several of the big oil discharges in modern time are disputed and take years to solve. The implementation of the polluters pays principle is one example of how to change the effect of economical externalisation.

Another system important here is the political/administrative system. This system decides who is responsible (competence), what will be done and how this will be done, it also allocates resources. Through this system the organisational framework is set up and it thus operates at an organisational level. This system decides the overall goal for the preparedness and the oil response. What kind of result is expected and how is it achieved? Here we can refer to the discussion

above about value oriented organisations. The question is how the values are communicated through the organisational structure and if they are interpreted in terms of e.g. measurable units. Changed priorities or new information might lead to an increase in the goal for the response organisation, e.g. an ability to handle 10 000 tons of oil instead of 5000 tons. Conventions and other political documents concerning the response to oil is transferred via this system to the proper authority, and if there is no authority, this system will create one. Apart from how the overall goal is explicated, several other organisational factors are important for the structure of the preparedness.

The response structure at sea seem to be organised within one organisation. The reason for this is the absence of or at least few administrative borders at sea within each country. On land, there are much more administrative borders where administrative conflicts can occur or where the chain of command might be blurred. The more natural division on sea can however not be found easily on land. The often specially assigned organisation on sea have to correspond with any available organisational structure on land. The nature of the problem seem to fit quite bad on the administrative structure on land. To put it very simplified: specialists at sea and generalists on land. There are however examples of organisational structures on land, e.g. mobile supplies with equipment for shore cleaning. This means that any organisation on land whose contributions can be requested also is part of the preparedness. It is however difficult for any available organisation to maintain a good preparedness for events that almost never occur.

Another fact is that the oil slick might cross several administrative borders on land. This is a problem since quite many organisations suddenly must cooperate on an issue that is seldom or never experienced. The fact that several organisations on the same level must cooperate call for a organisational level with cooperative or command functions on a regional level. One problem that has to be solved is the matter of necessary priorities. In case of a big accident, most likely the resources wont suffice. One reason is that special equipment has to be maintained, and updated and personal have to be trained continuously. It is not likely that this cost will be paid off, and a prisoners dilemma situation arises. There are however examples that at the regional level the operative function is less developed than on a local level. The German Havarikommando is one clear example of the necessity to in case of a big accident, transgress the German bundesländer organisation.

Another organisational matter is on what level and with what procedure operational decisions are being made. A priori, it is preferred to decentralise the operational decisions. Often time is crucial and a long chain of command might slow down the decisions, especially in the beginning.

The last system of importance is the natural system, a system with another character than the other - social - systems. The main difference is that it is not negotiable in itself. The laws of nature are as they are, however, their effects might be conceived very differently and even socially constructed. We tend to not understand long term changes without explicit characteristics while we tend to

recognise instantaneous, explicit changes. If, however, there is a direct connection between our actions and nature's feed back, we tend to understand the relations in question. Knowledge about the oil-water relations accounted for above stem from experience and scientific, controlled studies. Technology is our way to relate to or handle the laws of nature by physical means.

Of importance for the normative structure is two aspects: The first is considered under cognition. To be successful when it comes to oil response, we need to know about the laws of nature, either by experience or by science (often a mix). What can be mentioned here is the means that the response organisations have at their disposal. The technical system and its standard is however not discussed in this report. At the scenario workshops there was a remark that the technical systems not always are compatible.

The second aspect concerns the laws of nature that are not easy to control or adapt to. It is clear that the available technical systems used for oil response are limited in its use. When there is to much wind, to much current or to high waves, much of the technical means can not be used. Circumstances concerning the weather can thus be of very big importance when responding to oil discharges. It might seem meaningless to relate to bad weather, but there are several measures that can be taken in this respect. In case of bad weather, an increased level of preparedness might be necessary. If possible, it might also be necessary to direct ships differently. In case of bad weather, and the risk of no or little success in recovery at sea, the alert to coastal and land authorities must be swift. The same for alerting other countries. The above mentioned mechanism MAS is relevant in this perspective.

Close to the laws of nature, is time. Due to the laws of nature, it is apparent that the oil spill and its consequences has a dynamic character. Oil spills occur at sea but have effects also in the air, on the coast and on land. Contained in a tanker, the oil then becomes very large quite soon after an accident. Oil spills follow the current and the wind. Oil leaking out in the water disperse and evaporates depending on the properties of the oil and the temperature and other factors of the water and the air. The properties of the oil thus changes and it can evaporate into the air, emulsificate but also remain solid in the water, at the surface, in the water column or on the sea bed. Eventually, all of the oil transforms, through e.g. biodegradation. Time is an important factor and several processes are depending on each other. As has mentioned above, some of the processes take a couple of hours, so while thinking, things happen.

The response to this strong dependency on time is referred to as 'technology windows-of-opportunity'. These principles are indeed norms formulated with respect to the laws of nature and combined with the time element. The essence of this technology is that during a time laps, there are certain time periods under which certain response measures are possible and effective. This means that this technology facilitate the choice of measures, but also facilitates environmental and cost benefits. One reason to be prepared with such technologies is that there is

often very little time to collect information, assess it an decide on what measures to take.

Worth mentioning here is the tendency to ignore the effects when they are not seen or obvious. When oil is evaporating, nothing can be seen, and oil can “disappear” in the sea. Black sticky oil on the cliffs or on the beach is the obvious opposite position, a fact that activates certain values, for instance environment. Mass media always react to black sticky oil, especially on white sea birds. Several informants have noted that there are examples of actions taken that are to some extent influenced by this social mechanism. News on oil on beaches activates security, environment, property etc.

Recommendations

The over all impression is that such an extra ordinary accident assumed in the Baltic Master WP 1, stresses every organisation in every country enormously. Several informants had the opinion that such an accident is not possible to handle and that even 5000 tons of oil is enough to make up an extra ordinary accident. Probably is the preparedness not designed for these kinds of accidents regarding physical or administrative resources. The problem of physical resources is however beginning to find at least one solution when EMSA is allocating five response vessels to the Baltic Sea area. Despite this additional resources, the common pool of possible resources the countries in the Baltic Sea together with EMSA possess, require a great deal of cooperation - both on an international level and on a national level. This cooperation is in focus for this last section of the report.

The extra ordinary accident we assume is very difficult to imagine unless one has experienced something similar to it. At a seminar with many participants from Swedish rescue organisations, it was clear that most professionals never experience a major accident, more less an extra ordinary accident. One problem is thus how to increase the awareness of the still relatively high risk for a major accident among all levels in an organisation. From the workshops we learned that persons that had experienced a major accident looked upon the problem very different compared to those who had not. It seems very important to substitute this experience with something that might have similar effect, e.g. a scenario, perhaps built in a simulator or a PC platform.

Another finding is the significant difference between sea and land. Even though the oil slick is the same all the way, it is conceived differently and treated differently at sea compared to on land. The problem changes character when it moves from sea to land. On sea the time frame is very limited, while this is not a problem once the oil has hit the land. At sea, one organisation is responsible, while several organisations are responsible on land. The technique and strategy for handling the oil is different at sea and on land. Sweden has regional deposits supplied by the Swedish Rescue Agency together with educated staff and Denmark has the Danish Emergency Management Agency that has both material and staff. Connected to this division is need to define a structure for on-land response. Today there is no clear structure of contact points that the sea based organisation can work with; the problem is rather handed over when the oil reaches land. It is however possible and important to include and involve the land based organisation at an early stage. Exercises including land should be possible.

There is scattered experience of cooperation between different countries and many sections of the Baltic Sea region lack special agreements for cooperation. This is however ongoing work within the Helcom framework.

It is suggested to further use (common) tools that can facilitate the decisions that have to be made during time stress. This is one way to reduce the complexity that the oil spill presents including its environmental and socio-economic

consequences on land. At sea there is e.g. Sea Track Web to solve the problem of how to forecast the oil drift. On land The German VPS-system is one example and Sweden is developing another tool for contingency planning, sensitivity analysis etc. However, an extraordinary accident might as well effect more than one country and the need for a common tool is then obvious.

Regarding the actual work, there is a need for as many as possible to experience major accident; it would be desirable to arrange for the opportunity for “trainee officers” from other countries to participate in response operations around the Baltic Sea region.

The knowledge seems to be focused on oil rather than chemicals. There is a need for upgrading the awareness and the preparedness for chemicals.

Sweden has regional deposits supplied by the Swedish Rescue Agency together with educated staff and Denmark has the Danish Emergency Management Agency that has both material and staff.

It is recommended to focus more on preventive measures within the response system. Adequate measures taken at an early stage have great effect on reducing the later consequences. Changed levels of alert and on duty time for bad weather or other risk scenarios might be fruitful. Make use of the MAS mechanism.

Finally, many informants have stressed the importance of exercises of different kinds. It is recommended to enhance and expand the number of exercises within countries. The exercises should be as realistic as possible, including the land based organisations, crossing geographic and administrative borders etc. Why not mix personal from different countries?

References

Cormack, D. (1999). Response to marine oil pollution: review and assessment. Dordrecht, Kluwer Academic.

Ericsson, M., C. Lindgren, et al. (2003). Oljeutsläpp från fartyget Prestige, Spanien 2002. Karlstad, Räddningstjänstavdelningen Räddningsverket.

Forsman, B. and Statens räddningsverk (1997). Oljan är lös: handbok i kommunalt oljeskydd. Karlstad, Statens räddningsverk.

Kulander, K.-E. and Statens räddningsverk (2004). Oljeskadeskyddet utmed de svenska kusterna och i de stora insjöarna inför 2010. Karlstad, Avdelningen för stöd till räddningsinsatser Räddningsverket.

Lindgren, C., H. Lager, et al. (2001). Oil spill dispersants: risk assessment for Swedish waters. Stockholm, IVL.

Lindgren, C. and J. Fejes (2003). Miljöeffekter i strandzonen av oljepåslag och saneringsinsatser: anteckningar från workshop. Karlstad, Räddningsverket.

Oljeutsläppsutredningen (1999). Att komma åt oljeutsläppen: betänkande. SOU 1998:158. Stockholm, Fritzes offentliga publikationer.

Riksrevisionen (2005). När oljan når land: har staten säkerställt en god kommunal beredskap för oljekatastrofer? Stockholm, Riksrevisionen.

Törling, G., T. Nilsson, et al. (1996). Oljeutsläpp i Wales februari 1995 : rapport Räddningstjänstavdelningen P22-145/96. Karlstad, Statens räddningsverk.

Törling, G., K.-E. Kulander, et al. (2000). Oljeutsläpp från M/T Erika : Bretagne, Frankrike 1999. Karlstad, Räddningsverket.

http://ec.europa.eu/environment/civil/marin/cis/cis_index.htm