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A qualitative study of the interaction between maritime pilots and vessel traffic service operators

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A qualitative study of the Interaction between Maritime Pilots and Vessel Traffic Service Operators

By

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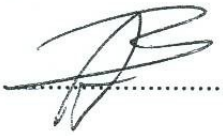
Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): 

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Abstract

Title of Dissertation: **A qualitative study of the Interaction between Maritime Pilots and Vessel Traffic Service Operators**

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The aim of this dissertation is to seek knowledge into the area of interaction between pilots and VTSOs. The reason for this is that there is evidence in the form of statements by industry people, accident reports and investigations indicating that there are issues within the interaction that can affect the performance of the two safety systems in a negative way, and thus resulting in adversed effects on safety at sea.

During this work a qualitative research in the form of interviews were performed in order to gain knowledge of this subject. The respondents were VTSOs and pilots in the Sound. The main findings of this indicates that there are social issues that affect the interaction between pilots and VTSOs. These social issues reveal themselves in the form of a strong feeling of group belonging, lack of trust and lack of communication. In order to enhance the co-operation between the pilots and the VTSOs, these social issues have to be addressed and properly dealt with. One way to achieve this could be to train pilots and VTSOs together or to find other effective means of interaction e.g. common meetings on a regular basis, as this will provide a better understanding of how the other service functions and it will also be an excellent chance to get to know each other and thereby building up the trust

KEYWORDS: maritime, pilotage, VTS, co-operation

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List of Abbreviations

BRM - Bridge Resource Management

COLREGS - The International Regulations for Avoiding Collisions at Sea

EMPA - European Maritime Pilots Association

IALA - International Association of Marine Aids to Navigation and Lighthouse Authorities

IMPA - International Maritime Pilots Association

MAIB - Marine Accident Investigation Branch

NTSB - National Transportation Safety Board

OJT - On the job training

PEC - Pilot Exception Certificate

SAR - Search and Rescue

SBP - Shore Based Piloting

SMCP - Standard Maritime Communication Phrases

TSS - Traffic Separation Scheme

VTM - Vessel Traffic Management

VHF - Very High Frequency

VTS - Vessel Traffic Service

VTSO - Vessel Traffic Service Operator

1 Introduction

1.1. Safety at sea

To raise or maintain the level of safety in a particular sea-area, a State or an organisation has the option of implementing different kinds of safety systems. Some of them can be viewed as being passive (Hughes, 2009, p. 440) e.g. Traffic Separation Schemes (TSS); others can be denoted as active e.g. pilotage or Vessel Traffic Services (VTS). It is up to the organisation to decide which system/systems to implement in order to achieve the desired safety level. In areas that are deemed to need a high safety level, multiple safety systems can be implemented, and a combination of the three earlier mentioned is a common choice. This will result in the fact that different safety systems are active in the same area and with the same overall goal; moreover, these systems will interact and affect each other. The interaction between the passive system and the two active ones are rather static; however, the interaction between the two active ones are dynamic and should be so in order to achieve the best result. This dissertation will focus on the two active systems – VTS and pilotage.

Pilotage has a long history of acting as a safety system in areas deemed to propose difficulties for the navigator of a ship. Typical such areas could be - ports, rivers, heavily trafficked areas, areas with potential adversed meteorological / hydrological conditions and/or areas with a highly sensitive environment. VTS, on the other hand, is a relative new type of safety system compared to pilotage, and is often implemented in areas already covered by pilot services. The goal for the two services is to assist ships in their voyage from one geographical position to another in the safest and most efficient way possible. VTS does this by monitoring the ships in the assigned sea area, trying to organize the traffic in the safest and most efficient way. At the same time the pilot is active in that same area on one of the VTS monitored

ships. In theory, this would warrant a high level of safety in all situations by having two independent systems assisting the ship on its voyage. Although the systems are independent, the nature of work demands that the two systems interact and co-operate to achieve the best result. This interaction is according to the author an area that needs to be investigated since there has surfaced evidence that points on the fact that there can arise issues from the interaction that can have negative effect on safety at sea.

2 Background

The issue of safety at sea is an issue that has got more and more attention recently due to the rising concern for the environment by the public. Authorities have to take measures to confine the risk of having an accident that might cause damage to the environment. Two of the measures that authorities can choose to implement is pilotage and VTS. These two safety systems are often combined and do often operate in the same area and on the same object i.e. the ship; moreover, they do it simultaneously. The fact of having these two systems acting in the same area might, under certain circumstances, affect each other in a negative way - resulting in that the desired safety level is not met, this fact is similar to what Perrow describes he's book *Normal Accidents* (Perrow, 1999). This issue was first noted by the author during his work as a VTS operator, employed by the Swedish Maritime Administration. At first this was perceived as a minor problem by the author and believed to be a local occurrence. Nevertheless, the issue was raised during discussions with people in the business, both pilots and VTSOs and it was found that issues rising from the interaction between pilots and VTS was not a local issue, but rather an issue that was identified by others working in different regions and countries. Further on, this was backed up by accident reports that, although not always in a direct way, showed irregularities in the interaction between pilots and VTS. Moreover, the issue of co-

operation between pilots and VTS has been raised at two consecutive congresses organized by the International Maritime Pilots Association (IMPA). During the XVIth congress held in Hamburg 2002 the IMO Secretary-General W.A. O'Neil brought forward the question of how the relationship between pilots and shore-based vessel traffic operators would develop in the future; moreover, he identifies the need to integrate the VTS into the vessel control team (O'Niel, 2002). In the following congress held in Istanbul 2004, the now acting Secretary-General Efthimios Mitropoulos continues on the subject of VTS and pilot co-operation, and states that in his view the two services are two complementary services; however, Mitropoulus does recognise that there are opinions among the pilot community that see the VTS as a threat (Mitropoulos, 2004). To sum up, both the present Secretary-General and his predecessor do acknowledge the importance of the co-operation between the growing VTS industry and the pilot service – and they both indicate that a rivalry between the two services can be found.

2.1. Technical description of the two systems

The two safety systems of VTS and pilotage are widely spread around the globe; however, it should be noted that the two systems, although governed by international guidelines and conventions, vary from state to state. Hereunder, a technical description, which is based on international conventions and guidelines governing pilotage and VTS, will be presented of the two systems. The aim of this description is to give the reader a brief knowledge of the two systems of pilotage and VTS, which is needed to understand further discussions and analysis in this dissertation.

2.2. Pilotage

2.2.1 History of pilot services

Pilotage has a very long history, and the exact origin of pilots are most probably lost in the same. The notion of pilot is found in the bible in the book of Ezekiel where the word pilot is used four times, moreover, Homer (Homerus) writes about *Thestor the*

pilot in the first book of Iiiad (Hofstee, 2003). Since the early days of navigation, ships navigating in or out of ports, or in other areas deemed to propose difficulties in navigation, has been guided by pilots. These pilots adviced the master of how to conduct the ship - based on their local knowledge and experience ((U.S.) & Piloting, 1994, p. 30). By doing so pilots have since the beginning of shipping contributed to safety and efficiency of ship traffic. In Sweden, there are traces found that indicate that during the 1400th century local inhabitants of the archipelago and sailors did perform pilot services against payment; however, a more un-organized form of pilotage is believed to have existed long before this (Hillberg, 2007).

2.2.2 Pilotage of today

As described in previous paragraphs pilotage has a long history, today most coastal States has laws and regulations that cover the area of pilotage. A pilot of today is still an adviser to the ship's master and he still possesses a great deal of local knowledge. According to International Maritime Pilots Association (IMPA) and the European Maritime Pilots Association (EMPA) the prime obligation for a pilot is:

Assist the master of a ship, by providing local knowledge of navigational and operational matters combined with specialist ship-handling experience. The pilot should also be familiar with the local requirements and unique conditions that prevail in the area. The pilot serves the public by contributing to the overall safety at sea and thereby the protection of the environment; moreover, the pilot is to contribute to the free flow of ship traffic in the area (“EMPA main,” 2009; “IMPA - International Maritime Pilots' Association,” 2009). Pilotage can be divided into different categories namely, port-pilotage and deep sea pilotage. In port pilotage, the pilot is onboard for the transit to or from the port, which usually is a shorter period of time, typically a few hours; in the event of deep sea pilotage, the pilot could be onboard a ship for a much more extended time that could span over several days.

2.2.3 Conventions and guidelines governing pilotage

The importance of pilot services was formally recognized by IMO in 1968, when the organization adopted resolution A.159(ES.IV). The resolution recommends States to organize pilotage services in areas where such service is likely to be more effective than other measures. Further, in 1981 IMO adopted resolution A.485(XII), that was reviewed and replaced by Resolution A 960, *Recommendation on training and certification and on operational procedures for maritime pilots other than deep sea pilots*. This resolution was adopted in 2003 and is in force today. These two resolutions can be seen as the most important ones. IMO has moreover, produced a number of documents regarding technical issues with respect to pilotage e.g. in SOLAS Chapter V there are requirements on how to embark or disembark pilots in a safe way. IMPA has a consultant status at IMO, and takes an active role in updating and drafting new/existing guidelines and conventions. Another organisation that produces guidelines regarding pilotage is EMPA.

2.3. Vessel Traffic Services

2.3.1 Development of VTS

Not long after World War II, it was clear that short range audio-visual aid to navigation was not sufficient enough to assist ships in their voyage into or from a port in all weather conditions. This resulted in delays that propagated to other modes of transport and affected the import export industries of a State. There was a need to be able to keep ports open in all conditions of visibility and traffic density. The maritime experts of the time believed that the use of shore-based radar combined with communications to monitor and organize the traffic could be applied to enhance the safety and thereby the efficiency in port areas. The first shore-based radar was implemented in Douglas, Isle of Man in 1948 and was followed by stations in Liverpool and Rotterdam. These single radar stations were developed, and in 1956 the entire port of Rotterdam was covered by a chin of shore-based radars. The main objective of these systems was to keep the traffic operating without any delays;

however, the issue of safety was also considered, and there were studies conducted on this topic. The conclusion was that these simple radar systems not only enhanced the efficiency of the traffic flow - but they also reduced the numbers of accidents in the area. During the nineteen-sixties and seventies there was a rising concern among the public with regards to the maritime environment; this concern came from some major shipping accidents e.g. Torrey Canyon and Amoco Cadiz. The authority's answer, was to expand and further develop the use of radar surveillance and vessel traffic management (*IALA Vessel Traffic Services Manual*, 2008, p. 14).

2.3.2 VTS of today

As technology was developing, the shore-based radar systems evolved from being a quite simple system consisting of radar and communication with the aim of increasing efficiency of shipping in adversed weather conditions, to a highly advanced system with multiple sensors with the aim of increasing safety at sea, improving the efficiency of maritime traffic and to protect the environment. Today there are some 500 VTS systems in use all over the globe and the number will continue to grow as many coastal states wishes to be protected from any negative effects of maritime traffic ("Feature: VTS comes of age with increasingly strategic role - BIMCO," 2008). According to Resolution A 857(20) produced by IMO, there are two different kinds of VTS, one is the Port or Harbour VTS and the other one is a Coastal VTS. The Port VTS is mainly concerned with ship traffic to or from a port, while a Coastal VTS is mainly concerned with ship traffic passing through the VTS area. In a VTS area there are different service levels that the VTS can provide the ship traffic with, these are:

Information Service (INS). An Information Service provides essential and timely information to assist the on-board decision-making process. An Information Service does not participate in on-board decision-making;

Traffic Organisation Service (TOS). A Traffic Organisation Service is a service to provide for the safe and efficient movement of traffic and to

identify and manage potentially dangerous traffic situations. A Traffic Organisation Service provides essential and timely information to assist the on-board decision-making process and may advise, instruct or exercise the authority to direct movements;

Navigational Assistance Service (NAS). A Navigational Assistance Service may be provided in addition to an Information Service and/or Traffic Organisation Service. It is a service to assist in the on-board navigational decision-making process and is provided at the request of a vessel, or when deemed necessary by the VTS. A Navigational Assistance Service provides essential and timely navigational information to assist the on-board decision-making process and may inform, advise and/or instruct vessels accordingly.

(*IALA Vessel Traffic Services Manual*, 2008, p. 63)

The development of VTS are still very much ongoing and at the time of writing, there are processes that aim to develop a concept called Vessel Traffic Management (VTM) which is an enhanced VTS service that aims to incorporate more services into the VTS systems. Such services could be maritime security, law enforcement, and search and rescue (SAR).

2.3.3 Conventions and guidelines governing VTS

During the development of VTS, there was a need for international harmonisation and the issue was brought forward to Inter-Governmental Maritime Consultative Organisation (IMCO), the predecessor of International Maritime Organisation (IMO). A resolution, A.587(14) was produced and adopted encompassing the implementation and it provided the framework for further harmonisation. The requirements brought forward in the resolution were considered by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) together with the International Maritime Pilots Association (IMPA) and the International Association of Ports and Harbours (IAPH). During the mid-1990's the resolution was updated and a new resolution was adopted, A.857(20). This new

resolution is internationally recognized to be the source policy document of VTS. IALA has become the organisation that deals with VTS issues and holds a consultative status at IMO. VTS are also governed by other conventions, in IALA's VTS manual the conventions that have relevance to VTS are listed (Table 1). Moreover, IALA has produced several documents that are relevant to VTS and they are compiled in a publication called IALA VTS Manual. The content of the manual spans over technical issues to issues regarding the training and certification of VTS personnel.

Instrument	Entry into Force
International Convention for the Safety of Life at Sea, 1974 (SOLAS) Protocol 1978 Protocol 1988 Chapter XI ISPS Code	May 1980 May 1981 February 2000 June 2004
Convention on the International Regulations for Preventing Collisions at Sea, 1972.	July 1977 (Amended 1981, 1987, 1989, 1993 and by resolution A.910(22) of November 2001.
International Convention on Seafarers' Training, Certification and Watchkeeping, 1978 (STCW) Amendment 1995	April 1984 February 1997
International Convention on Maritime Search and Rescue (SAR), 1979 Revised by MSC.70(69)	June 1985 January 2000
Convention on the International Maritime Satellite Organization, 1975/76 (IMSO)	July 1979 (Amended 1985 & 1989)
International Convention for the Prevention of Pollution from Ships, 1973 and amended 1978 (MARPOL 73/78)	October 1983
International Convention for Control and Management of Ballast Water and Sediments	Adopted 2004; enters into force 12 months after ratification by 30 states.
International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), 1990 HNS Protocol 2000	May 1995 Not yet in force (2004)

Table 1: IMO Conventions that have relevance to VTS

Source: (*IALA Vessel Traffic Services Manual*, 2008, p. 31)

2.4. The evidence that builds the case

When trying to validate this research, several sources of information have been used; however, it has proven difficult to find sources that can be used as "hard" evidence. During the research it has not been possible to find any recent academic writings regarding the specific issue of interaction between pilots and VTS; however, there are other documents and reports that touch upon the subject. These sources of information can, when scrutinized from the pilot – VTS interaction point of view, provide information that helps to underpin this research.

2.4.1 Customer research ordered by SMA

During 2008 the Swedish Maritime Administration ordered an investigation to be made regarding the customer's view on the services rendered by the administration. The investigation was conducted by Statistiska Centralbyrån, Statistics Sweden, and the target group was ships agents, ships officers and pilots. It should be noted that pilots are employed by SMA and are therefore not a customer; however, they are using all the services that were to be investigated. The services that were dealt with in this investigation were Fairways, VTS and Sea charts. The main results were presented in the form of a grade index that ranges from 0-100. A grade index below 40 can be classed as not satisfactory; the limit for satisfactory are at 55 and a grade index of more than 75 can be viewed as very satisfactory.

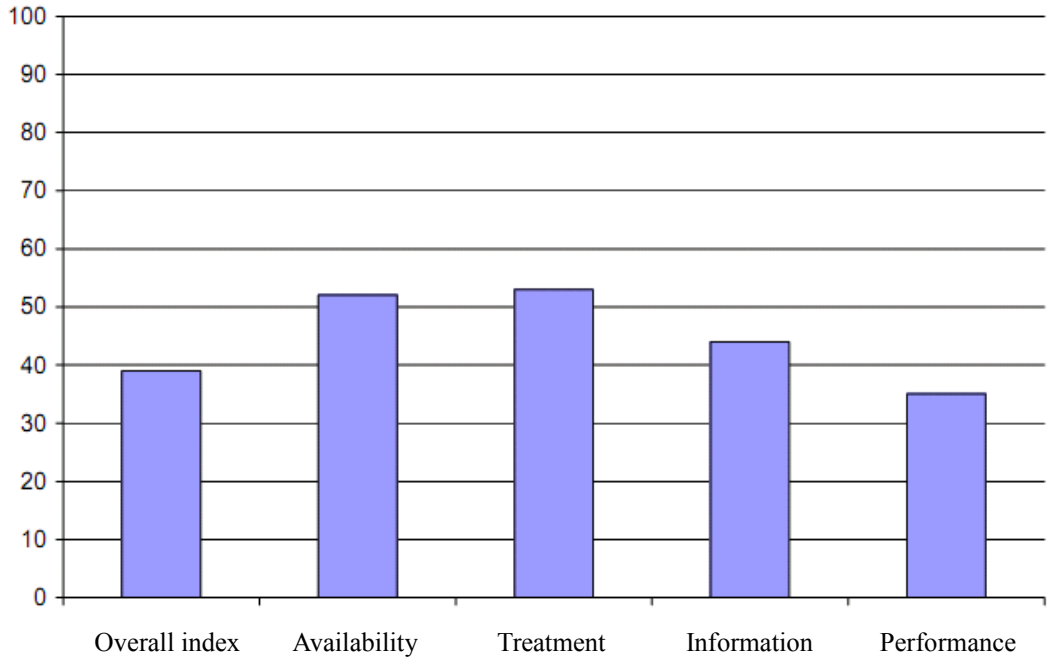

Figure 1: Pilots overall index

Source: (*SCB Pilots Survey*, 2009, p. 5)

The overall result of the part where pilots got to evaluate VTS was 39, which can be seen as not satisfactory. The result is presented in Figure 1.In the model analysis made the factors regarding Information and Performance are deemed to be prioritized to improve the service (*SCB Pilots Survey*, 2009). The pilot's assessment of VTS clearly shows that they are not satisfied with the function of VTS services in Sweden. This could be seen as evidence that VTS services in Sweden are not performing in a satisfactory way. However, the results from the survey where ships officers evaluated VTS are quite different. In the results of that survey VTS got an overall index of 74, which according to the index is satisfactory and it is very close to be classified as very satisfactory (75) (*SCB Ships Officer Survey*, 2009) . The results are presented in Figure 2.

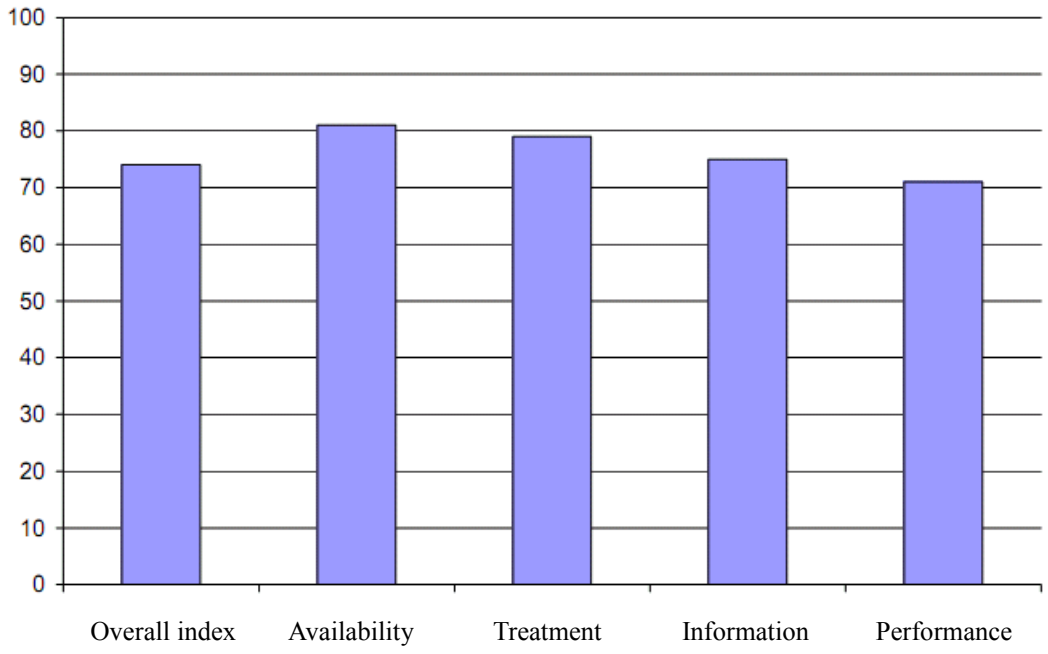

Figure 2: Ships officers overall index

Source: (*SCB Ships Officer Survey*, 2009, p. 3)

In the model analysis, the factor regarding Information is deemed to be prioritized to improve the service. In conclusion, the results suggest that the VTS service is not satisfactory according to the pilots, while the ships officers give the VTS a rather high overall index.

2.4.2 Accident reports

There are few accident reports that investigate the relationship between VTS and pilots as a contributory factor to the development of an accident. During the literature research contact was made with accident investigation organisations, such as the Swedish Maritime Safety Inspectorate's Marine Casualty Investigation Division and the organisation responsible in United Kingdom, Marine Accident Investigation Branch (MAIB) asking for help to find relevant accident reports. The result of that request was not very fruitful, as it seems that the area of interaction between VTS and pilots is an area that often just is described and not analysed in the accident investigation. The reason for this might be that the accident investigation used do not

extend into organisational issues.

The collision between Audacity and Leonis

One of the few accidents found during the literature review for this dissertation that points out the area of interaction between pilots and VTS, is the report of the collision of the Audacity, a product tanker loaded with gas oil, and the Leonis, a general cargo ship. The accident occurred in 2007 in the approaches to river Humber in the United Kingdom. At the time of the accident there was poor visibility in the area and both ships had pilots onboard. Luckily, there was only structural damage as a result, but it is easy to imagine the potential negative impact on the environment if the gas oil carried by the Audacity had escaped into the environment. In the analysis made by the Marine Accident Investigation Branch (MAIB) critic was issued against the Humber VTS for being passive. In the conclusion of the report it is stated that:

> VTS operators did not consider they were able to give advice and guidance to vessels with pilots on board. It was considered that the pilot would know what he was doing and that the operator did not need to be further involved once a pilot was on board (MAIB, 2008, p. 36).

This indicates that the VTSO was reluctant to assist a ship with a pilot onboard, although the operating procedures of Humber VTS stated the following:

> Thus, if he observes that a vessel is navigating unsafely and is, for example, about to run aground or perhaps to collide with another vessel then he has a duty to do everything in his power to prevent a mishap taking place. In doing so, however, he should avoid giving direct pilotage advice if at all possible.

(MAIB, 2008, sec. Annex 8)

Moreover, IMO Resolution A.857(20), clearly states in paragraph 2.3.4, that

instructions are to be given to the master or the pilot.

The allision between Cosco Busan and the San Francisco–Oakland Bay Bridge

The allision between Cosco Busan and the San Francisco–Oakland Bay Bridge is another accident where the accident investigation reflects up on the involvement of both pilot and the VTS. The investigation was carried out by the National Transportation Safety Board (NTSB).

On the 7 November, 2007, Cosco Busan was outbound from the Port of Oakland with a pilot onboard. The Cosco Busan was intended to transit under the San Francisco-Oakland Bay Bridge between the delta-echo span; however, Cosco Busan made a navigational error which resulted in contact with one of the bridge pylons. The contact resulted in a long and wide gash in the hull, allowing fuel oil to escape into the sea. Prior to the allision, the VTSO on duty noticed that the Cosco Busan was deviating from its intended route, and approximately three minutes before the allision took place the VTS radioed the pilot on the VHF, and asked him for his intentions. NTSB concludes in their accident report that the probable cause of the accident was due to;

> the failure to safely navigate the vessel in restricted visibility as a result of (1) the pilot's degraded cognitive performance from his use of impairing prescription medications, (2) the absence of a comprehensive pre-departure master/pilot exchange and a lack of effective communication between the pilot and the master during the accident voyage, and (3) the master's ineffective oversight of the pilot's performance and the vessel's progress *(NTSB, 2009, p. Xi)* .

Although the report in its conclusion of the probably cause does not involve the VTS

as a contributory factor, the report identifies and evaluates the actions taken by the VTS. In the conclusion under the findings section it is stated in bullet point number 13 and 15 that:

> 13. Vessel Traffic Service San Francisco personnel, in the minutes before the allision, provided the pilot with incorrect navigational information that may have confused him about the vessel's heading.
>
> 15. Although Vessel Traffic Service San Francisco personnel should have provided the pilot and the master with unambiguous information about the vessel's proximity to the Delta tower, the Safety Board could not determine whether such information, had it been provided, would have prevented the allision (NTSB, 2009, p. 134).

The pilot onboard the Cosco Busan has a different view, in the submission made by the pilot, commenting on NTSB draft report it is stated that a correct warning even if it is communicated in a late stage would have made a big difference. According to the pilot, he would have had time to alter the course and pass the bridge in a safe way (Bornstein & Quiroz, 2008, p. 19). The fact that the VTS did not perform as intended and that it communicated the wrong information lead to the situation that one of the board members voted against the results of the investigation. The reason stated for voting against the report was mainly due to the fact that the VTS, even though they where closely monitoring the ship, did intervene in an earlier stage.

If one scrutinizes the accident from a pilot - VTS point of view, one might propose the following questions:

- The VTS did monitor the ship's transit and they were aware of the intended route, still there was no communication with the ship until 3 minutes before the allison. Why did the VTS not intervene at an earlier stage? Was it because

there was a pilot onboard?

- Why did the pilot not utilize the VTS as an aid when he discovered that the radar was not working properly, and he was in doubt of the position of the ship?

3 Purpose

The purpose of this dissertation is threefold, firstly it will illuminate and analyse the interaction of pilots and vessel traffic operators. Secondly, it will try to identify the origin of the found issues, and thirdly, it will propose some recommendations on how the interaction might be improved to gain safer seas.

There are two key questions that this dissertation aims to answer, those are;

- How do pilots and VTSO perceive the co-operation between them?
- Are there issues related to the interaction between VTS and pilots that could affect safety at sea?

4 Method

The issues relating to the interaction between VTSO and pilots was identified by the author through the experiences of working on daily bases with the two groups. These issues were deemed important to understand to be able to improve both services, and thereby contribute to a safer sea. Further, it is the believed by the author that the main area to address in this issue lies within the area of social science and more precise in the interpersonal interaction between the two service providers i.e. pilots and VTSO. When consulting different research methods, the method of Case Study was found to be the most appropriate one to use in the quest of gaining knowledge of this subject.

4.1. Description of the Case study Method

The main cause for choosing Case Study as method is that it can, according to Merriam, help the researcher gain in depth understanding of a certain situation and how the people involved perceive that same situation. Moreover, it is suitable to tackle problems that need to be understood before one can improve the practice (Merriam, 1988). This view is also shared by Patton who claims that Case Study is useful when one wants to understand a problem in great depth and when a few samples can be used to learn a great deal (Patton, 1987, p. 19). Merriam concludes after comparing five author's definitions of case study that the fundamental features of a case study are – particularistic, descriptive, heuristic and inductive (Merriam, 1988, p. 26).

4.2. Literature review

The literature used was drawn from various sources, such as books, conference proceedings, seminars, research reports, accident reports, peer reviewed journals, periodicals, class handouts, data bases, incident reports from Sound VTS and the internet. The literature review has been done in two phases. Firstly a scooping literature review was made to investigate if there were earlier academic writings on the subject. The result of that search was that no previous academic papers or other document was found. Secondly, a search of other relevant information sources that could be used was performed; this search included contact with international key persons in the specific area of VTS and pilotage asking them for assistance in the search. Although there were no previous academic writings found, there are areas/subjects that are closely related to this subject. One such area is the issue of Shore Based Piloting (SBP), which is currently under discussion in many European countries; therefore, literature on that subject was used as a source of information. The aim has been to acquire a wide range of literature and to use the most recently

and up to date information.

4.3. Interviews

The aim of the interviews was to gain understanding of how the respondents perceived the interaction between pilots and VTSOs. According to Patel and Davidsson, the use of a qualitative interview method is most appropriate to obtain such understanding (Patel & Davidsson, 2003, p. 78). There are different forms of qualitative interviews that could be applied; these forms ranges from an open form to a structured form. To be able to gather specific information from all respondents a semi-structured interview was applied. These interviews are controlled by a number of questions that are open-ended. The semi-structured interviews are based on the individual respondents defining their reality in different ways. The aim of the interview is thus not to force the respondents to adopt the researcher's categorisation of the world (Patton, 1980 as cited in Merriam, 1988, p. 88). The questions were drafted by the author based on pre-knowledge and information obtained during literature review of the subject. In the process of interviewing for this research notes were taken during the interviews, and they were recorded with a dictaphone. When interviews are used to gather the data the conclusions will be, to some degree, built up on self-reported data – the respondents make a conscious choice of what to answer and what not to answer (Lantz, 1993, p. 15). Moreover, when transcribing interviews, there is a risk that information is since the spoken words and the written words are not really the same; there are nuances in the spoken language that can be lost when it is transcribed in written words (Patel & Davidsson, 2003, p. 104). This is the nature of interviewing; however, care has been taken to limit the effect of the latter. To validate the interviews and to make the questions as objective as possible, a modified Delphi method was used when constructing the questions.

4.3.1 Delphi Method

The Delphi concept was developed in the early 1950s under a U.S. Air Force study headed by the Rand Corporation. The scope of the study was how to use the opinions of experts. Out of this study the Delphi method was developed and is currently widely used. There are several forms of the Delphi method existing today; one of them can be denoted as the *conventional Delphi.* This conventional Delphi method is a paper-and-pencil exercise and can in short be summarized as follows:

A team develops a questionnaire which is sent to a bigger group called the respondent group, when the questionnaire is returned, it is evaluated by the team and a new questionnaire is produced and sent out including the feedback made by the respondent group. The respondents group are usually given at least one opportunity to re-evaluate their original answers that have been evaluated by the team.

This will according to Linstine and Turoff facilitate a structured group communication process that allows a group of individuals, as a whole, to deal with a complex issue (Linstone & Turoff, 1975, p. 3).

The use of the Delphi method when developing the questions for the data collection was done to limit the influence of the author and to produce questions that are the result of a group of experts in the field, thereby providing validity to the interviews.

The Delphi method used for this dissertation is modified to fit the specific purpose better. The author has drafted the questions based upon the initial research performed, and then sent them out to a group of experts chosen by the author. The expert group has then made their comments and sent the questions back to the author, and the comments have been considered when drafting the final interview questions.

The members of the expert group consisted of the following persons:

- Martina Bach, CEO, Inquiring Relations
- Anders Alestam, Area Manager of South Coast Maritime Traffic Area

- Jens-Uwe Schröder, Associate Professor at World Maritime University
- Michael Manuel, Phd canditate
- Per Baek Hansen, Danish VTS Manager

Great care should be taken when construction questions according to de Vaus, in his book *Surveys in Social Research,* it is suggested that 6 broad principles should be observed when designing questions. These 6 principels are: reliability, validity, discrimination, response rate, same meaning for all respondents and relevance. These principles have been considered when finalizing the questions; moreover, de Vaus proposes a check list to be used when wording the questions which also has been followed in the construction of the final questions (Vaus, 2002, p. 97). The final questions used were:

1 What is the purpose of your job?

2 Describe the purpose for the VTS/pilotage.

3 How do you see your job changing in the future due to e.g. technological, administrative or other issues?

4 What information do you need to receive from VTS/pilot in order to be able to do your job?

5 How helpful is the current information offered to you by VTS/Pilot?

6 How would you describe the relationship between pilots and VTSO?

7 Have you experienced difficulties in the co-operation between pilots and VTS?

8 How do you perceive the communication between VTS and Pilots?

9 What factors do you think affects the communication between pilots and VTS?

10 In what way do pilots and VTS services complement each other?

11 Are you utilizing VTS/pilot as an information source in your job?

12 In which way would you enhance the co-operation between pilots and VTS?

The questions were asked in the order they are presented above. In addition to the questions, the respondents were informed that after the last question, they would be able to comment on additional issues that they thought was of importance to this study. Before the interviews started, the respondents were informed about the topic of the study and they all signed a Volunteer Consent Form, where it was stated how the data was going to be used and that the interview was conducted in anonymous and confidential way. All the interviews were conducted in a good climate and co-operative manner, where the author felt that the respondents were responsive in a very positive manner; moreover, there was felt to be a genuine understanding of the subject and the issues related to the same. Moreover, it were perceived that the VTSOs had a slightly bigger interest in this subject, this is based on that the amount of answers that were given and the length of the discussions during the interviews.

4.3.2 Method for data collection and analysis

The interviews were conducted between 2009-07-22 to 2009-07-28, and the location for the interviews was at the SMA Pilot stations in Malmö and Helsingborg. A total of ten interviews were conducted, 5 VTSO and 5 pilots. The total number of pilots employed at Malmö or Helsingborg pilots stations is 16, and the total number of VTSO employed in Sound VTS is 14. The pilots are employed by SMA and their working area is mainly the Sound. The VTSOs are employed by SMA and the Danish Maritime Safety Administration and they all work in Sound VTS. Both pilots and VTSO answered the same 12 questions. To select the respondents the author interviewed the pilot or the VTSO that was working the day of the interview. Since the author did not have any pre-knowledge of the duty roaster, this can be seen as a form of random selection.

The collection and analysis in a qualitative case study such as this, is not a linear process, because the collection and analysis of information do occur simultaneously according to (Merriam, 1988, p. 133). The interviews conducted generated a vast amount of data to be analysed. The chosen method used to analyse was to organize the data into themes or categories. This organisation of the data was based on the notes taken during the interviews; the notes were first transferred from the hand written paper into a clean written document on the computer, this were conducted directly after the interview, and if there were any questions or unclear notes the audio recordings were consulted to clarify any unclear statements. When all the interviews were conducted, the process of intensive analysis started. The data was put into case narratives (presented in Chapter 5), one for pilots and one for VTSOs. The purpose of writing case narratives were twofold. Firstly, it serves the purpose of presenting the results from the interviews to the reader; secondly, during the process of writing the Case Narratives regularities and phenomenons that reoccurred were identified. This process created 4 themes as presented in Chapter 6. These 4 themes were then used as the base for the discussion and analysis.

4.4. Limitation

The size of this research is limited, it was only Sound VTS and the Swedish pilots in the Sound who were subject to the data collection; therefore, the interviews only allow limited conclusions to be drawn. To be able to get a broader perspective of the issues the data collection needs to be extended to include other pilot and VTS areas in Sweden and preferably in other countries. There are also limitations regarding the gathering of data, which were briefly described previously in paragraph 4.3.

5 Case narratives

The aim of this chapter is to provide the reader with an understanding of the result obtained from the interviews that were conducted. This follows the thoughts of Kvale, who states that narratives can be used as a method of structuring and presenting the results from interviews (Kvale, 1996, p. 274). Moreover, the case narratives serves the purpose of structuring the data into themes or issues which were discussed in Chapter 4.3.2. The case narratives is the product of the answers provided during the interviews, out of which 4 different themes have surfaced. These themes are:

- Current and future views on VTS and Pilotage
- Information
- Communication
- The relationship and co-operation

Hereunder these 4 themes will be presented in a narrative way and in Chapter 6 they will be discussed and analysed.

5.1. VTS operators

5.1.1 Current and future views on VTS and Pilotage

Derived from question 1, 2, 3

The overall impression after interviewing the VTSOs working at Sound VTS is that it is a group of people that are highly qualified for their tasks. They all have a master mariner exam and all of them have experience as OOW from various ships. Further, they deem themselves to be amply experienced and trained to perform the tasks involved in their work. The purpose of their job is to monitor and assist ships in the VTS area with the main intention of hindering accidents from occurring and thereby increase safety at sea, which in turn will protect the environment. The VTSOs view on pilotage has a lot in common with the view they have of their own jobs. According to them, the prime reason for a ship to take onboard a pilot is to increase safety, because the pilot will contribute to this by advising the master on how to conduct the ship based on the knowledge that the pilot has. The pilot is regarded to be a highly qualified expert, with vast knowledge of the local area. Moreover, the VTSOs are of the opinion that pilotage is a service that is good and that it will raise the level of safety for the ship; moreover, pilotage is a service that will be around in the foreseeable future. When questioned about their future as VTSOs the answers were positive, although it was recognized that the future is in the hands of politicians - but since history has proven that Sound VTS are effective there are very good chances that the decisions will be in favour of the VTS. Moreover, it is thought that VTS services are a growing industry all over the world and it is the way of the future. The services of Sound VTS will expand with regards to both the size of the area and the service level, which is something that is perceived as positive and will change the work for the VTSOs. An expansion of the system will require more education and better technological equipment. There seems to be an overall positive attitude towards technology, since it is believed that better technology will help the VTSO to perform their tasks better. The fact that Sound VTS as it is operated today is a

voluntary system providing Information Service is something that can be a hinder for the VTSOs in their work. There is a feeling that what they do is not for real, because ships can choose not to participate in the VTS system. They wish to have more power in the form of navigational assistance to be able to fulfil their tasks in a satisfactory and optimized way. Although the VTSOs are exited about the future and the increase of the service level, there are concerns that this might have negative implications on the relationship with the pilots.

5.1.2 Information

Derived from question 4, 5, 11

Information exchange is the primary interface between VTS and pilots. According to the VTSOs, the information needed from the pilots is the same information that is required from any other ship i.e. there is no additional information needed just because there is a pilot onboard. Information that could be useful for the VTSO from pilots or any other ship is information about issues that they cannot perceive on their displays, e.g. information about malfunctioning navigational aids, visibility in the area, the technical status of a ship, if a ship is behaving in an unusually manner and obstacles in the fairway. This type of information the VTSO can obtain from any ship in the area; however, if it is reported from a pilot, the information is regarded as more trustworthy. The fact that the information from a pilot is perceived as more trustworthy is explained by the assumption that the pilot has a feeling of responsibility for the area in which he serves. It is deemed by the VTSO that the need of information exchange lies more in the interest of the pilot rather than in the interest of the VTS.

5.1.3 Communication

Derived from question 8, 9

The information is transferred by means of VHF communications between the VTS and the pilot. This communication is according to the VTSO very good, it is short, professional and precise. This is believed to be the result of both pilots and VTSOs

are similar background and culture. To have the same background is a big advantage when communicating, as it creates a better understanding of each other. It is recognized that there are certain factors that affect the communication such as stressed situations or when external factors like e.g. weather conditions are challenging. Another factor affecting the communication is personal issues in the form of competitive or rival interest between the two services.

5.1.4 The relationship and co-operation

Derived from question 6, 7, 10, 12

The relationship between pilots and VTSOs is a relationship over distance; it is rare that they meet face to face. Although not demanded by the operative procedures of Sound VTS, most VTSO's do check if the ship has a pilot onboard because a ship with a pilot onboard gives the VTSO a feeling of safety, which makes it possible to take away focus from that ship for a bit longer time than a ship without a pilot. It is felt by the VTSOs that there is a professional relationship between the two - this relationship is based on their common background as sailors and the fact that both parties are trained in the local area i.e. the VTS area. The VTSOs have experienced some negative issues in relationship that stems from a feeling of being ignored by the pilots – there is a feeling of not being accepted by all pilots in the area. Moreover, there is noted a difference in the relationship and acceptance of the VTS system between the Swedish pilots compared with the Danish pilots. It is felt that the Swedish pilots have accepted the VTS but not all their Danish colleagues have. The co-operation as it is today is limited to smaller standard issues, such as providing the pilots with the current water level and other technical information. It is similar to the co-operation that exists with all the vessels participating in the VTS system. However, it is recognized that there are common areas that could be explored and enhanced to make the two services complement each other in a better way, and thereby increasing the level of safety. According to the VTSOs, the pilots are the eyes on the sea, although the equipment in Sound VTS is deemed to fulfil the needs

of the tasks to perform, it can never give the real picture of what is happening in the area with regards to certain details. It is in such special situations that the pilots can be a complement to the VTSO. There is also a sense that the VTSO can be a good complement to the pilot since the VTSO has the overall view of the area and that he has the history of the area.

5.2. Pilots

5.2.1 Current and future views on VTS and Pilotage

Derived from question 1, 2, 3

The overall purpose with pilotage is to sail a ship from one geographical point to another in the safest and most efficient way possible, and by doing so preserving the environment. The task of a VTS is to monitor the ship traffic and to assist ships with information that can be used by the bridge team; such information can be e.g. water level, wind speed and direction and ship movements in the area. There seems to be a positive attitude towards technology by the pilots because the new technology aids the pilots in their tasks and add to the overall safety. However, the pilots do at the same time, place most of the trust in their own knowledge, and do acknowledge that to much technical aids might take away the focus from the core task. The fact that the ships today are equipped with better and newer technology will not affect their job since the crews on the ships are not adequately trained to take advantage of the same. However, the technological development can propose a change to their work in the form of SBP. The notion of SBP is by the pilots perceived as a service that will not function in practice, at least not in their operative area of the Sound. There is a feeling of uncertainty of what the future holds; this is due to the fact that there are several ongoing investigations with the aim of investigating alternative forms of pilotage. This alternative forms could for instance be SBP or the privatization of the pilotage services in Sweden. Moreover, there are big organizational changes within the SMA that most probably will change the future for the pilots.

5.2.2 Information

Derived from question 4, 5, 11

The need for information from the VTS to the pilot is very limited; in fact the pilots already have the information which they get from the same source as the VTS. The information flow should be of a dynamic sort, i.e. it is affected by the type and size of the ship that is being piloted, and of the prevailing meteorological and hydrological circumstances. It is stated that there are certain special circumstances when it might be a need for information exchange; those circumstances could e.g. be if there is a grounded ship in the fairway that is affecting the pilots voyage, a hampered ship in the fairway or if there is any inoperative navigational aids. It is also stressed that the information that is received from the VTS has to be correct otherwise it is useless.

5.2.3 Communication

Derived from question 8, 9

The communication is limited, but when it occurs it is short, positive and professional. The fact that all communication is performed in English and the Standard Marine Communication Phrases (SMCP) are used is perceived as positive. There is a favour amongst the pilots for the concept of silent VTS[1]. The pilots have noted that inter-ship communication most often is performed outside the VTS VHF frequencies. The background of the VTSOs is a factor that affects the communication in a positive way, as it gives a feeling of having the same language i.e. a good understanding of each other. Stress is deemed to be a factor that can affect the communication in a negative way for example, the VTS might call when the situation onboard is stressed and this increases the level of stress.

1 This means a VTS system without any mandatory reporting points.

5.2.4 The relationship and co-operation

Derived from question 6, 7, 10, 12

The relationship between pilots and VTSOs is regarded as being OK, but it is a vague relationship. There are some pilots that recognize that a few pilots other than themselves have difficulties in the relationship with the VTS. The co-operation is regarded as OK; however, there is very little co-operation between VTS and pilots. One negative issue that affects the co-operation is all the standard reporting therefore, if a Silent VTS were implemented, this negative issue would disappear and this would favour co-operation. The fact that VTS has the overall view of the area and that the pilot is physically present on the ship is deemed to be a circumstance that makes the two services complementary to each other. Both parties are perceived to be service organisations with the intention to serve maritime traffic. There are suggestions that there might be a difference in the hierarchy between the two parties, which can affect the relationship and the co-operation, although the background of the VTSO's erases that hierarchy to a certain degree. Another factor that is deemed to affect the co-operation and the relationship is the fact that pilots and VTSOs do not know each other in person since they have never meet.

6 Discussion and analysis

6.1. The themes

The themes that have been developed will hereunder be discussed and analysed. It should be noted that all the themes are interconnected in one way or the other and they all affect each other; moreover, each theme itself is an area that calls for a deeper analysis in order to gain thorough knowledge of the subject. The chosen approach here is to analyse and discuss the themes in an isolated way; this is due to reasons of simplicity and the fact that a deeper analysis is not that aim for this dissertation. In this section there is text that is in *italic* font, which indicates that it is a statement/comment that is derived directly from the interviews.

6.1.1 Current and future views on VTS and pilotage

When the pilots and the VTSOs were asked about the purpose of their jobs, they gave similar answers like e.g. *Contribute to safety when a ship is sailing to or from a port or in a fairway* and that *the overall goal is to avoid accidents*. Further on, the answers showed that one of the main objectives with the service provided was to preserve the environment. This is in line with the Resolutions A960(23) and A857(20); moreover, it is in line with the goals set for the services by SMA ("Sjöfartsverket - Maritime Traffic Information," 2009; "Sjöfartsverket - Pilotage," 2009). However, it was also recognized by the respondents that in addition to the safety perspective, the services aim at improving the efficiency of ship traffic, meaning that the ships should have a safe and fast passage with as few delays as possible. The two goals of safety and efficiency might propose implications on one and another. In the book Normal Accident Theory, Perrow states, although in the context of Air Traffic Control, that organising traffic in the most efficient way might be in conflict with safety standards (Perrow, 1999, p. 158). This conflict of goals, is apparent in the maritime industry as well, and the areas of pilotage and VTS are no

exception. For example, the pilot can be subject to economical pressure from the ships owner, which could take the form of pressure from the agent acting on behalf of the owner requiring, that the ship should be berthed although the conditions might not be safe according to the pilot. The VTSO meets similar problems in the daily work, if the operator has the power to close a port due to e.g. bad visibility, this will have an economic impact on the ships and their owner. The conflict between safety and efficiency is well known; it was e.g. identified by the managers of E.I. du Pont de Nemours Powder Company in the beginning of the twentieth century. However, is there really a conflict? – To be safe is to be efficient - to have an accident will impact negative on the efficiency. This was also the result of the above mentioned experiments and the management shifted focus from efficiency towards promoting safety, which resulted in an overall better efficiency (J. C. Wood & M. C. Wood, 2002, p. 283). The balance between efficiency and safety is a constant struggle, a struggle that needs to be acknowledge by the management.

The only real difference between pilots and VTSOs when they were asked to describe the purpose of their job was that the VTSOs considered themselfes more as a service organisation than the pilots did. This is underpinned by the answers given on the question where they were asked to describe the purpose with the opposite job (i.e. the pilots described the purpose of VTS and vice versa). It is clear that the pilots see VTS as a service to them and other ships, and this is also in line with the VTSO's views of their job.

New and existing technology has a great impact on both services, which was acknowledged by respondents from both groups. Technology is in the center of the operations in a VTS Centre of today, because almost all tasks are performed with the aid of technological equipment (Jean-Hansen, Sagberg, Hoff, & Brotnov, 2005) This makes the relationship between VTSOs and technology to be something natural. This were mirrored in the interviews, as it was clear that the VTSO's were positive towards technology, *new technology will help us to offer a better service* and *new*

technology will make our job more easy are typical statements during the interviews with the VTSOs. The pilots on the other hand are generally positive towards technology, although in a more sceptic way. They are satisfied with the technical aids that they are using today, and they believe that they do increase the safety margin. However, pilots acknowledge that there are risks involved in the fast development of new and existing technological aids, and as one pilot stated *there is a risk with all technology that we are to use – one might lose focus on the core task.* Moreover, the pilots did make a connection between technological development and the possibility of SBP to evolve from the drawing table into a service that will be used in practice. The issue of SBP is something that the pilots believe will not work in practice, and it is a clear threat to their livelihood. The pilots emphasises the need for better training of the crews onboard ships if they are to be able to take advantage of the technical aids and thereby be able to sail without a pilot on board or in a SBP system, or as one pilot put it: *the work of a pilot will not change as long as the crew do not know how to utilize the technology onboard.*

Both groups of respondents believe that their profession will be around in the future; the overall judgement by the VTSOs regarding the future was that their future is in the hands of politicians, but with comments like: *VTS services will not go away in the future, VTS is a service that are growing all over the world* and *our existent are proved by history* It is obvious that there is a strong belief in the future development of VTS Services. The pilots did give voice to a more mixed view of the future, as it was recognized that protecting the environment is an issue that is high on the political agenda and it can advocate the need for pilots. The fact that the crews on the ships are poorly trained are another issue in favour for the pilot business. On the other hand, concerns were raised about how the ongoing organisational changes within the SMA would affect the pilots, and there was a concern that they might be privatized in a not to far away future. Moreover, several investigations have been made on how to make pilotage more efficient by means of using new technology and by reconstructing the forms and regulations for pilotage. The most extensive one was

ordered by the Swedish government with the purpose to:

> review certain piloting issues (ToR 2006: 116). The remit has included showing how new technology can facilitate and streamline pilotage services and examining the possibilities of developing pilotage from a land-based centre (Bjelfvenstam, 2007, p. 25).

This investigation was followed by others, such as:

- **Task regarding new technology for pilotage** (Uppdrag avseende ny teknik för lotsning) (Grundevik & Wilske, 2007)
- **Decision Support for Navigation** (Anderson, Koester, & Steenberg, 2007)
- **Report pre-study "Piloting from Shore"** (Lutzhöft, Dahlman, & Prison, 2008)

The purpose of these investigations can be summarized as investigations into how to make pilotage more efficient by means of technology, and they all investigated the possibility of SBP. It is likely that SBP will be performed from a VTS centre, which most probably will create job opportunities for VTSOs, while it is not far fetched to make the assumption that these investigations affect the pilot's view of the future in a negative way.

6.1.2 Information

The need for information exchange between pilots and VTSOs is deemed to be limited by both respondent groups; from the pilots there were comments like: *As a pilot nothing, we did good before VTS, considering today's technology – VTS is not necessary* and *if I need information then I ask for it.* This could be interpreted that pilots are satisfied with the information they have and do not need any further information. The VTSOs are having similar thoughts on the information exchange, *no special information are needed just be case there is a pilot onboard* and *we will treat a ship with a pilot the same way as any other ship* These are indications that the need for information is limited to the standard information needed from every ship

that enters the VTS area. The notion of information is widely used and the meaning of information is hard to pin down. According to Davenport and Prusak there is an old distinction between data, information and knowledge. This distinction is criticised by them, because they are of the opinion that information is an umbrella term for all three and serves as the connection between data and knowledge. However, for the purpose of this dissertation, the proposed definitions made by them will be used to illuminate the notion of information in this specific context. It is proposes that Data is *simple observations of the world*, and in the context of pilotage and VTS that can be for instance the water level. The next step is Information, namely *data endowed with relevance and purpose*, and finally there is Knowledge which incorporates interpretation and contextualisation by a human (Davenport & Prusak, 1997). If putting this in the context of the information exchange between pilots and VTSOs and adding comments like: w*e have the same source of information* and *we have all information our self,* it becomes clear that since the source of data is the same, the information transferred by the VTS is regarded as unnecessary, and it can even be irritating to receive the information, since it is already known. The above is true regarding general information; however, both groups of respondents do acknowledge that in special cases there is a need for information exchange. Those cases are related to situations where either one of the groups, in one way or the other, are not able to obtain the data. Such situations could e.g. be when a pilot informs the VTS that the ship has restricted manoeuvrability due to loss of steering; the pilot in this case collects the data from his/her position on the ship and transfers it to the VTS, which in turn transforms it into information that is broadcast to the ships in the vicinity. Information exchange in the other direction i.e. from VTS to pilot could be for example if there are reported containers floating in the water. The VTS has the data and transfers it to the pilot, who will interpret it and use the information as ground for further decisions. There is further recognized a need for correct information, which was stressed by the pilots: *the information has to be 100 % correct otherwise it is useless.* It seems that the pilots are concerned if they

can trust the information from the VTS, and base their decisions on it. This is supported by the SMA customer investigation presented in Chapter 2.4.1, where the area of information gets a low grade and is deemed to be a prioritized area to be able to improve the VTS service. This concern is fully appreciated when one thinks of the context in which the pilots are preforming; they are “out there” close to the action and close to the result of the used information. Part of this concern might stem from the fact discussed earlier, that the source of the data is the same e.g. the water level is checked by the pilot and a short while later the VTS informs the pilot about the water level. However, there is a difference in the water level perceived by the pilot and the information gained from the VTS. This can be an issue of concern for the pilot and might affect the trustworthiness negatively, rendering in the pilot checking the water level again to be sure that he has the accurate data as a base on further decisions. The explanation of the difference in water level might be a sudden change in the water level or that the information is not yet updated on the computer screen in front of the VTSO. Another situation could be if the VTSO informs the pilot about a ship's intended route, the pilot receives the information and base the decisions on that. A few moments later that ship could alter course in an unpredicted way and cause a close quarter situation for the pilot. The pilot will question the information from the VTS, however; the VTSO acted on the information known to him without knowing that the turning ship just received a change of destination and thereby changed the course, without informing the VTS (these two examples are taken from real situations). If a pilot is exposed to this kind of situations repetitively without knowing all the factors behind the information, it is understandable that it will create a scepticism towards the validity of the information received from VTS.

6.1.3 Communication

Information and communication are notions that are intertwined with each other. Communication is to; talk to each other, television, the clothes we are wearing, newspaper and many other activities (Fiske, 1984, p. 11); moreover, communication is a necessity within all social interactions (Giddens, 1998, p. 638). The content of the communication process is usually denoted as information. The notion of communication is "to talk to" in a process that is mutual; however, it should be acknowledged that there is a communication form that is one-way, namely the one-way communication process (Palm, 1989, p. 13). The communication process is described in several ways; however, most of the proposed descriptions contain a sender, a receiver, channel (medium) and message. In Shannon and Weaver's book *Mathematical Theory of Communication* there is one part added called noise source. The noise source is everything that is added to the signal that is not intended by the source, which could be technical issues such as noise from a bad connection (Fiske, 1984, p. 18). According to Kaufmann and Kaufmann the source of noise can consist of filtering the information, selective precipitation, feelings, language, amount of information, non-verbal signals and time pressure. All these are barriers that stands between the message as it is perceived by the sender to how the message is understood by the receiver (G. Kaufmann & A. Kaufmann, 2005, p. 372). Hereunder, the barriers to communication offered by Kaufmann and Kaufmann will be used in the context of communication between pilots and VTSOs.

Short, concise and friendly – strait, positive – short, precise and professional are all comments on how the respondents perceive the communication between the two groups. It is further perceived as positive, that the communication is following the SMCP and that it is in English. The fact that all communication is done in English is a way of overcoming the **language** barrier identified by Kaufmann & Kaufmann; moreover, it allows all the ships in the area to be able to understand the conversation.

We *talk the same language* is a comment that reoccurs within both respondent groups; by language it is meant "sea speech", a way of communicating that is derived from education and the following experience of a sailor. This phenomena helps the communication in a positive way. Although the communication is deemed to be generally good, most of the comments were regarding the technical communications i.e. how the communication is performed when it occurs. However, when talking about communication in a broader sense, the picture is not quite the same. There is a reluctancy to communicate by the pilots, and part of this reluctancy is believed to be connected with the limited information needed, as discussed in the previous paragraph. The communication with a VTS can according to the pilots result in a **feeling** of irritation and could be disturbing in certain situations; moreover, simple things as the mode of the day can affect communication; one of the pilots stated that: *sometimes I am short on the VHF, this is when I have a bad day and are fed up with the reporting procedures, this is a fault by me.* This does indicate both that feelings, or in this case the daily spirit of the pilot and the pilots view of the VTS functions, do affect communication. Further, it can be seen as the pilots think that there is an over-communication i.e. the **amount of information** that is communicated is deemed to be excessive. The solution for these issues, proposed by the pilots, is to have a silent VTS system. **Time pressure** i.e. stress is a factor that is named by both of the groups as negative with regards to communication.

6.1.4 The relationship and co-operation

The relationship and co-operation are the result of previous discussed themes. Any glitches in either one of them will be visible within the context of co-operation and relationship, e.g. it is easy to see that if the communication does not work the co-operation will suffer and in the end the relationship will suffer as well.

During the interviews the notion of relationship and co-operation was perceived as being very close to each other in meaning, as many of the answers given on the

question addressing relationship was answered from a co-operation perspective. This has resulted in some difficulties in separating them during the analysis. However, the fact that the respondents did not make any bigger differences between the relationship and the co-operation, can be seen as evidence of how closely connected the two are. One issue that was raised by both of the groups were the fact that they seldom meet face to face, this were perceived as an issue that affected the co-operation and relationship in a negative way. The fact that the two groups do not meet face to face indicates that the interaction between them can be denoted as co-operation over distance. That distance plays an important role in co-operation is a well known issue. In a survey done by Bradner and Gloria it was concluded that:

> the data strongly indicate that the geographic distance between collaborating and previously unacquainted partners matters. The ability to persuade another and the willingness to initially cooperate decrease with distance while deception of another person increases with distance (Bradner & Gloria, 2002, p. 9).

Further, Bradner and Gloria emphasised the importance of trust, because it is believed that if there is a sense of trust between the co-operative partners, the negative effects offered by distance can be defeated. The issue of trust is something that is an essential factor in the co-operation between pilots and VTSOs, as touched up on in the previous Chapter 6.1.2 dealing with information, a mistrust between the two groups can be identified; however, that mistrust seems to be one way, since it is the pilots that mistrust the VTSOs. In fact, the VTSOs do rank pilots as very trustworthy, and this is underlined by comments like: *the information revived from a pilot is very trustworthy.* The important role of trust is identified in the *Report pre-study "Piloting from Shore"*. This report is focusing on SBP; however, there are many similarities to be drawn with the co-operation between pilots and VTS. The conclusion of the report suggests that the area of focus for further work should be the

area of communications and trust. Moreover, it is stated that trust is intimately connected with face to face contact. Another finding made during the research for the report was that the pilots had observed that there was a lack of trust between the ship's crew and VTSOs (Lutzhöft et al., 2008).

There are, amongst the VTSOs, an issue that seems to overweight all other issues; that issue is concerning the lack of communication with pilots. During the interviews there was numerous comments made about the reluctancy of certain pilots to answer the VTS when they were called on the VHF; *pilots that do not answer the VHF when we call them - some pilots do not even answer on channel 16 - there are pilots that don't answer the VHF, this is very arrogant towards us and no answer from ships with pilot onboard, that is a strange feeling*. These statements are underpinned by incident reports made by VTSOs, and there can be found several reports that deal with the non-compliance of pilots. As an example there was a ship with a draft of 8,8 meters entering the area, with a pilot onboard. Since the draft of 8,8 meters is far too deep to transit through the Sound, the VTSO tried to radio the ship on both channel 16 and channel 71 several times without any success. The VTSO then contacted Lyngby Radio and asked them if they could send a Digital Selective Call (DSC) to the ship, and in that way establish contact. Lyngby Radio was able to establish contact, and the pilot informed that the present draft was 7,5 meters, which allows safe passage through the Sound. The pilot stated that the VTS system is a voluntary system and that he did not want to contact the VTS; moreover, the pilot did not see any problem with the AIS that indicated 8.8 meters (Sound VTS, 2009).

This incident indicates that there is a clear reluctancy from the pilot to participate in the Sound VTS system; further, it also identifies a lack of understanding of how the VTS works, because it does so by the fact that he did not see any problem with having an AIS transmitting wrong information. The issue of pilots that will not participate in the VTS system was demonstrated by not answering when they are called, seems to be confined to the Danish pilots according to statements made by

VTSOs and the analysis of incident reports from Sound VTS (it should be noted that this is an extreme case, and that the majority of the Danish pilots do co-operate in the best way possible). There might be a parallel to be drawn with regards to the issue of co-operation over distance. The Swedish pilots are much closer to the VTSOs since they are stationed in the same building as the VTS, although on another floor, and this makes it easier for the Swedish pilots to meet the VTSOs in person. Another issue that might help to explain why there seems to be a more infected relationship with the Danish pilots could derive from the start up of Sound VTS. For the on the job training (OJT) the VTSOs are acquired to follow a pilot during a transit pilotage e.g. a piloted ship that transits the Sound from north to south. The Danish pilots did not want any VTSOs onboard while they were piloting; however, there were no problems in joining a Swedish pilot on a ship. The reason for this could be many and it does probably not reflect the opinion of all the Danish pilots; nevertheless it was perceived as negative by the VTSOs.

Another area that was put forward during the interviews as a contributing factor to the relationship and the co-operation was the fact that there could be an element of competition between the two groups. Comments, such as *I have always been positive towards VTS when I was sailing, but then there were no competition for work - the competition for work might be a factor that affects the communication - there is a struggle for power - SMA needs to inform what is going on to reduce the feeling of competition*. Further, the issue of competition is recognized by experts within the maritime industry, for example the statements made by IMO's both Secretary General's as presented in Chapter 2. Part of this issue can derive from the fact that the two parties identify them selves as belonging to two separate groups. A group can be anything from a few people like for example a family, to vast groups that are determined by religion. This makes the definition of a group complicated and several authors have come up with different definitions (Brown, 1988a). According to Kaufmann and Kaufmann, a social group can be seen as a number of individuals with common interests of a more permanent sort e.g. common ideals, religion or interests

and that group members will affect each other by their actions (G. Kaufmann & A. Kaufmann, 2005). However, the pilots and the VTSOs could be regarded as one group since they have a common interest in safety and they do affect each other. However, in several definitions of groups there is a criterion that interaction is made face to face (Johnsson & Johnsson as cited in (Hwang, 2005, p. 306). Following this it is not far fetched to make the assumption that pilots and VTSOs despite the fact that they have many similarities, can be viewed as two groups. It was also quite obvious during the interviews that pilots and VTSOS did see themselves as two separate groups. Brown puts forward that the mere fact of belonging to two different groups will affect the view of the other group. Brown goes on and highlights two social psychological processes that can explain the intergroup problem. These two are social categorization and social identification. Social categorization can be described as how people order their social environment. By dividing the social environment into categories, it will help individuals to define who they are i.e. social identification. These two processes can explain that individuals get some of their self-worth from belonging to a certain group, and the better that group is, compared to other groups, the higher self-worth the individual will feel. All this together contributes to a competition between groups (Brown, 1988b). The competition between groups will quite naturally have an impact on co-operation and the relationship.

7 Conclusion and recommendations

Pilot services and VTS services are two very similar services; they both aim at increasing safety by providing information and assistance to ships. In the case of Sound VTS and Sound Pilotage the persons that render that service are also similar with regards to e.g. professional background, education and training. The overall impression is that the interaction between pilots and VTSOs are regarded as being limited but satisfactory by most of the interviewed respondents. Although the interaction between the two groups work without problems most of the time, issues such as a strong feeling of group belonging, lack of trust and lack of communication have been identified. These issues clearly have a negative impact on the interaction and do affect the services in a negative way. In the quest for gaining knowledge of how to improve the services, the negative issues found have been the main focal point of this work, and therefore it has painted a rather black picture of the interaction between pilots and VTSOs. However, it should be stressed that the interaction is well functioning in most cases and do thereby contribute to a safer sea.

The analysis indicates that many of the issues found are derived from poor interpersonal relations and a strong group feeling. Further, the fast developing technology is an issue that affects the need for interaction. The pilots stated that the information obtained by the VTS was already known to them, and therefore it is felt unnecessary to receive it once more, and it can even be a source of disturbance while performing their tasks. According to the author, VTS has to take this into account when developing working procedures. The fact that pilots most often have the information that they need could also serve as part of the explanation of the result derived from the customer investigation ordered by SMA. The ship's officers do not have access to the same information sources as the pilots do and do therefore find the information from the VTS useful. The incitements for co-operation between the two

services were deemed to be limited under normal circumstances by the interviewed respondents; however, both groups do acknowledge that there are situations where they both could gain on enhanced co-operation. However, it is believed that to be able to do that in an effective way the hinder proposed by the social issues has to be addressed. The competitive group feeling has to be abolished and replaced with a feeling of being a team that works towards the same goal. To be able to facilitate such co-operation the individuals have to have a genuine trust in each other. The issue of trust is a central issue because if there is no trust the interaction will not have any solid ground to grow in. As described by Lutzhöft et al., trust is closely connected with face to face contact, to meet each other in person. This is also brought forward by the VTSOs and the pilots as they think that if they were to meet in person it would be easier to co-operate. One way to achieve this could be to train pilots and VTSOs together, since this will provide a better understanding of how the other service functions and it will also be an excellent chance to get to know each other and thereby building up the trust. Moreover, this combined training will be time and cost saving. If there is success in building up the trust and thereby achieving a team feeling, it might open the road to involve the VTS more actively in Bridge Resource Management (BRM) onboard ships. If the VTS are acting as a member of the BRM team then the two systems will complement each other in an effective way, and thereby the level of safety will rise considerably.

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