

GOVERNMENT SUPPORT FOR SUSTAINABILITY OF MARINE SALVAGE SERVICES: A CASE FOR TURKEY

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ABSTRACT

Marine salvage, in principle, is a service rendered to assist or save a maritime property in marine peril. Today there are many improvements in maritime safety in the world. In parallel, decreasing number of marine accidents and the technological changes in ship designs as well as characteristics of cargo and increasing amount of dangerous goods being transported by ships started to cause the characteristics of demand for marine salvage services to change putting the marine salvage industry in operational and financial difficulties.

Today, marine salvage is considered as a solution for preventing marine pollution caused by shipping accidents in the maritime industry. Emergency response and pollution prevention has become important elements of marine salvage services. Maritime nations are in continuously working on improving maritime safety for pollution prevention, as the maritime traffic is constantly increasing.

Modern salvage approaches such as; government supported ERV (Emergency Response Vessel) systems are in practice in many maritime countries as a solution for pollution prevention as the marine salvage industry is facing an eradication in recent years, due to operational and financial stress caused by expenses of being ready to respond for modern salvage needs on stand by.

Turkey, standing on an important maritime geography, needs sufficient marine salvage capability on its coasts considering the increase in the maritime traffic.

A delphi research was done for determining the capability of marine salvage services in Turkish waters, and the qualitative analysis of the experts' opinions has shown that there are weaknesses in training, equipment, planning and organization elements of marine salvage industry in Turkey.

This paper emphasizes on the necessity of governmental assistance for sustainability of marine salvage services which carry a major role on pollution prevention in the maritime industry. An analysis of risk potential of Turkish coasts and improving salvage capability in high risk areas and a government supported marine salvage system for all coasts are recommended for improving coastal safety in Turkey.

Keywords: Marine Salvage, Marine Peril, Marine Pollution, Emergency Response, Sustainability

1. INTRODUCTION

In the last two decades, importance of sustaining a sufficient marine salvage capability for emergency response and marine pollution prevention had been realized and had become a major concern for the maritime industry. The concept of conventional marine salvage, which has been basically consist of assisting a maritime property in marine peril (Chorley and Giles's 1995), has gone under a change putting more responsibility on the salvor by forcing them with a very critical duty as preventing marine pollution in maritime accidents. On the other hand, with the decline in the number of maritime accidents and the high expenses of pollution prevention, the salvage industry started to face financial and operational complications. Especially for accidents among vessels carrying pollutant cargo such as; petroleum and chemical tankers, saving the maritime property had almost become a secondary mission for the marine salvor after preventing marine pollution being the major international, national and public concern (NRC 1994). Today the terms marine salvage and emergency response are closely interactive with each other. It is difficult to separate

emergency response and salvage because of the variety of conditions of distress at sea (DOTARS 2004). For the purpose of this study salvage capability and emergency response are interactively used.

2. MARINE SALVAGE

Salvage is the act of rendering services to a vessel in danger. Those services must be rendered voluntarily where the salvor will expect receiving a financial profit for his effort (Anderson 1993). The service rendered pursuant to an official duty can not be considered as a salvage service (Schoenbaum 1994; White 2000). This means that there must be no preexisting contractual arrangement between the salvor and the ship-owner.

The International Convention on Salvage 1989 defines marine salvage as; "...any act or activity undertaken to assist a vessel or any other property in danger in navigable waters or in any other waters whatsoever."

Today salvage operations are carried out upon a salvage agreement which includes the details of remuneration of the salvor (Franko et al. 1994). Today most widely used salvage agreement is Lloyd's Open Form (LOF) (Schoenbaum 1994).

Salvage may occur in emergency situations where the property or environment is in immediate danger requiring emergency response.

2.1. An Overview of the Marine Salvage Industry

Today, there is a significant decline in the maritime accident rates around the world parallel to the improving safety standards in shipping industry with the hard work of IMO. However, this decline of the rate of maritime accidents had not affected the marine salvage industry in a favorable way since the concept of salvage award depends on maritime peril (Grime 1991). The marine salvage industry is facing financial conflicts because of the operational costs of waiting on stand-by for any need of emergency response. There were 255 Lloyd's Form cases in 1980, but only 80 in 2006. There was a minor increase in the first half of 2007, with 51 cases, but the workload is still running at significantly less than 50 per cent of the level of 25 years ago (Bishop 2007).

On the other hand changes in the characteristics of the needs for marine salvage assistance in maritime accidents requires the conventional marine salvor to adopt to modern salvage needs of complicated and highly specialized salvage equipment and qualified personnel. Improvements in ship designs, increasing ship sizes with greater capacity of cargo and sophistication of cargo handling systems forces the salvor to invest more to the equipment and personnel. Financing a marine salvage company with an emergency response capability for pollution prevention had become non-profitable, if any, because of the operating costs, resulting in a decline in the number of professional salvors (O'Neil 2003).

These changes in the characteristics of the marine salvage services and the impact on the salvor should not only be the concern of the industry but should influence international and national authorities to consider the future sustainability of the marine salvage services keeping in mind the major role of marine salvage in pollution prevention.

The first international effort to promote the salvor was the article 14 of the 1989 International Salvage Convention and the "special compensation", which modified the historical "no cure – no pay" principle of marine salvage, that let the salvor to be remunerated for the effort for minimizing or preventing marine pollution disregarding the result of the salvage operation (International Salvage Convention 1989). However, number of professional marine salvage companies capable of stand-by for emergency response is still in a decline because of the financial facts.

The International Salvage Union (ISU) has been searching for solutions to the problem. These solutions include a new remuneration system expected to support pollution prevention expenses for salvage and governmental support which could place salvage industry on a stable ground for the future. ISU emphasizes on the responsibility of the governments for pollution prevention and need for governmental support to salvage industry. In 2003, the salvage industry's total income from casualty services amounted to less than about 80 million US Dollars which is much less than the amount they recover from the casualties. ISU salvors covering the 90% of the casualties in the world have responded to over 2,000 ship casualties and recovered more than 11 million tonnes of pollutants. Financial security is major concern for the salvors since they are to continue providing these vital services in the future (Rooji 2005).

2.2. The Role of Salvage in Marine Pollution Prevention

Marine salvage industry recovered over 11 million tons of pollutant, including 9 million tons of crude oil, from over 2000 vessel since year 1994 (Rooji 2005).

Maritime transportation has taken great steps on improving safety standards which affected the rate of accidents and marine pollution. In 1970's there have been approximately 20 large maritime accidents yearly, resulting in marine pollution while this rate decreased to 3 or 4 by year 2000. In the mid 1990's the marine salvage industry recovered estimated 2 million tons of pollutant. Today this amount is approximately half million to 1 million a year. In 2003, 218 salvage operations commenced by the International Salvage Union (ISU) members who carry out 90 percent of the salvage cases in the world, and 600,000 tons of pollutant was recovered. It was 734,582 tons in 266 operations in 2004 and 875,331 tons in 247 cases in 2005 (ISU 2006).

Today, severe maritime accidents resulting in large marine pollution are rare. However, disasters of Erika in 1999 and Prestige in 2002 resulting in oil spill of estimated 700,000 tons proved the industry the significance of marine salvage. Marine salvage industry saved 12,5 billion US Dollars by recovering 452,000 tons of pollutant only in 2004 (ISU 2006). ISU authorities emphasizes on the point that the marine salvage capability is the solution for marine pollution prevention and instead of focusing only on cleaning up the pollution, to prevent it by strengthening the emergency response through salvage capability must be the new strategy (Rooji 2005).

As a conclusion to the argument on the role of the marine salvage industry on pollution prevention; a total of 520,000 tonnes of oil was lost from ship casualties between years 1994-2006. The cost in clean-up procedures and compensation totals in billions. Over the same period ISU salvors recovered over 20 times that amount and salvaged more than 10 million tonnes of oil (Bishop 2007).

2.3. Marine Salvage and Emergency Response

International agreements such as the International Convention for the Safety of Life at Sea (SOLAS), 1974 define assisting a vessel in distress as a legal duty. Also Article 10 of the International Convention on Salvage 1989 emphasizes; "every master is bound, so far as he can do so without serious danger to his vessel and persons thereon, to render assistance to any person in danger of being lost at sea.

This is to prove that there is a minor distinction between salvage and emergency response (DOTARS 2004). Especially today, with the article 14 of the International Convention on Salvage, 1989 which encourages the salvage effort to minimize or prevent marine pollution in salvage cases by giving the salvor the right for being remunerated for the effort even if the property to be salvaged is lost at the end of the operation, the strong link between two concepts is undeniable.

Other than the wreck removal or towage parts of the salvage concept (Anderson 1993), which in some countries not even recognized as salvage (Rodiere 1963), the circumstances of the distress to be assisted by salvors may very well require emergency response.

2.4. New Approaches to Marine Salvage: Governmental Support

Since the marine salvage service is accepted as an important tool for pollution prevention, among some maritime countries there has been a search for solution to overcome the fact that the industry is in trouble and weakening. There are new approaches around the world to marine salvage, which is vital for coastal protection, such as; Emergency Response (ERV) or Emergency Towing Vessels (ETV) systems (Middleton 2005). ERV or ETV systems are supported by the government and consist of fully equipped and manned stand-by salvage tugs 24/7, located at strategic areas on the coastline (DOTARS, 2004). England, France and Australia are some examples of maritime countries using Emergency Response Vessels to protect their coastline. ERV systems are operated in cooperation of governments and private salvage companies through chartering agreements between parties for use of the salvage capability assisted and financed by the governments (Davidson 2006; Adsteam Marine 2006)

Figure 1 shows Emergency Response Vessels strategically located and some planned to be located around Northern European coast.

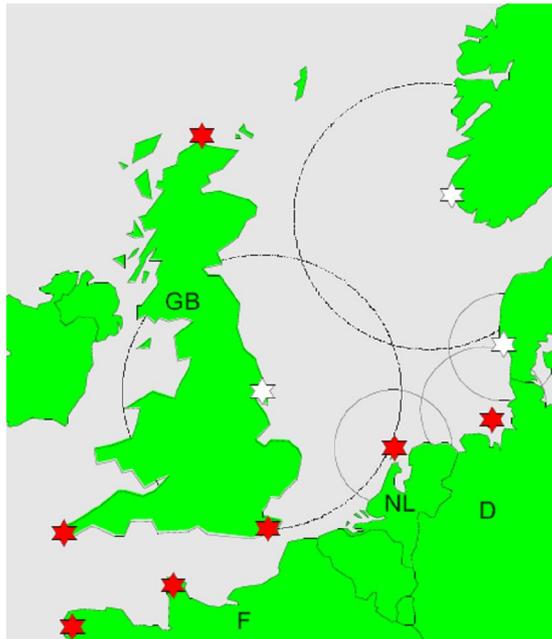


Figure 1: Emergency Response Vessels Locations around Northern Europe.
 (★ ETV existing, ERV suggested. ☆ ERV suggested.)
 Source: WWF 2000

Main duty of ERVs is to stand-by at all times to render emergency salvage service to vessels in distress to prevent any loss and possible marine pollution. ERVs also have secondary duties such as supporting pollution clean-up operations, Search and Rescue, traffic monitoring and assisting maritime authorities (Bonn Agreement Counter Pollution Manual 2005).

Australian Maritime Authorities in 2004 concluded that it is inevitable to analyze the risk potential on Australian coast and strategically place ERVs around these areas. In Australia a command control mechanism named Maritime Emergency Response Commander (MERCOC) was established with full authority for emergency salvage cases on the coastline (Davidson, 2006). Figure 2 shows the 9 areas of high risk determined to be supported with ERVs on Australian coast of 17,000 km in length (DOTARS, 2004).

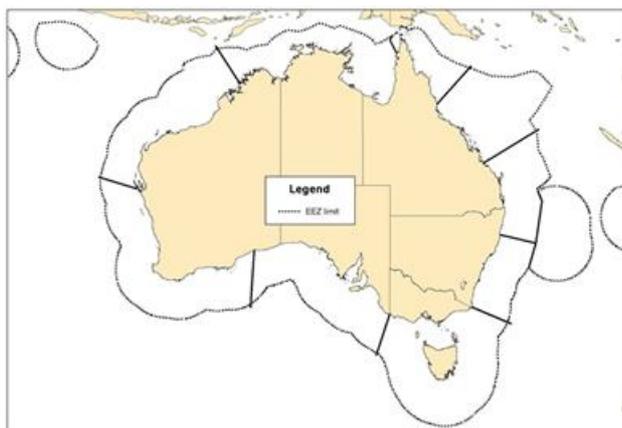


Figure 2: High Risk Areas Determined for ERV Location.
 Source: DOTARS, 2004

2.5. Marine Salvage in Turkey

There are 3 major marine salvors in Turkey, all based in Istanbul, which are members of The International Salvage Union (ISU 2006), one being the state owned Directorate General of Coastal Safety (DGCS). Salvage services in the Turkish Straits and Sea of Marmara is being given under monopoly of The Head of Salvage and Rescue Services Department of DGCS (DGCS 2007).

After February 2006 with the change of the official Main Status of Directorate General of Coastal Safety (R.G. 2006/26078) the monopoly area of the establishment has been narrowed down to Strait of Istanbul including an area on the Black Sea entrance, The Sea of Marmara and Strait of Canakkale including an area covering Aegean Sea entrance of the Strait as shown on figure 3, while before DGCS covered larger area on the coast rendering salvage services..

DGSC renders salvage services in the Straits area under its monopoly with its stand-by emergency response teams and salvage tugs. DGSC also carries responsibility for pollution prevention and clean-up procedures providing necessary equipment and facilities (DGCS 2007).

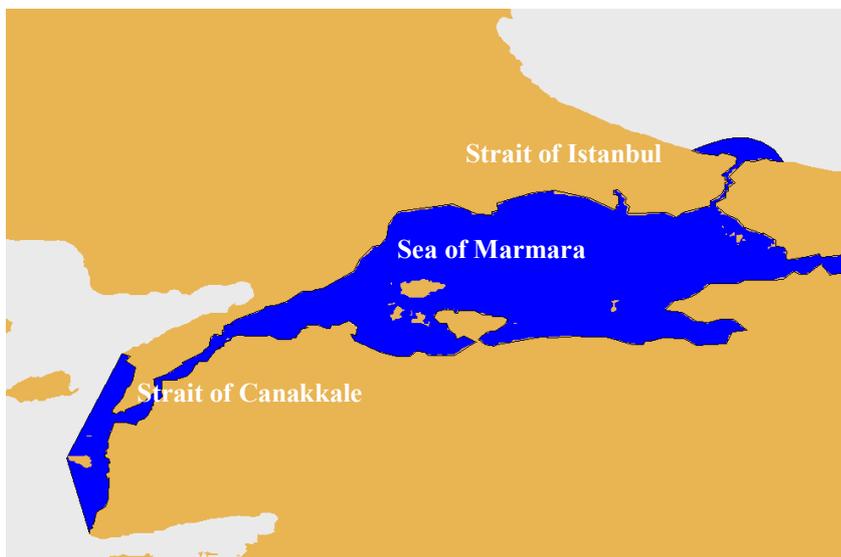


Figure 3: Area of focus of Directorate General of Coastal Safety (The Turkish Straits Area).
Source: Adopted from Main Status of DGCS.

Since the status of DGCS has been changed the establishment backed up to the Straits Area with all its salvage tugs and emergency response equipment. Today, minor salvage services on Turkish coastline outside the Straits Area are rendered by small companies as secondary activity beside their core competence of port tug and pilotage services. There are no salvage stations or major salvage capability ready for emergency response recorded around the Turkish coastline outside the Straits Area. DGCS has its 10 salvage tugs and all emergency response capability located in the Straits Area (DGCS 2008). Another ISU member salvage company has 3 salvage tugs again all based in Istanbul (arassalvage.com). The third salvage capable company is based in Istanbul and renders tug services of some ports in the Bay of Iskenderun on the coast of Eastern Mediterranean as well (medmarine.com).

3. MARITIME RISKS ALONG TURKISH COASTLINE

Turkey is a developing maritime country with a coastline of 8,333 km in length. Parallel to the maritime traffic increasing around the world Turkey needs to take necessary precautions to protect its precious coastline from dense maritime traffic that always carries potential of risk for a maritime disaster. Some countries have experienced great losses in the past from maritime disasters such as; oil spills of Exxon Valdez, Erika and Prestige and the marine salvage industry has proven itself as a major tool for marine pollution prevention.

Table 1 (Acar 2007) shows 1371 maritime incidents according to vessel types occurred around Turkish waters between years 1997 and 2005. It is determined that approximately one of every two incidents is a cargo vessel accident and these are followed by yachts with a ratio of 17% and fishing vessels with 11%.

Table 1: Maritime Incidents According to Vessel Types in Turkish Waters between years 1997 and 2005.

Vessel Type	Total	Ratio (%)
Cargo	686	50,0
Yacht	242	17,7
Fishing	153	11,2
Passenger	134	9,8
Small Craft	85	6,2
Service Boat	50	3,6
Other	21	1,5
Total	1371	100,0

Source: Acar 2007.

Statistics show that 38% of these incidents resulted in major damage to lives, property and environment (Acar 2007).

A review of the maritime traffic through the Turkish Straits would support the argument of the need of salvage planning and solution on Turkish coasts. Today there are 12 times more ships passing through the Turkish Straits since the 1936 Montreux Convention. This value is 25 times more in amount of tonnage. Table 2 shows the increase in maritime traffic through the Straits by the years 1996 – 2005. In 2005, the number of ships passed through the Strait of Istanbul (54,794) was 1,09 times more than the number in 1996 (49,952). In 2005, the number of ships passed through the Strait of Canakkale (49,077) was 1,38 times more than the number in 1996 (35,487).

Table 2: Maritime Traffic through the Turkish Straits between years 1996-2005.

YEAR	STRAIT OF ISTANBUL	STRAIT OF CANAKKALE
1995	46954	35459
1996	49952	36198
1997	50942	36543
1981	49304	38777
1999	47906	40582
2000	48078	42561
2001	42637	39249
2002	47283	42669
2003	46939	42648
2004	54564	48021
2005	54794	49077

Source: Oral and Ozturk 2006.

The increase in the maritime traffic becomes more dramatical, reviewing the number of ships passing through the Straits carrying dangerous cargo. Figure 4 shows the increase in the number of tankers carrying dangerous cargo through the Straits between years 1996-2006. The number of tankers carrying dangerous cargo through the Straits has increased 136% from 1996 to 2006. The number has reached to 10153 while it was 4248 in 1996. The amount of dangerous cargo being carried through the Straits has increased 138%, being 60,1 million tons in 1996 and 143,5 million tons in 2005 (Figure 5).

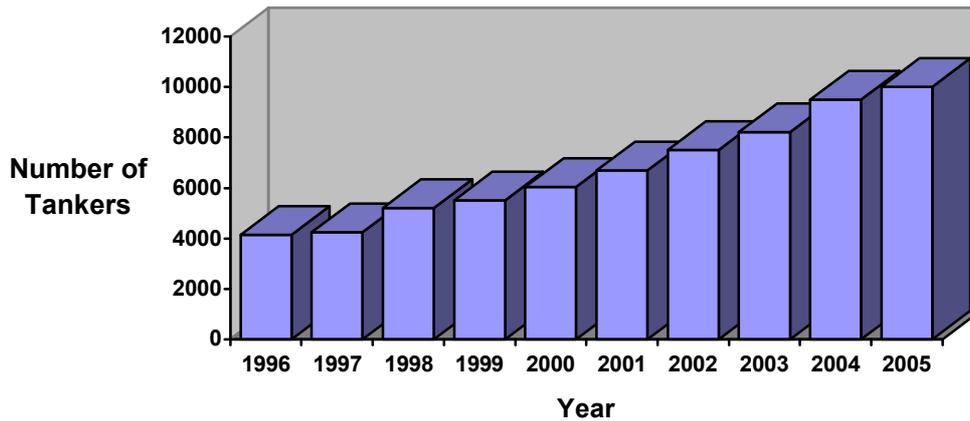


Figure 4: The Number of Tankers Passed through the Turkish Straits between 1996-2006. Source: Birpinar et al. 2005.

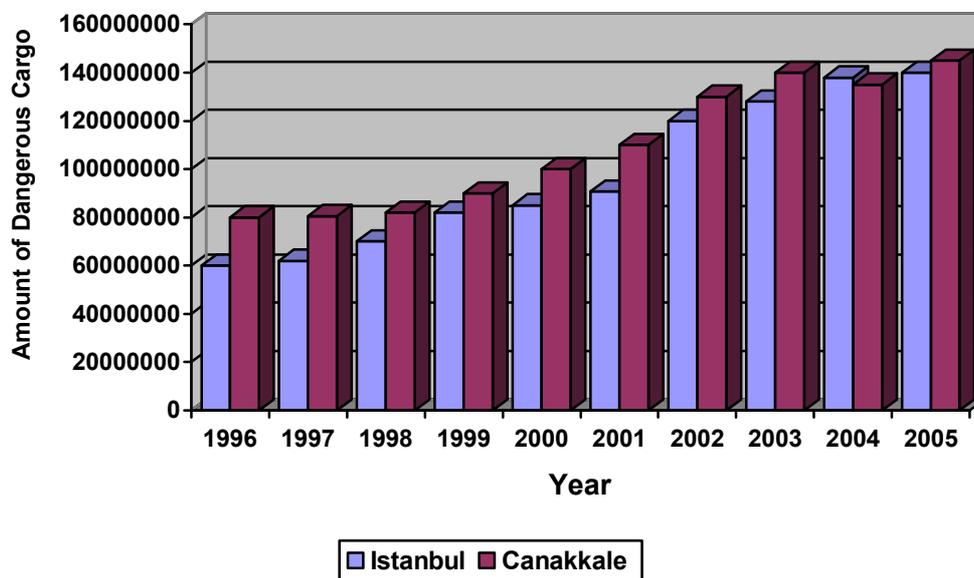


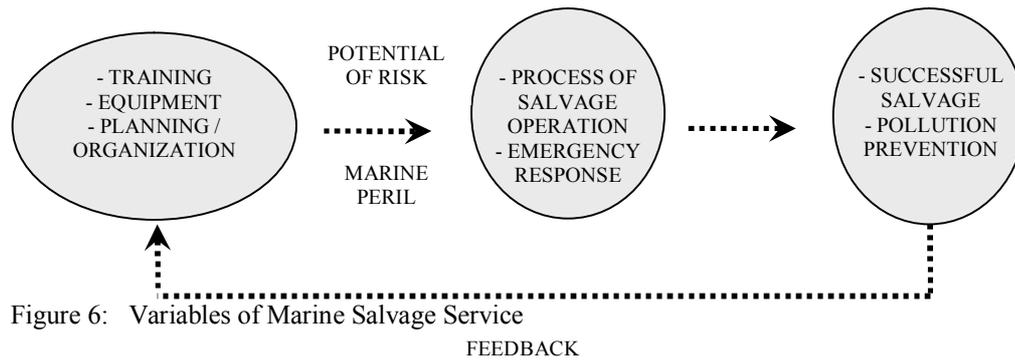
Figure 5: The Amount of Dangerous Cargo Carried Through the Straits between 1996-2005. Source: Oral and Ozturk 2006.

4. OBJECTIVES AND APPLICATION OF THE STUDY

Turkey, standing on an important maritime geographical location, needs sufficient marine salvage capability on its coastline considering the rapid increase in the maritime traffic.

A delphi research was carried out for determining the capability of marine salvage services in Turkish waters, and the qualitative analysis of the experts' opinions has shown that there are weaknesses in training, equipment, planning and organization elements of marine salvage industry in Turkey. The necessity of governmental support was also emphasized by the experts.

The objective of this exploratory research is to determine the capability of marine salvage services in Turkey considering the emergency response and pollution prevention properties of the service through experts' opinions. The variables of marine salvage services were determined, as shown on the model in figure 6, through the initial interviews with the experts which were carried out prior to the delphi research.



For the concept of modern salvage and the objective of this study it is proposed to fit together emergency response and salvage. A successful salvage including pollution prevention depends on the timing of emergency response to the peril and accurate decision for process of the salvage operation. This is possible only through constant training, sufficient equipment, well planning and organizing. The study was carried out to determine the capability of marine salvage in Turkish waters through experts' opinions on these aspects.

4.1. Methodology

The Delphi technique as a qualitative research method was preferred to collect data for this exploratory research to carry out the study. The Delphi technique is a method of collecting and refining group judgments through a series of questionnaires. (Kinnear and Taylor, 1995; Abdel-Fattah 1997). Each subsequent questionnaire builds upon responses to the previous questionnaire. The process ends when consensus is reached among participants (Jones et al., 1992).

Delphi is rather more practical technique than many other group techniques such as; focus groups. The technique is preferred in situations where the large number of panelists complicates reaching meaningful results from the discussions. The Delphi technique is also structured to avoid the financial problems and timing difficulties of gathering panelists in a discussion group (Mitchell and McGoldrick, 1993).

The effective selection of the panelists as expert group is a significant factor for success in Delphi. The panel may consist of 10 to 100 participants in Delphi studies (Yong et al., 1989). Participants should have experience and sufficient knowledge on the research subject for eligible feedback (Yilmaz, 2004).

First statements are formulated and expanded from assumptions, solutions and options provided from initial interviews, previous researches and literature. Then, an expert panel is selected and invited to provide opinions. The responses are analyzed according to a predetermined consensus criterion. A second questionnaire is generated from the results and feedback from the first round. Panelists' opinions are again collected and analyzed (Day & Bobeva, 2005; 106).

The consensus criterion for the participants' opinions is another important factor in a Delphi research. There are various consensus criteria used in the literature (Tuna & Ozer, 2002). There are Delphi studies where the consensus is defined as 51% while some others used consensus rate of 70% or 80% (Hasson et al., 2000). For the purpose of this study the consensus is defined as 80%.

4.2. Delphi Study Sampling and the Implementation Process

In identifying the panelists, the variables described in the model in figure 1 were taken into consideration and salvage experience of the panelists to be selected was especially considered. Face to face interviews and contacts by telephone and e-mails with the maritime industry related groups were used in identifying the panelists of 21 with salvage background. Salvage background was prerequisite for the participants so the panelists were limited to 21. The panelists were selected from representatives of government and private sector related with marine salvage industry. Participants also from different areas of maritime industry related with salvage services such as; The Undersecretaries of Maritime Affairs, Port Authorities, Coast Guard, P&I Clubs, maritime law were proposed to be identified in the Delphi panel to create a wider range of opinions about the subject.

Table 3 show the list of the panelists from different professions participated in the study excluding the ones who could not complete the whole stages of the study.

Table 3: List of Panelists Participated in the Delphi Study

PANELIST	NO	DESCRIPTION
DGCS	2	Salvage Master (Oceangoing Master)
PrivateMarine Salvage Company	4	All senior officials experienced with salvage operations, 2 also are oceangoing masters and port pilots
Port Authority	2	Senior Officials
Coast Guard	2	Senior officers with salvage experience
The Undersecretariat of Maritime Affairs	1	Senior official at Ministry of Maritime Transportation
Ship Building	1	Marine Architect and Lecturer
Insurance	1	P&I Club official and Oceangoing Master
Law	1	Maritime Lawyer
Pilotage	1	Oceangoing Master, Pilot in a private company assisted many salvage operations
Ship Management	1	Fleet Manager, Oceangoing Master

A cover letter for the confirmation of the panel was delivered to the participants by e-mail, telephone, fax and face to face interviews with the first stage questionnaire containing the 14 statements generated. Following the collection and analyzing of the first round statements another questionnaire was developed including new statements for the ones which did not reach consensus and delivered to the panelists. At the end of two rounds consensus of 80% was reached for all statements and final report was prepared as a conclusion. Figure 7 shows the stages of the Delphi study.

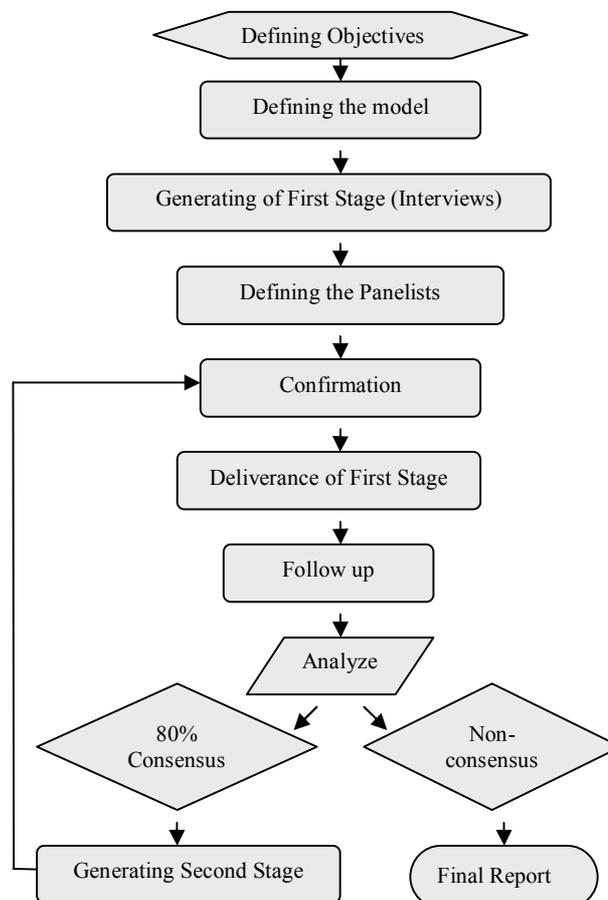


Figure 7: Flowchart of the Delphi Study Stages.

4.3. Results

As mentioned above, for the purpose of this study the Delphi consensus is defined as 80%. After collection of the first round questionnaires the consensus rates were calculated and statements with over 80% rate of agreement or disagreement were accepted as consensus reached. On the first round 10 of the 14 statements reached consensus. The other four stayed below 80% as shown in Table 4.

Table 4: First Round Results of the Delphi Study.

Statement No.		**		Results
		+	-	
1.	There is sufficient human resource with necessary technical knowledge and expertise on marine salvage to cover all coastline of Turkey.	0	16	100% Disagree CONSENSUS
2.	Marine salvage requires expertise of different professions such as; ship handling, ship building, environment, and law. On all coasts of Turkey salvage operations are carried out by teams of professionals of these branches.	1	15	93,8% Disagree CONSENSUS
3.	Marine salvage requires training besides experience. There is salvage master training given in Turkey.	0	15	93,8% Disagree CONSENSUS
4.*	There are realistic emergency drills with different salvage scenarios carried out regularly on all coasts with participation of all related groups and institutions	4	12	75% Disagree
5.	There is sufficient number of salvage tugs to fulfill the requirement of any kind of maritime accident all around the coastline.	0	16	100% Disagree CONSENSUS
6.*	The salvage tugs on coasts are fully equipped for any kind of maritime accident.	3	12	75% Disagree
7.	There are sufficient salvage tugs stationed around the coastline on stand by 24/7 for emergency response for any kind of maritime incident.	1	15	93,8% Disagree CONSENSUS
8.	Today pollution prevention has become a part of a salvage service. The salvage tugs on the coastline are fully equipped for pollution prevention.	0	15	93,8% Disagree CONSENSUS
9.	Considering the increasing maritime traffic and carriage of pollutant cargo around the world and on Turkey's coastline, the overall salvage capability around the coast is sufficient and substantial.	0	15	93,8% Disagree CONSENSUS
10.*	There are complete and practicable emergency salvage plans for Turkish coastline including outside port limits.	4	12	75% Disagree
11.	There are a large number of organizations and institutions with some kind of responsibility and duty on marine pollution prevention and clean-up procedures. There are effective plans for organizing and communicating all these parties in case of an emergency and pollution related salvage case on Turkish coasts.	2	14	87,5% Disagree CONSENSUS
12.	There is sufficient number of well organized stand-by salvage stations to fulfill the requirement of any kind of maritime accident all around the coastline.	0	14	87,5% Disagree CONSENSUS
13.	Places of refuge on Turkish coasts for any kind of maritime emergency including for a salvage operation if needed are planned	0	14	87,5% Disagree CONSENSUS
14.*	There are plans prepared for cooperation with near by countries in case of an international salvage case.	3	11	68,8% Disagree

(*) represents non-consensus statement. (**) represents opinions (+) agree and (-) disagree.

The panelists' opinions and comments were analyzed and for the statements that were below consensus criteria, new statements generated to present to the panelists for the second stage. As a result of the second stage consensus was reached for all the statements (Table 5).

Table 5: Second Round Results of the Delphi Study.

Statement No.	**		Results	
	+	-		
1. (4)*	<i>There are realistic emergency drills with different salvage scenarios carried out regularly on all coasts with participation of all related groups and institutions</i>			
1.1.	Drills are carried out but the participation and scope are not efficient.	13	0	86,7% Agree CONSENSUS
1.2.	There is a jurisdictional dispute to be overcome between authorities of coastal emergencies and drills shall include cooperation of all parties.	13	0	86,7% Agree CONSENSUS
2. (6)*	<i>The salvage tugs on coasts are fully equipped for any kind of maritime accident.</i>			
2.1.	Turkish Straits are sufficiently equipped however on rest of the coastline there is lack of emergency ready, stand-by salvage tugs.	14	1	93,3% Agree CONSENSUS
3. (10)*	<i>There are complete and practicable emergency salvage plans for Turkish coastline including outside port limits.</i>			
3.1.	Plans exist however need to be strengthened by continuous training and regularly commenced drills for practicability and effectiveness.	13	0	86,7% Agree CONSENSUS
3.2.	Plans exist for mainly port limit areas but no for the rest of the coastline.	13	0	86,7% Agree CONSENSUS
4. (14)*	<i>There are plans prepared for cooperation with near by countries in case of an international salvage case.</i>			
4.1.	Plans exist however need to be strengthened by continuous training and regularly commenced drills for practicability and effectiveness.	13	1	86,7% Agree CONSENSUS

(*) statement no of first stage. (**) represents opinions (+) agree and (-) disagree.

5. CONCLUSION

The basic principle of marine salvage is the voluntary assistance of a salvor to a maritime property in peril endangering own life and property and obtaining the right to be remunerated, depending on the value salvaged, for the effort made. However, the modern marine salvage concept requires more than that because of the change of the maritime transportation itself. Increasing amounts in carriage of pollutant cargo while world becoming more sensitive to the environment is one reason for the development of the new approaches to marine salvage which today is not considered separate from concept of emergency response. On the other hand improvements in shipping technology and safety standards resulting in less salvage cases put the salvage industry in last decades in a difficult era, again generating a need for new approaches to marine salvage.

The most practiced approach for marine salvage solutions as means of emergency response is the financially government supported stand-by salvage teams with the sufficient equipment and trained personnel located strategically on high risk areas on the coasts ready to respond and assist ships in danger and also capable of prevention pollution.

As a result of this study, it is determined that out of the range of the Turkish Straits which are covered by state owned Directorate General of Coastal Safety (DGCS) for the salvage services, there is lack of salvage capability around the Turkish coastline of 8,333 km in length. The main status of DGCS has been changed in February 2006 and the establishment stationed only in The Straits Area while before more of the coastline was under its monopoly in salvage services leaving the coasts to small salvage companies with port tugs whose core competence is often tug and pilotage services. However, it is not to be forgotten that the accident of Prestige, for example, did not occur neither in a narrow channel nor a strait. It is inevitable that there is a rapid increase in the maritime traffic on Turkish coasts parallel to the increase in the world's trade, leading to greater risk potential. The increasing traffic through the Straits is the indicator of the total increase of the traffic on the coasts.

As the results of the study since Directorate General of Coastal Safety backed all stations, equipment and personnel to the Straits salvage services are only given by small companies with port tugs with no capability to handle severe salvage cases. Today it is a fact that operating costs of a stand-by salvage station is not financially profitable for many salvage companies leading them to invest on other services, not focusing on salvage and continue marine salvage with a narrower scope. The commonly practiced new approach in the world is government assistance for sustainability of marine salvage which seems to be the essential solution to protect Turkish coastline as supported by the study results through the delphi panelists' feedbacks. Considering the length of Turkish coasts it is not efficient to base all the salvage power on one area which is the case today in Turkey. It is vital to strategically locate salvage power on high risk areas along the coastline to prevent future marine disasters and it is recommended as a future study to analyze and evaluate the high risk areas along the Turkish coastline through a risk assessment to define the strategic locations for positioning necessary salvage stations.

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