



Maritime Safety in the Strait of Gibraltar: Taxonomy and Evolution of Emergencies Rate in 2000-2004 period

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ABSTRACT

Both SAR'79 and UNCLOS'82 Conventions are specific tools that establish the juridical and technical foundations for the development of reactive aspects related to maritime safety response. These conventions set up the search and rescue regions in which coastal states should assume the responsibility to dedicate resources, to cover the needs of the SAR responsibilities. 2006 amendments to IAMSAR manual volume I, in force since 2007, June the 1st, established the identification and assessment of risks related to maritime safety as one of the practical principles in maritime risk management. The Strait of Gibraltar is a narrow navigational channel connecting the Atlantic Ocean and the Mediterranean Sea between Spain and Morocco. The Strait supports a huge volume of maritime traffic increasing steadily every year. This paper presents the preliminary results obtained in relation with the taxonomy and temporal distribution of maritime emergencies reported and documented by the Spanish Maritime Administration throughout 2000-2004 period.

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1. Introduction.

1.1 Background

The active involvement of the coastal states in safeguarding and promoting the safety of human life, environment and property related to maritime navigation in the waters in which they exercise jurisdiction, sovereignty or sovereign rights, is shown in a number of international legal texts.

The International Convention on Maritime Search and Rescue, Hamburg, 1979 (Convention SAR'79) and the United Nations Convention for the Law of the Sea, Montego Bay, Jamaica, 1982 are included among those juridical tools.

These two fundamental legal instruments lay down both regulatory and technical aspects of the development of reactive response to maritime emergencies.

Both texts establish the principle of division of the entire maritime waters, defining areas of responsibility for maritime search and rescue associated with every coastal nation. These nations should assign specific resources - human, technical

and legal - to meet the requirements that arise as a result of the liabilities undertaken by the parties.

Although both conventions regulate the commitments related to maritime search and rescue matters undertaken by the parties, the International Convention on Maritime Search and Rescue, Hamburg 1979, known as SAR'79 Convention, which Spain joined in 1993, lays down the basic guidelines to be followed by the Authorities of the coastal states in the process of design and implementation of maritime search and rescue services.

Over the years, this agreement has been amended a number of times. Among the amendments which are due to be highlighted, we find those adopted in 1998. According to these, it is essential to provide the centres responsible for carrying out maritime search and rescue operation with detailed operational plans appropriate and adapted to the particularities of each specific search and rescue region. These plans will allow carry out these actions effectively.

These plans should also establish not only the procedures to be followed during mobilization of rescue units, but also provide the methodology to be used in developing search and rescue operations. The plans require the establishment of coordination instruments between adjacent rescue centres and procedures and criteria to be used not only during the gathering and evaluation of relevant information related to the emergency but also alerting ships and aircraft transiting the

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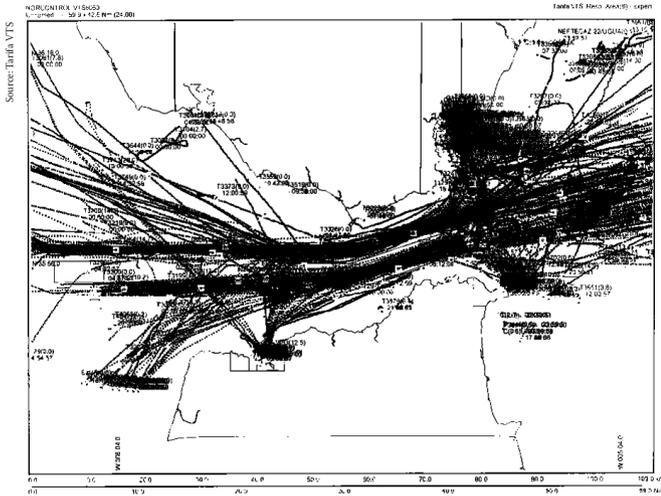


Figure 2: Cumulative maritime traffic radar surveillance picture.

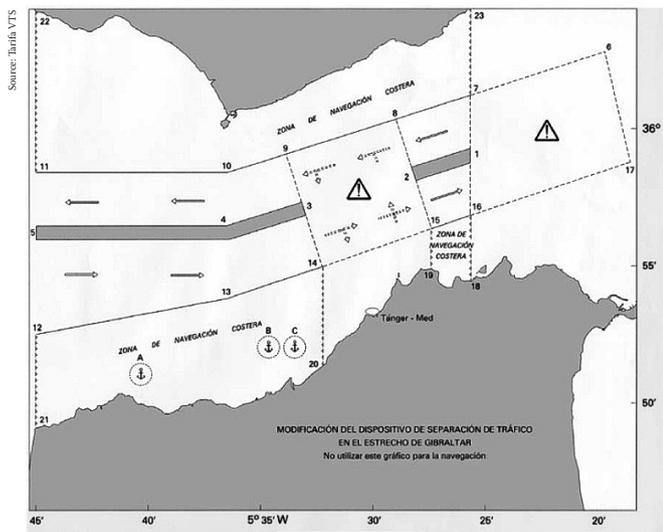


Figure 3: Traffic evolution. Years 2005-2008.

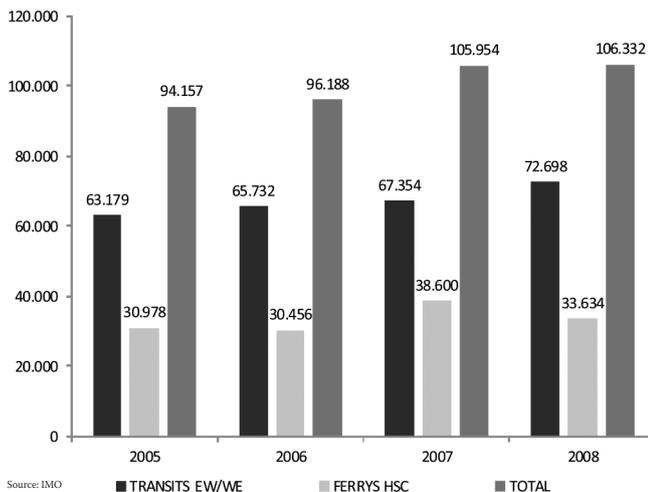


Figure 4: Traffic separation scheme and precautionary areas in the Strait of Gibraltar.

forced the Spanish and Moroccan governments to promote, through the International Maritime Organization, the establishment of several marine traffic organization and monitoring measures (Figure 4) – traffic separation scheme, mandatory reporting system, precautionary areas, vessel traffic services – all of them complemented by an extensive network of maritime signals covering both, northern and southern coasts.

2. Methods

The historical analysis of emergencies in the Straits has been developed on the basis of the information provided by three historical data sets:

1. The database of the General Directorate of Merchant Marine.
2. Annual reports of the Maritime Rescue Coordination Centre of Tarifa, and
3. Annual reports of the Maritime Rescue Coordination Centre of Algeciras.

The analysis of the three data sets reveals a lack of harmonization that, although the big similarities in their basic structure, leads to significant differences in the criteria followed while classifying the information related to each event. It should be highlighted the lack of information concerning the initiating events or causes of accidents and the extent of damage to property.

Nevertheless, despite the lack of some important information, the geographical location of each event and a detailed description of the units deployed during the response operations are always available.

Due to the high level of dispersion of information regarding maritime emergencies occurred in the Strait of Gibraltar and the lack of clearly defined relationships among the historical records, it becomes necessary a previous compilation of the information, and the unification of criteria for the classification and its subsequent analysis. This all led to the creation of a special data base called GIBSAR, which is the basic tool for the development of this historical analysis of maritime accidents in the Strait of Gibraltar.

This database does not only compile information provided by the marine rescue coordination centres of Algeciras and Tarifa and the statistical series of data produce by the General Directorate of Merchant Marine, but it also establishes a scale for the assessment of effect, both for individuals an vessels, caused by the consequences of these events.

3. Results and discussion

The analysis of the data (Table 1) shows that the total maritime emergencies documented by the Spanish Maritime Administration in the period 2000-2004 within the Strait of Gibraltar area comes to a total amount of 1,216 cases. Only 23.5% of this these figures, 284 cases, are due to false alarms while the remaining 76.5%, 922 cases, are due to real alerts. Notice that the annual distribution of the data presents a great homogeneity.

Table 1: Distribution of real and false alerts related to maritime emergencies in the Strait of Gibraltar. Years 2000-2004.

Emergencies	Year					Total
	2000	2001	2002	2003	2004	
Real	181	187	181	189	184	922
False	61	66	51	58	48	284
Total	242	253	232	247	232	1206

Source: Authors

Table 2 shows that 90.8% of total number of real cases are related to incidents, that means there is neither major structural damages to ships nor losses of human lives nor missing persons nor pollution episodes involved in the event.

On other hand, only 9.2% of the real emergencies are related to marine accidents, considering such events as those involving total loss of the ship or major structural damages, or losses human lives or missing persons or a pollution episode.

In this case, the distribution is also very homogeneous, with values ranging from a minimum of 181 emergencies documented in 2000 and 2002 to a maximum of 189 emergencies in 2003.

Table 2: Distribution of accidents and incidents related to real maritime emergencies in the Strait of Gibraltar. Years 2000-2004.

Emergencies	Year					Total
	2000	2001	2002	2003	2004	
Accidents	20	19	14	12	20	85
Incidents	161	168	167	177	164	837
Total	181	187	181	189	184	922

Source: Authors

Table 3 shows the distribution of all real emergencies attended in the period 2000 to 2004 according to subtype.

There is a clear predominance with 24.1% of the total amount of performed search and rescue operations due to mechanical failure of ships systems and/or services. Pollution episodes amounts 15.6% of the total number of cases.

We should also focus the attention on the number of search and rescue operations related to illegal immigration, whether in the preventive stage, escorting the crafts used in the passage through the Strait as well as in the phase of assistance to the occupants or, where appropriate, during search, location and recovery of corpses. These cases come to represent 12.8% of search and rescue operations.

Operations related to drifting objects varies from 5% to 10%, assistance to users of recreational crafts and devices amount 8.4% and 7.2% respectively, rescue operations on coast and cliffs 5.6%, and drifting boats, which comes to be 5% of the total.

We should also consider the medical transfers between Spanish hospitals located on both sides of the Strait (Ceuta to Seville or Cadiz), which means 4.6% of total operations, nearly twice the rate of medical evacuations from ships which rates 2.6% of the total.

Regarding the severity of the consequences on persons, crafts or vessels and on the environment, it should be notice that minor and negligible severity cases range nearly 30%, while moderate severity cases range 30.4% and major severity 28.5%. Severe cases involving total losses of ships, losses of human lives, missing persons or severe pollution events range 6.5% (Table 4).

Table 3: Distribution of real emergencies according to subtype. Strait of Gibraltar. Years 2000-2004.

Subtype	Year					Total
	2000	2001	2002	2003	2004	
Leisure crafts	12	11	8	22	13	66
Assistance to navigation	2	5	3	3	6	19
Overdue	0	3	0	1	1	5
Allision/Collision	2	3	3	0	2	10
Pollution	29	35	35	23	22	144
Drifting crafts	12	7	7	11	9	46
List / Stability	0	0	1	0	0	1
Medical Evacuation	5	9	5	4	1	24
Medical Transfer	4	3	11	7	17	42
Mechanical Failure	37	38	40	50	57	222
Man Overboard	5	4	3	3	4	19
Sinking	2	3	4	3	4	16
Fire/ Explosion	2	4	2		2	10
Illegal Immigration	23	23	19	38	15	118
Drifting Objects	18	18	24	8	9	77
SOS Message	1	0	0	2	0	3
Castaway Rescue	0	0	0	1	1	2
Coastal Rescue	17	13	8	4	10	52
Grounding	3	3	3	4	6	19
Leaking	4	2		2	2	10
Other	3	3	5	3	3	17
Total	181	187	181	189	184	922

Source: Authors

Table 4: Distribution of real emergencies according to severity rate. Strait of Gibraltar. Years 2000-2004.

Severity	Year					Total
	2000	2001	2002	2003	2004	
Severe	15	13	12	9	11	60
Major	50	61	54	58	40	263
Moderate	57	49	47	77	84	314
Minor	14	17	8	8	9	56
Negligible	45	47	60	37	40	229
Severe	15	13	12	9	11	60
Major	50	61	54	58	40	263
Total	181	187	181	189	184	922

Source: Authors

Table 5: Distribution of real emergencies according to casualty condition. Strait of Gibraltar. Years 2000-2004.

Casualty Condition	Year					Total
	2000	2001	2002	2003	2004	
"Shelf rescued"	328	34	6	12	2	382
Rescued	431	825	474	2156	542	4428
Assisted	9	398	373	303	198	1281
Evacuated	65	11	16	12	17	121
Died before arrival	10	27	17	2	1	57
Died after arrival	22	4	12	12	9	59
Missing	5	3	7	9	1	25
Total	181	187	181	189	184	922

Source: Authors

According to table 5 and regarding casualty condition, almost 90% of the persons involved were assisted or rescued, while 6% of the total amount of persons involved in emergencies got safe by their own means and the number of persons who lost their lives or were missing rates 2.2%.

4. Conclusions

Annual distribution of emergencies, considering the whole period, presents a very stable trend, ranging from a minimum value of 181 to a maximum of 189 cases.

In terms of geographical distribution, two main areas support the highest rate of emergencies both quantitatively and qualitatively. Those areas are the central zone of the Strait of Gibraltar and Algeciras Bay (Figures 5 and 6).

The results of the study highlighted the large number events, such as medical transfers, pollution incidents in port service waters, operations related to the use of recreational crafts and devices, swimmers, diving and other natures related events which, although not considered as maritime emergencies, required the deployment of specific marine search and rescue resources.

It should be noticed the low rate of emergencies directly related to any maritime search and rescue service responsibilities such as leakage, collision or allision, fire or explosion, heel or stranding, which all together rate 7.2% of the SAR operations performed. This rate would increase up to 9.8% if medical evacuations conducted from ships or boats are included.

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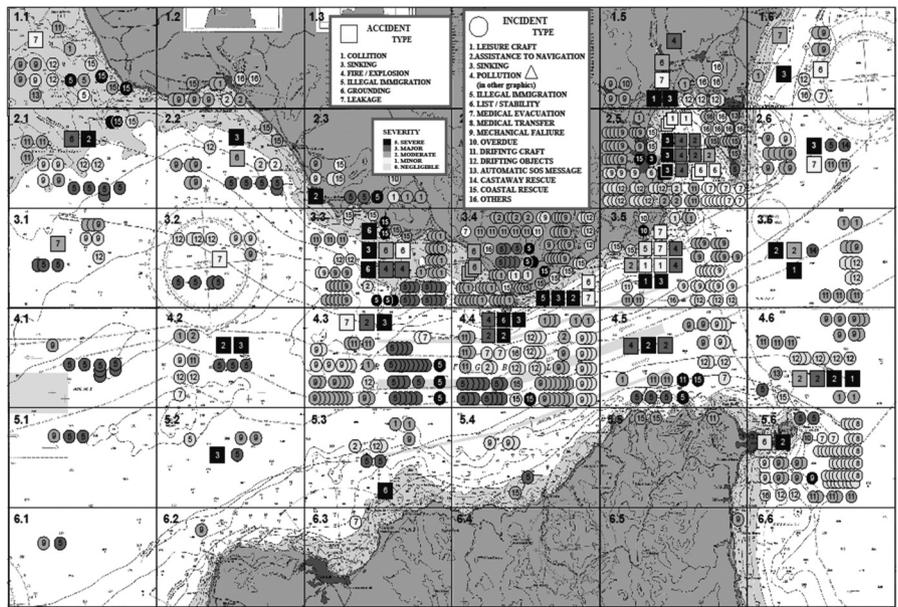


Figure 5: Geographical distribution real emergencies according to subtype. Strait of Gibraltar. Years 2000-2004.

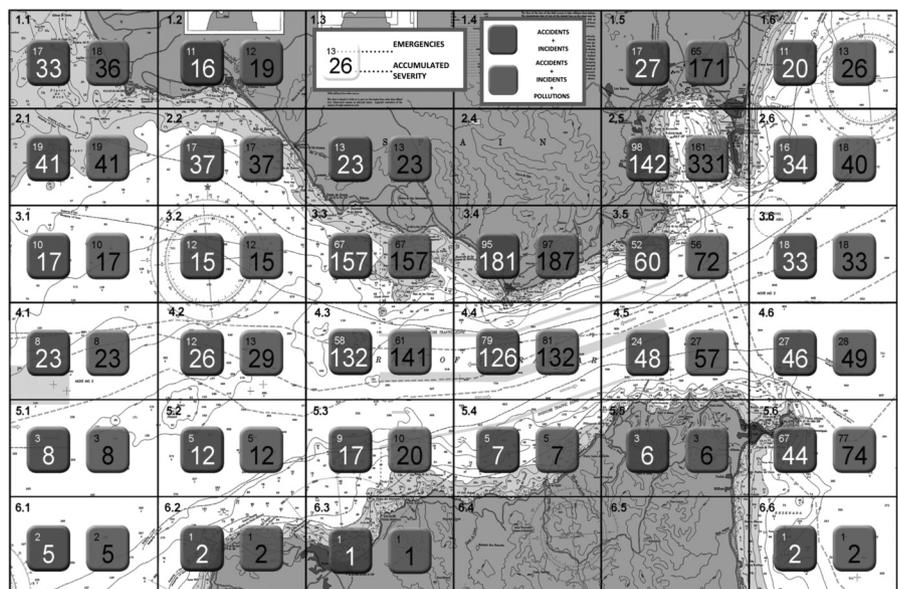


Figure 6: Geographical distribution real emergencies according to severity. Strait of Gibraltar. Years 2000-2004

Source: Authors

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