

Conclusions from the analysis of causes of significant accidents involving pleasure craft in the SOS database 2004 to 2013

'Safe Boating'. EU! Study, March 2015

Preface

This study was done on the initiative of the partners in 'Safe Boating' ('SAFE BOATING') ['Safe Boating'!]. 'SAFE BOATING' strives to improve safety on the water by providing information. Unfortunately, accidents on the water involving pleasure craft occur each year, a number of them involving fatalities. Improved insight into the causes of accidents is essential in order to increase safety on the water.

This study was realized thanks to the efforts of various parties. We would like to thank Timco van Brummelen and Jan Willem Vreugdenhil Rijkswaterstaat [NL Department of Waterways and Public Works] for making available the necessary data from the SOS database and for their explanations and advice. We would also like to thank the 'SAFE BOATING' workgroup, project group and steering group for refining the study and the experts who participated in the expert session. And we also want to warmly thank the volunteers who validated the database.

There is still much to be learned about the causes of accidents involving pleasure craft. We hope that this study is a valuable contribution to the larger picture.

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1 Reason for study

Since 2008 the information campaign 'Safe Boating' ('SAFE BOATING') has striven to further improve safety on the water by means of diverse information channels. The partners in 'SAFE BOATING' are public parties and parties from the water recreation sector and commercial shipping. See Annex 3 for a list of the partners involved in 'SAFE BOATING'.

In 2013 there were 9 fatal accidents involving pleasure craft. These accidents, questions from the media, the attention given by the Ministry of Infrastructure and the Environment to safety as well as the goals of 'SAFE BOATING' prompted 'SAFE BOATING' to study the possible causes of accidents.

The partners in 'SAFE BOATING' have expressed the wish to 'set a point on the horizon' with regard to increasing safety on the water. It appeared that the overview of and insight into the possible causes of accidents was not sufficient to enable well-supported suggestions about the measures that could contribute to increasing safety. This was a reason for 'SAFE BOATING' to further study the causes of accidents among pleasure craft.

2 The goal of the study

The goal of the study was:

- To get insight into the causes and consequences of serious and fatal accidents among pleasure craft and between pleasure craft and commercial vessels;
- To improve the basis of the (collective) communication about safety on the water provided to commercial vessels and pleasure craft;
- To improve the basis for answering questions about safety on the water asked by media and other parties;
- To advise on possibly refining the registrations in the SOS database.
- To identify what knowledge is lacking and to advise on improving the information and collecting information at and after accidents.

Using the results of the study, we examined whether and how the contents and use of 'SAFE BOATING' information could be implemented to further increase safety on the water.

3 Analysis of SOS database

The national RWS database for shipping accidents (SOS database) was further analysed. The SOS database contains information about shipping accidents that have occurred in the area supervised by the Netherlands. More information on the SOS database can be found via:

<http://www.rws.nl/water/veiligheid/scheepsongevallenregistratie/>.

For the 'SAFE BOATING' analysis, we used incidents registered in the SOS database that met the following criteria:

- Registered incidents involving only pleasure craft.
- Registered incidents involving pleasure craft and commercial vessels.
- Registered incidents on Dutch inland waterways.
- Registered incidents from 2004 to 2013.

- Significant shipping accidents. These are serious accidents (victims, obstructions lasting longer than an hour, serious damage to a waterway and/or boat).

A total of 445 significant incidents registered in the SOS database met these criteria. In 107 significant incidents pleasure craft and commercial vessels were involved. In 338 significant incidents only pleasure craft were involved. The design of the study is explained in Annex 1.

4 Most important results of the study

Learning from registered accidents in the SOS database

- It was educational to validate and analyse the registered significant incidents in the SOS database together with 'SAFE BOATING' partners. As a result, 'SAFE BOATING' partners now have a shared view of the information that is and is not available with regard to the accidents. The study improved a number of aspects of the information on registered significant incidents in the SOS database; for example, incidents that did not meet the requested criteria were deleted and, on the basis of the qualitative descriptions, inconsistencies in the registrations were adjusted.
- The analysis showed that the suspected cause and effect of the accident was very often registered as 'unknown' in the 445 significant incidents analysed in the SOS database. Moreover, subjectivity possibly played a role in completing the registration form. The quality and thoroughness of the registration of significant incidents should be improved. In addition, no information was given about, for example, the captain (age, sailing diplomas/licenses, familiarity with the area, owner or renter of boat). This information is needed to gain more insight into the causes of accidents involving pleasure craft.
- SOS is a collective database that is intended to give a total overview of all shipping accidents that have been registered in the Netherlands. The sources of information for the SOS database are the registrations of shipping accidents by diverse parties such as nautical supervisors (RWS, harbour supervisors, the Coast Guard, some provinces) and the police and inspection services (including the KLPD [Corps of National Police Services] and IL&T [the Human Environment and Transport Inspectorate]). In addition, some information about accidents is taken from news releases in the national media. All of these services supply information to the SOS database but, in practice, not all of the relevant information from these parties is entered into the SOS database. This should be improved. Another point of attention is using registered information from lower government bodies and non-government bodies such as the KNRM [Royal Dutch Rescue Team] (this enters SOS partly via nautical supervisors) and insurance companies. For a study of the causes of accidents, the information from these various sources should be uniformly accessible.

Diagram 1 gives an overview of registered significant incidents, suspected cause and consequences.

Schema 1: SOS database 2004-2014 Number of registered significant casualties in which recreational crafts were involved

				plausible cause	effects								
					total	injured	badly injured	deceased	boat damage	infrastructure damage	stagnation	environmental damage	
recreational boats/ commercial barges	107			operating error	59	3	4	3	56	2	3	2	
				local error	3	1							1
				device / material	9	1	1	1	8		1	1	
				unknown	36	6	6	6	30	3	2	2	
				total	107	11	11	10	94	5	6	6	
moored	44			operating error	2				2	1		1	
				local error	2	1			2				
				device / material	18	3	6	1	18		1	4	
				unknown	22				22	2		12	
				total	44	4	6	1	44	3	1	17	
recreational boats	338	singel	111	operating error	15	4	4	3	15				
				local error	4	2	6	1	4				
				device / material	41		1	1	40	3		2	
				unknown	51	7	6	3	49	1	2	6	
				total	111	13	17	8	108	4	2	8	
navigating	294		boat-boat	operating error	30	3	5	1	30	2			
				local error	1		3		1				
				device / material	6				6	1	1	1	
				unknown	8	2			8				
				total	45	5	8	1	45	3	1	1	
accident	183		boat-infrastructure	operating error	35	1	3	1	34	2	1	2	
				local error	4				4	2			
				device / material	18				8	1	1	1	
				unknown	68	4	2		59	2	1	1	
				total	125	5	5	1	105	7	3	4	
boat-object	21			operating error	4	1	1	1	4				
				local error	13				13				
				device / material	1				1				
				unknown	3		1		3				
				total	21	1	2	1	21	0	0	0	

In the registration of incidents in the SOS database there are five separate categories of suspected causes:

- Operating error: Error by (the condition of) the crew or a crewmember of the boat.
- Error of surroundings: Error not caused by the crew or (the condition of) the boat, but by an external factor.
- Facilities/material: Error caused by the lack of (suitable) equipment/material/procedures, poorly operating or non-operating equipment/material or an incorrect construction.
- Communication error: Error cause by the communication between the crewmembers of one or more boats and/or between the crewmembers of boats and traffic supervisors on shore.
- Unknown: Suspected cause was not known at the time of registration.

Learning from incidents with pleasure craft

- In the ten-year period 2004 to 2013, 338 accidents were registered as significant incidents with pleasure craft in the SOS database (see diagram 1).
- Of the 338 significant incidents with pleasure craft registered in the SOS database in 2004 to 2013, many of them seem to be sailing, one-craft significant incidents (111), and many are traffic accidents between a boat and the infrastructure (117) (see diagram 1). In the cases of boat-infrastructure, many accidents involved the shore (stranding), bridges and groynes.
- Of the 338 significant incidents with pleasure craft registered in the SOS database in 2004 to 2013, 31 of them resulted in 61 slightly injured, 37 incidents resulted in 56 seriously injured and 12 incidents resulted in 14 fatalities (see Annex 2).
- Almost all of the registered incidents resulted in boat damage (334). Damage to the environment was especially registered for stationary significant incidents (8) (see diagram 1).
- The suspected causes of the 338 registered significant accidents with pleasure craft only are often operating errors (86), facilities/material errors (84) and unknown (144) (see diagram 1). The most common operating errors were errors of judgment (18), navigational errors (20) and irresponsible behaviour (17). Fire (23), engine trouble (18) and explosions (14) were the most frequently registered sorts of facilities/material errors (see Annex 2).

Learning from incidents between pleasure craft - commercial vessels

- In the ten-year period 2004 to 2013, 107 accidents were registered as significant incidents between pleasure craft---commercial vessels in the SOS database (see diagram 1).

- Of the 107 significant incidents between pleasure craft---commercial vessels registered in the SOS database in 2004 to 2013, 11 incidents resulted in 26 slightly injured, 11 incidents resulted in 18 seriously injured and 10 incidents resulted in 17 fatalities (see Annex 2).
- Operating errors (59) and unknown (36) are the most frequently given suspected causes of the registered significant incidents between pleasure craft---commercial vessels in the SOS database 2004 to 2013 (see diagram 1). Lack of attention (29) and errors of judgment (17) were the most frequently registered reasons for operating errors for the registered significant incidents between pleasure craft---commercial vessels.
- In 65 cases of the 107 registered incidents between pleasure craft---commercial vessels, the person suspected of having caused the accident was identified on the basis of the qualitative description of the accident. It appeared that both pleasure craft and commercial vessels were equally often the suspected cause of these registered significant incidents.

5 Conclusions and consequences

Improving the registration of accidents

The registration of accidents involving pleasure craft should be improved:

- a) Improving the quality and thoroughness of the information in the SOS database.
- b) When accidents are registered, additional information about the captain should be included, such as age, sailing diplomas/licences, sailing experience, the knowledge of area and owner or renter of boat.
- c) Join databases/information about accidents to form one single database in order to analyse the causes of accidents involving pleasure craft.
- d) Annually validate and analyse the significant incidents with 'SAFE BOATING' /Numerical partners.

These improvements require the efforts of all of the parties in 'SAFE BOATING' and from insurance companies and possibly other parties. Concretely speaking, this means that 'SAFE BOATING' partners will take the initiative to improve the quality, availability and accessibility of data about accidents. As owner and manager of the SOS database, RWS has formulated goals to improve the quality and clarity of the registration of incidents in the SOS database. Based in part on the 'SAFE BOATING' study, they plan to see how missing information can be amended annually. It is desirable that information about incidents with fatal results is expanded when the police has finished its investigation.

'SAFE BOATING' and RWS will discuss what additional information can be added to the registration form and the SOS database and how this can be done. During the expert session, suggestions were made to use the European accident form for car damage as an example to improve the registration of accidents with pleasure craft. And to look at the example of bicycling accidents, where people register the accidents themselves. It was proposed to do a pilot in one region or for one certain type of incident to see how improvements could be made.

Registered incidents with pleasure craft

The nature and suspected causes of the registered significant incidents with pleasure craft in 2004 to 2013 in the SOS database confirm the importance of good preparations for the trip, having technical equipment and material in order and being aware of safety on the water.

'SAFE BOATING' is going to emphasise the information in these areas. It plans to meet with existing and new partners (e.g. insurance companies) to organise positive stimuli for preventative behaviour among sailors of pleasure craft. 'SAFE BOATING' is also going to discuss these points with providers of sailing instruction, such as VAMEX, to see if these aspects should be given more attention in the lessons and exams.

Further study of the incidents with pleasure craft is desirable if it focuses on:

- A) Causes and characteristics of fatal accidents;
- B) Involvement type of boat and characteristics of captain;
- C) Considering the number of significant incidents concerning boat – infrastructure, the further characteristics of these accidents.

To the extent that it is possible (given the number of unknowns), both categories A and C above could be further studied with the current SOS database, possibly supplemented with information from other sources. Further study of category B requires a more extensive registration.

Registered incidents between pleasure craft - commercial vessels

It is still the goal of 'SAFE BOATING' to enhance safety where commercial vessels and pleasure craft meet on the water. The behaviour of the captain, of both the commercial vessels and the pleasure craft, is crucial to preventing accidents.

'SAFE BOATING' encourages information that expands the importance of being aware, changes behaviour and provides mutual insight into the sailing behaviour of pleasure craft and inland navigation vessels. During the boating season, extra attention will focus on being aware of each other's presence on the waterways. Means that have proven effective (sailing on ships in places where pleasure craft and commercial vessels encounter each other) will be used more often to provide the opportunity to sail on commercial vessels. 'SAFE BOATING' will speak with bodies giving instruction on commercial inland navigation and on navigation by pleasure craft as well as with VAMEX to see if an instruction film and/or a serious game can be developed to contribute to preventing potentially dangerous situations between pleasure craft and commercial vessels.

Further study is desirable in the cases of incidents between pleasure craft---commercial vessels that result in fatalities. The cause of most of the registered incidents between pleasure craft--- commercial vessels involving fatalities is registered as unknown. It is desirable to have more information about these accidents and their causes. 'SAFE BOATING' is speaking with RWS and the Dutch Safety Board about the possibility of further investigating these incidents.