



## A proactive approach for maritime safety policy making for the Gulf of Finland: Seeking best practices

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### ABSTRACT

A rapid increase in maritime traffic together with challenging navigation conditions and a vulnerable ecosystem has evoked calls for improving maritime safety in the Gulf of Finland, the Baltic Sea. It is suggested that these improvements will be the result of adopting a regionally effective proactive approach to safety policy formulation and management. A proactive approach is grounded on a formal process of identifying, assessing and evaluating accident risks, and adjusting policies or management practices before accidents happen. Currently, maritime safety is globally regulated by internationally agreed prescriptive rules, which are usually revised in reaction to accidents. The proactive Formal Safety Assessment (FSA) is applied to risks common to a ship type or to a particular hazard, when deemed necessary, whereas regional FSA applications are rare. An extensive literature review was conducted in order to examine the opportunities for developing a framework for the GoF for handling regional risks at regional level. Best practices were sought from nuclear safety management and fisheries management, and from a particular case related to maritime risk management. A regional approach that sees maritime safety as a holistic system, and manages it by combining a scientific risk assessment with stakeholder input to identify risks and risk control options, and to evaluate risks is proposed. A regional risk governance framework can improve safety by focusing on actual regional risks, designing tailor-made safety measures to control them, enhancing a positive safety culture in the shipping industry, and by increasing trust among all involved.

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### 1. Introduction

The global economy is based on an efficient transportation of goods among countries and continents, and today over 90% of the world's trade is transported by sea [1]. However, intense maritime traffic can have negative consequences, such as vessel accidents potentially leading to a loss of life and cargo, and detrimental impacts on the environment. Thus, there is an ever growing need for maritime safety measures to prevent and mitigate harmful consequences.

In the Gulf of Finland (GoF) in the Baltic Sea, rapidly increased maritime traffic has evoked calls for improving safety by adopting a regionally effective proactive approach to policy formulation [2–4]. In this context, safety refers to the absence of maritime accidents that can cause harm to the ship/cargo, humans/society

and/or the environment. The risks of accidents in the GoF are seen as high, because the environmental conditions and high traffic volumes make navigation challenging [5], and because the ecosystem of the area is very fragile [6]. A proactive approach to safety aims at preventing disasters by anticipating future events and adjusting policies or management practices before something happens. This, it is argued, will save economic resources, and prevent the loss of human life and environmental damage. As the future is uncertain, it is, however, difficult to know what kind of disasters might happen and what kind of preparations should be made. Thus, a proactive policy-making approach is grounded on a formal process of identifying, assessing and evaluating accident risks, and focusing adjustments on those risks that are evaluated as being at an intolerable or unacceptable level.

Maritime safety in the GoF is managed basically by the same prescriptive international regulations that are found in all the world's seas [7]. The international regulations mainly relate to ship conditions, construction and equipment, mariners and management, and navigational instruments. The global rules are set down

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by the International Maritime Organization (IMO) that brings together 168 states of the world as well as non-state actors, such as shipowners and environmental organizations, in order to achieve general acceptance [8]. At the level of the European Union (EU), the European Commission (EC) translates the regulations, determined at the IMO, into binding laws, with the support of the European Maritime Safety Agency (EMSA) [9]. Further, the rules are adapted to regional conditions by the Baltic Marine Environment Protection Commission (Helsinki Commission, HELCOM), an intergovernmental organization of nine Baltic coastal countries and the EU [7,10]. Finally, the regulations are implemented by individual nations. Only in their territorial areas (up to 12 nautical miles from the coast) do the coastal states have an extensive right to arrange and govern issues such as piloting, Vessel Traffic Services (VTS), the maintenance of waterways and safety devices, nautical charting, and weather, water level and ice services [11,7].

These international rules are widely regarded as the only possible way of managing safety at sea, because they ensure the principle of the freedom of navigation, guarantee uniform safety standards for all waters, and provide a coherent operational environment for shipping companies and seamen [11–13]. Still, the safety regime is criticized *inter alia* for being ineffective, diffuse and partial, too slow in its reactions, and incapable of addressing local shipping conditions and satisfying the needs of the most vulnerable sea areas [12–15]. The limitations are manifested in efforts by individual states or regions to implement additional safety measures in their adjacent waters [16–18,11]. Local measures are rarely supported by the IMO because they interfere with the integrity of global navigation [19,11,7].

The international regulations are of a reactive nature, which means that they are usually revised after major accidents have occurred somewhere in the world [20]. In 1997, the IMO took a step towards proactivity by inviting its member governments and non-governmental organizations to apply formal safety assessment (FSA) when deemed necessary, to support the IMO's decision making [21]. In 2002 the IMO approved guidelines for FSA [22]. FSA is defined as “a rational and systematic process for assessing the risks relating to maritime safety and the protection of the marine environment and for evaluating the costs and benefits of IMO's options for reducing these risks”. Since the initiative, a host of FSA studies have been submitted to the IMO [23–25]. As the FSA studies aim at enacting generic international regulations, they mainly focus on risks common to a particular type of ship or hazard, and rarely on risks of particular sea areas [26,27,20]. Thus,

the recommendation given by the IMO to conduct FSA provides a supportive, but not sufficient basis for a proactive approach for the GoF.

There is a need for a framework in the GoF that enables a systematic process of handling regional risks at the regional level [28,13,29]. In this paper the possibility of developing such a formal approach is discussed, by seeking “best practices” from the maritime field and beyond it. Proactive management approaches are applied *inter alia* in the nuclear industry [30], aviation [31], climate science [32], and fisheries management [33]. The authors examine the procedures of probabilistic risk assessment (PRA) of the nuclear industry as an example of a highly advanced proactive safety management approach. Defining the total allowable catch (TAC) for fisheries in the EU provides an example of a governance framework involving scientists, policy makers, and stakeholders. Finally, the Prince William Sound (PWS) case from the maritime field demonstrates how stakeholder involvement in risk management has been actively utilized in improving maritime safety.

The paper is structured as follows. Section 2 introduces the GoF area. Section 3 provides theoretical considerations for proactive safety management, and Section 4 presents the selected examples. In Sections 5 and 6 the authors derive ideas from the examples, and discuss the prerequisites, challenges, and potential benefits of establishing a formal risk governance framework for the GoF. Section 7 is for conclusions. The paper is grounded on an extensive literature review.

## 2. The Gulf of Finland and its safety regime

The GoF, the easternmost basin of the Baltic Sea (Fig. 1), is one of the most trafficked sea areas in the world. For instance, in 2012, 41,005 ships crossed the pre-defined Automatic Identification System (AIS) passage lines in the GoF, including 7549 tankers. In the whole Baltic Sea, there were 407,425 AIS crossings, of which about 52% were by cargo vessels, 16% by tankers, 16% by other ships, and 9% by passenger ships [34].

According to the most recent estimations, about 160 million tons of oil and oil products is transported via the GoF per year [35]. The majority of them are exported from Russia, which exports one third of all its oil via the GoF [36]. As Russia's oil production and exports are growing, it has been estimated that oil volumes being transported via the GoF may even reach nearly 200 Mt in the near future [35].



Fig. 1. The GoF covers an area of 30,000 square kilometers, and is 400 km long and 48–135 km wide.

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