SAFGOF

Evaluation of traffic increase in the Gulf of Finland 2007-2015 and the effect of the increase on the environment and traffic chain activities

Suomenlahden meriliikenteen kasvunäkymät 2007-2015 ja kasvun vaikutukset ympäristölle ja kuljetusketjujen toimintaan

Funding: National (Finland)
Duration: Jan 2008 - Dec 2010
Status: Complete with results

Background & policy context:

Maritime traffic in the Gulf of Finland has increased remarkably during the last years and it is expected to increase further during the coming years. It is expected that the increase will also considerably improve the economics in South-East Finland, which will also improve the economic income of the people living in the area.

Unfortunately, the growing maritime traffic will also increase the environmental risks through direct environmental effects and rising accident risk. The increase of maritime traffic can also affect general security by means of criminal activities.

Objectives:

The SAFGOF project aims to study in a cross-disciplinary manner, how the traffic patterns are estimated to change in the Gulf of Finland by the year 2015. Based on these estimates, the effects on risk levels for ship collisions and groundings will be studied. Once the traffic pattern estimates have been evaluated, the environmental effects of traffic can also be studied.

SAFGOF will utilise as input the results obtained during the years 2006-2007 in the projects MS GOF – Maritime Safety in the Gulf of Finland (GoF) and TRANSGOF – Transport and Logistics in the GoF. In addition, the results of the OILECO project (2005-2007) will be utilised. OILECO included studies related to analysis of the sea nature under oil pollution and how to minimise the undesired effects to nature in the GoF after an oil spill.

Methodology:

The project tasks are as follows:

WP 1: BalticSea traffic flows
The aim of the work package is to study and create scenarios for how traffic flows in the Gulf of Finland will develop. The scenarios will be product and route specific and they will include estimates for the number of different type of vessels. The scenarios will be used as a basis for the other work packages. The scenarios on how traffic flows will develop as input data in the modelling and analysis of maritime traffic and accident and environmental risks.

WP 2: Development of ship collision and grounding risk models and classification of the risks
The work package aims to evaluate risk for accidents on sea by systematically studying the behaviour of the fleet navigating in this area starting from single ships and ending to the total fleet behaviour. For this purpose, reliable risk modelling will be developed based on full scale observations and simulation of ship collisions both in open water and in ice.

WP 3: Environmental risks of maritime traffic
The work package will produce probability based risk estimates on the harmful effects caused by the increasing maritime traffic on nature. The risk estimates will be based on the scenarios of the development of traffic flows, produced in WP 1, and on the estimates of probabilities of maritime accidents, produced in WP 2. The risk model produced in the work package will help in focusing the future risk management and assessment on factors which can most effectively reduce the risks caused by maritime traffic on nature.

WP 4: Atmospheric emissions of the increasing maritime traffic
The aim of the work package is to evaluate by emission externalities the effects of the development of the maritime traffic in the Gulf of Finland, and create scenarios to evaluate different means to reduce emissions. The scenarios are created based on the information produced in WP 1 on the development of the traffic in the Gulf of Finland. The calculation of emission externalities is extremely well suited also for the comparison of different traffic routes and types. The work package will consider the most important atmospheric emissions of maritime traffic from the emission externality point of view.

WP 5: The challenges posed by the growth of good flows and disturbance factors on the intermodal system of ports
The work package carries out a study in the port interface on the intermodal transport operation and on th

Related Projects:
METKU, MIMIC

Other programmes: The project is partly funded by the European Union and by National ERDF

Partners:
Finland:
KMRC (bringing together the University of Helsinki, Kymenlaakso University of Applied Sciences, University of Turku and Aalto University School of Science and Technology)

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Key Results:

WP 1 results: the cargo flows in maritime traffic in 2007 were studied and the three alternative scenarios were made for the year 2015. Each scenario was based on certain assumption about economic development:

• the slow growth scenario - economic recession
• the average growth scenario – quick recovery
• the strong growth scenario – the most optimistic visions will come true.

Scenarios were formulated on the basis of previously made transportation scenarios and other visions for future. Generally it is believed that the growth of maritime traffic will continue also in future. The development of Russian economy and oil industry are the key issues for the future of maritime traffic in the Gulf of Finland.

WP2 results: Collision probabilities were estimated for the Gulf of Finland for 2008 maritime traffic and for the three 2015 traffic scenarios (from WP 1). For various smaller areas in the GOF, the accident probability estimates were also calculated given certain risk management actions (from WP 6). With the model, the estimated expected number of collisions in the Gulf of Finland in 2008 was 0.19 per year and the most collision-prone area was found to be the eastern part of the gulf. The expected value for the 2015, given average traffic scenario, was 0.52 collisions per year.

WP3 results: With the user interface for the evaluation of ecological risks, the results are further utilized to calculate probabilistic oil drifting maps that are combined with the information of endangered species populations on the Finnish coastline. The approach produces unique information on the environmental oil accident risks separately for accident-prone areas in the Gulf of Finland, which enables efficient local risk control actions to be analyzed by the decision makers.

WP4 results: The total external cost of ship-originated CO2, NOx, SOx and PM emissions in the Gulf of
Finland was almost 175 million Euros in 2007. Due to increased traffic volumes, these costs will increase to nearly 214 million Euros in 2015. Scenario modelling is also a method for estimating the effects of forthcoming or planned regulations, and it helps to target emission abatement actions to maximize their profit.

WP5 results: The survey clearly identified a group of risks related to the intermodal transport chain. Both frequencies and consequences of interferences were estimated and classified into different risk classes. Some findings made were further selected to b

**STRIA Roadmaps:** Network and traffic management systems
**Transport mode:** Water transport (sea & inland)
**Transport sectors:** Freight transport
**Transport policies:** Environmental/Emissions aspects