# MIMIC

EUSBSR
Steering committee meeting
13-14.5.2013

# MIMIC

## Minimizing risks of maritime oil transport by holistic safety strategies

Implementation period: 04.2011 – 12.2013

Source: http://eu.baltic.net

UNIVERSITY OF HELSINKI

SMHI

Kymenlaakson ammattikorkeakoulu
University of Applied Sciences

SYKE

MERITURVALLISUUDEN JA -LIIKENTEEN TUTKIMUSKESKUS
KOTKA MARITIME RESEARCH CENTRE
MERI KOTKA

TALLINNA TEHNIKAÜLIKOOL
TALLINN UNIVERSITY OF TECHNOLOGY

UNIVERSITY of TARTU

1. Aalto University
2. Kotka Maritime Research Association
3. University of Turku
4. Kymenlaakso University of Applied Sciences
5. University of Helsinki
6. Finnish Environment Institute

7. Tallin University of Technology
8. University of Tartu, Estonia Marine Institute

9. Swedish Meteorological and Hydrological Institute

# RESEARCH THEMES

- To study and compare the effect of different management actions on the risk of maritime transportation of oil, using the integrative model, giving insight to the cost-effectiveness of these measures.

- To further develop an integrative, probabilistic model that integrates new models related to traffic, accident probabilities, ecosystem impacts and the response possibilities of the society to decrease these risks or their consequences (integrating knowledge from earlier projects).

- To study the accidents and their causes and how to prevent them.

**WP1: Management, coordination and information activities**

**WP2: Development of *traffic flows***

2.1 Oil cargoes: present situation and scenarios
2.2 Ship particulars
2.3 Crew competencies
2.4 Enhanced/integrated AIS interface development

**WP3: Identification and assessment of *security-related risks***

3.1 Maritime oil transport security – state of the art
3.2 Identification of threats
3.3 Security control options

**WP4: Assessment of *environmental and economic risks* by the integrative model**

4.1 Future accident scenarios
4.2 Assessment of overall impacts on the ecosystem
4.3. Development of interactive decision analysis/support application (SmartResponse Web)
4.3 Assessment of the overall safety management

**WP5: Creating *effective measures and maximum interest* to prevent accidents and to decrease the impacts of accidents**

5.1 Analysis and improvement of policy instruments
5.2 Cost-effective improvement of safety management
5.3 Linking security and safety
5.4 Dissemination of the results and recommendations for the society

# WP1

Project management, coordination and information activities

(Kotka Maritime Research Center)

# COMMUNICATION

- Social media: updating www-pages, Facebook, Twitter.
- Stand at European Maritime Days, 21-22 of May 2013 in Malta.
- Brussels visits – European Parliament, the Commission.
- Researcher presentations in scientific seminars, conference etc.
- Final seminar 20.-21.11.2013, Kotka, Finland.

# WP2

## Development of traffic flows

# OIL TRANSPORTATION IN THE GULF OF FINLAND IN 2020 AND 2030

| Oil & oil products transported in 2020 in the Gulf of Finland | | |
|---|---|---|
| | Million tonnes | Change (%) |
| Year 2009 | 150. | |
| Slow development 2020 | 170. | 13.30% |
| Average development 2020 | 187. | 24.20% |
| Strong developme 2020 | 201. | 33.80% |

| Oil & oil products transported in the Gulf of Finland in 2030 | | |
|---|---|---|
| | Million tonnes | Change (%) |
| Year 2009 | 150.6 | |
| Stagnating development 2030 | 165 | 9.50% |
| Towards greener society 2030 | 177.5 | 17.90% |
| Decarbonised society 2030 | 169.5 | 12.50% |

http://mkkdok.utu.fi/pub/A61-Oil%20transport%20in%20Gulf%20of%20Finland%202020-2030.pdf

# SHIP PARTICULARS

| | Average | Max | Min |
|---|---|---|---|
| Length (m) | 206 | 277 | 61 |
| Draft (m) | 12.3 | 17.1 | 3.1 |
| DWT (t) | 74500 | 159500 | 991 |
| Number of tanks | 13 | 20 | 5 |

# SHIP PARTICULARS

# CREW COMPETENCES

# CREW COMPETENCES

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# WP3

Identification and assessment of security related risks (KyAMK)

(Kymenlaakso University of Applied Science)

# OBJECTIVE

- Define security related threats of maritime oil transportation in the Baltic Sea.
- Evaluate impact of the threats on the total safety concept.

# OBJECTIVES

- To create a risk and decision analysis model that integrates information concerning the maritime traffic, oil transportation, oil accidents and their likely environmental consequences, and cost-effectiveness of management actions.
- To study and compare the cost-effectiveness of different management actions in preventing accidents
- To integrate the knowledge from earlier projects and new information.

# SECURITY THREAT ANALYSIS FRAMEWORK

Controls:

- Technical
- Organisational
- General
- Location specific

*Risk indicators:*

- *expected consequences (loss of lives, economic losses, release volumes, etc.)*
- *likelihood of consequnces exceeding …*
- *likelihood of unacceptable/ unrecoverable impacts*

# A MODEL FOR ASSESSING THE LIKELIHOOD OF REALIZATION OF THE DIFFERENT THREAT TYPES

# WP4

## Assessment of environmental and economic risks

## (Aalto University)

# OBJECTIVES

- To create risk model that integrates information concerning the maritime traffic, oil transportation, oil accidents and their likely environmental consequences, and cost-effectiveness of management actions.

- The risk model should be suitable for decision making to be conducted in WP5.

# GENERAL RISK MODEL

**1. Ship model:**

- ship layout & tank arrangement
- structural arrangement
- CB model

**2. Grounding scenario:**

- Direction, velocity
- Rock/bottom topology

**3. Calibrated damage assessment model:**

- Assessment of structural damage
- Extent of damage opening

**Output:**

- Extent & description of damage
- Response surface allowing rapid prediction of grounding damage

**4. Oil outflow model:**

- simulation of oil spill

**Output:**

- Amount and duration of oil spill

**5. Ultimate strength assessment model:**

- Assessment of ultimate strength of damaged ship hull

**Output:**

- Assessment of residual strength after the grounding accident

# RISK MANAGEMENT – WHERE, WHEN ?

**Pre-accident**

- Preventing accidents

1. Routing and navigational systems (ENSI)
2. Pilotage
3. VTS

**Accident**

- Preventing oil spills

4. Structure of a tanker

**Post-accident**

- Improving accident response

5. Efficiency
6. Capacity

# MIMIC

Structure options?
Year
Expert uncertainty
Oil recovery efficiency?
Oil type
Season
Leaking TTs
Navigation information service
Scenario
Leaking TOs
Leaking Gs
ATOTleaking
Stranding time
Number of tanker-tanker collisions
Number of tanker-other collisions
Number of groundings
Oil recovery
Air surveillance cost
Cost of vessels
Oil loss
Leakage
Emptying cost
Other open sea costs
Final amount of oil in water TOT
Amount of recovered oil TOT
Logistic and processing cost (open sea)
Mechanical recovery costs
Storage cost (open sea)
Oiled coastline
VTS cost
Maintenance cost
Recovery costs million €/year
VTS costs million €/year
Container cost
Waste amount
Logistic cost (coast)
Storage cost (coast)
Bag cost
Mechanical cost
Material cost
People cost
Processing cost (coast)
Treatment costs (coast)
Manual cost
Clean-up costs
Clean-up costs million €/year

# WP5

Creating effective measures and maximum interest to prevent accidents and to decrease the impacts of accidents

(University of Helsinki)

# OBJECTIVES

- To study and compare the cost-effectiveness of different management actions in preventing accidents
- To integrate the knowledge from earlier projects and new information.

## Pre-accident

Probability of an accident (AALTO)

Ship particulars

Consequences of an accident (TUT)

Oil outflow and Duration

## Post-accident

Tracking the oil and efficient booming (SMHI)

Oil path and boom effects

Joint Decision Making on oil combating (UTARTU)

MIMIC

# OBJECTIVES

Future Scenarios 2020 & 2030
Security and safety elements
Management (preventive)
Oil transport
Maritime traffic
Ship accidents
Oil accidents
Oiled coast
Organism group model
Oil recovery (post-accidental management)
Losses
Optimization
Optimization
New elements
Updated / existing elements

# OBJECTIVES

- Study will continue by doing cost-benefit analysis for certain measures (extending piloting obligations, routing and the development of VTS system), in co-operation with SYKE.

- Also theoretical base for cost-benefit analysis and its application in maritime safety policy will be studied in more depth.

cursor

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KOTKA
CITY BY THE SEA

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SYKE

CENTRAL BALTIC INTERREG IV A PROGRAMME 2007–2013

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