SSPA HIGHLIGHTS

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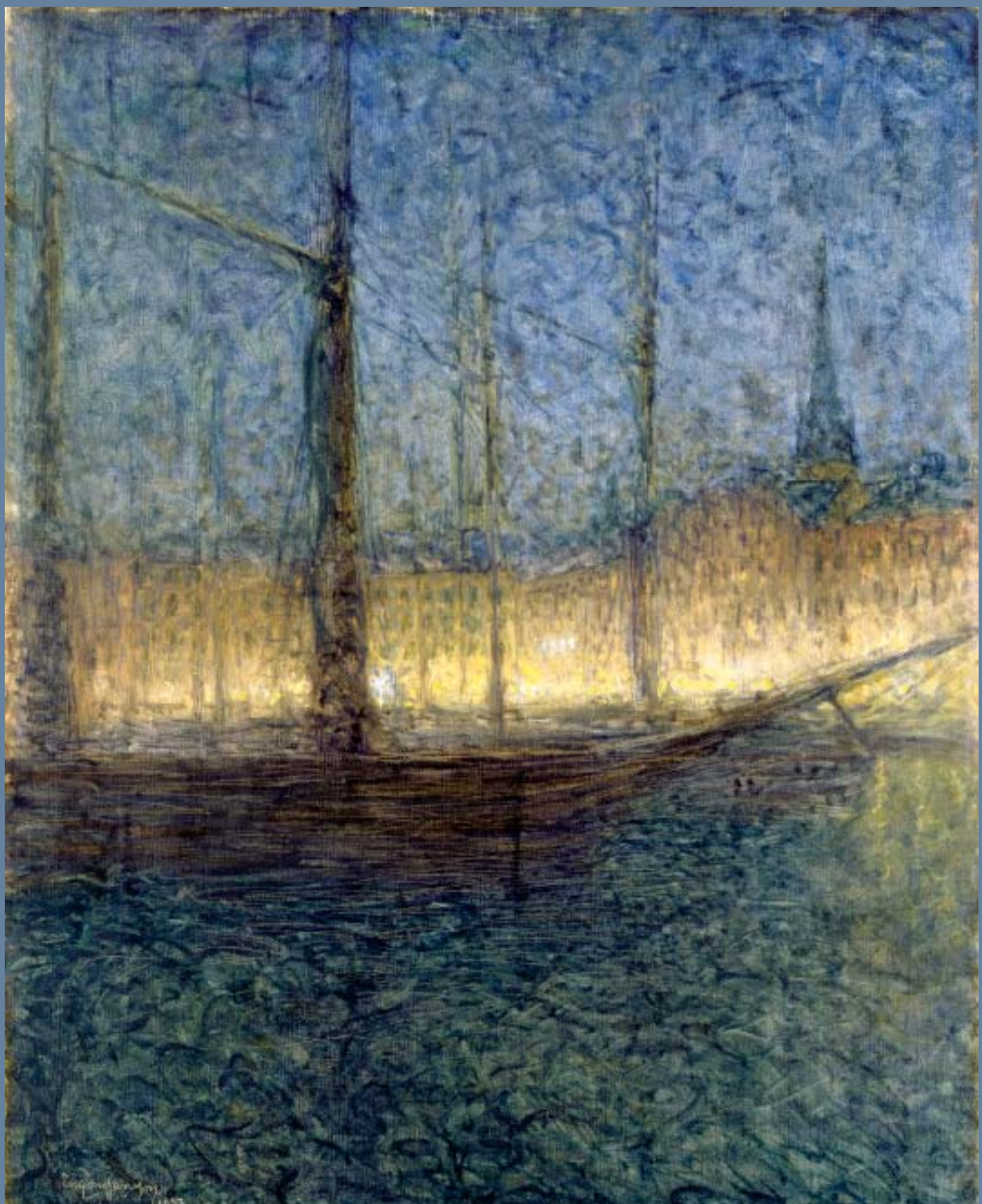


'EVENING IN KORNHAMNSTORG, STOCKHOLM' BY EUGÈNE JANSSON PHOTO: NATIONALMUSEUM, STOCKHOLM

My sincere Season's Greetings to all of SSPA's clients, partners and colleagues in the maritime society.

For us living in the Nordic country Sweden, the upcoming Christmas and New Year's Eve are the most important festivals of the year, originating from ancient Nordic folklore and later on replaced by Christian values. Whether religious or not, this is the time of the year when many of us prioritise spending time with the family and friends, giving each other presents and enjoying food served from our traditional Christmas smorgasbord. At New Year´s Eve we take the opportunity to reflect on the year that has passed, and new plans and promises for the future are made.

If I were to summarise the year 2004 of the maritime field in one word I would use - Dynamic. The shipping industry is booming as a consequence of the ongoing globalisation and the strong economic growth in for instance Asia. To be competitive and successful in the market, geographical location of raw material deposits, production facilities and consumer market are once again of less importance. Reasons for that are, among many others, the more and more effective intermodal transport solutions and the ongoing ports and coastal zone developments made.

I believe that this trend will remain strong through the year 2005 creating new challenging business opportunities for the maritime society. We, SSPA, will do our best to make it come true.

Susanne Abrahamsson

Appendages for high-performance ships – Testing for design

Designing appendages such as shaft brackets and rudders for modern high performance commercial ships poses several challenges earlier met only on naval vessels. The commercial ships offer an even more difficult task as they are operated more or less continuously at close to maximum performance, whereas naval vessels spend the vast majority of their life span at economical power or even at dockside.

Problems most often encountered include excessive drag leading to poor propulsive performance and cavitation related problems such as cavitation noise and, most important, cavitation erosion on brackets and rudder. Improper appendage design can also affect the propeller performance with regard to cavitation erosion, pressure pulses and noise.

Towing tank tests not always enough

The traditional approaches to appendage design have been to choose sections from the NACA 4-digit series (e.g. NACA 0015) and then to try to optimise the alignment of brackets and other appendages using a combination of different towing tank tests. These often include paint flow tests on plates fixed to either the brackets or small rods in place of the brackets. Rudder neutral angle is often optimised for minimum shaft power.

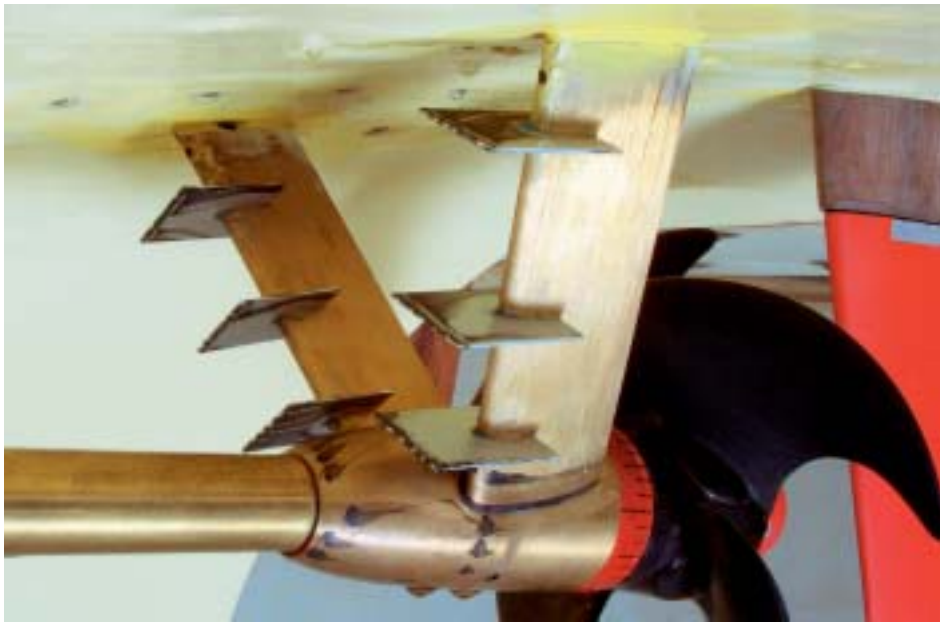
Towing tank tests can, however, sometimes be misleading. The need for Froude scaling due to the free water surface in a towing tank places a limit on the Reynolds-number, which can lead to scale effects that are difficult to judge.

The traditional approach outlined above may be combined with CFD-studies and provides a decent starting point, but for today's high performance ships further work is needed in order to ensure a trouble free service life. Advanced foil sections provide greater margins against cavitation inception and sometimes also reduced resistance on brackets, rudders and other foils. The progress in section design has been made possible by the development of easy to use CFD-applications. For some ships it might also be necessary to introduce twist in shaft brackets and rudders.

Tunnel tests verify solution

SSPA's large cavitation tunnel has proved to be an ideal tool for developing and verifying appendage designs. Flow visualisations using several different techniques and cavitation observations can easily be made in the large cavitation tunnel. In order to investigate cavitation erosion problems ordinary cavitation observations in stroboscopic light can be supplemented with high-speed video recordings and/or soft paint erosion tests. The tunnel also offers the possibility of performing cost effective high-resolution wake measurements using either conventional 5-hole probes, LDV or PIV.

Potentially erosive rudder cavitation in model scale. 3° rudder angle is applied.



Paintflow plates on brackets is a simple but effective method to measure the angle of attack. The relatively high water speed in the cavitation tunnel decreases the scale effects.

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From horror…

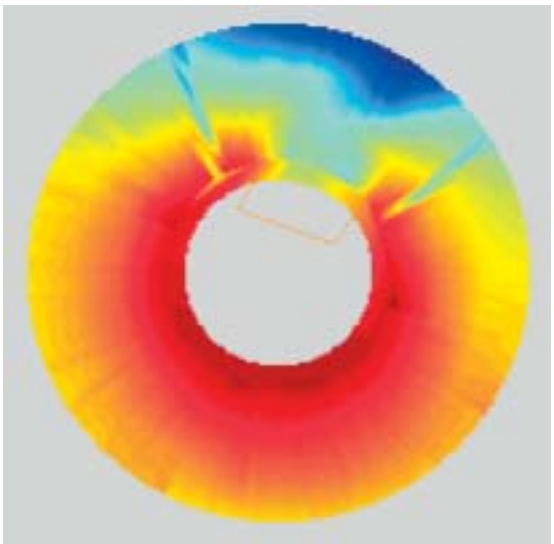
Fincantieri recently commissioned SSPA to perform a project considering a fast Ro-Pax vessel that well shows the possibilities of using SSPA's large cavitation tunnel in order to develop a successful appendage design package. The project, for which towing tank tests had been performed elsewhere, started out as a relatively simple cavitation tunnel test performed in order to verify the propeller design. During this test several potentially serious appendage related problems were noted. Cavitation was present on the main shaft brackets and rudder, and the propeller cavitation and thus pressure pulses and noise were clearly influenced by the wake from brackets and shaft line. Fincantieri's engineers immediately realised the serious implications both from erosion and noise point of view if the ship design was to go into production as it was. Thus a programme to investigate and improve the appendage design was immediately launched in cooperation with SSPA and Rolls-Royce who supplied the rudder and propeller designs.

…to success story

Based on results from an array of tests, such as cavitation observations, flow visualisations and pressure pulse measurements a number of alternative appendage packages were designed by Fincantieri. These were tested and further optimised both with regard to cavitation and resistance of the appendages themselves and their impact on the propeller performance. One surprising effect found was that a slight misalignment of the forward I-bracket had a large influence on the wake and thus propeller cavitation and pressure pulses. The rudder design was also changed to a design incorporating advanced sections and a considerable twist. This in combination with some fine-tuning of the propeller design gave excellent results, e.g. reducing pressure pulses at higher orders by more than 10 dB and the expected broadband noise at higher frequency by more than 6 dB in combination with improved cavitation patterns.

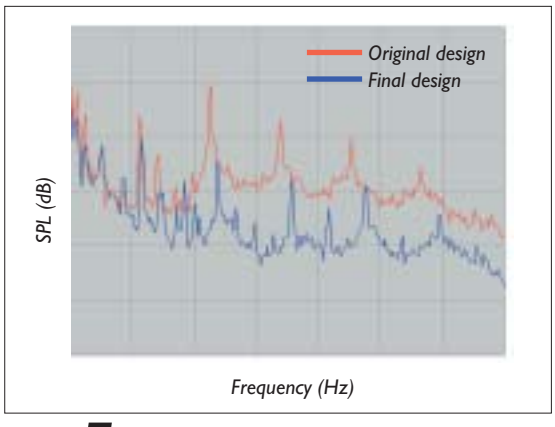
Careful design of brackets, shafting and rudders is an essential element in achieving satisfactory propulsive, noise and cavitation performance in today's and tomorrow's high performance ships. This can be achieved by using e.g. twisted or new sections for brackets and rudders. SSPA stands well equipped with knowledge and experimental resources to help our customers performing this vital task.

Per Lindell / Ted Rosendahl



Result of high-resolution wake measurement. The effect of the shaft brackets can be clearly seen. This is often missed in normal towing tank tests.

Full-scale rudder erosion. Improper design can cause severe damage after only one year in service.



Effect on noise and pressure pulses from a careful propeller and appendage optimisation. Note the large reduction in broadband noise.

LNG transports – Risk assessment and operational analysis

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Erland Wilske, Project Manager. He graduated in 1988 (M.Sc. in electronic engineering) from Chalmers University of Technology. After graduation he worked with research of opto-electronics sensors (at Chalmers) and software development of cargo handling systems (at Saab Rosemont). In 1994 he joined SSPA and has since then been involved in projects linked to development and use of simulation tools, mainly in the area of manoeuvring and seakeeping.
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SSPA has for many years developed and model tested a large percentage of the LNG carriers being built in the world. SSPA has been committed to carry out hull form optimisation by parametric database and/or CFD, model testing (resistance, propulsion, wake survey, cavitation, manoeuvring and seakeeping tests), manoeuvring and seakeeping simulations (separately or combined) and other studies, e.g. operational analysis, routing, risk and safety assessment.

SSPA can therefore pinpoint some crucial factors when it comes to LNG tankers. It doesn't take much of imagination to realise the devastating consequences of an accident, collision etc that results in fire with a large LNG tanker involved, particularly if it occurs in a port adjacent to densely populated areas. The efforts concerning risk reduction should primarily be devoted to preventive measures. Both technical and hydro-mechanical aspects as well as all features and equipment enhancing the operation of the ship and minimizing the risk of human errors should be considered. Here some general aspects and features affecting the ship safety at the concept stage are given.

Twin-screw ships favourable

The manoeuvrability is generally better for a twin-screw ship than for a single-screw ship. The two independently controllable propellers improve the turning capacity at low speeds in ports etc. This reduces risk of accidents at manoeuvres in ports and other confined areas.

The manoeuvrability is enhanced by using CP-propellers, since the engines are generally kept running during manoeuvres. Thereby a quicker response can be obtained when changing propulsion force or direction.

The manoeuvrability, particularly at low speed, can be improved by using high lift or oversized rudder/s going to larger angles than the standard 35°.

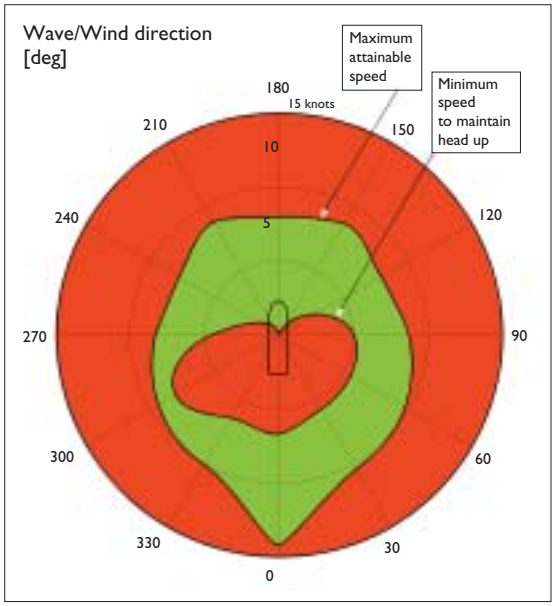
Redundancy

Redundancy is a key factor in minimizing risks. It means backup capacity in case of failure or loss of control of propulsion or manoeuvring functions as well as other vital equipment for operating the ship. The twin-screw concept with its two propellers and two rudders is favourable also in this aspect. Model tests and simulation studies for several twin-screw ships have shown that, at a combined engine/rudder failure on one side, the ship can in most cases comply with the IMO manoeuvring standards and be able to continue operations more or less as what is normal for a single-screw ship. In case of failure of both rudders, twin-screw ships will still have a considerable manoeuvring ability.

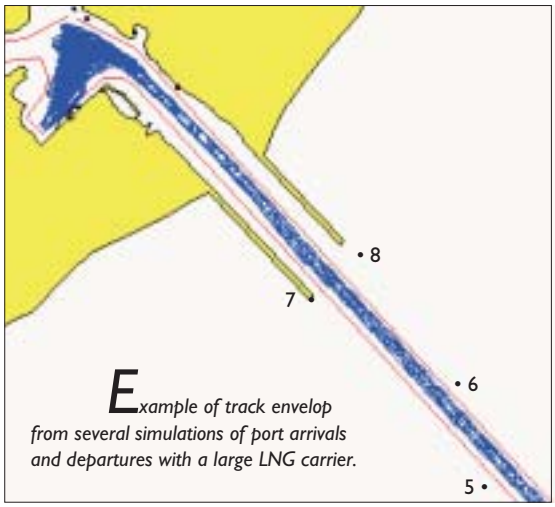
Operational analysis

Operational analysis is the method of assessing the availability and performance of the ship in its environment from a statistical point of view. Examples of input are seakeeping analysis, calculation of contribution of resistance due to wind and waves, manoeuvring simulations with given terminal design and facilities, and statistics of winds and waves for the intended routes. Especially LNG carrier projects, where the investments are tremendous, the outputs of the operational analysis are important figures in the cost/benefit analysis for optimal decision of hull design, power generation and manoeuvring devices. We have also seen an increasing interest from ship owners in using the results of the operational analysis as benchmark indicators for the fleet in service.

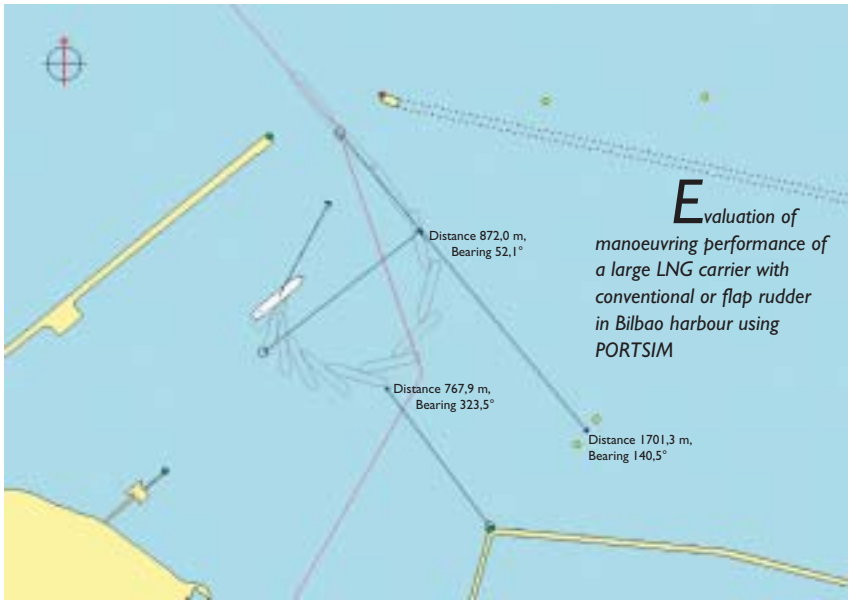
As an example of operational analysis carried out for LNG carriers results are shown of estimation of the average annual speed at constant power. A number of routes



Polar diagram showing the maximum attainable speed and minimum speed to maintain heading in Sea state 6 for a twin-screw ship with one-side engine and rudder failure.

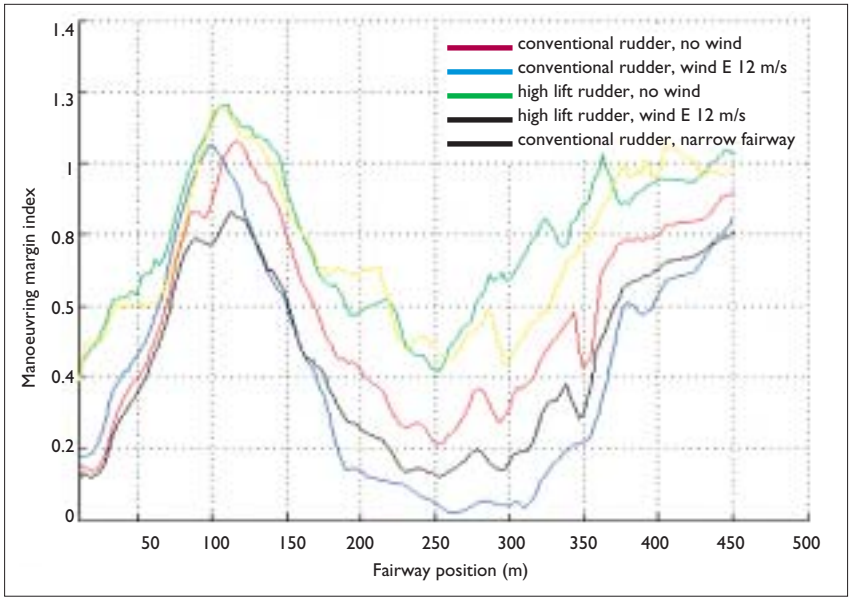


Example of track envelop from several simulations of port arrivals and departures with a large LNG carrier.



Evaluation of manoeuvring performance of a large LNG carrier with conventional or flap rudder in Bilbao harbour using PORTSIM

The manoeuvring performance of large LNG carriers is crucial for safe operation at sea as well as in port.



Route	Average annual speed [knots]
Algeria to Boston	19.4
Trinidad to Bilbao	19.6
Australia to Barcelona via South Africa	19.8
Australia to Japan	19.9
Norway to Boston	19.2

have been analysed based on results from model tests (resistance and propulsion test, seakeeping test and wind tunnel test) and statistics for wind and waves.

Tools for simulation studies

For the assessment of the ship in a specific harbour/terminal SSPA has developed a software package that covers different development stages ranging from early concept evaluation to operational studies and crew training. The simulation tools cover:

– speed–power and manoeuvring prediction
– seakeeping simulation
– manoeuvring simulation in harbour and fairway including tug handling and confined water effects

The quality of the harbour and fairway assessment is highly dependent of the accuracy in the mathematical model of the ship. These tools are a condensation of decades of experience of model testing, full-scale trial and simulation modelling.

Manoeuvring margin index

In order to improve the procedure of assessing the results from manoeuvring simulations SSPA has developed a method of calculating a manoeuvring margin index. The method is based on systematic simulations, which are analysed in order to assess the ship's possibility to succeed along the intended route. The algorithm assumes that the difficulties in handling the ship follow a Gaussian distribution both with respect to proximity to fairway limitations and utilization of manoeuvring forces. This index is very useful for assessing influence of changes in fairway design and/or ship design.

Peter Trägårdh / Erland Wilske

The manoeuvring index illustrates the influence of changes in rudder efficiency, wind impact and fairway width for a ship proceeding thought an S-shaped channel. If the index reaches zero the ship will exceed the fairway limitation no matter what measures are taken. The index is suitable for defining acceptance criteria. Le us say we accept an index above 0.4, the result in the figure then shows that our alternative is to equip the ship with a high lift rudder of flap type. The index also shows that the wind impact in the tested wind direction can be up to 12 m/s.

Efficient, safe and environment friendly shipping in the Baltic

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Efficient shipping and port operations are essential to handle the increased goods volumes in the Baltic Sea Region without compromising with safety, performance and environmental issues.

On May 1, 2004 the European Union expanded in the eastern direction. Today, the Baltic Sea is almost completely surrounded by member states. The demand for goods transportation in the region is generally predicted to grow considerably, which reflects the expected economic growth and increasing trade. However, pressure of pollution and overexploitation from human activities affect the sensitive Baltic Sea.

The Baltic economies have grown rapidly during recent years. The transport and communication sector is important in all EU countries, but its share of Gross Domestic Product (GDP) is the highest in the Baltic States. One explanation for the high figures is the location of the countries. The extensive transit industry in the region is the result of export of large volumes of oil products, mineral fertilisers, metals and timbers from Russia, Belarus and other neighbouring countries to the west. As an example, about 80% of the total turnover in the Latvian ports was transit cargo in 2003.

Comprehensive studies of Baltic ports

SSPA has for many years been involved in a number of different consultant and research projects in the Baltic Sea Region, for example in the fields of ship and port simulation, route optimisation, port logistics, risk assessment and oil handling. All Polish ports – from small fishing ports to major seaports - have been investigated regarding reception facilities for ship-generated waste. Port of Kaliningrad in Russia, with its strategic location between Poland and Lithuania, has been studied in cooperation with the Swedish Maritime Administration. One of SSPA's most recent projects is an assessment of Port of Liepaja in Latvia. The aim is to identify and address actual and potential environmental, safety and security issues in the port, where an audit system provides the framework.

The semi-enclosed Baltic Sea is surrounded by nine countries, which are interconnected through a dense network of waterborne routes. Port of Liepaja is indicated in yellow on the map.

Port of Liepaja – from naval base to commercial activities in 10 years

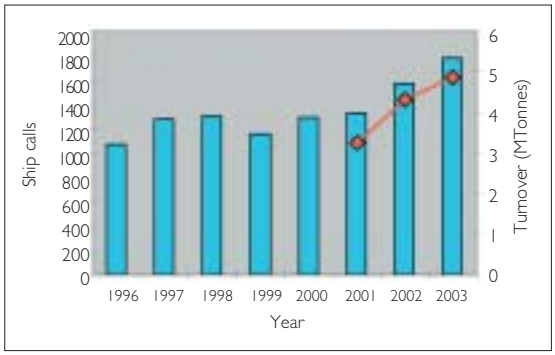
Port of Liepaja is the third largest port in Latvia, with a cargo turnover of 5 million tonnes in 2003. The port consists of four parts: the commercial canal, the winter harbour, the free harbour and the Karosta canal. Karosta -

The Kalpaka swing bridge at the Karosta Canal, the gate to new commercial areas in Liepaja, was once the access to the former restricted military zone.

PHOTO: BJÖRN FORSMAN

Railways transport the goods between Latvian ports and cargo distribution centres in Russia, Belarus and other neighbouring countries.

PHOTO: JOANNE ELLIS



Volumes transported in the Baltic Sea Region have increased in recent years due to economic growth and greater trade. The blue columns show ship calls and the red line shows cargo statistics for Port of Liepaja in Latvia.

Latvian for 'war port' - was built by order of the Russian Czar Alexander III as a military port. During the Soviet period, Karosta became a west coast naval base and was closed to civilians. The Soviet army evacuated the area in 1994, following Latvian independence.

One of the first steps in the process of preparing the port for commercial activities was to get rid of the former military operations and to remove sunken naval vessels and submarines. The operations started in 1995, and the port nowadays handles mainly timber, metals, fertilizers, bulk and liquid cargoes. Two Ro-Pax ferries are also operating between Liepaja - Rostock (Germany) and Liepaja - Karlshamn (Sweden). The Liepaja Special Economic Zone was established for 20 years in 1997 in order to attract more investments in commercial activities.

Environmental and safety issues in a sensitive area

Waterborne transportation plays a strategic role for cohesion and accessibility in the Baltic Sea Region and the importance of transportation for global, national and regional economies is apparent. However, the increased volumes of shipped oil and chemical continue to be a serious risk of spills and contaminations. Today the eutrophication, which manifests itself as algal bloom, as well as high levels of hazardous substances such as heavy metal and dioxin, are major concerns.

The International Maritime Organisation (IMO) approved in principle this year the proposal from the countries around the Baltic Sea (excluded Russia) to designate the Baltic Sea a Particularly Sensitive Sea Area (PSSA). A PSSA is an area that due to its ecological, economic, cultural or scientific significance and its vulnerability to shipping activity has been recognised by IMO. Specific measures will be introduced to control the maritime activities what may include the use of local pilotage, installation of Vessel Traffic Services (VTS) and ships' routing measures.

These changes will raise the demands on shipping companies and ports to prevent environmental damage and to improve maritime safety and navigation. This is in line with SSPA's overall interests, and we are looking forward to continuing our contribution to more efficient, safe and environmental friendly shipping.

Linda Styhre

On the bridge – From clutter to smart decision support

Peter Grundevik, Project Manager, received his PhD in physics at the University of Göteborg/Chalmers University of Technology in 1982. He then worked at Ericsson Radio Systems developing e.g. laser radar, rangefinder and night vision equipment. In 1993 he became president of Dyning Utveckling, developing video conference and communication systems. He joined SSPA in 1997 and works with telematics and navigation technologies as well as co-ordination and project management of international projects.
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In all technically complicated professional operations, e.g. aviation, nuclear power and modern process industry, a basic challenge lies in the man-machine interface - to give the operating human being the correct, easy to understand-information. Certainly this is of highest importance in avoiding incidents or even worse accidents.

Every mariner knows that we have a similar situation on the bridge. The function and management of the radar, AIS (Automatic Identification System) and ECDIS (Electronic Chart Display and Information System) are of greatest importance in order to achieve efficient, safe and good environmental conditions for humans, society and property. But it is also well known that the displays of these systems together are too complicated and they are often near the boarder for cluttering and information overload, which is dangerous in critical situations.

SÄSAM

In order to analyse human machine interaction aspects SSPA has participated in an integrated bridge design study called SÄSAM, a Swedish abbreviation with the meaning 'Safety and human-machine interaction in water-borne transport'.

In the study the ECDIS system usage has been investigated through questionnaires. Radar systems interfaces have been evaluated on site. The role of the radar in some accidents and incidents has also been studied. Proposals and present regulations for display of AIS information have been analysed as well.

The integration of radar, AIS and ECDIS information and how to present the selected information is the main outcome of the study.

AIS by MKD -cheap, easy but…

A lot of effort has been put into the definition and standardisation of the AIS technique and forming a carriage requirement for the international fleet. The resulting legislation and the short time for its implementation is impressive.

However, the definitions of the display issues are treated very briefly. The only mandatory carriage requirement for an AIS information display today is a so called minimum keyboard and display (MKD) unit. This display is the easiest and cheapest but more a temporary solution.

The natural choice is instead that the targets should be displayed on the radar and/or the ECDIS, and that is the view of most mariners. Appropriate integration of AIS targets and bearings, headings, speeds etc. into these systems will increase the value of AIS information for navigation and safety purposes. Although there exist different commercial products presenting AIS on radar and ECDIS systems, as many as 60 per cent of the 25 000–30 000 installations today use the simple MKD.

Integration of radar, AIS and ECDIS information

In order to have a smooth introduction of the new AIS technique into the working procedures on the bridge it is proposed that in the first run the combined radar, AIS and ECDIS solution shall follow the established routines with the radar (and ECDIS) instrument. The SÄSAM study proposes as follows:

- AIS targets shall be included in the radar and follow the presentation structure of the ARPA radar targets.
- Sparse, selected ECDIS information shall also be pre-

The mandatory requirement for presentation of AIS information is a minimum keyboard and display (MKD) unit that has a simple alphanumeric display or a small graphic display. These MKD presentations do not represent a user-friendly form. They have no references to radar targets or electronic chart information and represent another stand-alone unit on the busy bridge environment.

PHOTO: PETER GRUNDEVIK

PHOTO: ERIC WAGNER

There are a lot of instruments on the bridge, all with the aim to facilitate operation of the ship and increase the awareness. Each separate information data is important as such. The problem is to handle all the instruments. The officer may be stressed, tired and overloaded with information and different duties. Other problems are that some information may be difficult to interpret, it may be accessible in a serial fashion and different navigational aids may provide information that may be in conflict.

An example of a spacious bridge environment that gives excellent basic visual awareness.

PHOTO: ERIC WAGNER

The project was financed by:
VINNOVA
Swedish Maritime Administration
Swedish Mercantile Marine Foundation

Project consortium
SSPA Sweden (project management)
IT/HCI Uppsala University
Kalmar Maritime Academy
MSI Design.

sented on the radar screens. The main purpose of the radar/AIS information is collision avoidance, but the ECDIS information will add functionalities for navigation and avoidance of grounding.
– AIS/ARPA targets shall be available on the ECDIS. The contour of the radar screen (normally a circle) in scale shall also be included. The main purpose of the ECDIS is to present detailed chart information for navigation and grounding avoidance. The radar/AIS information on the ECDIS adds collision avoidance functionalities.

The purpose of having information selected from both systems into each other is the ambition not to lose the attention completely of the other system information when going from one to the other. Generally, the present radar and ECDIS displays are too complicated and present too much information. The threats of clutter and information overload have to be repelled in the future through the combination of data and the reduction of the presented information by filtering processes. In a reliable system the operator is generally not interested in how the presented information is gathered. All the efforts to reach the presented information for decision support has to be hided in order to reach non cluttered presentations.

General conclusions

The key principles to get better solutions to the existing problems are to include human factors approach in the interface design. It is important that
– the different system information is handled comprehensively in an integrated view and the risk of collision and grounding shall be treated in one display
– the presented information shall be sparse, since information overload is dangerous
– there shall be short steps to receive desirable information, and manual command handling during high-tempo situations shall be avoided
– several senses display alternatives, like audio and vibration alternatives, should be considered in addition to graphics and text.

It is believed that applicable knowledge from aviation, nuclear power and process industries - which often are more experienced – can be combined with the understanding of the navigational demands in order to achieve more user-friendly integrated navigational systems. It is important to include the end-users/mariners in the design process together with the professional developers.

Peter Grundevik

A total grip on sea surveillance

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What can be derived by combining AIS-information (Automatic Identification System) with PSC records (Port State Control) and advance notifications on dangerous cargo? – Various authorities register and exchange a lot of sea related data by paper forms, telephone, meetings, e-mail and sophisticated portals, but there is no focal point of the information flow to ensure efficient compilation from all data providers and dissemination to information users.

SSPA Sweden has been engaged in a wide range of investigations on handling sea related information for the Coast Guard, the Maritime Administration, the Rescue Services Agency and other Swedish authorities and is familiar with their information processing. Our present task is to elaborate a specification for a new IT-based information system capable to download data and to compile and wrap it into useful information from ten Swedish authorities and agencies. This will enhance the effectiveness and facilitate sea surveillance, fishery inspection, shipping notification, marine environmental control etc. The new system, SJÖBASIS (Swedish abbreviation for coordination of sea related information) will provide an on-line database with information and advanced tools for selection/extraction and with graphical chart displays for presentation of results.

The sea surveillance task

The Swedish Coast Guard (SCG) is a civilian authority under the Ministry of Defence. It exercises surveillance, supervision on maritime border, fisheries control, monitoring of the environment, shipping and safety at sea. 2002 the SCG was given an additional task – to coordinate the demands and to provide the other civilian authorities with the sea related information they need from other authorities. By this, the various governmental resources will gain effectiveness and facilitate exchange of information. The implementation of this new task calls for a new IT-system to handle information from the cooperating authorities.

A GIS tool for presentation of sea related information

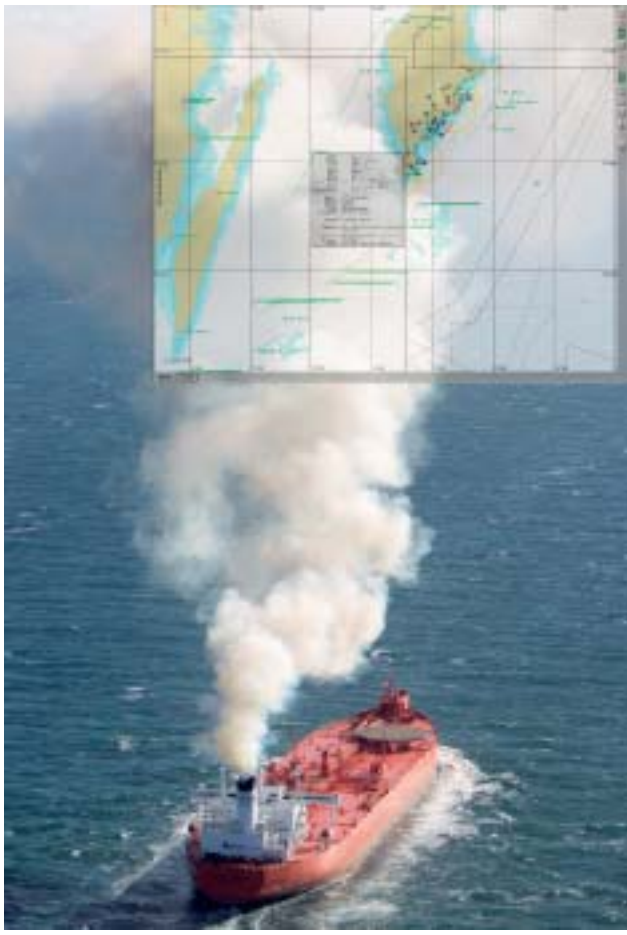
SJÖBASIS will provide the user with opportunities to combine data and chart layers from different GIS applications (Geographical Information Systems) with on-line information on ship positions or statistically recorded data on ship tracks etc. Data from different sources and sensors for identification of commercial vessels, fishing vessels and radar targets are combined and displayed on any chart background.

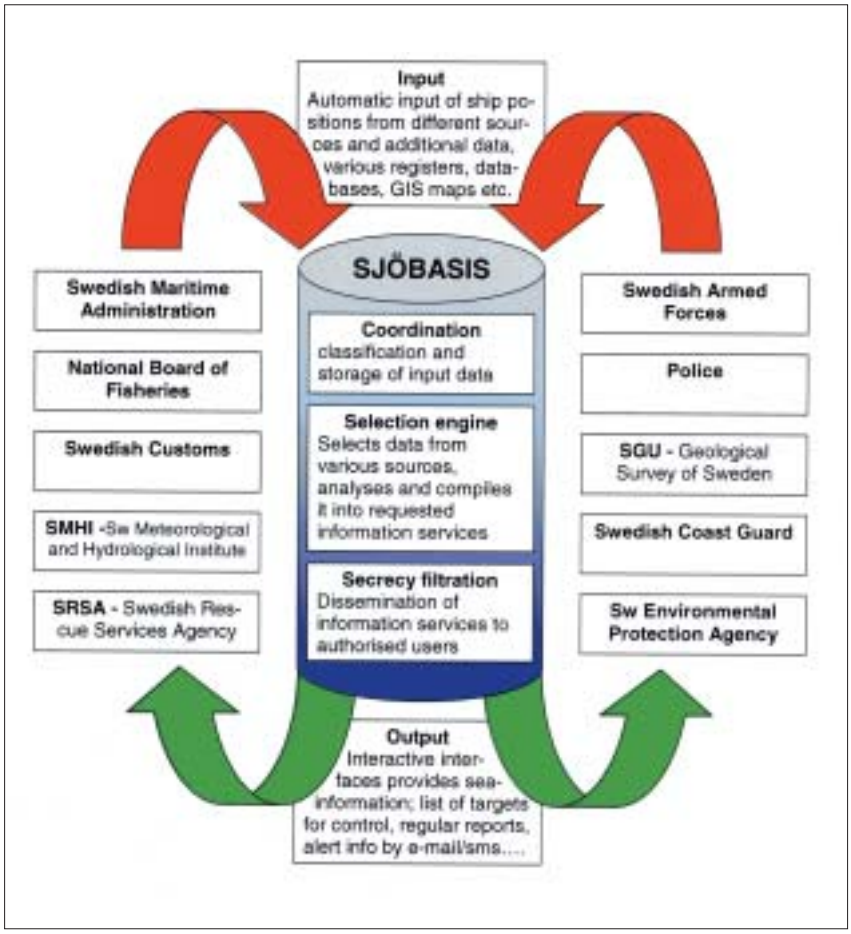
Risk analysis based selection of inspection targets

SJÖBASIS will provide tools for selection of objects to be targeted by inspections. The new SJÖBASIS will identify specific vessels to be targeted for inspection by automatic

The fight against illegal operational oil discharges can be sharpened by coordination of information resources and calculation tools. PHOTO BY COURTESY OF THE SWEDISH COAST GUARD

The exhaust emission contribution from shipping industry has become an important issue on the maritime agenda, and SJÖBASIS can provide tools for survey and statistical analysis.
PHOTO BY COURTESY OF THE SWEDISH COAST GUARD





The basic system and the ten interacting authorities.

comparison of reported activities, previous inspection protocols and actual positions or track. Thereby it will improve the hit rate and contribute to more efficient inspection. The Customs, the Police, The Department of Fisheries and other authorities will benefit from these possibilities of defining criteria for automatic selection of inspection targets.

Better surveillance of illegal oil discharges

The possibilities of identifying ships that illegally discharges oil may also be improved by the system. When an oil slick is detected, the spill drift modelling tool SeaTrackWeb (developed by SMHI) can be used in 'reversed mode' for synchronised hindcasting with the recorded ship tracks until an intersection is found. The tool includes actual wind and current data, and together with oil sample analysis data the origin of the pollution may be determined.

Long-term follow-up of ships' emissions

The Swedish Maritime Administration compiles an annual report on the total estimated emission contribution from the shipping sector, but so far the available data is limited and inaccurate. In the future, however, it may be possible to combine data from a ship emission factor database with actual recorded statistics on identified ships and automatically compute accurate emission and deposition figures and maps.

Mapping the oil transportation pattern

The Swedish Environmental Protection Agency sees an urgent need to compile more quantitative information on the oil transportation patterns around our coast. SJÖBASIS will provide report generators that automatically may accumulate and record AIS information from tankers on various routes. Such information may also be combined with new GIS-based environmental sensitivity mapping data and thereby e.g. specifically critical areas and routes with regard to oil tanker traffic and environmentally sensitive areas may be identified and analysed.

Early warning for substandard ships

Maritime safety inspectors may request the SJÖBASIS to review all ship names in the ports´ lists of expected ship calls versus data from PSC inspection databases like the SIReNaC (used by the 19 European signatory countries of the Paris Memorandum of Understanding) or the International Equasis and thereby automatically present a list identifying all ships with high target factors and directly highlight the ship on the chart display as it approaches the port.

A stepwise development of the SJÖBASIS system

In the first phase the communication schemes between the authorities, their respective databases and systems will be established together with the flexible SJÖBASIS platform capable to provide basic prioritised information services. The system will be refined in subsequent development steps with more complex output services, more input sensors and integrated analysis tools. The first call for tenders on system design and implementation will be launched by the SCG in late 2004.

SSPA's task

SSPA's consultants have been working in close cooperation with the SCG's project management and the scope of SSPA's task in the SJÖBASIS project included: i) Initial feasibility investigation on existing data exchange and future information needs of the ten identified sea related authorities, and ii) Proposal for a new IT-based support system and specification of requirements for tenderers.

Björn Forsman

Short comments

Maritime Safety Management

From November 1 to December 3, SSPA Sweden conducted the seventh issue of the five-week advanced international training programme on Maritime Safety Management (MSM), sponsored by Sida (Swedish International Development Cooperation Agency). In total about 150 participants from 25 different countries have now exchanged experience and learnt from Swedish expertise. The training programmes are very important for SSPA's networking with maritime administrations and other authorities all over the world. By updates on our course web and by e-mail correspondence with and between former participants we keep the network alive. For participants from the Asian countries, SSPA will arrange a follow-up workshop in Shanghai in April 2005 in cooperation with China Maritime Safety Administration.

The MSM programme covers a wide scope of topics such as international safety conventions, implementation of safety culture, flag state inspection and port state control, human factor considerations, risk analysis and casualty investigation, navigational safety and VTS, etc. The participants represent various professions and organisations, and individual case study presentations are also important in the knowledge transfer process.

Björn Forsman

SSPA papers and articles 2004

Allenström, B., Byström, L., Magnusson, M.: 'Parametric study on motion sickness in submarines'. Paper presented at 'Humans in Submarines', Stockholm, Sweden, August 18–20, 2004.

Byström, L.: 'Submarine recovery in case of flooding', Naval Forces No III/2004, Vol. XXV, 2004.

Flodén, D., Kim, K., Ottosson, P.: 'A computational/experimental investigation on resistance and seakeeping characteristics of trimaran configuration in comparison with monohull'. Paper presented at the Ninth International Symposium on 'Practical Design of Ships and Other Floating Structures' PRADS', Lübeck-Travemünde, Germany, September 12–17, 2004.

Grundevik, P., Styhre, L.: 'High-speed ports for high-speed craft'. DPC Dredging and Port Construction, September 2004.

Guthed, A., Malmgren, I., Styhre, L.: 'A systematic method for analysis of performance in intermodal transportation'. Paper presented at the 16th annual NOFOMA Conference, 'Challenging boundaries with logistics', Linköping, Sweden, June 7–8, 2004.

Hua, J.: 'Assessment of the course-keeping ability of a fast ship in following waves'. Journal of Ship Mechanics, China, 2004.

Hua, J.: 'Model test for quantitative analysis of ship dynamics in waves'. Paper presented at the 7th International Ship Stability Workshop, Shanghai, China, November 1–3, 2004.

Leer-Andersen, M.: 'SSPA does more than model testing'. The Scandinavian Shipping Gazette, No 18, The Scandinavian Yearbook of Maritime Technology 2004, October 1, 2004.

Ottosson, P.: 'Cargo lashing is a delicate matter'. The Scandinavian Shipping Gazette, No 18, The Scandinavian Yearbook of Maritime Technology 2004, October 1, 2004.

Styhre, L.: 'Hindrances to efficient goods flow in port from an intermodal perspective'. Paper presented at the 4th International Congress on Maritime Technological Innovations and Research, Barcelona, Spain, October 20–23, 2004.

Trägårdh, P., Levine, R. A.: 'A study on the manoeuvring capabilities of the twin screw POLAR ENDEAVOUR class tankers'. Paper presented at SNAME Maritime Technology Conference & Expo, Washington, DC, USA, September 29–October 1, 2004.

Trägårdh, P., Lindell, P., Sasaki, N.: 'Double Acting Tanker- Experiences from model tests and sea trials'. Paper presented at the First International Conference on 'Technological Advances in Pod Propulsion: T-POD', Newcastle upon Tyne, UK, April 14–16, 2004.

During the summer 2004 a pontoon was successfully located in an area of the "Strömmen" with less traffic. The pontoon was frequently visited by people walking along the quays enjoying the beautiful view of the Old Town.

PHOTO: JIM SANDKVIST

Variety of activities along Stockholm's waterfront

Stockholm, the capital of Sweden, has a beautiful and historical waterfront area. The inner port 'Strömmen', just outside the royal castle, is a vital and important centre of all passenger transports to and from the archipelago, with more than 1.4 million passengers passing through every year. Most transport activities are performed during two intensive summer months, generating more than 11000 ship movements in very narrow basins. The waterfront area is also an attraction for recreation, shopping, pleasure boating, etc.

SSPA was recently contracted by the Stockholm port authorities in order to analyse the passenger ferry traffic situation in the 'Strömmen' area from a safety point of view and to look into the possibilities of establishing a yacht marina in this area. The presence of even a small marina is expected to generate traffic of thousands of pleasure boats in this frequented water basin. The interaction between passenger ferry traffic and pleasure boating will thus further increase the risks of collisions and other accidental situations. A number of safety measures were suggested.

Jim Sandkvist

The training includes theoretical education as well as study visits and practical exercises. For the participants from countries like e.g Cameroon, the trial with survival suit in the icy sea water at the SRS's (Swedish Sea Rescue Society) training centre at Öckerö, was a new experience.

PHOTO: CHRISTINA BACKMAN

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