SCHOOL OF NAVAL ARCHITECTURE & MARINE ENGINEERING

LABORATORY FOR MARITIME TRANSPORT
NEWSLETTER No 18
July – September 2011

http://www.martrans.org

N.T.U.A.
NATIONAL TECHNICAL UNIVERSITY OF ATHENS

Dear Reader,

The electronic newsletter of the Laboratory for Maritime Transport (LMT) of NTUA is issued regularly to inform you regarding our current and forthcoming activities. You are warmly encouraged to visit our website (*www.martrans.org*) for further information and to contact us about your enquiries. Your feedback will be highly valued. Kind regards._ *The LMT staff*

IMO business: MEPC 62 finalizes environmental risk evaluation criteria

Agony over EEDI: The LMT team (Kontovas, Ventikos, Psaraftis) at a break during MEPC 62

The 62nd session of IMO's Marine Environment Protection Committee (MEPC 62) held in London in mid-July 2011 will surely go down in history as the session in which IMO adopted EEDI, the ship's Environmental Efficiency Design Index. Irrespective of the pros and cons of EEDI, and of the debate that was held on the subject, those who witnessed first hand all the drama surrounding that decision can certainly claim 'I was there too'.

Three people from the LMT were at MEPC 62, but for a different reason: to finalize the environmental risk evaluation criteria in Formal Safety Assessment (FSA). This capped some 4 years of deliberations on the subject, starting from MEPC 56, which had noted that the one matter that needed consideration within the context of the FSA Guidelines relevant to its work was the development of environmental risk evaluation criteria. In this connection, it recognized the need to carry out a more in-depth analysis of the proposed environmental risk evaluation criteria for the purpose of the FSA before inclusion of such criteria in the IMO FSA Guidelines. At stake was the use of the CATS criterion (for Cost to Avert a Tonne of Spilled oil). Noting that more work, including more research, was needed on the subject, MSC 56 agreed to establish a Correspondence Group (CG), under the coordination of Greece and the chairmanship of Prof. Psaraftis continued in the intersessional periods between successive sessions of the MEPC 56, 57, 58, 59 and 60.

At MEPC 60 (2010) a Working Group (WG) was established for the first time, again under Prof. Psaraftis's chairmanship. The major result there was the decision to abandon the constant CATS approach and go for a nonlinear CATS function. In fact, a function proposed by Greece (based on regression analyses of IOPCF data) was chosen among a set of nonlinear functions and was proposed for further testing. NTUA-LMT was the main contributor to this analysis.

At MEPC 62, another WG was established, and Greece was represented by LMT Assistant Professor N. Ventikos and PhD candidate C. Kontovas, whereas H. Psaraftis again chaired the WG. The main results of the WG that were endorsed by MEPC 62 were as follows:

First, a consolidated oil spill database, developed jointly by Germany, Japan, Greece and the United States and based on IOPCF data, US Data and Norwegian data, was endorsed. Second, MEPC 62 agreed that the following volume-based total spill cost functions could be appropriate to be used in environmental FSA studies:

Dataset (V is spill size in tonnes)	**Total Spill Cost (2009 US dollars)**
All spills	$67{,}275\ V^{0.5893}$
V>0.1 tonnes	$42{,}301\ V^{0.7233}$

FSA analysts are free to use other conversion formulae, so long as these are well documented by the data. MEPC 62 also endorsed the WG's proposals on how to combine environmental and safety criteria for RCOs that reduce environmental and safety risk, on what should be an appropriate Severity Index, and on how to proceed on the ALARP region and F-N curves. MEPC 62 invited IMO's Maritime Safety Committee to consider the outcome of the work on environmental risk evaluation criteria, and in particular, to include the relevant parts into the FSA Guidelines.

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Working long hours: The WG on environmental risk evaluation criteria at MEPC 62

SuperGreen project news

Second plenary workshop held in Genoa

The second plenary SuperGreen workshop took place at Villa Pagoda, just outside Genoa, Italy on September 12, 2011. It attracted an audience of about 35 professionals in the area of green freight logistics. The objective was to present project results achieved thus far and obtain stakeholder feedback on a number of technical issues that can affect the economic, social and environmental sustainability of green corridors. Harilaos Psaraftis and George Panagakos represented LMT in this event.

SuperGreen Project Officer Fleur Breullin (EC DG-MOVE) addresses the audience at the Genoa workshop

The project has already completed the benchmarking of selected corridors through a number of indicators like cost, time, reliability and frequency of services, and CO_2 and SOx emissions. It is now moving into expanding the benchmarking exercise so as to incorporate technical aspects like "green technologies" and smart Information and Communications Technology (ICT) applications. These two topics were the subject of the workshop's two parallel sessions.

An extensive collection of green technologies to be applied in the selected corridors has been done with the purpose of making these corridors greener and solving the identified bottlenecks. Many innovative technologies have been identified in respect to road, rail, waterborne (inland waterway and maritime) and multimodal transport. Among them, 40 technologies have been selected as the ones with the largest potential for the project. A Technology vs. Application matrix has been created to give the primary indications about possible technology application and an assessment of their greening potential. The first session of the workshop was dedicated to identifying the most promising technologies among them and the collection of data to be used for benchmarking corridors on the basis of applied technologies. Along with the identification of green technologies, the role of ICT flows has been defined and exploited towards the goal of greener transport. The preliminary results achieved led to the classification of information flows and mode of usage. Major ICT clusters have been defined and application areas for greening via ICT have been selected. The second session of the workshop was dedicated to obtaining the stakeholders' expectations on the effectiveness of a number of ICT systems in the event they were applied on selected corridors.

The two parallel sessions were followed by a discussion among representatives of key stakeholders and the audience.

AC and PMC meetings held in Genoa

The Advisory Committee (AC) of SuperGreen met with the Project Management Committee on September 13, 2011 at the premises of partner D'Appolonia in Genoa. Much of the discussion focused on feedback received during the workshop of the previous day and the difficulties in obtaining the data needed for a reliable corridor benchmarking.

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The SuperGreen Advisory Committee with the Project Management Committee

The AC meeting was followed by an internal Project Management Committee (PMC) meeting, which assessed the status of each work package of the project and reached decisions on further actions.

Various External Presentations

Three presentations of the SuperGreen project took place in September. One was on 6-7 September, in the context of conference "Green Corridors in the TEN Network", held in Trento, Italy and organised jointly by the Brenner Corridor Platform and Arge Alp (Working Community of the Alpine Regions - Autonomous Province of Trento). Another one was on 21-22 September, in the context of the "Green Corridor" conference organized by the Polish Presidency in Szczecin, Poland. And the third one was in Bayonne, France, in the context of the 2011 Atlantic Logistics Forum organized by the Aquitaine-Euskadi Logistical Platform.

Highlighted LMT Research

A mathematical model to calculate the annual operating cost and CO2 emissions for the fleet of a liner company

In the frame of LMT research, Senior Research Engineer Panayotis Zacharioudakis, Assistant Professor Dimitrios Lyridis and undergraduate student Stefanos Baratsas have built a mathematical model which calculates analytically the annual operating cost and annual CO_2 emissions for the fleet of a liner company. Subsequently, using genetic algorithms, the model calculates the optimum fleet deployment of the company in its network of operations by using as decision variables the service speed, frequency of port calls, idle time of vessels etc. The optimization has a twin objective function (pareto optimisation): *minimizing CO_2 emissions* and *minimizing annual operating cost*.

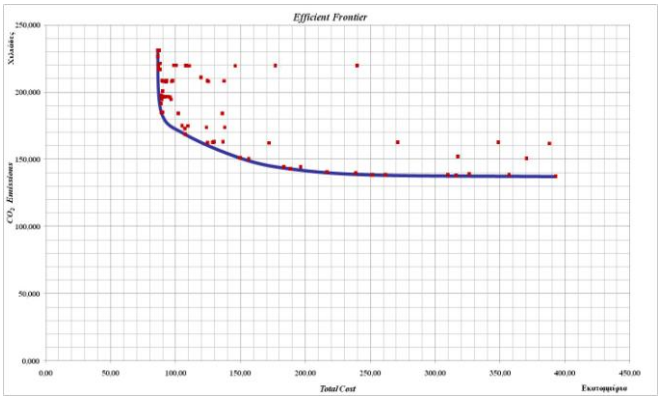

Figure 1. The efficient frontier of the optimum combinations of minimum CO_2 emissions and minimum annual operating cost.

The results are fed in an operational cost vs. CO_2 diagram (Figure 1) in order to produce the efficient set of optimum solutions.

Then Figure 2 produces the curve of minimum operating cost points as a function of different levy values. It is important to note that it will take quite a large levy for a substantial reduction of CO_2 emissions for the company under investigation. The methodology although cumbersome is really straightforward, can be applied to any shipping company operating a fleet of container carriers (although a similar procedure could be developed for companies owning other vessel types) and it may be applied for other measures aiming at reducing emissions for comparative reasons. Thus it is useful either to shipping companies aiming at reducing CO_2 emissions with the minimum cost or for the comparative assessment of the various suggested emission reduction measures for the global fleet.

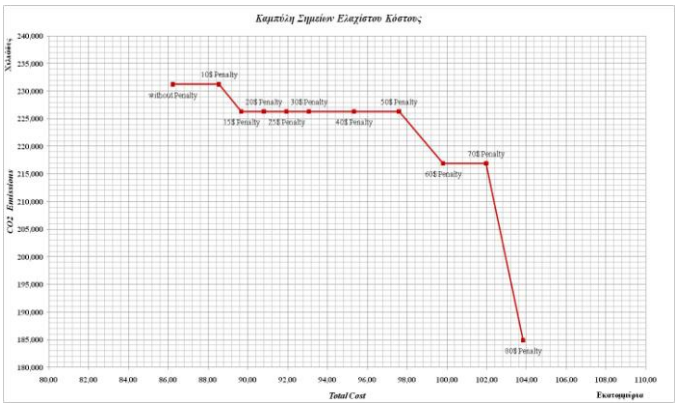

Figure 2. Minimum annual operating cost as a function of fuel levy values aiming at reducing emissions.

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Meetings and Events
attended by LMT staff

- MEPC 62 (Marine Environment Protection Committee), IMO, London, UK, July 11-15.
- Green Corridors in the TEN Network Conference, Trento, Italy, September 6-7.
- SuperGreen 2nd plenary workshop, Genoa, Italy, September 12.
- SuperGreen 3rd AC meeting, Genoa, Italy, September 13.
- SuperGreen 6th PMC meeting, Genoa, Italy, September 13.
- IMAM conference, Genoa, Italy, Sep. 13-16.
- Green Corridors conference, Szczecin, Poland, Sep. 21-22.
- 2011 Atlantic Logistics Forum, Bayonne, France, Sep. 29.

Papers, presentations and speeches
published / presented by LMT staff

- Psaraftis, H.N. (2011), "A multi-commodity, capacitated pickup and delivery problem: The single and two-vehicle cases," European Journal of Operational Research 215, pp. 572–580.
- Kontovas, C.A., H. N. Psaraftis (2011), "Reduction of emissions along the maritime intermodal container chain: operational models and policies," Maritime Policy and Management Vol. 38, No. 4, pp 451-469.
- Zacharioudakis, P. G., S. Iordanis, D. V. Lyridis, H. N. Psaraftis (2011), "Liner shipping cycle cost modelling, fleet deployment optimization and what-if analysis," Maritime Economics and Logistics 13, pp. 278-297.
- Panagakos G.P., Psaraftis H.N. (2011), "Green Corridors and the SuperGreen project: First results", presentation at the Green Corridors in the TEN Network Conference, Trento, Italy, September 6, 2011.
- Panagakos, G.P and H.N. Psaraftis (2011), "The effects of regulatory changes on green freight corridors," IMAM 2011 conference, Genoa, Italy, Sep. 13-16. In "Sustainable Maritime Transportation and Exploitation of Sea Resources," E.Rizzuto and C. Guedes Soares (eds), CRC press, pp. 807-814.
- Kontovas C.A., Ventikos N.P., Psaraftis H.N. (2011), "An updated analysis of IOPCF oil spill data: Estimation of the disutility cost of tanker oil spills," IMAM 2011 conference, Genoa, Italy, Sep. 13-16. In "Sustainable Maritime Transportation and Exploitation of Sea Resources," E.Rizzuto and C. Guedes Soares (eds), CRC press, pp. 807-814.
- Chatzinikolaou S.D., Ventikos N.P. (2011), "Sustainable maritime transport: An operational definition," IMAM 2011 conference, Genoa, Italy, Sep. 13-16.In "Sustainable Maritime Transportation and Exploitation of Sea Resources," E.Rizzuto and C. Guedes Soares (eds), CRC press, pp. 807-814.
- Psaraftis, H.N. (2011), "The SuperGreen project: overview and first results," presented at Green Corridors – Multimodal Sustainable Transport System' conference organized by Polish Presidency, Szczecin, Poland, Sep. 21-22.
- Lyridis, D.V (2011), 'The SuperGreen project', presented at the 2011 Atlantic Logistics Forum, organized by the Aquitaine-Euskadi Logistical Platform, Bayonne, France, Sep. 29.

CALL FOR PAPERS – SOME 2012

4th International Symposium on "Ship Operations, Management and Economics"
Athens, Greece - November 8-9, 2012.

The Greek Section of the Society of Naval Architects and Marine Engineers (SNAME) would like to invite you to take part in this event by presenting a paper in one of the relevant topics of interest as described in the CFP.

Download the call for papers at
www.martrans.org/some2012.pdf

Abstracts due: November 30,2011

LMT's Lloyd's List Greek Shipping Awards