Tugs Towing & Offshore Newsletter

LEKKO All about tugs

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Buying, Sales, New building, Renaming and other Tugs Towing & Offshore Industry News

MIDWEEK–EDITION

TUGS & TOWING NEWS SPECIAL

TUGNOLOGY 2015

OPENING BY CAPT. DON COCKRILL

After four hugely-successful Tugnology events, in Southampton in 2007 (183 delagates), Amsterdam in 2009 (274 delegates), Antwerp in 2011 (318 delegates), London in 2013 (324 delegates), again this two-day tug conferences is hold in London. The hands-on, nuts-and-bolts focus of the papers and the lively forum sessions have proved again extremely popular with delegates. The immensely useful information and interaction they provide, together with the extensive networking opportunities at the event, have been shown to drive forward both business relationships and key elements of the development of our industry. Captain Don Cockrill, Chairman, United Kingdom Maritime Pilots has present the inauguration of this Tugnology '15 conference.

COMPANIES REPRESENTED AT CONFERENCE

360-Control, The Netherlands • ABB Pte Ltd, Singapore • Al Masaood, United Arab Emirates • Mike Allen, Arbitrator and Mediator, UK • Alphatron Marine, The Netherlands • Andofe Shipping Management srl, Italy • Anglo Belgian Corporation NV, Belgium • APB Marine Ltd, UK • Aramco Overseas Company, UK • Aspin Kemp & Associates, Canada • BA Griffin Associates Inc, USA • Bogazici Denizcilik AS, Turkey • Boluda France AS, France • Boskalis, The Netherlands • Breakwater Group, Canada • British Marine, UK • Bugsier Reederei und Bergung GmbH & Co KG, Germany • Burchett Marine Inc, Canada • Bureau Veritas Marine Nederland BV, The Netherlands • Bureau Veritas, France • Caterpillar Financial, Spain • Caterpillar Marine, Germany • Caterpillar Marine, USA • Century Marine Services Ltd, UK • Cheoy Lee Shipyards Ltd, Hong Kong, China • Cintranaval Ship Design, Spain • Commonwealth Bank of Australia, UK • CPT Remolcadores SA, Chile • Crowley Marine Solutions, USA • Cummins Holland BV, The Netherlands • Cummins Inc, UK • Cummins Inc, USA • Cummins UK, UK • Damen Shipyards Gorinchem, The Netherlands • Damen Shipyards Hardinxveld, The Netherlands • DMT Marine Equipment, Romania • DMT Marine Equipment, The Netherlands • DSB Offshore Ltd, UK • DSM Dyneema, The Netherlands • Dynamica Ropes ApS, UK • EASA Estaleiros Amazônia SA, Brazil • Echo Cargo & Shipping LLC, United Arab Emirates • EDDY Tug BV, The Netherlands • Far East Towing Company Ltd, Japan • Force Technology Division for Maritime Industry, Denmark • M J Gaston, UK • GE Transportation - Marine, The Netherlands • General Electric LLC, Norway • Gleistein Ropes, Sweden • Gleistein Ropes, The Netherlands • Gondan Shipyard, Spain • GPC Tugs, Colombia • Greenbay Marine Pte Ltd, Singapore • Heila Cranes Nederland BV, The Netherlands • Helm Operations, Canada • Hill Marine Consulting Services Inc, Canada • Ibercisa, Spain • Imtech Marine, The Netherlands • International Maritime Services, Australia • International Tug & OSV, UK • Iskes Towage & Salvage, The Netherlands • Jastram Technologies Ltd, Canada • Jensen Naval Architects and Marine Engineers, USA • JonRie InterTech LLC, USA • Kaiyo Kogyo Corporation, Japan • Karmøy Winch AS, Norway • Kawasaki Heavy Industries (Europe) BV, The Netherlands • Kawasaki Heavy Industries (UK) Ltd, UK • Kluber Lubrication LP NA, USA • Kohler Power Systems, The Netherlands • Kotug International BV, The Netherlands • Kotug UK Ltd, UK • KTK Tugs, Netherlands Antilles • Kumera AS, Norway • LamaLo Technology Inc, Canada • Lankhorst Ropes UK Ltd, UK • Lankhorst Ropes, The Netherlands • Lekko ITES, The Netherlands • Lloyd's Register EMEA, The Netherlands • Logan Clutch Corporation, USA • Logic Vision, The Netherlands • Maestro Iletisim Grubu, Turkey • MARIN (Maritime Research Institute Netherlands), The Netherlands • Marine Services (PVT) Ltd, Pakistan • Marine Services

Company Ltd, Saudi Arabia • Markey Machinery Company Inc, USA • Marlow Ropes Ltd, UK • Martek Marine Ltd, UK • Martin Ottaway Van Hemmen & Dolan Inc, USA • McKeil Marine Ltd, Canada • MedMarine, Turkey • Micanti BV, The Netherlands • MTU Benelux, The Netherlands • MTU Friedrichshafen GmbH, Germany • Multraship Towage & Salvage, The Netherlands • Nautican Research & Development Ltd, USA • Newfoundland Transshipment Ltd, Canada • Novatug BV, The Netherlands • Ocean Group, Canada • Ocean srl, Italy • Offshore Ship Designers BV, The Netherlands • Ortlinghaus-Werke GmbH, Germany • P Hoenderop BV, The Netherlands • P&O Maritime FZE, United Arab Emirates • Pangea Marine Trade AS, Turkey • Piriou / SEAS, Vietnam • Piriou, France • Pon Power BV, The Netherlands • Redwise Maritime Services BV, The Netherlands • Remolcadores de Puerto y Altura SA (REPASA), Spain • Remolcadores Ultragas Ltda, Chile • Ridderinkhof BV, The Netherlands • Riverwijs Pty Ltd, Australia • Rivtow Marine, Australia • Robert Allan Ltd, Canada • Rolls-Royce OY AB, Finland • Rosetti Marino SpA, Italy • Rotortug BV, The Netherlands • Royston Ltd, UK • Samkwang Shipbuilding & Engineering Co Ltd, Korea • Samson, UK • Samson, USA • Sanmar AS, Turkey • Schottel GmbH, Germany • Schottel Nederland BV, The Netherlands • Seabulk Towing Inc, USA • Seacontractors, The Netherlands • Seatrade Communications, UK • SeaWays Consultants Pty Ltd, Australia • SeaWays Europe Ltd, UK • SeaWays Europe, UK • Serco Marine Services, UK • Servicios Maritimos de Baja California S de RL de CV, Mexico • Serviport SA, Colombia • SGF GmbH & Co KG, Germany • Ship & Boat International, UK • Ship's Equipment Centre Groningen BV, The Netherlands • The Shipowners' Protection Ltd, UK • Simrad, UK • Simrad, USA • Smit Lamnalco, The Netherlands • Smit Towage North West Europe, Belgium • Andy Smith, Freelance Marine Journalist, UK • Solent Towage Ltd, UK • Svitzer Americas Ltd, USA • Svitzer AS, Denmark • Svitzer Asia Middle East & Africa, United Arab Emirates • Svitzer Australia, Australia • Svitzer Europe, UK • Systems Interface Inc, USA • Techsol Marine Inc, Canada • TOS Energy & Maritime Solutions, The Netherlands • Total AMS Pty Ltd (TAMS), Australia • Towingline, The Netherlands • TradeWinds Towing LLC, USA • Tripmare SpA, Italy • Tug Malta Ltd, Malta • TugDoc International, The Netherlands • Twin Disc International SA, Belgium • United Kingdom Maritime Pilots' Association, UK • Unterweser Reederei GmbH, Germany • Uzmar Workboat and Tug Factory, Turkey • Veth Propulsion, The Netherlands • Victaulic, France • Voith Turbo BV, The Netherlands • Voith Turbo Güç Aktarma Teknigi Ltd Sti, Turkey • Voith Turbo SA, Spain • Voith Turbo Schneider Propulsion GmbH & Company KG, Germany • VSTEP Simulation, The Netherlands • Vulkan Industries Ltd, UK • Vulkan Kupplungs und Getriebebau Bernhard Hackforth GmbH & Co KG, Germany • Warsash Maritime Academy, UK • Wärtsilä Italia SpA, Italy • Wärtsilä Netherlands BV, The Netherlands • Wärtsilä UK Ltd, UK • Westug, Australia • Wilson, Sons Group, Brazil • Wilson, Sons, Brazil • WK Hydraulics BV, The Netherlands • WKM Cornelisse Trading BV, The Netherlands • Astilleros Zamakona SA, Spain • ZF Marine Krimpen BV, The Netherlands

CHRISTENING OF THE RT EVOLUTION

On the Monday evening 18th May, before the conference started Damen and Kotug had chosen Tugnology '15 as the venue to christen the new Damen-built hybrid Rotortug **RT Evolution** which took place on the River Thames. Mrs. Elizabeth Brunton-Reed, spouce of Allan Brunton-Reed Chairman Tugnology 2015, was honoured to christen the vessel. *(Photo: Willem Holtkamp)*

PAPERS

The two day conference covered various aspects relating to the tug in General, but especially the technical aspects. The conference gives a great deal of thought to the topics covered in this year's papers, and have emphasised the key issues currently affecting the industry, including: fuel efficiency; tug safety; performance optimisation; use of alternative fuels, including LNG and hybrid battery systems; and crew comfort.

Fourteen topics are been covered during the two days. These are extensively explained by specialists in this field.

Below the fourteen chapters showing the synopsis of the papers.

The conference was chaired by Mike Allan, long standing ITS Convention chairman.

Paper 1;

HIGHER TUG CREW COMFORT FOR ADVANCED SOUND AND VIBRATION CONTROL

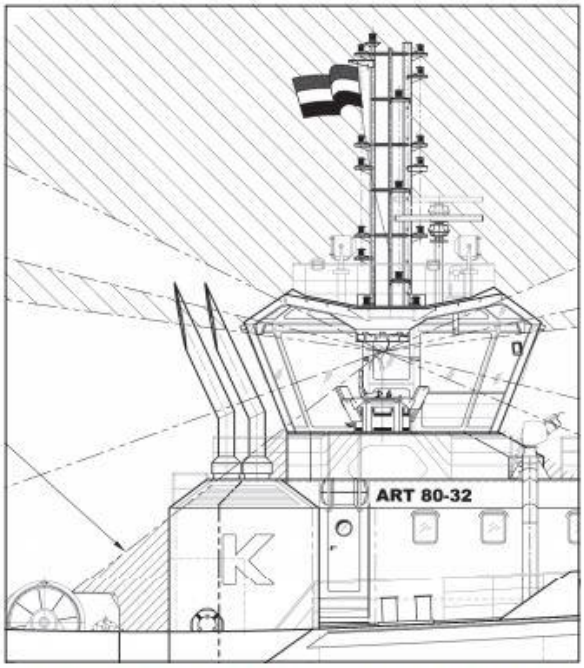
With the continuously increasing focus on crew comfort on board tugs, it becomes crucial for a tug designer to have a deeper knowledge of sound and vibration. The Damen Research Department is constantly exploring new technologies, as traditional approaches to sound and vibration control might not be sufficient in the future. As a designer and builder of standardised vessels, Damen has the opportunity to invest in state-of-the-art technologies and profits from continuous feedback. A parallel with the car or aircraft industry is easily drawn. When it comes to sound analysis, new measurement and calculation techniques originating from these industries have been investigated for their application in tug design in order to gain more insight into sound behaviour. This paper deals with the promising results of the latest research and how Damen implements these techniques to improve crew comfort on tugs.

Reference sensor on one of the main engines

Receiver microphone in one of the cabins

This paper was extensively explained by the specialists; Tjakko Keizer, Principal Engineer Sound & Vibration, Damen Shipyards Gorinchem, The Netherlands and Jochem de Jong, Project Manager Research, Damen Shipyards Gorinchem, The Netherlands

Paper 2;
BRIDGE ERGONOMICS - FASHION OR FUNCTION?



Sightlines and visibility of Alphabridge on ART80-32 tug

With the introduction of so many innovative ideas relating to tug operations worldwide, the main control position, the bridge, is still so often a 'forgotten priority'. Where shipbuilders can reap the production benefits of a modular ergonomic bridge concept and operators can reap both operational and efficiency benefits, the time is right to consider bridge ergonomics as a vital part of a ship's operations. We will introduce our own ideas on how to answer the question with our Alphabridge concept, explaining how the concept was realised, and will accompany our explanation with some photos and a short video during the presentation.

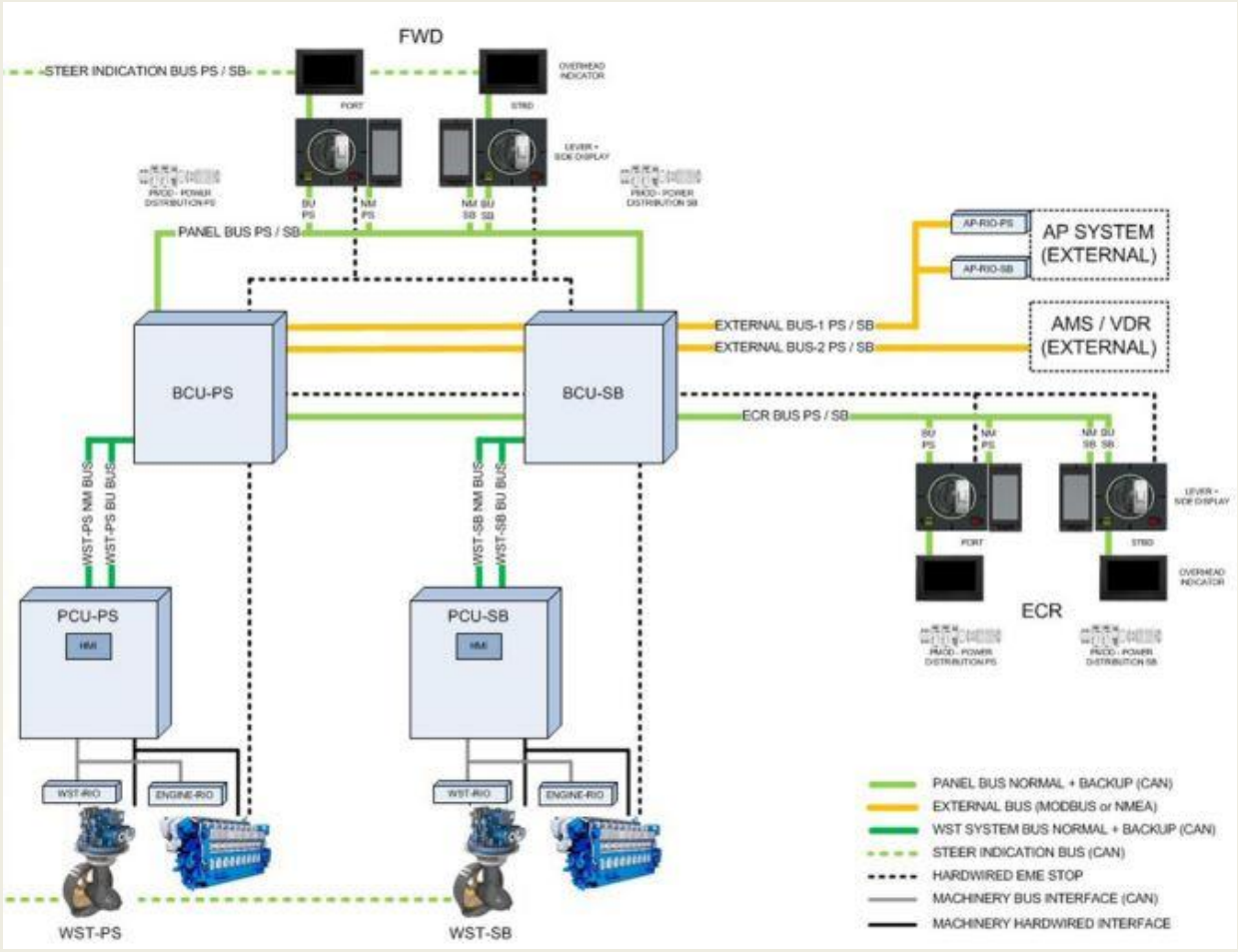
When looking at rules for classification of ships in general, various items can be linked to bridge ergonomics, varying strongly according to the type of vessel, field of operation and classification society. These rules for nautical safety are set up with the objective of reducing the risk of failure and achieving optimum safety and efficiency in bridge operation.

This paper was extensively explained by the specialist; Gerard van den Baard, General Manager of Sales, Alphatron Marine, The Netherlands

Alphabridge tugboat design

Paper 3;

THE BENEFITS OF SYSTEM INTEGRATION ON PROPULSION UNITS FOR TUGBOAT APPLICATIONS



Propulsion controls system layout for a typical tugboat application

The market for tugboats provides a lot of challenges to the propulsion system designer. While bollard pull performance, manoeuvrability and compactness remain critical matters, additional attention needs to be paid to energy efficiency, environmental aspects and ease of installation. The paper will emphasise the efforts of Wärtsilä Propulsion to develop a new thruster series, especially designed for new tugboat generations up to 110 tonnes bollard pull, with thruster powers ranging from approx 1 to 3 MW. Beyond the requirement for unit efficiency and ship integration, the system compactness is addressed in detail. The new thrusters provide extensive system integration and all auxiliary systems are integrated into the compact thruster which reduces space requirements and simplifies the installation of the thruster. Next to hydraulic steering, electrical steering is available as an option. The lubrication system is fully integrated within the thruster with new innovative components. The new thruster series is compliant with US EPA VGP2013 regulations without the need to use environmentally acceptable lubricants (EAL) in the entire thruster. The propulsion controls include the Wärtsilä ProTouch bridge system and an advanced layout in the machinery room introducing new field bus technologies.

This paper was extensively explained by the specialist; Dr Elias Boletis, Director R&D, Wärtsilä Ship Power, The Netherlands

Paper 4;
USE OF MODERN RADAR IN TUG OPERATIONS

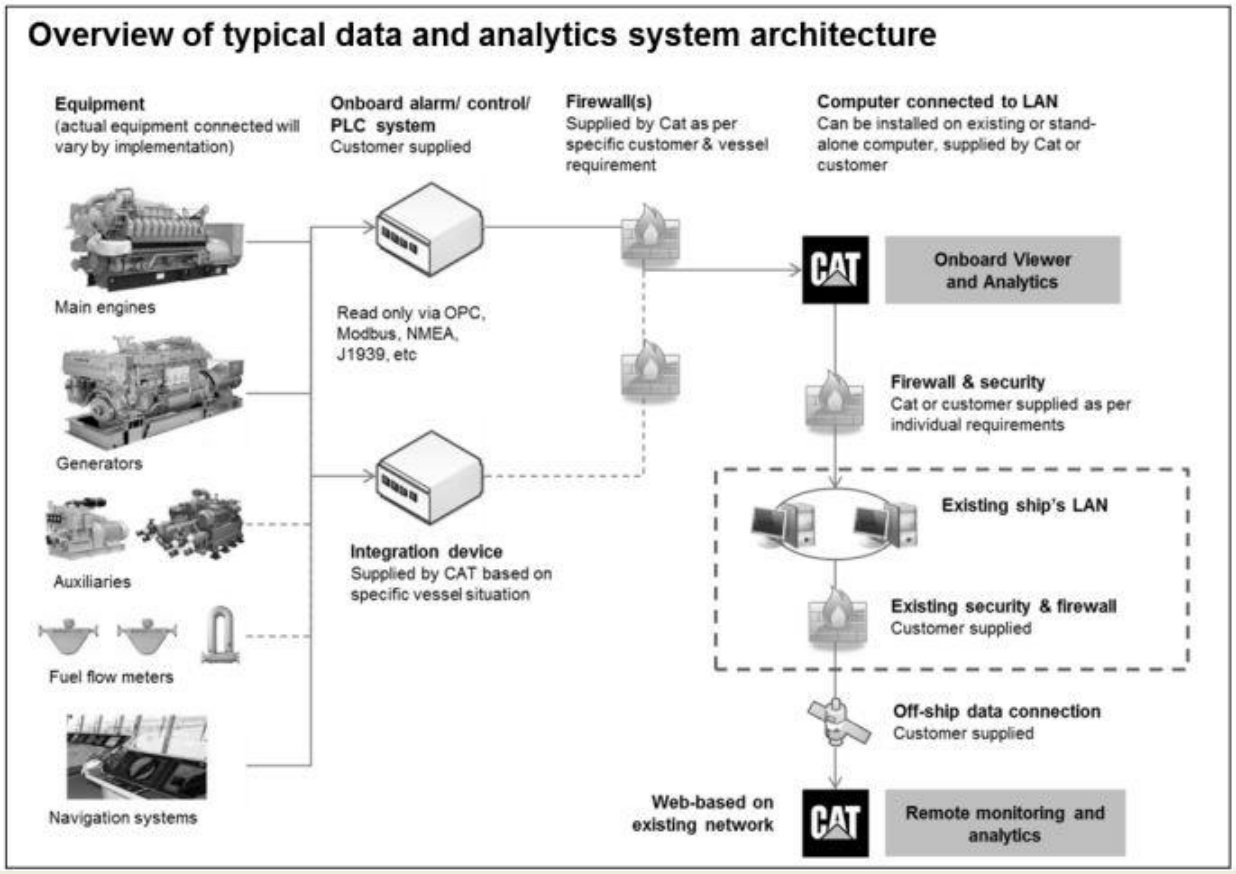
Kalakala's captain with ship's radar, 1946

In this paper, the use of modern integrated radar systems to secure a safer, more predictable and more efficient way to commence tug operations will be discussed. The various radar uses in different applications, as well as new radar technologies, will be explained along with how to choose and use the right radar for your specific applications. Hardware systems reviewed will be of the traditional pulse type, along with newer solid state frequency modulated continuous wave (FMCW) radars. Reviews of specific radar feature subsets, such as small target detection and ice navigation, will also be provided. The assertion of this paper is that a percentage of vessel operators may lack sufficient knowledge of currently available radar systems to proactively make an informed decision as to whether the technology should be deployed within their fleets. It is presumed difficult for key decision-makers to quantify the return on investment of newer non-traditional radar systems, based on the limited feature ceilings typically seen on their currently installed radars. Perception of a specific type/brand/model aside, isn't radar just a radar?

Modern tug radar operator station

This paper was extensively explained by the specialist; Stephen Furr, Business Acquisition Manager, Simrad, USA

Paper 5;
THE VALUE OF MARINE ANALYTICS IN THE TUG AND OSV INDUSTRY



Overview of illustrative application of LLoT in the marine industry

Ship-owners, managers and crews are continuously being challenged to increase the return on investment (ROI) of their assets. The next generation of performance improvement involves enabling relevant stakeholders, from onboard operators to vessel owners, to use technology to make better maintenance and operational decisions. Caterpillar recognises this market need and uses automated advanced analytics and expert engineering advisory services to turn onboard data into actionable information for more than 23 critical systems on the vessel. This can help to optimise maintenance, avoid equipment failures, improve vessel or equipment performance, increase fuel efficiency, increase safety, and/or increase overall asset productivity. Using data analytics to improve tug and offshore operations and maintenance has the potential to create billions of dollars of value in the marine industry today and even more in the future. This Industrial Internet of Things (IIoT) concept – connecting machines and using automated data analytics along with domain expertise to optimise operations and maintenance – has already created significant value in many industries such as power generation and commercial aviation and is now becoming a reality for the marine industry. While the opportunity across industries will exceed US$10tn per year in the enxt 15 years, the opportunity for owners and operators to reduce costs, improve fuel efficiency, and increase uptime and reliability is approximately US$20bn today for the entire marine industry and will exceed US$50bn by 2030.

This paper was extensively explained by the specialist; Leslie Bell-Friedel, Marine Product Support Regional Manager, Caterpillar Marine, USA

Paper 6;

THE RANGLER - LOOKING AT LNG-POWERED TUGS WITH FRESH EYES

The LNG fuel module

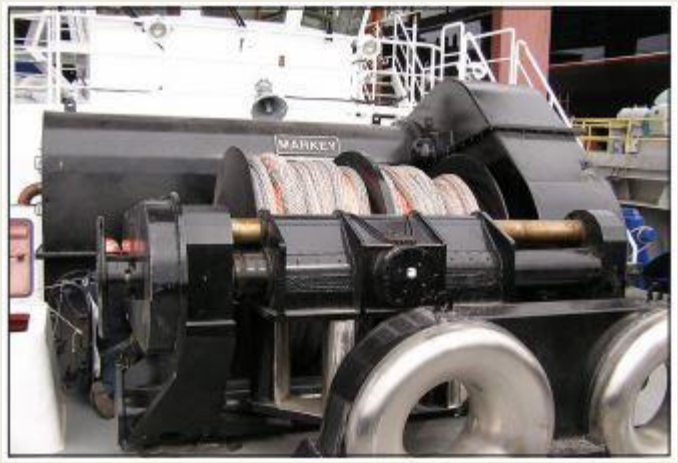
Since the industry first started looking at LNG as a primary fuel in small vessels such as tugs, the focus to date appears to have been on how to fit the large gas tanks and associated components into a more-or-less conventional tug package. Robert Allan Ltd believes that the use of such a fuel requires a complete rethink of what a tug should look like in order to accommodate, and more importantly, take maximum advantage of, the benefits of LNG. The RANGLer concept will be presented and the many features which distinguish this design will be highlighted. What would an LNG-fuelled tug look like for my operation? Can I use an existing design which has proved successful and modify it to use a different fuel? Better yet, can I convert existing conventional tugs in my fleet to run on LNG? Wheter the motivation is economic, environmental, or a combination of both, these are the types of questions which are being commonly asked by tug operators in the industry today. Of course, the first priority with any tug design is to ensure that the vessel is optimised for its primary function, Whether towing, ship-assist, or escort. A poorly designed tug that successfully integrates LNG is still a poor tug. Whether related to space, location, additional hazards, or other constraints, there are many opportunities for an LNG tug's design to become more about accommodating the LNG system than about good towing performance. Despite the additional challenges presented by LNG, use of this fuel is no excuse for poor tug design.

The RANGLer design

This paper was extensively explained by the specialist; Kenneth Harford, Managing Director, Robert Allan Ltd, Canada and Mike Philips, Naval Architect, Robert Allan Ltd, Canada

Paper 7;

TUG SAFETY AND MODERN TECHNOLOGY - A WINCH ENGINEER'S PERSPECTIVE



Griffin bullnose fairlead by Markey Machinery Company

The case is made that modern technology, though providing more capabilities, does not inherently improve safety. For instance, extensive use of computers and sophisticated sensors adds many parts to a system and may require new strategies to maintain or improve reliability. This is in particular an issue for tugs, because, in contrast with industrial operations, when inoperability occurs on a tug, there is often no time to fix things and an abort or mission failure will occur. Being out at sea for longer periods with broken or poorly performing equipment is a problem as well. Remedies for these situations are discussed, in particular providing redundancy and the capability to remotely troubleshoot problems, adjust controls and assist with shipboard repair. Simplifying design rules and increasing safety factors are also addressed, as well as the desirability of management safety rating. Emphasis is placed on the need to recognise that tug operations are complex, as three variable and often unpredictable environmental forces, wind, waves and currents, are acting on the tug and the assisted ship, requiring the operator to make complex judgments. The case is made that safety can be improved not only by better training, more reliable equipment and better troubleshooting, but also by providing more tugs, so that when a tug gets into a difficult situation it can back off timely and let another tug take over until it has been able to get itself in a better position. This is the ultimate redundancy. Suggestions for a test and training programme conclude the paper. As winch engineers, we got more involved in the operational aspects of tug safety and crew training than many other tug equipment engineers and even naval architects, because the winch is the main tool for the tug operator when in adverse situations. Pushing with the fenders, the other tool the tug operator has to induce forces on the assisted ship, is usually not practical in adverse situations. We often get involved in the early stages of the crew familisation with a new tug, as we have to explain how the winch and all its modern controls work and how this modernisation can help them better deal with their challenges. Typically, the more sophisticated the equipment is, the more we participate and get exposed to the man-machine interface issues that modern technology presents to the operators. It gives us a perpective that we thought may be interest to others in the industry.

This paper was extensively explained by the specialist; Peter Hammerschlag, Chief Engineer, Markey Machinery Company Inc, USA and Scott Demers, President, Systems Interface Inc, USA

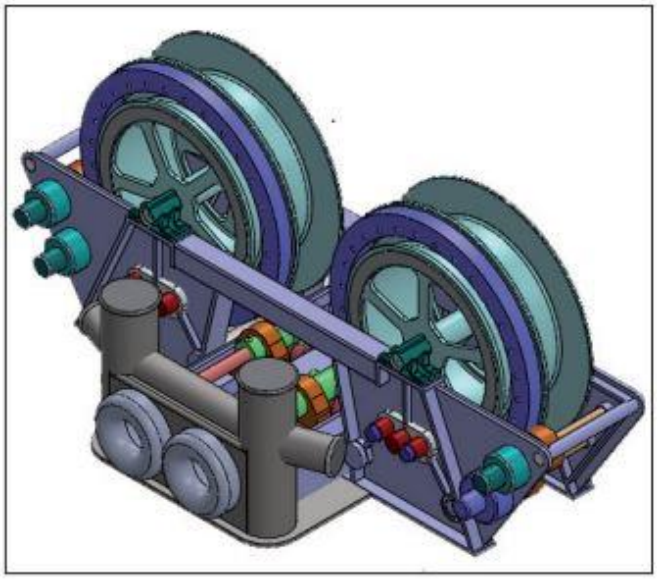
Paper 8;

THE COMPACT FOREDECK - OPTIMISING WORKING DECK SPACE AND TOWING LEVERAGE FOR ASSIST AND ESCORT TUGS IN THE 50 TO 125-TONNE RANGE

The authors propose a new foredeck general arrangement for ship assist and tanker escort tugs. The design is based on a new hawser winch and structural concept. The content is relevant to: the safe handling of oil and gas tankers in harbours and open ocean conditions; ship handling tugs fitted with specialised

Close coupled spooling system and V staple on Crowley VSP tug Response

winches and winch control systems; high molecular weight (HMPE) synthetic hawsers; deck-mounted hawser fairleads (staples and bitts); naval architecture and marine structural engineering; and the Capex and Opex associated with the shipyard construction and on-going operations of hawser-based ship handling tugs. The performance, power, and complexity of tugs engaged in manoeuvring large oil and gas tankers has steadily increased worldwide in the decades following World War II. While much progress has been made, innovation remains important in meeting the emerging commercial missions and environmental mandates of harbour towage, open water terminals and multi-mission operations.



Griffin Lotus double drum assist-escort winch (guards not shown) – patent pending

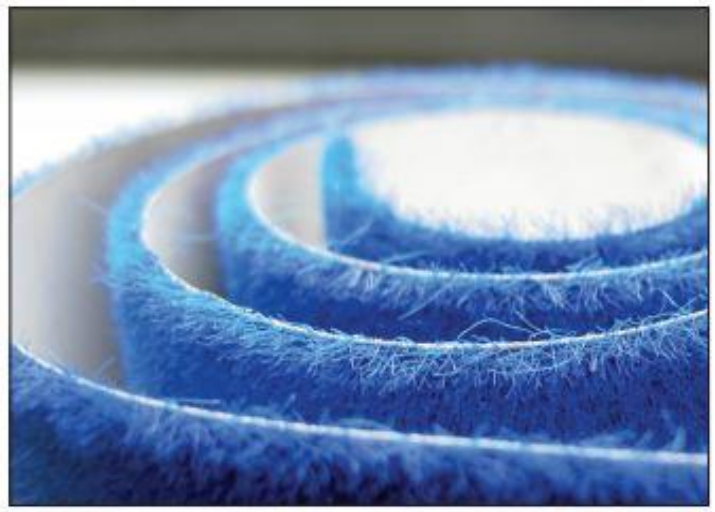
New missions challenge all aspects of tug design, hull shape and structure, propulsion, winches, hawsers, construction, training, with few exceptions, demand more total power, and his power must be incorporated into the tug

safely, efficiently, and at lowest overall capital and operation cost.

This paper was extensively explained by the specialist; Jonathan Parrot, Vice President, New Design Development, Jensen Naval Architects and Marine Engineers, USA and Barry A Griffin, President, BA Griffin Associates Inc, USA

Paper 9;

A COMPARATIVE STUDY OF THORN-D ANTIFOULING AND COPPER-BASED ANTIFOULING ON TWO HARBOUR TUGS



Early in 2013, two new harbour tugs were deployed for the Port of Amsterdam in the Netherlands. One was coated with a regular antifouling paint, the other with Thorn-D antifouling foil.

Thorn-D can be applied on flat surfaces, such as ship hulls, as a foil

The vessels were then inspected two to three times per year. This paper presents the results of comparing the coatings after two years in full service, and also explains some differences in areas such as application, repairs and cooling. Since the announcement of the worldwide ban on TBT-based antifouling coatings by the International Maritime Organization (IMO), the search for alternatives has taken off. So far, the only real choice has been to use copper-based antifouling coatings. These are far less effective, however, and as the toxicity of copper is also apparent, an additional search for long-lasting alternatives is being pursued by many research institutes and paint manufacturers. So far, paint companies have all chosen to aim for new biocidal approaches, or have developed non-stick or fouling-release coatings through silicone or fluoropolymer-based technologies (still combined with biocidal action). Micanti has chosen a different approach with its Thorn-D® product. Instead of smoothing the surface and creating a low-energy surface (hydrophobic), Micanti's solution uses small fibres ('thorns') to make surfaces unattractive for settlement by fouling species, such as barnacles, mussels and algae.

This paper was extensively explained by the specialist; Dr Rik Breur, Managing Director, Micanti BV, The Netherlands.

Installation of Thorn-D on the cooling tubes of vessel Pollux

Paper 10;
PERFORMANCE MATTERS - A CASE STUDY

Performance matters, but it is difficult to quantify in the dynamic marine environment. Through this paper we aim to encourage and support companies in evaluating

Indirect mode – 8 knots

tugboat active steering and braking performance over the full operating speed range. We will show how state-of-the-art technology enables performance evaluation during routine operations and appeal to stakeholders to expand their view on navigational risk management and disclose previous results on similar trials. This paper describes the full-scale escort trials conducted with **RT Evolution**, the ART80-32 series in the North Sea basin. We discuss the requirements to meet and challenges to overcome in selecting appropriate sensor technology. We will also explore two different sensor technologies and how to make sense of the resulting data soup. Rotortug published full-scale trials data at the 16th ITS convention in 2000 after full-scale trials on **RT Magic**, a 75-tonne bollard pull 32m Rotortug. To benchmark the new

Combination arrest – 8 knots

Robert Allan design ART80-32 series and calibrate future computational fluid analysis (CFD) analysis on the Rotortug concept, we decided to conduct full-scale trials with the new ART80-32 series.

This paper was extensively explained by the specialist; Marinus Jansen, Technical Innovations Manager, Rotortug BV, The Netherlands

Paper 11;

MEETING ENVIRONMENTAL REGULATIONS WITH MECHANICAL-BASED SYSTEMS AS AN ALTERNATIVE TO HYBRIDS

This presentation will describe an alternative mechanical solution for meeting society's pursuit for reduced emissions with developments based on traditional mechanical solutions. Central to the system and operations prescribed to meet the regulations is a two-step main propulsion gear from Kumera AS. The essence of the vessel systems is that the owner has prescribed a number of operational modes.

KN 2E4D6C-2500 (left)

The operational modes may be met by setting the rev/min of the main engines as well as varying the rev/min of the Kumera gear by engaging one of the two gear steps. The operation modes are defined based on the vessel's propeller curve. The marine industry belives that hybrid solutions are coming and will provide a significant share of the engine and main propulsion market in the years to come. Currently, a number of concepts are available, ranging from inline permanent magnet motors to concepts tying proven products and solutions together via the gearbox. Kumera Norgear, as a mechanical power transmissions supplier, is focusing on concepts employing marine gears and associated controls for operation of the electrical motor in conjunction with the conventional fuel engine, main propulsion line, etc. Buksér og Berging AS, with more than 30 tugs in operation in Scandinava and the North Sea, had a requirement for reduced emissions and reduced fuel consumption from a mechanical based system, as an alternative to hybrids.

Buksér og Berging ASD 100

Kumera Norgear was contracted by Vard Brevik and Buksér og Berging to develop, engineer, test and deliver a two-step main propulsion mechanical transmission with multiply power take-offs, which is the KN 2E4D6C-2500.

This paper was extensively explained by the specialist; Mente Baak, Sales & Marketing Manager, Kumera AS, Norway

Paper 12;

THE CARROUSEL-RAVE TUG - DESIGN DEVELOPMENT OF A UNIQUE HIGH-PERFORMANCE DOCKING/ESCORT TUG

The Carrousel-RAVE tugboat concept is a unique, novel development in the tugboat industry. The design is a joint co-operation between Robert Allan Ltd, Voith, Novatug and Multraship.

Example of Carrousel tug in transverse position behind assisted vessel (prototype Carrousel tug Multratug 12)

The prototype design is for a compact, 70-tonne bollard pull vessel combining a Carrousel system with an in-line Voith Schneider Propeller configuration. With this arrangement, the tugboat can efficiently generate high forces when assisting and escorting ships by utilising the hull's own hydrodynamic characteristics, while using minimal thrust. Controllability and manoeuvrability of the tug are also enhanced, and operations in confined spaces can be executed effectively. This design is the culmination of several years of extensive numerical modelling, theoretical predictions, simulations and model tests. Experienced tug master feedback is very positive with regard to the ease of controllability of the tug and its ability to effectively perform a plethora of operations. The Carrousel-Rave tug concept is the culmination of many years of experience, research and innovation by three main companies: Robert Allan Ltd of Canada, Voith Turbo Schneider Propulsion GmbH & Co of Germany, and Multraship of the Netherlands.

Perspective rendering of Carrousel-Rave tug

The design combines the Carrousel towing system designed by Novatug and installed by Multraship on its

Multratug 12, with the unique longitudinal in-line Voith Schneider Propeller configuration pioneered by Robert Allan Ltd. and Voith. The Carrousel system has been described in papers presented at previous *ITS* and *Tugnology* conferences, beginning in 2002. Designed and patented by Novatug BV, the system comprises a compact and lightweight towing winch rotating around a circular track, counterbalanced by a hydraulic power pack.

This paper was extensively explained by the specialist; Dr Oscar Lisagor, Vice President, Naval Architecture, Robert Allan Ltd, Canada; Aandra Papuc, Naval Architect, Robert Allan Ltd, Canada; Dr Dirk Jürgens, Head of R&D, Voith Turbo Schneider Propulsion GmbH & Company KG, Germany and Leendert Muller, Managing Director, Multraship Towage & Salvage, The Netherlands

Paper 13;
ADVANCED SYSTEM SIMULATION IN TUG ENGINE DEVELOPMENT

The 16V4000M63L marine engine

This paper will discuss the advanced simulations utilised in the development of high-speed diesel and gas engines for tugs. MTU has developed a simulation tool which enables modelling of the complete ship system, including hull characteristics, combustion engine and propulsion driveline. It can be used for engine design and subsequent engine calibration (ECU mapping) on the test bench, and also for optimisation of the propulsion system performance, eg for crash stop manoeuvres. The necessary data required for the simulation is, in this case, based on extensive field experience and enhanced by dedicated tank testing, eg propeller tests for azimuth stern drives in extreme manoeuvres. We will also look at how the simulation is applied during the development of the MTU lean-burn gas engine, with a special focus on 'demanding' tug manoeuvres. Furthermore, an example will illustrate how simulation results were directly implemented to improve the manoeuvrability of a conventional twin screw propeller tug. Manufacturers of marine diesel engines are sub-suppliers to the marine industry, delivering one major component for a ship. Unlike in the automotive industry, the engine and the vehicle/vessel are not developed and assembled under one roof, which would make it possible to adept the engine to the vehicle or vice versa from the very beginning

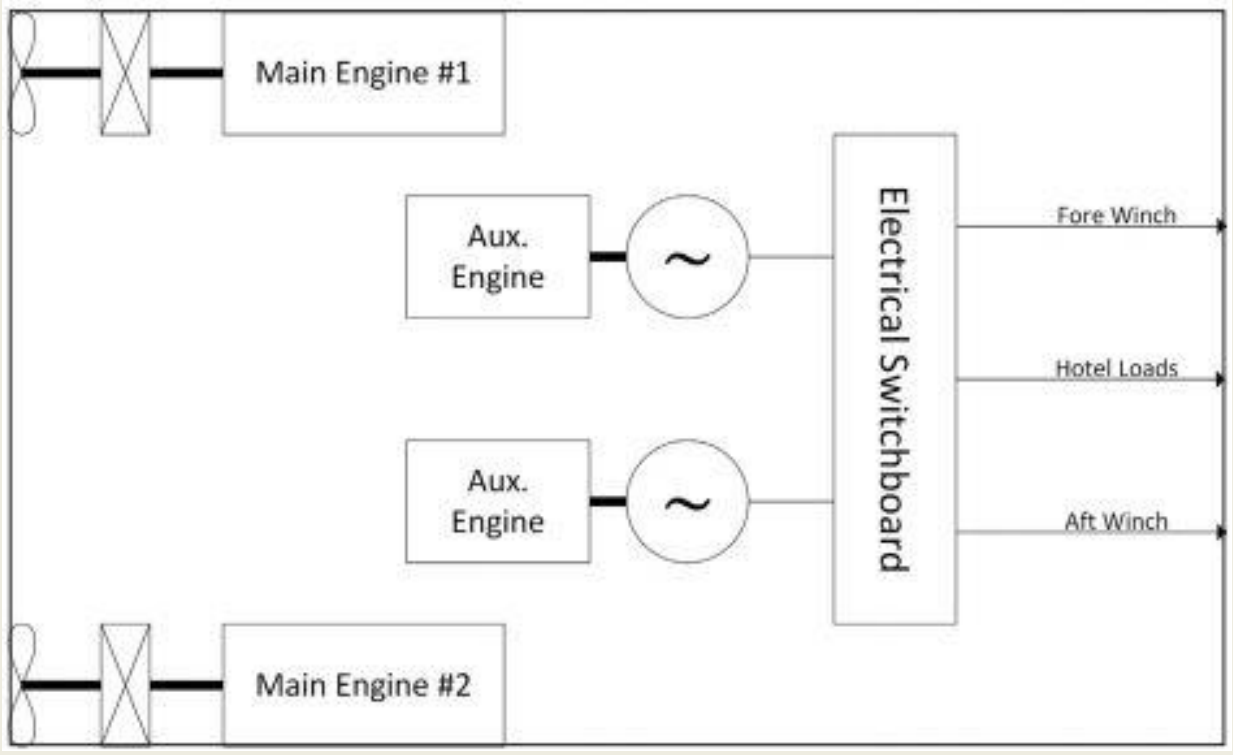
Sanmar's Boğaçay-Class tugboat available with an MTU 16V400M63L

of the product development. A propulsion engine is often designed and developed for use in various applications which often impose contradictory requirements. But the customer still expects a perfectly calibrated engine and propulsion system meeting their specific requirements.

This paper was extensively explained by the specialist; Cyrill Halbauer, Application Engineering Commercial Marine, MTU Friedrichshafen GmbH, Germany and Christoph Thielen, Thermodynamics & Control, MTU Friedrichshafen GmbH, Germany

Paper 14;

ANALYSIS OF FUEL-EFFICIENT ALL-ELECTRIC TUGBOATS

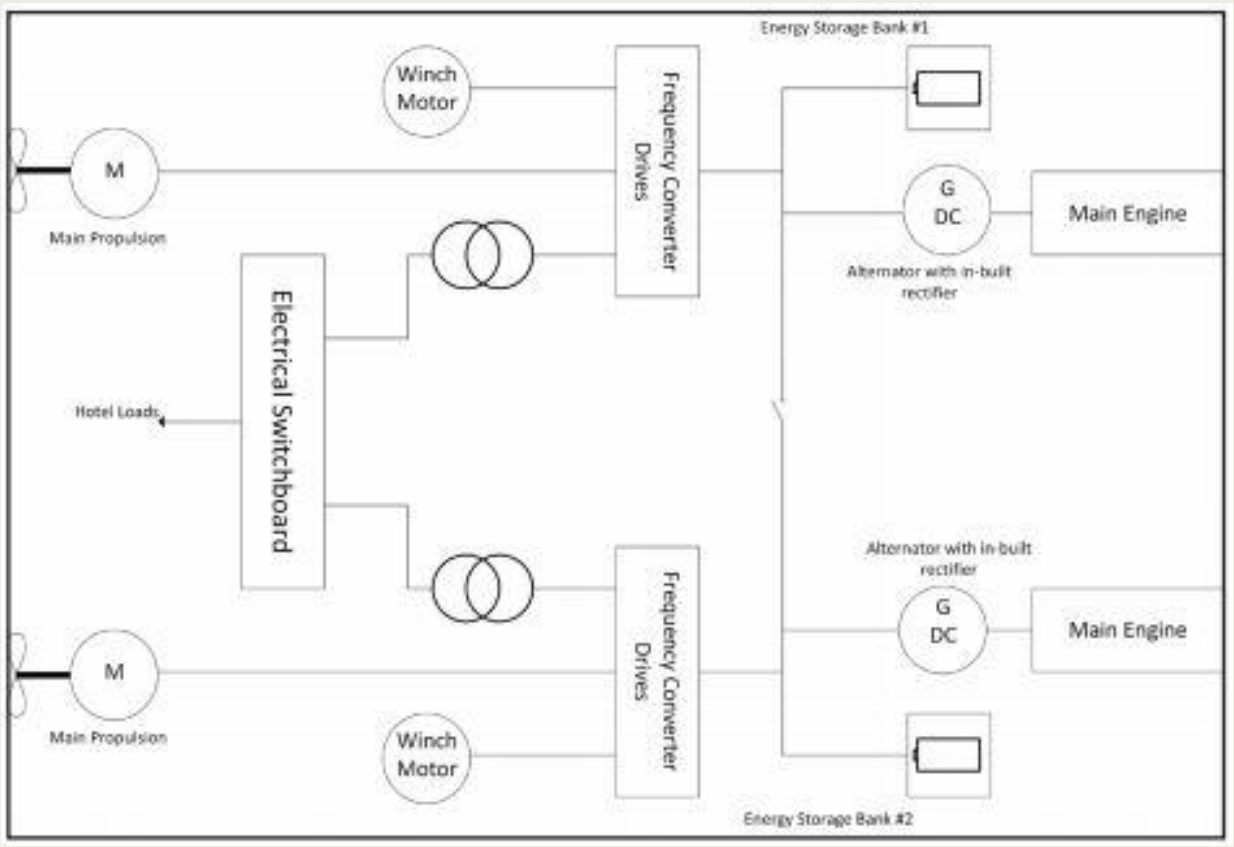


Power plant of a typical diesel-mechanical ASD tug

The increasing concerns about pollution and fuel costs have prompted widespread interest in electric and hybrid propulsion for tugboats. All-electric propulsion solutions offer many advantages. In addition to flexibility in power system design and simplicity in operation, all-electric solutions are more robust, require lower maintenance, and reduce fuel consumption and hazardous emissions. In

this paper the benefits of time-domain simulation tools for performance analysis of hybrid tug solutions with batteries will be described. Case studies analysed with such a tool will be presented and the results for all-electric and diesel-mechanical solutions will be compared. All-electric and hybrid tugboats with batteries have been increasingly considered in recent years as a replacement for the traditional diesel-mechanical tugs. In many offshore applications, electric and hybrid technologies are deemed to be the state of the art to improve fuel efficiency, reliability, and to reduce emissions. The impact of improved fuel consumption and the corresponding fuel cost and emissions become hughly significant when the entire lifecycle of the vessels is considered.

This paper was extensively explained by the specialist; Dr Ricky Chan, Product Manager, ABB Pte Ltd, Singapore.



Power plant for an all-electric hybrid concept with DC distribution system

THE ABR COMPANY LTD. - TEAM

The organisers of the Tugnology 2015 conference is the ABR Company Ltd. This 'no-frills' technical conference on the design, construction, operation and economics of tugs, was organised by the same team as the highly-successful ITS Convention. Here we like to presented this team.

Chairman
Allan Brunton-Reed

Managing Director
Garth Manson

Convention Secretariat
Val Harris

Conference Chairman
Michael Allen

Advertisement Director
Nickie Hoddinott

Business Development Manager
Helen Stephen

THANKS TO TUGNOLOGY 2015

Towingline/Tugs Towing & Offshore News thanks the organisation ABR Company team of the Tugnology 2015 with this successful two days focus on the design, construction and economics of tugs. For, again, the good organized instructive two conference days, their hospitality and invitation.

Thanks also for the excellent diner on Tuesday sponsored by Damen Shipyards; Netherlands

Thanks also for the lunches on Tuesday and Wednesday sponsored Uzmar Workboat and Tug Factory; Turkey

Thanks also for the coffee and tea breaks during the conference days sponsored by MTU; Germany.

Thanks also for all the Speakers for their extensively explanations of the papers.

A DECADE AGO AND TODAY'S HARBOUR TUGS

A decade of difference in design, technic, fuel efficiency, safety and performance optimisation.

Not only the shipping world has changed also the towing and tugboat industry has undergone a change

Tugnology has showed over the years to get a best tug you can get.

The **Helen L. Tracey** (left) with a raised pilothouse because of her employment in New York. Powered by a 400 horsepower two cylinder compound steam engine fed by a coal fired boiler.

The **Eddy 1** one of the latest new designed tugs with around view pilot house. With azimuth thrusters forward and aft, hybrid drive train to ensures optimized fuel economy in all operational modes.

After a period of 5 years to have the Newsletter sent continuously, in the next two weeks the Tugs Towing & Offshore Newsletter will not or appear limited because of my holiday. Thanks for your understanding

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Last week there have been new updates posted:

1. Several updates on the News page posted last week:

   - *EDDY Tug launches new 24 meter design*
   - Svitzer awarded new contract in Northern Canada, servicing Baffinland at Milne Inlet
   - Eastern Shipbuilding Group, Inc. Delivers the M/V BILL SEYMOUR for Florida Marine Transporters, Inc.
   - Vane Brothers welcomes Kings Point as the company's latest Maryland—tugboat

mailto: *jvds@towingline.com*

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