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Historic Ships

International Conference on

Historic Ships

25-26 November 2014, London, UK

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DAY 1 PAPERS:

09.00-09.30 **COFFEE & REGISTRATION**

09.35-10.10 **CREATING THE QUEEN'S ROWBARGE "GLORIANA"**
Stuart Roy, FRINA, Independent Naval Architect, UK

"Gloriana" was the first Royal Rowbarge to be designed and built since Prince Frederick's Barge of 1732. By recreating an impressive historical reflection of how monarchs passed up and down the great River Thames she stole the show at the Diamond Jubilee Pageant held on 3rd June 2012. To the public the 88ft "Gloriana" with her sweeping lines, 18 oarsmen in livery, rich decoration, glided adornment and royal crests is the epitome of the state barge as seen in the paintings of Canaletto (c1747), but she is also a UK Class V Passenger Ship certified for 52 persons, built in wood to Lloyds and complete with the full lifesaving appliances and fire-fighting equipment required for her class. She also has watertight bulkheads, flushing toilet with holding tank, twin electric engines powered by lithium batteries for repositioning between engagements and a bow-thruster to provide additional flexibility and instant power when manoeuvring in crowded waterways. The paper will provide some background to the project including the historical research undertaken before looking in more detail at some of the technical challenges and decisions made by the naval architects involving hull form, powering, construction, stability and engineering, as well as the project management required to complete the building in a construction time of just 22 weeks.

10.10-10.45 **RESTORATION OF PS MEDWAY QUEEN, THE SUCCESSFUL END OF THE FIRST PHASE**
W B Davies, Wyn Davies 5201 Consultancy Ltd, UK

This paper reports on the successful conclusion of the task of producing an accurate replica of the riveted hull for the paddle steamer Medway Queen, where technical consultants to the Medway Queen Preservation Society, together with David Abels as the build contractor, set out in late 2008 to interpret the 1924 steelwork drawings and build a new, completely riveted hull. It illustrates how the inspection and acceptance procedures put in place allowed for a smooth and relatively uneventful transition from shipyard to owner and also covers the delivery voyage from Bristol to Gillingham on the Medway. Although no longer classed as a Passenger vessel under current regulations various alterations were made to satisfy any future relaxation of the regulations and as a matter of due diligence in ensuring the safety of her crew when the final phase is concluded and the vessel is able to proceed under her own power. The paper will also review the activities necessary to setting in motion this final phase of the restoration and the fundraising needs. The successful outcome of the first phase of the restoration is demonstrated by the new hull alongside at Gillingham Pier.

10.45-11.15 **COFFEE**

11.15-11.50 **HMS VICTORY: MODELLING AND STRUCTURAL ANALYSIS: HOW THIS CONTRIBUTES TO THE CONSERVATION OF NELSON'S FAMOUS FLAGSHIP**
Richard Fenton, Fenton Holloway Ltd., UK

HMS Victory has been sitting in a dry dock supported on its keel and steel cradles since 1922. Since then movement in the hull has occurred and is continuing. National Museum of the Royal Navy commissioned this structural analysis project to assess the current structural stability and establish the causes of the movement. The authors have developed techniques for analysis for deteriorated historic structures to enable a 'minimum intervention' approach to repair. Publicly accessible structures including seaside piers, bridges, buildings and ships (in dry dock) have been restored by this method. The application of this approach to Victory represents a significant increase in complexity over previous work. Starting with laser scanning, graphical outputs from a very large analytical model were produced. A 'solid' digital model of all the components, a wireframe 'perfect model' and a 'degraded model' incorporating known defects were intermediate stages involved. The analysis showed that the movement was predominantly associated with the large deflection of the planking between the cradles caused by several contributory factors. This was a positive result in terms of current stability but emphasised the need for a more sympathetic support system to be installed. In parallel, an 'intelligent model' was developed to provide a digital record of the ship which provides a database into which historic repair records have been entered as well as full dimensional data on each component. This will be updated and expanded as further research and repair progresses to provide comprehensive live record for the remaining life of the ship and beyond.

11.50-12.25 **VASA'S PRESERVATION CHALLENGES: AN UPDATE ON CURRENT RESEARCH AND PRESERVATION ACTIVITIES AT THE VASA MUSEUM, STOCKHOLM**
Emma Hocker, Vasa Museum Conservator

The Swedish warship Vasa which sank on its maiden voyage in 1628, was raised from Stockholm harbour in 1961 and conserved by spraying with polyethylene glycol for seventeen years. In recent years, development of acidic outbreaks on the surface of the wood has led to a series of complex research initiatives examining the wood's chemistry and mechanical properties. The museum's climate control system has received a major upgrade, replacement of the 5500 bolts in the hull has begun and retreatment of some of the smaller objects in the collection is under way. A new project focusing on gathering data towards building an improved support structure for the hull has just been launched.

12.25-13.25 **LUNCH**

13.25-14.00 **ASGARD -CONSERVING ERSKINE CHILDERS UNIQUE YACHT**
John Kearon, Retired Historic ship conservator, National Museums Liverpool, UK

Asgard was slowly (and lovingly) conserved at the National Museum of Ireland, Dublin. She is now on public display in a designated gallery detailing her history and the unique conservation programme that saved some 70% of the original hull and restored the vessel to her original form. Asgard's importance has several aspects. In Ireland it is central to the historic Howth gun-running voyage in 1914 when Childers brought arms and ammunition into Ireland that were used in the 1916 Rising. Then there is her pedigree through her Norwegian designer and builder, Colin Archer. Lastly, there is Childers the man - superb yachtsman, author of the Riddle of the Sands, British war-hero and ultimately a martyr in the struggle for Irish independence. Built in Larvik in1905, Asgard is carvel built, of oak (topsides) and pine (underbody) on sawn pine double-frames. Managing the conservation of such a unique and iconic vessel carried a particular responsibility, not least that of applying museum standards of conservation to such a large, old and degraded wooden yacht. The project overcame many hurdles, given the damage throughout the vessel - predominately caused by ferrous metal corrosion. The presence and effect of chloride in iron, the main problem in both the Cutty Sark and the Great Britain is well known. However, Asgard may be the first wooden vessel where its presence was identified specifically as the destructive catalyst it is. The issues that surround ASGARD apply also to other vessels deemed historic and significant and a consideration of those issues will strike a chord amongst all that care for unique and historic craft.

14.00-14.35 **'DAZZLING DEBATES; THE DECISIONS MADE IN RESTORING, INTERPRETING AND OPENING HMS M.33'**
Matthew Sheldon, Head of Strategic Development, The National Museum of the Royal Navy, UK

Plans to preserve, restore and interpret the First World War monitor HMS M.33 have been 25 years in the making; finally now a project is funded to open her to the public on her centenary in 2015. This paper will investigate the history and chance survival of M.33; built on Churchill's orders in just 7 weeks, as one of five 355 ton shallow draft coastal bombardment vessels she saw action in the Dardanelles, Eastern Mediterranean and Russian Civil War. She then became successively: coastal minelayer, floating workshop, office and finally hulk. It will examine the different schemes for her restoration, explaining the debates and decisions made in the current project - including retention of her brief 1918 dazzle paint scheme. It will offer the perspective of a museum professional on the power of the ship's different stories to engage visitors and the methods available to promote a full understanding of her construction, operation, history and significance.

14.35-15.05 **COFFEE**

15.05-15.40 **SAVING LCT 7074: THE LAST D-DAY LANDING CRAFT**
Nick Hewitt, Strategic Development Executive, The National Museum of the Royal Navy, UK

'LCT 7074 is the last Second World War Landing Craft (Tank) in the United Kingdom, and one of only two left in the world. More than 800 LCTs took part in Operation Overlord, the D-Day landings on 6 June 1944, each capable of carrying ten tanks or other heavy armoured vehicles into battle. As far as can be established, 7074 is the last of these vital workhorses known to have actually participated in D-Day. After a chequered postwar career involving conversion into a floating clubhouse and nightclub, and then an ill-fated attempt to conserve her by the now-defunct Warships Preservation Trust, the ship lies in private hands, semi-derelict and sunk at her moorings at East Float Dock, Birkenhead. The threat to her continued existence could not be clearer: this is the very last chance to save this priceless example of our Second World War and naval heritage. This project is to transfer ownership of the vessel to the National Museum of the Royal Navy, refloat her, arrest her deterioration, and to prepare her and make her safe for sea transport to Portsmouth. In a place of safety in Portsmouth, she will be stored while an HLF submission is prepared to conserve, restore and interpret her prior to display ashore. In D-Day's 70th anniversary year, the NMRN has successfully sought a grant from the National Heritage Memorial Fund to meet the costs of saving LCT 7074 for the Nation, and intends to bring the ship to Portsmouth by the end of the year.'

15.40-16.15 **THE FORGOTTEN FLEET THAT HELPED QUENCH AMERICA'S THIRST: TODAY THE STRICTURES OF THE US VOLSTEAD ACT MAY WELL HAVE BEEN CALLED 'THE WAR ON LIQUOR'**
David Walker, Maritime Museum of the Atlantic, Canada

During the United Sates' Prohibition era, 1920-1933 many routes and methods were used to illegally supply beverage alcohol to thirsty US citizens, One of these routes lay by sea from the French colony of St Pierre et Miquelon to various offshore locations on the US Eastern Seaboard, After some ill-favoured attempts using various extant conventional vessel types the ship and boat builders of Nova Scotia designed and built a successful class of small wooden cargo vessel specifically for this trade, Before the repeal of the Volstead Act well over 100 of these craft had been delivered from provincial shipyards, In addition most of them were skippered and manned by men from Nova Scotia. Despite the relatively recent history of this event none of these craft exist today. These wooden rum running vessels were unique in several ways, their construction details are described and their suitability for the illicit trade discussed, Their operations and manning are briefly touched upon to give context to their unique trade, The fates of some of these nun runners are also described, one of them, REO II, was abandoned in a tidal inlet in Newfoundland, She was rediscovered and accessioned by The Fisheries Museum of the Atlantic in Lunenburg, NS, The last stages of her career: restoration, interpretation and maintenance are described in detail and her final disposition explained.

16.15- **GENERAL DISCUSSION & DRINKS RECEPTION**

DAY 2 PAPERS:

09.00-09.30 **COFFEE & REGISTRATION**

09.35-10.10 **SY TURBINIA – GENESIS, PERFORMANCE AND VIRTUAL REBIRTH.**

Keith W Hutchinson, Principal Naval Architect, Babcock International Group - Energy and Marine Technology, UK
Paul V Hodgson BSc(Hons) BA(Hons), Technical and Projects Manager, School of Marine Simulation and Senior Marine, UK

This paper will examine the design concept and development of the first-ever turbine steamer, the 103 foot long Steam Yacht Turbinia – arguably one of the most famous and influential ships in the world as she set the standard for the next generation of steamships that directly followed her, the majority of which were subsequently turbine powered. A reanalysis of the original resistance model tests carried out by R. E. Froude at Haslar in 1897 will be presented. The design of the Turbinia will be contrasted with a range of similar high speed vessels constructed over the past century. The performance of her hull form will compared with a representative sample of modern day forms in order to investigate and illustrate the developments in hull form design over the past century. Parsons' work on cavitation and the improvements in propulsive efficiency since the design of the Turbinia will also be discussed. Unfortunately, but understandably, Turbinia is no longer operational or afloat. However, she is still in existence and since 1994 has taken pride of place as the principal exhibit at Newcastle-upon-Tyne's Discovery Museum along with Parsons' original Cavitation Tunnel. However, the Turbinia does now exist as an operational ship again, albeit virtually, on the state of the art Ship Simulator at South Shields Marine School. The mathematical modelling and detailed graphical representation of the Turbinia will be discussed along with the capabilities of the Ship Simulator itself. The 'virtual' Turbinia will be presented to show the realism of current simulation and, of course, the performance of the Turbinia, which may encourage others as to the benefits of the realistic simulation of other historic ships and 'bringing them back to life'.

10.10-10.45 **HISTORIC SEA-GOING GRAIN BULK CARRIERS 海運船 *HĀIYÙN CH`UAN* OF PRE-MODERN CHINA**

M.S.K. Trimming, Royal Institution of Naval Architects, UK

Between the Tang 唐朝 (618-907 AD) and early Ming 明朝 (1368-1644 年) dynasties, China possessed the most numerous and technically advanced sea-going Trader & Navy Logistic Supply fleets on the Planet. The *Nanchuan Ji* 南船紀 of 1542, refers to a ship of 千料船 '1,000-liao 料' which was based on the 海運船 *Hāiyùn ch`uan* 'Grain Transport ship' of the Yuan dynasty 元朝 (1271-1368 年) and also built in large numbers during the Ming. The '*sha ch'uan* 沙 船 *Pechili Trader '* 北直隶船' *běizhílì chuán* type-specimen' was an ancestral precursor to the modern Dry Bulk Carrier 散装干货船 *Sǎnzhuāng gān huòchuán*. This traditional sea-going northern China Trader Junk has a traceable nautical and ethnological pedigree spanning a period of 1,500 years from the 'Bull-Head' ships 牛头船 *niu tou chuán* of the Liu Song dynasty 刘宋朝 (420-479 AD). The *sha ch'uan* 沙 船 has a unique historical maritime affiliation with Shanghai 上海 since 1282 AD; and was immortalized in 1990 as a component of the official 'City Emblem of Shanghai' 上海市市徽 *Shànghǎi shì shì huī*. Several innovative Naval Architecture technologies developed by the pre-modern China Shipwright 造船工人 for the 'Safe Carriage of Grain 谷物 in Bulk' at Sea, began to be emulated from c.1780 & Regulated from c.1850 by 'western' maritime nations, but only effectively implemented by the IMO in 1997. This original research identifies the extant historic China Grain-Carrier Database, and addresses specific Naval Architecture characteristics of pre-modern China Dry Bulk Carrier Technology.

10.45-11.20 **THE BUILDING AND THE JOURNEY OF THE VIKING SHIP "VIKING" IN 1892-1893**

Bjorn von Ubisch MSc, MRINA

In 1880 at a farm Gokstad in SE Norway an almost intact Viking ship from 880 was excavated in a burial mound. In 1893 a World Exhibition was planned in Chicago, Illinois, in order to celebrate the "discovery" of America by Columbus. A group of Norwegian seafarers decided to have an exact copy of the ship found at Gokstad, built and exhibited at the World Exhibition in Chicago. The construction started in August 1892 at a shipyard in Sandefjord in Norway. Delivery was in early 1893. The "Viking" departed Bergen 30th April 1893 and arrived in New London, Connecticut, 13th June 1893. The ship "Viking" arrived in Chicago 12th July 1893. The building method and procedures for assembling the hull were followed accurately. During the crossing certain design features became evident, not previously realized. The "Viking" had very good sea-keeping characteristics. The ship encountered several storms and turned out to be an excellent sailor. In the water around Cape Sable, "Viking" "competed" with the contemporary sailing vessels at the time and "Viking" was not inferior in any way.

11.20-11.50 **COFFEE**

11.50-12.25 **CFD ANALYSIS OF 80 YEAR OLD MODEL TESTS FOR TRANSATLANTIC LINERS**

J. Marzi, J.P. Voß, & S. Gatchell, Hamburgische Schiffbau Versuchsanstalt GmbH - HSVA, Germany

The two transatlantic liners "Bremen" and "Europa" built by different German ship yards in the 1920ies were re-analysed at HSVA using latest CFD tools. Rediscovering the old lines plans in the archives of Deutsches Schiffahrts Museum in Bremerhaven and of shipyard Blohm & Voss in Hamburg provided the basis for a challenging new project to prove the capabilities of the in-house RANS code FreSCo+ used to compare the performance of the two record holders in calm water and selected sea conditions. Bringing together the lines of the two "look alike" sister ships revealed for the first time the striking overall differences of the design concepts followed by the two builders at the time. Built to the same overall specifications and dimensions, it was obvious from old photographs that the bow sections and specifically the bulb varied in character .Comparing the full lines plans also indicates a significant difference in overall shape. In a first step, the present paper analyses calm water performance of both ships using different CFD prediction methods, potential flow as well as full RANS.
As past reports also indicated rather different seakeeping behaviour of both vessels, RANS based motion predictions were performed for a set of significant North Atlantic waves too. These show differences in ship motions and added resistance. The CFD predictions performed shed further light onto the differences of the pioneering hull designs of the two transatlantic liners.

12.25-13.00 **DIGITAL MODELLING IN THE PERFORMANCE EVALUATION OF 19TH CENTURY CLIPPER SHIPS: THE THERMOPYLAE AND THE CUTTY SARK**

Catherine Tonry, Mayur Patel, Christopher Bailey, Wynford Davies, Julian Harrap, Eric Kentley, Peter Mason, Computational Mechanics and Reliability Group (CMRG), School of Computing and Mathematical Sciences, University of Greenwich, UK

The Cutty Sark, built in 1869 in Dumbarton, is the last intact extreme clipper ship. Of composite construction, she famously took part in the tea races with another composite clipper the Thermopylae which was launched a year earlier in 1868. The hull efficiency of the Cutty Sark and the Thermopylae is currently unknown. However, with modern CFD techniques, virtual experiments can be performed to model the fluid flow past the hull and so based on the shear stress and the pressure over the surface of the hull to calculate the resistance. In order to demonstrate the difference between extreme clipper hulls and those of other sailing ships two other ships were selected. The Farquharson, an East Indiaman built in 1820; and the Erasmo a later Italian all-steel construction 4-masted barque built in 1903. As only one of these ships exists today, and she no longer sails, 3D geometries were constructed from lines plans of the ships' hulls. These 3D geometries could then be used to preform CFD simulations looking at the turbulence and waveforms produced by the ships at various trim, heel and leeway angles. This data can then be used to calculate the energy lost by the hulls in order to calculate their resistance to the flow of the water around them. Early results suggest several interesting differences between the ships. For example the Cutty Sark's bow, with its sharp forefoot is different to that of most of her contemporaries, suggesting a better performance to windward.

13.00- **GENERAL DISCUSSION**

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