

**ONRIFO European Office  
Naval Architecture, Ship Systems**

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**Trip Report: The 11<sup>th</sup> International Conference on  
Computer Applications in Shipbuilding [ICCAS'02],**

**Malmö, Sweden, September 11-13, 2002**

## **1. Executive Summary**

**ICCAS'02 was organized by Tribon Solutions AB, Malmö, Sweden. This is the 11<sup>th</sup> such conference; earlier meetings have been held at: Tokyo [1973], Gothenburg [1976], Glasgow [1979], Annapolis [1982], Trieste [1985], Shanghai [1988], Rio de Janeiro [1991], Bremen [1994], Yokohama [1997], and Cambridge, Massachusetts [1999].**

**Advances in information technology have revolutionized aspects of shipbuilding, from preliminary design to assembly and shipyard management. This technology will continue to be an important factor in future productivity and performance. The papers presented ranged the full spectrum --from reviews of operational experience with existing computer applications to discussions of emerging advances in information technologies destined to become the basis for the next generation of shipyard computer systems.**

**The papers were grouped into the following areas:**

**\*\* Early Design**

**\*\* e-Commerce**

**\*\* Materials Management**

**\*\* Collaboration**

**\*\* Expert Systems**

**\*\* Simulation and Analysis**

**\*\* STEP**

**\*\* Production**

**\*\* Life Cycle Management**

**\*\* Design**

**\*\* Systems Implementation**

Fifty four papers were presented with the authors coming from sixteen countries: Denmark, Finland, France, Germany, Italy, Japan, Korea, Netherlands, Norway, Russia, Spain, Sweden, Switzerland, Taiwan, United Kingdom, and United States.

The proceedings were published as follows: "11<sup>th</sup> INTERNATIONAL CONFERENCE ON COMPUTER APPLICATIONS IN SHIPBUILDING, 9-12 September, 2002 in Malmo Sweden, Edited by Kaj Johansson, One Volume, ISBN: 91-631-2726-1 Cost: EUC 129.00. Published by Tribon Solutions AB, P0 Box 505 55, SE-202 15 Malmo, Sweden. e-mail: [info@iccas-conferences.com](mailto:info@iccas-conferences.com), web: <http://www.iccas-conferences.com/>

The following sections list the manuscripts contained in the proceedings, and the authors and their affiliation.

## **2. Paper Groupings**

### **A. Early Design**

**On Ship Structure Design, Approval and Life Cycle Management**  
*Ilmo Kuutti [Napa Oy, Finland] & Larry Benthall [American Bureau of Shipping, USA]*

This paper was an overview of ship's structural design, and the link-up that occurs with a classification society. A new concept to exchange data between computer programs was also described. .

### **Three-dimensional Modelling of Slamming Impacts with an Explicit Finite Element Software. Application to Fast Ships**

*Nicolas Couty [Principia Marine, France]*

This paper described the used of using explicit finite element code LS-DYNA to model slamming impacts on fast ships.

### **Development of a New Direct Strength Assessment System for Double Hull Tanker**

*Hiroyuki Kobayashi, Yoshimichi Sasaki, Tatsuhiko Suzuki & Takuya Yoneya [Class NK, Japan]*

Describes the development of a strength assessment system developed by ClassNK, and outlines thje special functions and features of the system.

### **AEN.EAS - A Safe Move In Evacuation Analysis**

*Andreas Baumgart [Germanischer Lloyd, Germany]*

This paper describes an innovation evacuation analysis tool for simulating egress routes and evacuation procedures.

### **Fleet and Operation Planning Based on the Ship Design and Logistic Simulation**

*Hiroyuki Yamato [Univ Tokyo], Yasutomo Yamauch [Univ Tokyo]i, Kenji Tanaka[ McKinsey & Co, Japan], Mitujiro Katuhara [NMRI, Japan], Noboru Kubo [NMRI, Japan] & Ryoji Michida [IHI, Japan]*

This paper describes a methodology of planning the ship, fleet, and the operational timetable based on the formal ship design procedure, and the logistic simulation of a specific route.

### **Forging a Real-Time Link Between Initial Ship Design and Estimated Costs**

*Jonathan M. Ross & George S. Hazen [Anteon Corp, USA]*

The paper describes the Proteus Engineering Smart Product Model [SPM] that meets pre-production design and cost estimation needs.

### **Advanced Hull Structure Design by SAIAS**

*Akinori Ab [IHI, Japan], Yoshihiro Niihara [IHI, Japan] & Tomoki Nagas [IEM, Japan]*

This paper describes the integrated strength assessment system [SAIAS] that provides a more reliable evaluation of ship's design strength. An outline of the system is presented, and its application into an actual design is reported.

### **A Hydrodynamic Database for the Comparative Assessment of the Resistance and Seakeeping Performance of Ship Designs**

*P Crossland and R J Scrace [QinetiQ, UK]*

This is a description of a hydrodynamic database of resistance in calm water and seakeeping performance in head seas for a range of existing and concept monohull ship designs.

### **Development of an Initial Hull Structural CAD System for Computer-Aided Process Planning (CAPP)**

*Won--Joon Le [Daewoo, Korea], Kyu-Yeul Lee [SNU, Korea], Myung-Il Ro [SNU, Korea], O-Hwan Kwon [IAE, Korea] & Sung-Geun Lee [Daewoo, Korea]*

The paper describes the development of a structural CAD system appropriate for computer-aided process planning.

## **B. e-Commerce**

### **The R&D and Operation of ZoHakuWeb; An Information Exchange Network between Shipyards and Marine Equipment Suppliers**

*Hiroshi Tabuchi, Kunio Shinya, Toru Aoyagi, Kenji Shigematsu & Noriyuki Tabushi [ZoHakuWeb, Japan]*

The paper presents the outline of a project that is developing an internet-based system to accelerate cooperation and collaboration between shipyards and marine equipment suppliers.

## **Practice and Development of Supply Chain Management System in China Shipbuilding Corporation**

*Wei Tann, Lung Lung Chuang & Heiu-Jou Shaw [Nat'l Cheng-Kung Univ, Taiwan]*

This paper gives an overview of the web-based supplier chain management system utilized by China Shipbuilding Corporation

## **Internet-based Design Integration and Procurement System**

*Nikolay Shishkov [Tribon Systems, Sweden]*

This is a presentation of the internet-based design integration and procurement system available from Tribon. The structure of the system is outlined, and the specific solutions are described.

### **C. Materials Management**

## **Supply Chain Management by using Intelligent Supplier Catalogues in the Maritime Industry**

*Reinhard Ahlers [BAL, Germany]*

This is a description of the DYCONET project that focuses on the optimization of supply chain management in shipyards

## **Integrating Logistic Systems in Shipbuilding**

*Kristian Torp, Lars Riisberg & Lars Borglum [Logimatic Software, Denmark]*

This paper discusses advantages and disadvantages of various approaches for integrating IT systems that are targeted at the shipbuilding industry.

## **Shipbuilding Partners & Suppliers: Enabling the Shipbuilding Virtual Enterprise**

*Richard Bolton [NIIP, USA]*

This paper describes the SPARS consortium and its work developing and deploying supply chain virtual enterprises that integrate the shipbuilding supply chain. The goal is to replace paper-based business processes with WEB-enabled processes.

## **D. Collaboration**

### **Electronic Collaboration in a Shipbuilding Environment**

*Jim Rohr [USA]*

This is a discussion on how electronic information exchange has increased collaboration within the shipbuilding enterprises.

### **Internet Based Collaboration, an Opportunity to Increase Efficiency in Shipbuilding**

*Are Follesdal Tjonn[ ShipyardXchange, Norway] & Luis Garcia[ Sener, Spain]*

The paper discusses the problem of the exchange of information when different groups have unique IT systems, and different intrusion blocking mechanisms.

### **Collaborative Engineering in Shipbuilding**

*Fernando Alonso, Alfonso Cebollero, Augusto Gomez & Antonio Rodriguez [Sener, Spain]*

This is a description of the experiences of SENER in the development of tools to facilitate collaborative engineering for both concurrent and distributed design.

### **Collaborative Build Specification Development - from MS Word to Argus**

*Arnulf Hagen and Stein Ove Erikstad [ProNavis, Norway]*

This is a report about an ongoing Norwegian project that focuses on developing web-based solutions to support project development processes in the shipyard.

## **E. Expert Systems**

### **A Decision Support System for Shipyard Environmental Management**

*Bhaskar Kura [Univ New Orleans, USA]*

This paper describes a PC-based decision support system developed at Univ of New Orleans. It is specifically designed to support the needs of the

shipbuilding/repair industry.

## **Knowledge Modelling and Implementation Methods in Distributed CAE-Environments**

*Robert Bronsart, Ulf Cantow and Ventzeslav Petkov[Univ Rostock, Germany]*

A method for modeling knowledge to be utilized in the design process of ships is presented.

## **F. Simulation and Analysis**

### **Virtual Ships - The Demonstration of their Fitness for Purpose**

*Cathom Francis [NNC, UK], David Lee[NNC, UK] & John Duncan [DPA-MOD, UK]*

This paper presents the findings from research in the UK which summaries the issues and needs for the simulation based design and virtual prototyping system to be used with greater confidence.

### **S.A.V.I.U.S.: An Integrated System for the Vulnerability Analysis of Surface Vessels**

*Antonella Molini[CETENA, Italy], Ruggero Dambra [CETENA, Italy] & Marco Parapetto [Italian Navy, Italy]*

This paper describes an integrated software system for vulnerability assessment of naval surface vessels.

### **The Actual Reality of Virtual Reality**

*John Martin [BAE Systems, UK]*

This is a discussion of the principles and considerations for the implementation and operation of a virtual reality system in a shipbuilding engineering environment. Also included is an examination of the virtual reality technologies found in the day-to-day design process.

## **G. STEP**

### **Product Data Sharing in the Integrated Shipbuilding Environment**

*Ronald Wood [Northrop Grumman, USA], Thomas C Rando & Kathryn A. Bates[EB, USA]*

This is a paper that discusses the Integrated Shipbuilding Environment project whose objective is to provide enabling technologies and processes for shipbuilding co-design, co-production, and supply chain integration.

### **The Need for Standards to Ensure Efficient e-business**

*Tony Fry & John Kendall [EMSA, UK]*

This is a presentation of the Marine e-Business Standards Association effort to develop and publish standards for data exchange

### **XML Schemas for Shipbuilding**

*Ted L. Briggs & Thomas C. Rando [EB, USA]*

This is a presentation of the Integrated Shipbuilding Environment effort to develop and publish standards for data exchange

## **H. Production**

### **Master-Planning Optimization System for Cooperative Assembling with Several Shipyards**

*Marcus Bentin, Kunihiro Hamada & Mitsuru Kitamura [Hiroshima Univ, Japan]*

A master planning system for production planning and optimization customized for cooperative assembly is discussed. Examples are shown.

### **A Study on 3-D Digital Mockup Systems for Work Strategy Planning**

*Yuichi Sasaki [MHI, Japan] Masahiro Sonda [MHI, Japan] & Ken Ito [Tribon, Japan]*

This paper presents an effective use of 3-D digital mockup systems for ship hull structures focusing on work strategy planning/evaluation.

### **Multi-Project Planning in Shipbuilding**

*Roelof van Dyk [ORTEC, Netherlands], Noud Gademamm [Univ Twente, Netherlands], Geert Schouten [Netherlands] & Marco Schutten [Univ Twente, Netherlands]*

The paper describes the ongoing implementation of a decision support system at a Dutch ship repair yard.

### **The Production Information Portal Site of Shipyard**

*Y. Hanai, N. Shishido, N. Takata, K Kouno & M. Matsui [IHI, Japan]*

This is the description of the development and emplacement of an advanced information system at the Yokohama shipyard.

### **Design and Validation of a Sensor Guided Control System for Robot Welding in Shipbuilding**

*Mikael Fridenfalk & Gunnar Bolmsjo [Lund Univ, Sweden]*

The paper describes the development of a robot system for joining ship sections in the final stage when ship sections are to be assembled together in a dry dock.

### **Collaborative Production Management in Shipbuilding**

*Hiroshi Nakayama [NKK, Japan]*

This paper describes how knowledge management is being enhanced in the shipbuilding environment. It describes how collaborative works, knowledge sharing, and information technology are being applied in supportive ways.

### **A Management Information System for Ship Repair & Conversion**

*G. Bruce [Univ Newcastle, UK] & K Ward [Shipbuilders/Repairers Assn, UK]*

The paper described the SYRIOS project, an EC funded effort to develop a prototype IT-based solution to communication problems and information technology in SME repair yards.

## **I. Life Cycle Management**

### **Saving Time and Money with Integrated 3D Product Modelling and Life Cycle Management Tool**

*Matti Juntunen & Lauri T. Kosomaa [Elomatic OY, Finland]*

This paper presents a solution for managing the technology of a ship from concept to retirement with software solutions running in standard Windows environment

### **A Method for Knowledge Acquisition from Machinery Failure**

## **Reports**

*Hideyuki Ando, Akira Hori, Hiroyuki Yamato, Susumu Shirayama and Hiroshi Masuda [Univ Tokyo and Nomura Research, Japan]*

This is a presentation of a semi-automatic knowledge acquisition method from machine failure reports by utilizing text data mining techniques.

**Application of the Ship's Electronic Data Model Developed by the Shipyard, during Subsequent Stages of the Ship's Life**

*Oleg Shulyakovskv & Alexander Suslov[Baltiysky Zavod and State Marine Technical Univ, Russia]*

The paper encompasses the electronic data exchange interaction between equipment suppliers, design agency, shipyard, and maintenance companies.

**A Failure Reporting and Corrective Action System for LPD 17**

*Bahadir Inozu, Philippe Roy & Rory Keehn[Univ New Orleans and Northrop Grumman, USA]*

In this paper the Life Cycle Support vision of LPD17 is first described.. Then reliability data use in the design of LPD 17 is summarized. Reliability tracking requirements are discussed. Finally, FRACAS software are detailed.

**Condition Based Maintenance, Life Cycle Management, and AUTOLOG**

*Edward Hilferty [NSWC, USA]*

A description of efforts underway to move to condition-directed maintenance, and the role of automated reasoning and decision making models to monitor equipment operations.

**The Application of Product Model Technology for Design and Life-Cycle Operation of FPSO's**

*Vebjorn Guttormsen, Ole Christian Astrup, Arne Christian Damhaug & Anders Hvidsten [DNV software, Norway]*

This paper describes an integrated information model for capturing all relevant data during the design and construction phase vital to owners and

operators of FPSOs.

## **"V-BRIDGETM - ACCESSIBLE INFORMATION" - An Interactive Content Management Solution for Through Life Support of Electro-mechanical Systems**

*Gordon Stephen, K. Colquhoun, A Spalding, A Stewart, S Cooke and D Laing [Babcock, UK]*

The paper describes an interactive life cycle management system that runs in a thin client environment utilizing web technologies.

## **Quality Certificates through Co-operating Agents via Internet - An Inter-company Workflow Implementation for the Maritime Industry**

*Gustavo Alonso [Swiss Fed Inst Technology, Switzerland], UweLangbecker & Markus Lehne [Germanischer Lloyd and BAL, Germany]*

This paper is a description of a workflow management system to support the exchange and control of quality certificates via the Internet.

## **An Activity / Transaction Model for Ship Design Development**

*Daniel W. Billingsley[NAVSEA, USA]*

This paper proposes a simple model of the process that accommodates its scale, complexity, and variability.

## **J. Design**

### **Advantages of Software Integration from Initial Design through to Production Design**

*Jesus A. Munoz & Charles J. M. Forrest [Sener, Spain; and GRC, UK]*

This is a description of a joint Sener/GRC effort to integrate their design and production software packages.

### **Use of CAD/CAM/CAE in the Ship Structural Design of the Last Generations of Fast Displacement Ro-Ro Passenger Ships**

*Andrea Zamburlini [Fincantieri, Italy]*

This paper describes the “state of the art” and more recent innovations

concerning the use of computer software tools during the creation and development of Ro-Ro passenger vessels.

## **A Study on the Development and Deployment of the Job Supporting Systems for Shipbuilding**

*Ken Ito [MHI, Japan]*

This is a recollection of work by the author concerning his experiences and lessons learned in designing, and emplacing CIM in MHI's Nagasaki shipyard.

## **A Study of Design Process Innovation with Virtual Production Supported by Next Generation CAD System**

*Haruki Tsuru, Fusaichi Katayama, Kenji Doi and Hiroyuki Nishiyama [Hitachi, Japan]*

Paper discusses what function are required to organize virtual production and what process innovations can be expected to occur.

## **Possibilities of a Shipbuilding API**

*Henrik Hultin[Tribon, Sweden]*

This paper discusses the requirements for use of a publicly available APT based on the functionality of the design system.

## **Pipe-Routing Expert System**

*Richard L. Storch & Jin-Hyung Park [Univ Washington, USA]*

This is a presentation of an automatic pipe-routing system accommodating all major detail-design facets.

## **States of Arts and Contribution to Productivity Improvement of CIM System "AJISAI" in Ishikawajima-Harima Heavy Industries**

*Fujio Seto, Mamoru Itoh, Noritaka Uesugi & Kentaro Hiyoku [IHI, Japan]*

In this paper the authors present the application plan for a new product model.

## **Application of Knowledge Based Modelling to Detail Structure Design for Shipbuilding**

*Shuji Miyamoto, Shuji Nonoguchi, Jiro Matsuno, Takuya Matsumura, Shoji Murakami & Sumiaki Matsumoto [KHI, Japan]*

KHI is now developing a new design support system for the detailed structure design. This paper describes the system.

## **Efficient Management of Distributed Ship Design Processes**

*Reinhard M. Staebler [AES, Germany]*

The paper describes a recently developed information architecture and application program that supports the efficient planning and coordination of design projects, and the information exchange between collaborating parties

## **K. Systems Implementation**

### **Wireless Networks in the Shipyard to Reduce the Cost of Doing Business**

*Michael J. Taylor [NASSCO, USA]*

**A description of the wireless networks installed at Todd Shipyard, Seattle, Wa.**

### **Production Engineering - Key to Success in Commercial Shipbuilding**

*Leif Pergler [Tribon, Sweden]*

A commentary on the importance of production engineering to the manufacturing enterprise.

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