



WONDER MAR II

Wide Open Network for Development and Research in the
Maritime Industry

Shipbuilding IST Review



IT Support in Manufacturing & Assembly

Expert Group



- Odense Steel Shipyard
- LISNAVE
- IZAR
- Kvaerner MY
- TNO
- BMT
- Tribon
- OPI

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Aims



- Establish state of industry
- Identify state of art
- Investigate state of related industry
- Determine enabling IT
- Identify gaps
- Map out future actions
- Facilitate new proposals
- Serve as forum of interchange

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WONDER MAR II



wide

open

network for
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research in the
maritime industry

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Questionnaire targets



- Shipyards
- Suppliers
- Classification Societies

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Information collected



- Tasks
- Information objects
- Technology
- Tools

Questionnaire steps



- Expert Group
- State of the art
- First evaluation of results
- Improved questionnaire
- Distribution to other working groups
- Distribution to outside companies

Phases Covered



- Production Engineering
- Generation of Production Data
- Parts Production
- Assembly

Production Processes



- Material Management
 - Material Handling
 - Monitoring and Tracking
- Manufacturing and Assembly

Manufacturing & Assembly



- Bevelling
- Cutting
- Forming
- Punching & Drilling
- Shaping
- Heating
- Shearing
- Sawing

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Manufacturing & Assembly (2)



- Disposing
- Recycling
- Inspecting
- Setting & Erecting
- Fixturing
- Positioning
- Grinding & Sanding
- Washing & Cleaning

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Manufacturing & Assembly (3)



- Milling
- Bending
- Winding & Re-winding
- Cable pulling
- Hydrostatic Testing
- Welding
- Surface preparation & coating

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Material Handling - SOA



- Stationize personnel
- Power roller conveyors
- Robotics
- Automated Material Handling Devices
- On-block work environments (cranes, lifts)

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Material Handling Planning



- Simulation Modelling
 - Predict bottlenecks
 - Monitor various handling factors
 - Review options
 - Analyse cost impact
- Visualisation
- Cost Estimation
- Optimisation / Automatic Planning
- JIT

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Monitoring & Tracking



- Cell control
 - Information flow
 - Functional analysis
- Transfer of production data
- Scheduling & execution of work tasks
- Automatic Data Acquisition
- Monitoring, including production reporting
- Internet

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Monitoring & Tracking



- Flexibility
 - Easy to adapt to new circumstances
 - Activities can be changed / re-engineered
 - Impact Simulation
- Integration
 - Monitoring of all aspects
 - Impact of remote causes can be assessed
- Distribution
 - Workflow and scheduling

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Manufacturing - Bevelling



- NC contour bevelling
- Triple torch NC bevelling
- Mechanised bevelling
- NC milling

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Manufacturing - Beveling



- Enabling Technologies
 - Digital data transfer
 - Bevel data (electronic design/product model)
 - NC cutting data

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Manufacturing - cutting



- NC cutting
- Mechanised cutting
- Optical follower cutting
- Hand torch burning

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Manufacturing - cutting



- CNC
- DNC
- Data transfer
- Laser Technology
- Coordination

Manufacturing - forming



- Hot and cold
- CNC equipment
- Product model electronic data
- Flexible manufacturing

Manufacturing - Punching & Drilling



- CNC Punching and drilling
- Data transfer
- Flexible manufacturing

Manufacturing - recycling



- Overcoming negative positions
- Understanding waste generation process
- Understanding waste collection & disposal
- Identifying opportunities
- Developing new programmes
- Developing markets
- Reengineering

Manufacturing - disposing



- Storage, handling and containment
- Waste management
 - Identifying safeguards
 - Reducing hazardous exposure
 - Complying with laws and regulations

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Manufacturing - disposing



- Risk
- Liability
- Cost
- Viable strategies

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Inspecting



- NDE
- Internal discontinuities
- Audit documentation
 - CAD/CAM feedback
 - as-built condition
 - LCS

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Fixturing



- Restrain, clamp & manipulate
- Automation -> flexible fixturing
- CAD/CAM
- DFMA

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Welding



- Beveling
- Fitting
- SMAW
- GMAW
- FCAW
- SAW
- GTAW
- SW
- EGW
- ESW
- PAW
- Brazing
- LW
- EBW
- FSW
- RW
- EAS
- HVOF
- APS
- Joining

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Welding



- Robotics
 - Automotive industry
 - Design for automation
- Robotics software
 - Off-line programming
 - Sensing technology
 - Planning systems
 - Integration w/ CAD + Planning

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Welding



- Automation
 - Smart Mechanisation
- Sensor Technology
- On-board Controls

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Gaps



- Simulation -> Automatic Planning
- Cost Estimation
- PDM
- Digital Data Transfer
- Robotics
 - Sensing
 - Planning
- Re-engineering
- Risk Management
- Internet-based information sharing

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Modular Construction

