WONDERMAR
Delft
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Future scenario for production

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Introduction

Presenters

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Subject of the presentation

- The presentation will outline future scenarios and expected benefits of IT solutions of production process in the maritime industry

Content in brief

- Development needs – Future scenarios – Expected benefits

Objective

- Exchange of views and experience in the maritime industry

Production Processes

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

Manufacturing & Assembly

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

Manufacturing & Assembly (2)

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

Manufacturing & Assembly (3)

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

Major Causes of problems in production

- Incompatibilities at Basic Design Stage
- Incompatibilities at Detailed Design Stage
- Late Changes
- Production errors

Scenario

- Basic Design
- Detailed Design
- Late changes
- Production errors

Concurrent Engineering in yard

Concurrent Engineering

Configuration Management

Quality Assurance

Design Optimisation

- Producibility vs Optimisation
- Rules of Production
- Costs

- Feedback from production
- Cost Statistics parameters
  - Weight
  - Number of Parts
  - Public spaces
  - Overall Quality
  - Type of Machinery
  - Components
  - Manhours per area
  - …

- Production rules
  - Automatically enforced in design
  - Standardisation
  - Optimisation of welds
  - Assembly strategy
- Cost Information
  - High granularity

- Simulation Modelling
  - Predict bottlenecks
  - Monitor various handling factors
  - Review options
  - Analyse cost impact

Material Handling Planning

- Simulation not always used
- Poor visualisation (2D)

Material Handling Planning

- Visualisation
- Cost Estimation
- Optimisation / Automatic Planning
- JIT
- Modularisation of ships

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
- Mobile Technology

Monitoring & Tracking

- Materials Db linked to procurement
- Pilferage
- Damaged materials
- Wrong place
- Not delivered

Future Scenario

- Direct feedback
- Barcodes or similar
- Real time simulation

Recycling

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

Reengineering

- Sometimes done using consultants
- Always under control of yard
- Sometimes carried out with just yard staff

Reengineering

- Models (before and after)
- Path
- Workflow systems

Disposing

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

- Not automatically measured
- Can be deduced from other measurements

Disposing

- Risk
- Liability
- Cost
- Viable strategies

- Checklists
- IT Support

- Material receipt, production
  - Quantity
  - Size
  - Material Type
  - Potential damage
  - Documentation
  - …
- NDE
  - Weldings
- Internal discontinuities
- Feedback

- Manual
- Carried out by
  - Foreman
  - Specialised measuring groups
  - External advisers
  - Class
  - Owner
- Some changes are reported

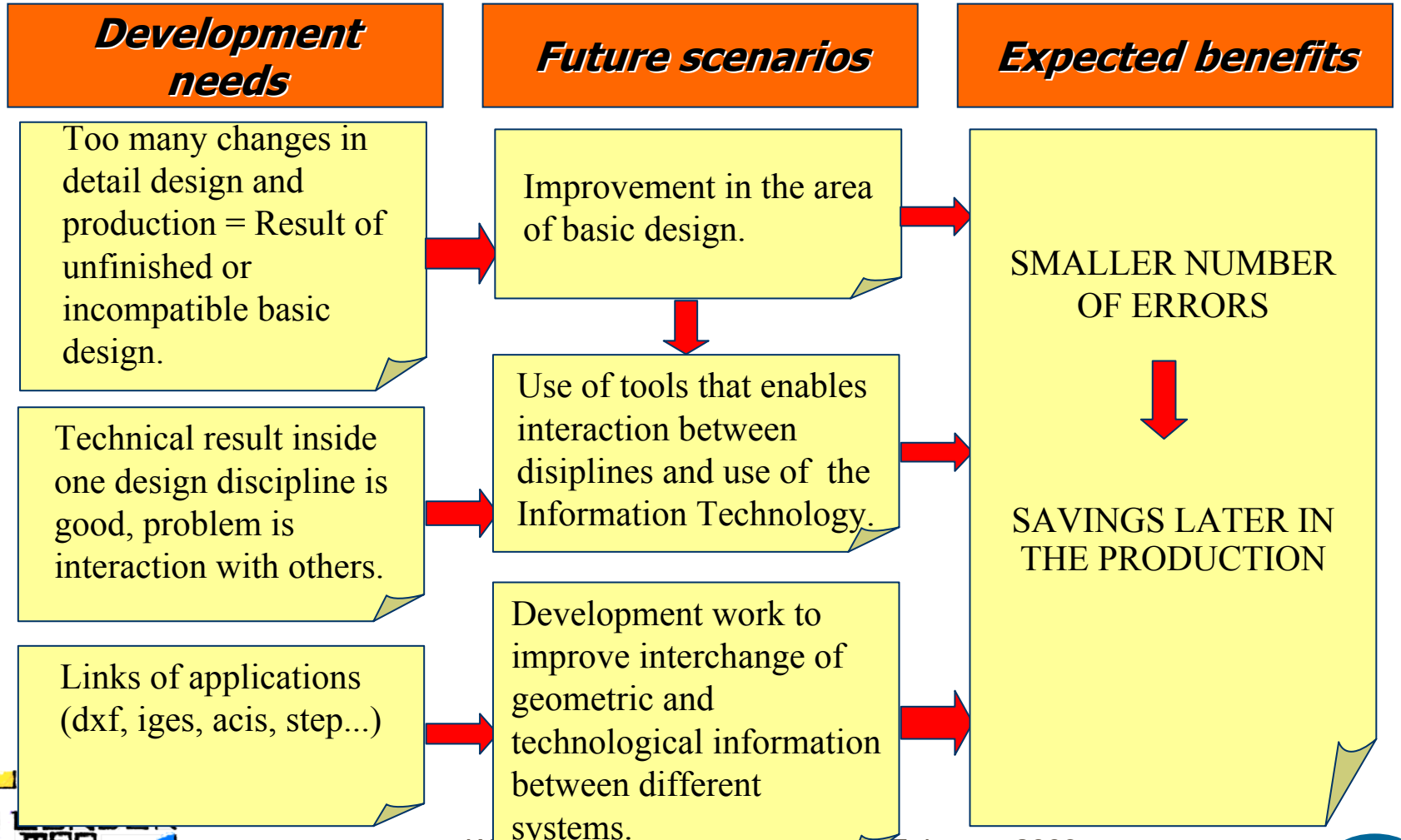
- PDAs
- Automatic annotation
  - CAD/CAM feedback
  - as-built condition
  - LCS
- Robots

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

- Automation of flexible production
- Smart Mechanisation
- Sensor Technology
- On-board Controls
- Improved accuracy in welding
- Automation of outfitting

- Desktop tools
  - General information
  - Phone Directory
  - News
  - …

- Knowledge Management Systems
  - Intelligent search
- Concurrent and collaborative engineering
  - Security
- e-learning
  - Software training
  - Life-long learning


Development needs
Future scenarios
Expected benefits
Too many changes in detail design and production = Result of unfinished or incompatible basic design.
Technical result inside one design discipline is good, problem is interaction with others.
Links of applications (dxf, iges, acis, step...)
Improvement in the area of basic design.
Use of tools that enables interaction between disiplines and use of the Information Technology.
Development work to improve interchange of geometric and technological information between different systems.
SMALLER NUMBER OF ERRORS
SAVINGS LATER IN THE PRODUCTION

Development needs	Future scenarios	Expected benefits
Optimizing the costs of material handling.	Simulation-based tools for logistic system design	
Risk of missing information between production and design e.g. reporting of the changes and errors in production.	ITC-tools for controlling the interchange of the information between production and design.	•BETTER QUALITY •SMALLER NUMBER OF ERRORS
The use of automation in production.	•machine vision •measurement and inspection •etc.	

We need quicker and more flexi means in order to 1) collect, 2) and 3) deliver information and knowledge to the right persons the right time.

Future requirements

- Improvement in the area of basic design (smaller mumber of incompatibilities = savings later in the production)
- use of tools that enables interaction between disiciplines and use of the Information Technology
- Development work to improve interchange of geometric and technological information between different systems
- Simulation-based tools for logistic system design
- ITC-tools for controlling the interchange of the information between production and design. We need quicker and more flexible means in order to 1) collect, 2) edit and 3) deliver information and knowledge to the right persons at the right time
- Automation (robotics, machine vision, measurement etc.)
- Further education, e-learning environment?

Statements

- Elimination of incompatibilities in design is the main objective. Design optimisation is an unrealistic goal
- Present simulation systems are not powerful enough to allow realistic simulation-based planning
- The Internet's potential for collaborative engineering, knowledge management and life-long learning is still far from being realised

Statements

- Outfitting is an area of production which will always lag far behind the others in automation
- Waste management is OK as it is. No need for major improvements in this area.
- Re-enginnering of the production process is a painful process with doubtful benefits. Any tools that would make this easier and more productive are welcome.