Introduction to the project

Objectives

Schedule

Overview of work package
Introduction to the project

European project founded in the FP7 call
Duration 36 months / 04.2011 - 03.2014
18 partners from 19 countries
Total budget 3,574,975 EURO / EU contribution 2,532,364 EURO

ThroughLife was merged from 2 projects:
- New business Models
- New technologies

Generic Approach
Develop business cases that open up new business opportunities for shipyards and owners

Technological approach
Develop maintenance friendly technologies for marine applications
Participating Partners

18 Partners from 9 countries
Introduction to the project

The ThroughLife project wants to overcome barriers between ship operators and the producers of new technologies. Often not the technology itself is a problem but the business model the ships are operated in. This could be for example:

- Unclear responsibilities in case of damage
- Required special knowledge is not handed on to the operators, as communication is most often unidirectional
- Ship is scheduled for selling before an amortisation of the technology could take place
- Unclear responsibility of who takes the risk in case the technology does not meet its goals – is it the supplier, shipyard, operator or owner?

Therefore ThroughLife does not only look at the development of new technologies but moreover at the entire situation the technology is introduced in. What adaptions need to be made for a successful market implementation will be clarified in business groups consisting of shipyards, repair yards and owners staying in close contact to the technology work packages.
Introduction to the project

Example what innovative materials can offer

**Innovative steels and coatings:**

- Increase significantly the safety of the ship
- Reduce ship resistance
- Reduce maintenance cost and repair lead time.

ThroughLife
Introduction to the project

Example why technologies are not introduced

Innovative steels and coatings:

- Experience from the past show: Often the full potential cannot be used
- The advantages are only accessible over a longer part of the life cycle and not during the investment
- Skills on how to repair and maintain the structures are not available worldwide over the full LC
Objectives

The main objective of the project is to develop and prove new, cost effective approaches for through-life asset management for selected technologies and application scenarios.

This will be done by ….

- Introducing efficient and environmentally friendly techniques and materials for ship production (new building), operation (maintenance, repair, conversion) and end-of life (dismantling and reuse);
- Condition monitoring and combining information from all life cycle phases and stake holders using state-of-the-art information and communication technologies;
- Strategies and tools for predictive, condition and risk based maintenance and repair, including decision support for repair, reuse, recycling or scrapping of materials, components or modules;
- Innovative design strategies and assessment tools for improved efficiency and environmental performance over the life cycle of ships;
- New business models for used products (ships, parts of ships, components), especially to extend the life span of these products instead of scrapping them;

… considering all life cycle phases of the technologies concerned in view of their cost efficiency, environmental performance and safety.
Business groups

Definition of three "Business Cases" with industry stake holders

Starting with small groups of stakeholders...
- New building yards
- Repair yards
- Ship operators

.....and defining new business scenarios combined with the application of new technologies for different ships.

Ferries operating in the Mediterranean
BARRERAS, Metal Ships & Docks, BALEÀRIA

River cruisers on the Danube river
Meyer Werft, Arosa, ÖSWAG

Mid-range cargo vessels
Uljanik, FC- Palermo, Grimaldi and Jadrolinija

Several workshops will be organised. The first one with project partners only, while the other ones will be extended to members from the partner associations (CESA, CMT and SSA).
New technologies

Definition of three "Specific Technologies"

The project focuses on three specific technologies which all show significant potentials for life cycle cost savings and increased environmental performance and require specific skills throughout the life cycle phases:

Recyclable and / or long life (reusable) Composites
E.g. weight reduction around 50%, not more than 30% increase in production cost, at least equal LC cost and good potential for re-use or recycling; [WP2]

Innovative self-healing coatings and corrosion monitoring
E.g. development of one model self healing paint, proof of (better) corrosion performance, different sensors and arrangements will be investigated and tested [WP3]

Innovative and anti-corrosive steels and steel structures
E.g. investigate at least three different innovative steels, reduce corrosion, improve the LC performance without increasing the new building cost; [WP4]
Develop solutions for "Enabling Technologies"

The project will develop solutions for enabling technologies, which are necessary to implement innovative life cycle asset management across specific technologies:

**Monitoring**
- **In-service validation** of the safety of new components based on composites or innovative steels
- A **monitoring plan** to support condition-based maintenance and life cycle decision making

**Maintenance**
- Monitoring supported **condition-based maintenance** for high payoff maintenance activities (e.g. corrosion & fatigue)
- Add a **risk based factor** to the predictive maintenance;
- To reduce off-service time of the vessel provide improved **tools for maintenance planning** based on specific maintenance, repair and conversion tasks, the shipyards schedule and the sailing schedule of the vessel

**Management**
- Monitoring supported **decision making software** to optimize ship operation
- Development of **operational database** to support decision making (design, retrofit, maintenance, and operation)
Proof of concept

Proof of concepts by "Hardware Demonstrators"

Based on the technological solutions, the generic enabling technologies and the business concepts, 3 prototypes will be build to test and demonstrate the practical feasibility and the life cycle impacts.

Production of technical prototypes
- Combining the technologies
- Prototypes shall reflect technologies for the specific conditions in the new building, retrofitting and operation industry
- During the trials the demonstrators will be compared to conventional solutions / ships

Proof and Validation of Business Concepts
- Using the assessment tools developed for specific technologies and materials
- Feasibility and potential impact shall be elaborated and demonstrated.

Validation of the overall project results and feasibility for a wider industrial community
- Lessons learned
- Preparation of guideline for a wider industrial community.
## Workpackages

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<tr>
<th>WP Number</th>
<th>WP Title</th>
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Interlinking workpackages

In order to make all results available within the project the workpackages are interlinked in feedback loops.
### WP 1 - ThroughLife Concepts / Objectives

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- Major objective of WP1 is to develop concepts for ThroughLife asset management.

- These concepts will be developed with all major stakeholders and evaluated according to commonly developed criteria in **3 Business Groups**.

- For the ThroughLife concepts and innovative materials new analysis methods and criteria will be developed to cope with the three different levels of assessment.
WP 2 - Composites recyclable vs. long lasting / Objectives

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- Major objective of this WP is to evaluate how introduction of traditional polymer fibre composites and green polymer fibre composites onto ships can improve the LC performance.

- Different cradle-to-grave and cradle-to-cradle alternatives will be evaluated which includes all stages from manufacturing, refurbishment, maintenance, operation to dismantling of the ship and possibilities to reuse or recycle the fibre composites.

- Lower life cycle costs through less maintenance requirements have to be proven, and risks as well as environmental aspects have to be explored.
WP 3 - Self healing coatings and corrosion monitoring / Objectives

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<td>Self healing coatings and corrosion monitoring</td>
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- Develop a self healing coating that can recover from scratches and small cracks to the surface.
- The benefit of this could be to develop a self healing ballast tank coating that only requires the application of one coat (layer) of paint.
- Additionally, a corrosion monitoring system will be developed during this workpackage to support the evaluation of the coatings during WP 6.
Work package description

WP 4 - Innovative steels / Objectives

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- Explore the potential of innovative steels compared to ship-building steel for certain highly maintained applications, e.g. a double-bottom.

- Prove better properties concerning corrosion, fatigue, reuse, LC Cost, etc. for operation conditions for an ocean-going vessel.

- Demonstrate the high potential with respect to e.g. corrosion resistance and load carrying capacity, of steel qualities, which are uncommon in ship structures.
WP 5 - Enabling Technologies / Objectives

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- The objective of WP 5 is to develop monitoring, maintenance and management strategies for a ship life-cycle as applied to the activities within this project and to the partner demonstrator activities within this project.

- As such, WP 5 will bridge WP 2-4 to WP 6 and will provide the implementation plan within a holistic life-cycle decision support structure for WP6 demonstrator activities.
WP 6 - Proof of Concept / Objectives

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WP 6 will set up real life test environments to prove the predicted improvements under operational conditions. The major objective of this WP is to map the business cases defined in WP 1 onto test scenarios with specific stakeholders including **demonstrators** that will then be installed and run on board ships or testing facilities.

Tests and monitoring will be performed by the tools developed in WP 5.

All information gathered will be collected and integrated into a common data pool for validating the concepts for innovative life cycle services.
WP 7 aims at actually testing and evaluating the demonstrators set up in WP 6.

During the trials the demonstrators will be compared to conventional solutions that may either be available on the same ship or in another but comparable environment.
WP 8 - Dissemination / Objectives

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- WP8 is a transversal WP which covers the entire project (3 years).
- Develop a technology implementation plan for the dissemination and exploitation
- Perform links with the other European and National projects
- Identify project output with potential for commercial exploitation
- Present the achieved ThroughLife results through presentation of non-confidential information in scientific journals, symposia and conferences and on the appropriate web site.