

PROJECT PROPOSALS FOR THE 2ND CALL OF FP7

(DEC 2007 – JAN 2008)

Template for the project synopsis

1. Proposal for project name

ProWEEL (Protection of Wheelset)

Wheelset protection systems to avoid corrosion and damages, that meets the design/calculation method, the product requirements and the requirements to the environmental legislation.

2. Problem that the project will address (why is the project being initiated?)

The main problem is, that no painting nor protection system, that meets the environmental requirements, can meet all the requirements of the protection against corrosion and against mechanical aggression defined in the existing EN – standard EN 13261 (Axles Product Requirements).

3. Scope of the project

- Investigation the adhesion behaviour of water based painting systems applied on axles and wheels with various surface conditions (roughness conditions). To understand the fatigue behaviour of materials used in wheelsets, fatigue assessment will be carried out via bench tests on small and large scale specimens.
- Investigation of new painting and protection systems and/or a design method for a paint-less system for all rolling stock types.
- Investigation of protection against ballast impact.

- Main (measurable) objectives

- **Reduce VOC level** by investigating new painting or protection systems.

By replacing the solvent-based system with water-based system on wheelsets, it is estimated that there will be a **total VOC reduction of around 85.000 kg**.

- **Reduce manufacturing and maintenance costs** by investigating new test methods for the painting or protection systems (including against ballast impact) to meet a quality standard under consideration of the realistic operation conditions

- o **Reduce non quality ratio (due to claims) by a better adhesion**

The estimated reduction in number of claims due to improved paint is **70%**.

- o **Avoid the investment in combustion systems**

Estimated cost of investment: 730.000 euro (550.000 equipment, 150.000 assembly and 30.000 others (approval tests)) for medium sized company (such as Rafil)

- o **Less frequent repainting during service (in between routine maintenance)**

For passenger vehicles and freights wagons

- Number of wheelsets in operation

Estimated number of wheelsets in operation for passenger : 488.688

Estimated number of wheelsets in operation for freight : 3.599.238

- Reduction in repair of wheelsets due to ProWEEL: 50% target

- **Economic & safety analysis of the paintless solution**
 - Proposed solutions and deliverables
- New products and procedures for the design method including fatigue calculation method of the wheelsets and their protection systems acceptable by the operators, the system suppliers, the wheelset producers and the technical approval authorities.
- The possibility to change from solvent-based paint system to environmentally friendly paint system.(water based solution)
- To determine new fatigue limits to allow different service conditions on wheelsets for different surface conditions.
- Investigation of new test methods for the painting or protection systems to meet a quality standard under consideration of the realistic operating conditions.
- New product requirements for the implementation into EN - standards for wheelset painting and protection systems against corrosion and impacts.
- Maintenance rules for repairing the axle protection systems and their implementation into standards.
- The possibility to have a design method without any painting system (SNCB is using paint free axle for freight cars)
- Matrix mapping the different solutions and risk associated

4. Which section of the 2nd call draft is being addressed?

ACTIVITY: 7.2.5 STRENGTHENING COMPETITIVENESS

AREA: 7.2.5.2 *Competitive surface transport products and services*

Topic: **SST.2008.5.2.1 Innovative product concepts**

5. State of the art: previous or on-going research or standardisation initiatives in this area

- Solvent-base paint are commonly used by the wheelset industry.
- The **ERWA/UIC painting group** investigated the application of water-based paint system in accordance with EN 13261. The new water-based coating systems and protection systems against impact according to the new environmental requirements cannot meet all the requirements of the standards. The conclusion by the working group of ERWA and UIC members is that no satisfactory paint system are available to meet the requirements of EN 13261, section 3.9.
- No previous or on going research or standardisation activities are known in this area

6. Estimated budget (total and EC Contribution)

(Please note that under FP7 R&D activities as well as demonstration will be 50% funded)

Around Euro 3 million

7. Project duration (*indicative range: between 24 and 48 months*)

36 months

8. The leader of the proposal preparation

Proposed project leader: I. Dolman (Lucchini UK)
Supported by UNIFE and ALMA

9. Main potential partners (names of companies supporting the proposal as opposed to potentially interested stakeholders)

- ERWA members (GHH, Valdunes, Rafil/BVV, Lucchini, CAF, Bonatrans)
- System Integrator (Siemens)
- UIC (representing operators)
- Research institutions (ENSCL (Lille), CREPIM, TU Clausthal, Politecnico di Milano)

10. Contributions to standards – can the results of this projects be transferred into future EN standards? (*Maximum 5 lines*)

Due to the harmonization for the European railway it is the main target of the project to implement the results for a revision into the existing EN standards for wheelsets.

The results shall be coordinated with the harsh operating conditions and requirements for train wheelsets and define the requirements for the painting- / protection - systems and testing methods which are reached with the new systems to ensure with in a sufficient and for a period of time durable protection against corrosion and damages to wheelsets. The results shall implement into the rules for the new production and maintenance of wheelsets and act as a guideline. New fatigue limits for the European used axle materials with different surface conditions in comparison to the definition in the existing standards will be implemented into new revised standards.

11. Implications of the project for current individual company products and practices – is the proposal supported internally within each major partner at the strategic level?
(*Maximum 5 lines*)

The results of the project shall move the wheelset producer and the operator into the situation to increase the quality of the products and shall ensure according to the requests in operation a sufficient protection against corrosion and damages to wheelsets. This new developed quality standard shall increase the competitiveness and shall significantly decrease the costs for production and maintenance.

12. Risk factors that could jeopardize the implementation of results. How to ensure market up-take and who will have the responsibility over the implementation?
(*Maximum 5 lines*)

Risk factors can be associated to technical problems that occur in the fatigue evaluation with especially a non-acceptable increase of the axle dimensions due to the change of surface conditions.

Railroads can refuse axles with such proposal that can limit the feedbacks of the project. But note that some railroads used axles without coating.

The market up-take will be done by the wheelset producers and the operators after the results are verified, fulfill the requirements of a technical safe product and accepted by the operators, the system suppliers and the technical approval authorities.

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