

CONSORTIUM - PARTNERS ON THE PROJECT

The consortium consists of 5 project partners from neighbouring countries: Croatia, Serbia and Slovenia.

RAILWAY CARRIAGES FACTORY ČAKOVEC Ltd.

Project coordinator and technical solution provider

www.rzv.hr

ALTIUS Ltd.

Marketing and communication activities

www.altius.si

R&D INSTITUTE "KIRILO SAVIC" a.d.

Testing technical and environmental performance of self propelled bulk carriage

www.iks.rs

FACULTY OF TRANSPORT AND TRAFFIC SCIENCES (FPZ), University of Zagreb

Life-cycle assessment on the self-propelled bulk carriage

www.fzp.hr

SUPERNA Ltd.

Project management

www.superna.hr

MORE INFORMATION:

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About product: Dražen Vidović (Railway Carriages factory Čakovec Ltd.)

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SELF PROP RAIL - ECO/12/332951/SI.656700



IN PROJECT SELF PROP RAIL, THE CONSORTIUM AIMS TO BRING A NEW, INNOVATIVE SELF-PROPELLED BULK CARRIAGE TO THE MARKET THAT DOES NOT NEED THE LOCOMOTIVE FOR SHUFFLING/MOVING DURING THE PROCESS OF CARGO UNLOADING.

Project full title:	Market introduction of a self-propelled bulk carriage
Project acronym:	SELF PROP RAIL
Contract no.:	ECO/12/332951/SI.656700-SELPROPRAIL
Start date of the project:	28. 08. 2013
Duration of the project:	24 MONTH



SPECIFIC OBJECTIVES

- 1) To reduce resource needs (deployment of locomotives) in railway construction and reconstruction by up to 20% in the project area in the next 5 years
- 2) To reduce energy consumption related to railway construction and reconstruction by up to 20% in the next 5 years
- 3) To reduce carbon footprint and pollutant emission during railway construction and reconstruction by up to 20% over the period of the next 5 years
- 4) The environmental impact (incl. energy consumption, CO2 emissions, acidification, eutrophication, photochemical oxidant formation) will be reduced by 20%, and by 60% 2-years after the end of the project.

The main objective of the project is to remove the barriers for market penetration of a self-propelled bulk carriage designed for resource-efficient construction and reconstruction of railway infrastructure.

PROJECT IMPLEMENTATION

The project work program consists of carriage work simulation and testing, conducting a life cycle assessment (LCA) of the carriage, obtaining TSI certificates and the EPD needed for carriage's penetration to market, maintaining the patent, finalizing the market exploitation plan and demonstrating carriage efficiency in various situations related to opportunities for market penetration. The physical location of this project will be in Railway Carriages Factory Cakovec (RZV) in Croatia.



WHERE TO USE SELF-PROPELLED BULK CARRIAGE?

Apart from its use in **construction and reconstruction of railway infrastructure**, the self-propelled carriage use can be applied to the **logistics sector**. In that view, the carriage ensures greater flexibility for more efficient operations relating to cargo shuffling/shunting.

The self-propelled carriages can be used also **for the transport of all types of bulk freight in rail traffic**. Due to the existence of tarpaulin roof and rubber seals, the carriage is suitable for the transport of small grain freight of various kinds (e.g. sand, mineral fertiliser, cereals, etc.). The use of the self-propelled carriage can also be replicated through its use **at port terminals**, decreasing the use of locomotives and other equipment. As the carriage is universal for all types of bulk freight **it can substitute 3-4 types of currently-used bulk freight carriages**.

BENEFITS OF THE PRODUCT

The self-propelled bulk carriage is a resource efficient way of (re)construction of railways. The carriage saves energy, human resources and shortens the time of transportation and unloading. It is cost and time efficient, it enables point-to-point transportation, and there is no need for cost-intensive cargo manipulation machinery for freight handling or time-intensive coupling and reloading processes.

TECHNICAL DESCRIPTION

The technical/technological improvement of this product in the process of construction/reconstruction of the railways is the application of hydraulic system adapted to the needs of self-propelled carriages. It makes the carriage effective in certain conditions and at places that are inaccessible by other means.

A “self-propelled” carriage means complete autonomy of action and better distribution of the locomotive fleet, which ensures enhanced resource efficiency in terms of less working hours for a locomotive, less waste being produced, less fuel consumption and thus lower CO2 emissions.

TECHNICAL SPECIFICATIONS OF CARRIAGE:

Type of bogie	Y25 Lsd-1
Compressed air brake	Yes (KNORR) KE-GP-A-2x10“
Slack adjuster	DRV2A-450H
Number of axles	4
Axel load	22,5 t
Tara weight	37,34 t
Max. weight of loaded wagon	90,0 t
Cargo weigh	52,66 t
Max. speed of empty wagon	100 km/h
Max. speed of full loaded wagon	100 km/h
Loading volume	50 m3
Loading area	35 m3
Loading length	11,2 m
Loading width	2,72 m
Length between the pivot	10700 mm
Length over buffers	15740 mm
Width of tracks	1435 mm
Buffer height	1060+5-10 mm
Draw gear	ST-9-2/160 – 1500 kN,
Screw coupler	1350 kN
Towing hook	1500 kN
Buffers	50 kJ



CARRIAGE FRAME

Wagon is constructed as a fully welded construction and consists of two side and two middle longitudinal girders connected solid cross-linked in a stable supporting structure. All parts of the frame are made from rolled steel sheets and profiles quality S355J2G3 according to the EN 10025-2.

Welding is performed by MAG M (135) method according to EN ISO 15085-2, with additional material quality G 42 4 C/M , 3Si1:EZ-SG2 according to HRN EN ISO 14341-A.

INNOVATION ASPECTS OF THE PRODUCT

One of the innovative parts of this carriage is **the development of a new construction opening and the unloading of cargo on 3 sides** (i.e. a ‘3-side dump’). The carriage consists of **2 cargo crates with the possibility of side and frontal lifting**. The unloading is controlled, enables full load ejection as well as dosing and partial unloading of cargo at points along routes. There is no need for manual unloading of cargo, use of other machinery for unloading or use of physical force when opening the doors and sides that is common in existing bulk carriages for railway construction. Compared to existing carriages with inadequate pneumatic system, the self-propelled hydraulic carriage has a larger cargo capacity, faster unloading using the ‘tipping’, i.e. tilting sideways, existence of the roof which enables transport of hygroscopic materials (grains, fertilizers, ore), ability to transport fine grit without spillage, and quieter operation (there are no huge air high-pressure tanks on the carriage any longer).