



Capacity for Rail

# SP2 New Concepts for Efficient Freight systems

WP2.2 Novel Rail Freight vehicles

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# Partners of WP2.2



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Requests from customers represented by Van Dieren and STVA were clear:

Cost reduction, Reliability, Flexibility (volumes and destinations), cargo security, updated information and sustainability

To progress in line with the customers demands several progress have been researched:

- A new design of wagon generating capacity
- An EP brake solution giving flexibility and thus improved asset utilisation estimated by experts with its cost based on US experience.
- A side effect of the EP brake solution providing energy and a bus of information all along the train, thus enabling to perform an automated brake test.

- Wagon design study

- New design of wagons were presented

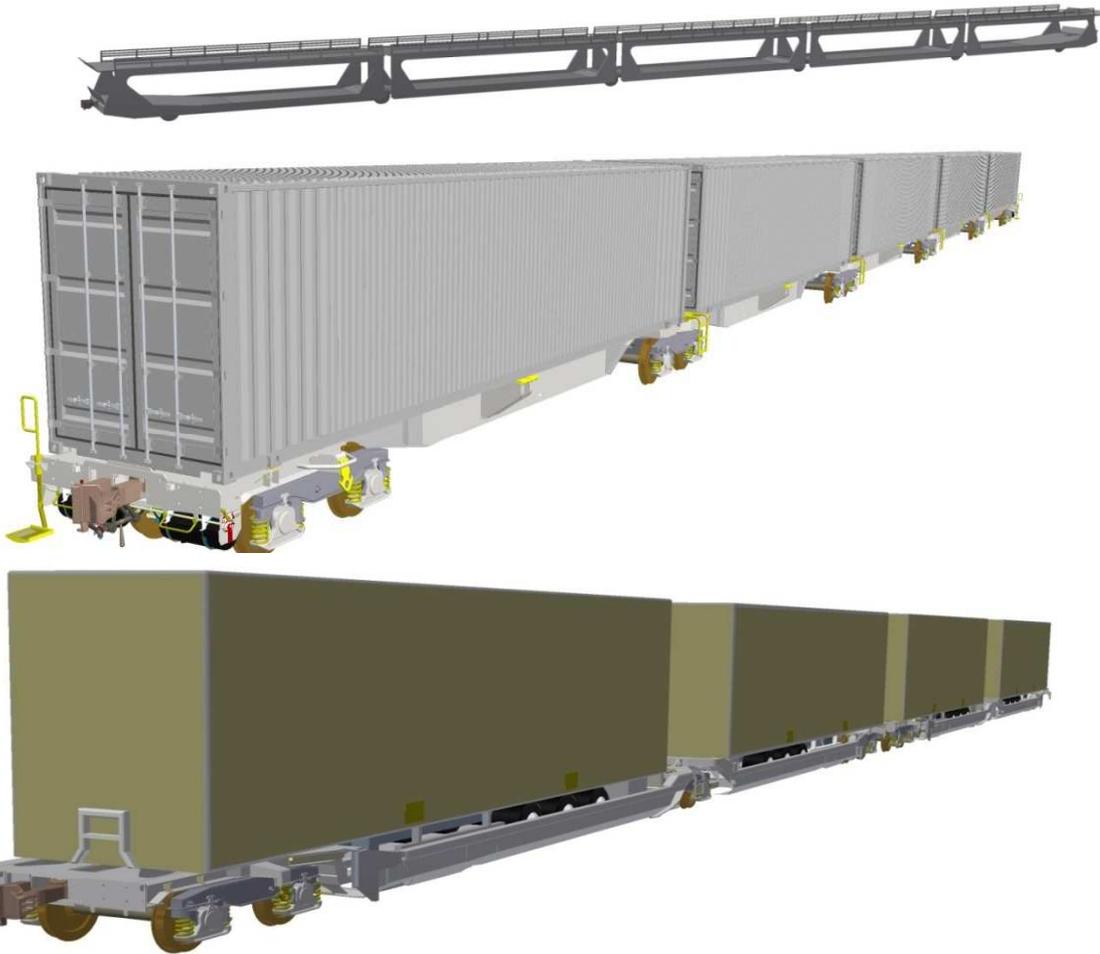
- These designs have been studied: weight, stability, Cost

- For these designs efficiency has been assessed

- An assessment of the profitability for the Wagon owner to decide such investment has been done based on mean capacity improvement and on the surplus of investment compared to a standard wagon. At least the wagon owner could claim an increase of its revenue in line with the capacity increase and the opinion is derived from these figures.

- To complete the analysis the impact of the flexibility on the train efficiency must be taken into account estimated at 20% while the electric line and its bus of information allow the introduction of predictive maintenance improving reliability by 5%

# Wagon design



## Global efficiency and cost of investments

Finished CAR Carrier  
WITH EP brakes 30% for 4,8%  
extra cost

Containers  
Without EP brakes 4,1% and  
12% cost decrease

Trailer transport  
Without EP brakes 2,4%  
progress and cost decrease of  
2% and

## *Other progress expected*

The electric line with a Bus of information has an interesting side effect as it authorizes to put sensors to implement an automated brake test.

Moreover this bus can also transfer these informations to the locomotive or directly to the consignee very interested by monitoring certain data of the cargo like the temperature.

A development of a solution enabling a block of 3 wagons to carry 3X 40' containers or One x45 foot and 2x40' with the same length is being studied.

# *EP brakes and Automated couplers*

EP brake has one very interesting application which is the capacity to lengthen the trains. This is due to the fact that in nominal mode all the wagons brake simultaneously reducing drastically the longitudinal compression forces.

This flexibility allows to cope with sudden increase in the demand subject to present the authorization of the use of the system

A further step in the line with the cost reduction target is the introduction of the automatic couplers. In this field important possibilities of cost reduction exist but the cost an automatic central coupler is quite high.

The question of developing a solution based on couples of two wagons using at both ends automatic couplers and linked in the middle by draw bars needs to verify that there is a demand for a logistics of coupled wagons.

When energy is brought on the wagon either from the locomotive or by batteries it seemed interesting to analyse the possibility of feeding reefer containers.

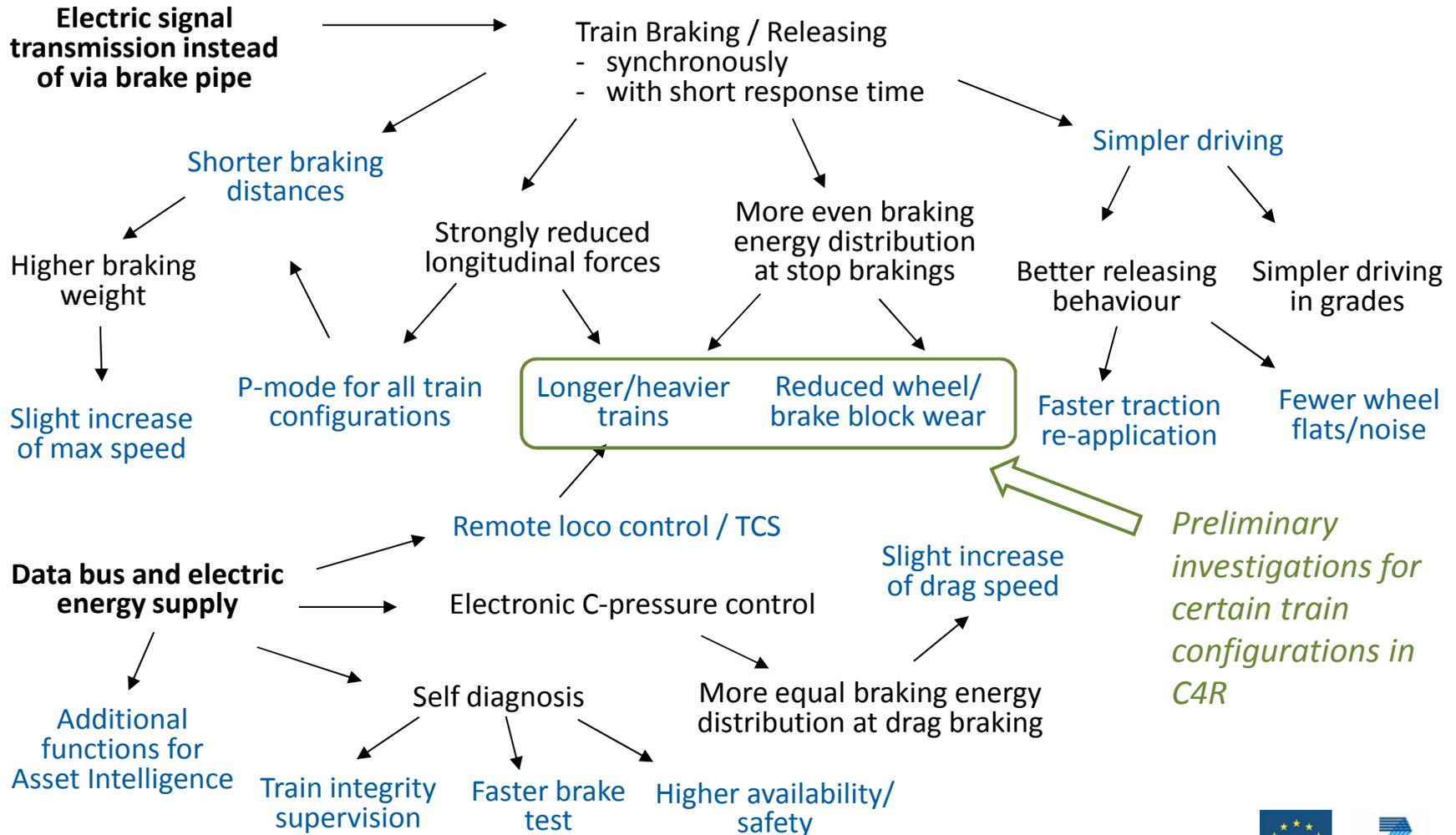
This study seems important as the risk of autonomous diesel generators functioning in long tunnel should be reduced by such an alternative solution.

The conclusion derived from tests made by KB and KTH showed clearly that the new-synchronous braking provided by the EP brake solution has generated a significant reduction in the tread temperature.

But to reach the critical temperature where damages are significant, it was necessary to brake constantly during many kilometers. The alternative solution of sequences of strong braking and releasing reduced the temperature reached with constant braking maintaining the speed. Thus the EP brake solution was not the most economic solution to reduce the wear and tear of the wheel tread. Other advantages of EP brake may justify the installation as there is a virtuous circle created by EP Braking.

# Brake related questions

## Advantages of Ep brakes



The last Topic of research is the connectivity of the wagons handled by KB.

Two ideas are being explored:

--installing a cable to transfer energy from the locomotive to the wagons to be able to place a several sensors to Track and trace the wagons and to transfer all information from the sensors.

--A seconde solution is to generate just enough energy locally on the wagon to feed sensors and to send the information to the interested parties

The connectivity of the wagon opens a new field of progress as it will be natural to follow all interesting data for the maintenance and improve the train management.

It will also enable to prepare in detail the organization of the final delivery and start to consolidate some transports in the same truck.

To apply the innovations that have been developed in WP22 two major questions have to be resolved:

- Is there a sufficient market demand for the improvements in a period where slowdown of economies have left a certain number of assets idle. Some wagon owners will prefer to use existing assets before launching new investments in important modifications.
- Are the innovations able to be introduced in the train management without creating troubles to other traffics. This is to be dealt in SP5

# Thank you from all partners of WP22



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