

 a Project of the S2R JU Project Number <b>777595</b>	Title <b>Presentations to standardisation bodies</b>	Deliverable Number <b>9.5</b>
		Version <b>1</b>

H2020-S2RJU-2017

**Mat4Rail**

**Designing the railway of the future: Fire resistant composite materials and smart modular design**

## **Deliverable 9.5**

### **Presentations to standardisation bodies**

WP9 – Dissemination and Exploitation

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## Revision History

Author Name, Partner short name	Description	Date
Julia Goetz (ACCEL), Johannes Ripperger (ACCEL)	First draft deliverable	20.09.2019
Markus Brede (UNI-HB), Per Blomqvist (RISE), Roland Rennert (IMA)	Additions and edits	25.09.2019
Elena Jubete (CIDETEC)	Revision and adaptation of introduction and objectives	27.09.2019
Julia Goetz (ACCEL), Johannes Ripperger (ACCEL)	Final version	27.09.2019

## Abbreviations

<b>CCA</b>	Cross Cutting Activities ( <i>cutting across Shift2Rail's five main Innovation Programmes</i> )
<b>CEN</b>	European Committee for Standardization
<b>ERA</b>	European Union Agency for Railways
<b>EU</b>	European Union
<b>FRP</b>	Fibre Reinforced Polymer
<b>NoBos</b>	Notified Bodies
<b>NSB</b>	National Standardisation Body
<b>NWIP</b>	New Work Item Proposal
<b>PIVOT</b>	Performance Improvement for Vehicles on Track ( <i>Shift2Rail project, ID: 777629</i> )
<b>PreWI</b>	Preliminary Work Item
<b>RASCOP</b>	Rail Standardisation Coordination Platform for Europe
<b>SRDP</b>	Standardisation Rolling Development Plan
<b>TC</b>	Technical Committee
<b>WA</b>	Work Area ( <i>substructure of Shift2Rail's Cross Cutting Activities</i> )
<b>WP</b>	Work Package

## Short names of Mat4Rail project partners

<b>ACCEL</b>	accelopment AG
<b>CIDETEC</b>	Fundación CIDETEC ( <i>Coordinator of the Mat4Rail project</i> )
<b>COEXPAIR</b>	Coexpair SA
<b>IMA</b>	IMA Materialforschung und Anwendungstechnik GmbH
<b>ITAINNOVA</b>	Instituto Tecnológico de Aragón
<b>RISE</b>	RISE Research Institutes of Sweden AB
<b>UNI-HB</b>	Universität Bremen

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## Executive Summary

This deliverable documents our activities regarding contributions to standardisation efforts that were carried out within Task 9.5 *Pre-commercialisation activities*.

### Objectives of the Deliverable

The purpose of these activities was (and still is) to facilitate the uptake and contributions of Mat4Rail results to the development of new standards and certification processes for the railway industry.

### Outcomes

To date, the Mat4Rail consortium members have participated in three events to transfer the results and knowledge derived from Mat4Rail to standardisation bodies.

### Next steps

As developing new standards in general is a rather lengthy process, further measures are planned after the project ends in September 2019, including continued participation in relevant standardisation working groups.

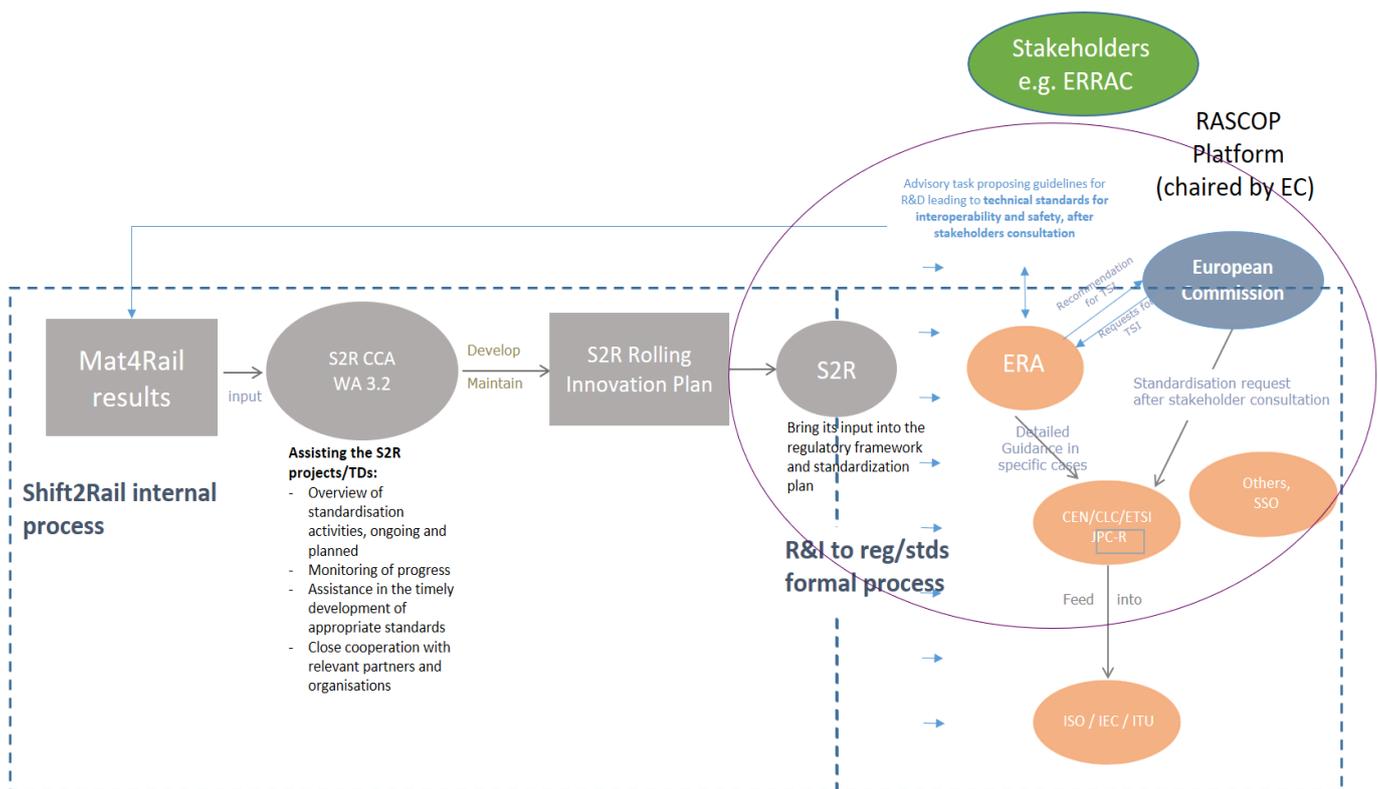
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# 1 Introduction and objectives

This deliverable documents our activities regarding contributions to standardisation efforts that were carried out within Task 9.5 *Pre-commercialisation activities*. The purpose of these activities was (and still is) to facilitate the uptake and contributions of Mat4Rail results to the development of new standards and certification processes for the railway industry.

It reflects how Mat4Rail work in collaboration with PIVOT (with the relevant leaders of Shift2Rail’s Technical Demonstrators also involved in such activities) has important outcomes in terms of standardisation, within the framework of Shift2Rail. Mat4Rail’s results are part of the process depicted in

Figure 1 below, which reflects how Shift2Rail creates impact on the generation of new standards and regulations. As it is shown, Mat4Rail provides input to the Shift2Rail Cross Cutting Activities, Work Area 3.2 (S2R CCA WA 3.2) which deals with standardisation. Within Shift2Rail, the “Standardization Rolling Development Plan” (SRDP) is maintained. The SRDP contains work/results of projects, that affect



standardisation and serves as input to the RASCOP group, as it will be the case of Mat4Rail outcomes.

Figure 1. Mat4 Rail results and positioning within the process leading to standards/regulation.

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## 2 Contributions to standardisation bodies

To date, the Mat4Rail consortium has participated in three events to transfer the results and knowledge derived from Mat4Rail to standardisation bodies.

### 2.1 Collaborative Mat4Rail/PIVOT Stakeholder Board meeting on standardisation,

On 1<sup>st</sup> February 2019 the Mat4Rail and PIVOT projects took their first steps towards standardisation of composites and dissimilar joints for use in Carbody by organising a collaborative Stakeholder Board meeting on standardisation between the two projects and representatives from the European Committee for Standardisation (CEN).



**Figure 2: Group photo of the participants at the Stakeholder Board meeting**

PIVOT was represented by Eduardo de la Guerra from Talgo, Carlos Eraso from Aernnova, and Thierry Mointagné from Faiveley/Wabtec. The Mat4Rail project was represented by the project coordinator, Elena Jubete from CIDETEC, Markus Brede from the University of Bremen, Roland Rennert from IMA Dresden and Johan Sandström from RISE. As for external consultants, both projects counted on the feedback of Geoff Matter - Chairman of the CEN TC 256 SC 2 Rolling Stock products, as well as Andreas Gross from Fraunhofer IFAM responsible for the Working Group 52 "Adhesive bonding in Railway" in the TC256.

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**Figure 3: Presentations during the Mat4Rail-PIVOT Stakeholder Board meeting on standardisation, Presenters: left Markus Brede (Uni-HB), right Roland Rennert (IMA)**

The reason behind the introduction of fibre reinforced polymer (FRP) composites is focused on weight reduction of the structures of components together with the aim of simplifying the manufacturing and integration process in terms of cost and time. New manufacturing and homologation concepts are needed for new materials. A partly virtual homologation process could also be an accepted approach to simplify and to accelerate the process and cut costs.

To gain confidence in new materials, demonstration cases have to be developed and put on track. The gap existing in the standardisation regarding new materials in the railway sector could be an impediment to tests on track. Different standards have been identified regarding this point mainly for carbody and running gear.

The conceptual roadmap for the acceptance of new materials in the sector was discussed, coming from design phase to standardisation and the organisations to be involved along the way. It was clear that it is necessary to gain experience with the new material in the railway environment.

CEN, PIVOT and Mat4Rail are fully aligned regarding the different steps to complete to achieve the common goal.

The PIVOT and Mat4Rail group were invited to be present at the CEN/TC 256 Implementation and Approval of New Materials Kick-Off meeting on 2019-02-20 in Brussels.

## 2.2 Mat4Rail/PIVOT participation CEN/TC256

A new survey group for CEN/TC256 *Implementation and Approval of New Materials* has been set up in which Mat4Rail and PIVOT partners have participated in. To date, three meetings have been organised to further discuss the standards and quality required to achieve the objectives set out CEN/TC256.

Mat4Rail represented by Markus Brede (UNI-HB) joined the Kick-off meeting held in Brussels, Belgium on 20<sup>th</sup> February 2019 as part of the Survey Group to support the implementation of results derived from Mat4Rail into the standards.

Following the Survey Group Kick-off meeting (Doc CEN TC 256 N6346) a second meeting was held on the 24<sup>th</sup> April 2019 to discuss further areas for consideration not raised in the kick-off meeting and to develop the way forward.

The Chairman of CEN TC 256 Sub Committee 2 – Rolling Stock Products as Survey Group Leader (SGL) had contacted CENCLC/TC9X to ensure there was no duplication of effort with their own initiative. However, TC9X had only received 3 nominations and as these were already active in this TC 256 Survey Group, they decided not to pursue their own task and requested that they be kept informed of the TC 256 group progress.

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As discussed in the kick-off meeting, a key point raised was the Approval and Acceptance by “authorising bodies”. A considerable amount of work was done on this in the REFRESCO project with emphasis on carbody shells. The SGL briefly summarised some information that he had received from a member of the Survey Group team who had worked on the REFRESCO project - WP2 – “Benchmark existing homologation processes and technical standards”; Deliverable 2.2, “Certification processes and standards” report has identified relevant standards, regulations and certification process within the Railway sector (EU and non-EU) (<http://www.refresco-project.eu/deliverables/>).

An open discussion was held on how this task of “Introduction of new materials” could be moved forward. It was pointed out that it is important to differentiate between a “New Material” and a “New variant” of an existing material (e.g. steel). It was generally felt that it was not possible to produce a “Generic standard” for all new materials. However, it was proposed that a “Process structure document” should be developed which is foreseen as a more realistically achievable output which may comprise the following subject matter, in no particular order:

- Ensure new materials (or substances) proposed meet the legislative/regulatory requirements
- Method to identify the requirements
- Identify plans for design, manufacture, maintenance and proof of compliance (e.g. test, ...)
- Strategy to engage authorisation bodies (e.g. NoBos & ERA)
- Relevance/complement of existing standards (rail sector / other sectors)
- Specific/new standard required
- Risk analysis / Risk based design
- Methodology of compliance (State of the art, existing application reference, expert(s) validation)
- Representative testing (e.g. sample versus full size fire testing)
- Manufacturing capability and compliance (e.g. material suppliers)
- Maintainability
- Systematic validation of material, sub-system and product characteristics
- Minimum product characteristics to be achieved
- A “Check list” i.e. Annex for describing completeness of “Relevance” or “Compliance” – Yes; No; NA (Not applicable)

Development of specific standards for specific new materials are foreseen as a requirement anyhow to support this process. Proposals for a way forward were:

- SGL is to present status of the Survey Group review so far at the CEN TC 256 plenary in May 2019.
- The TC management will be requested to review these proposals and seek the views/endorsement that this way forward is acceptable.
- The TC will be requested to consider if this is further pursued by the Survey Group or if a more formal “task force” be engaged for the development. This is necessary in order to establish the need for the resource participating to date and that required in the future.
- Depending on the outcome of the above, the SGL will arrange for future meetings accordingly.

A third meeting was held on 3<sup>rd</sup> July 2019 in Brussels. It was the meeting following the TC 256 plenary in May 2019. The outcome of the meeting was that the Implementation and Approval of New Materials group is requested to produce a New Work Item Proposal (NWIP) to include a scope and principle structure of the foreseen process standard. This was then submitted in due course to the NSBs to request support to create a Working Group to develop this requirement.

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At the final meeting of the Mat4Rail project on 18<sup>th</sup> September 2019, Markus Brede reported on the current state of play within the survey group. Meanwhile a ballot was started by CEN/TC 256 N 6649 about a new work item proposal C57/2019-Adoption of PreWI in new materials. The purpose of the standard to be developed is to meet the minimum requirements in the railway sector in a robust, efficient and safe manner whilst supporting the confidence level and acceptability during the approval process.

### 2.3 Further planned contributions

As stated above, the members of the Mat4Rail project plan on actively contributing to standards after the end of the project.

- Possible contribution of PIVOT and Mat4Rail in a new standard for adhesive bonding currently under development: EN WI 000256799 “Adhesive bonding of rail vehicles and parts” (WG 52) will be further considered.
- As a member of CEN TC256 SC2 WG2 (European standardisation for strength of railway vehicles) Roland Rennert (IMA) will suggest the results of the Mat4Rail research with respect to load assumptions and fatigue assessment directly to the CEN working group in order to implement the results in a new revision of DIN EN 12663.
- The ballot CEN/TC 256 N 6649 will be followed and supported by e.g. the Mat4Rail partner RISE as a member of the Swedish mirror committee (SIS) for CEN/TC 256.

## 3 Impact

Creating and developing clearly defined standards for the railway industry will benefit all stakeholder groups in a long-term perspective. Although most standards can be applied to a composite carbodyshell without jeopardising safety, some specific standards need adaptation for composite material behaviour. By continuously contributing Mat4Rail results to standards, by involving Mat4Rail partners with expertise in joining technologies from UNI-HB and ITAINNOVA, extensive know-how of RISE regarding fire testing methods, RISE and UNI-HB/Fraunhofer-IFAM regarding mechanical testing methods and IMA regarding load assumptions and fatigue assessment under operational loads, together with additional knowledge from CIDETEC and UNI-HB, linked with good positioning of COEXPAIR in the aeronautics industry, we will be able to make important contributions to future standardisation long after the project ends.