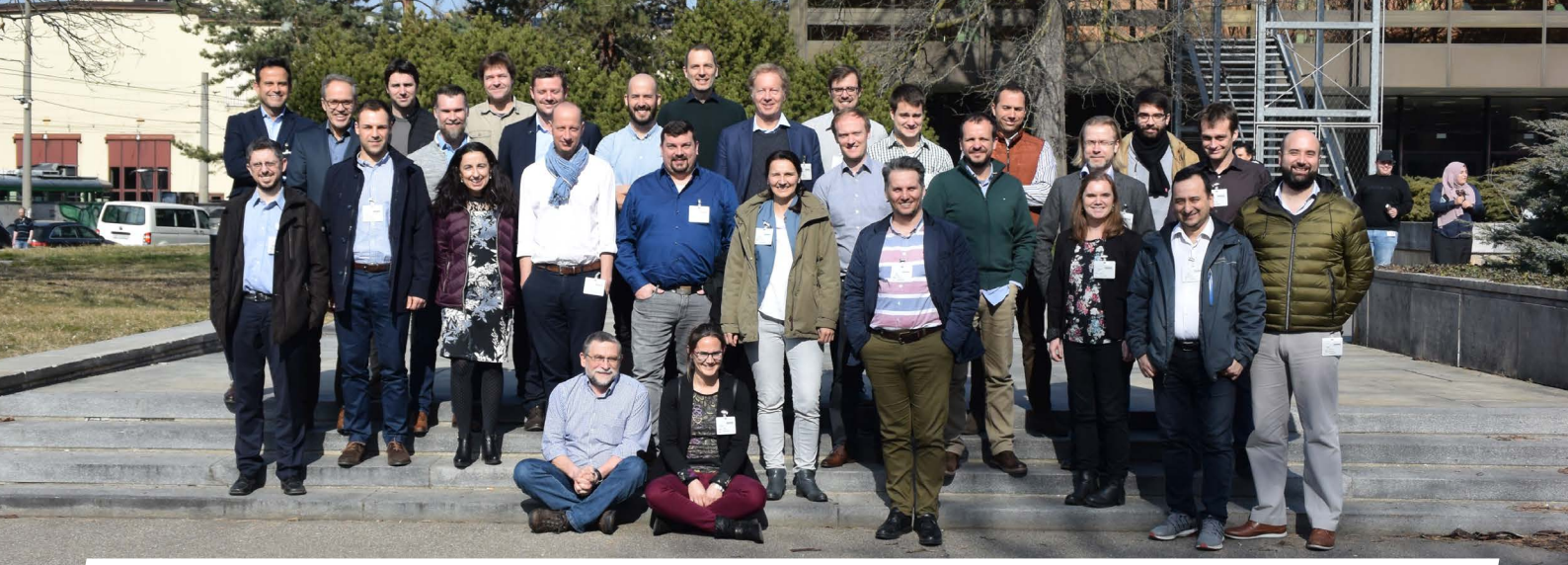

Mat4Rail a Project of the S2R JU Newsletter 03 | April 2019

Design in the Railway Industry

Why service offerings, consumer relation and flexibility of “plug & play” interior concepts will help to win back lost terrain and lead into a better future of consumer driven intermodal transportation landscape

New offerings and features available in trains are in growing demand and are a relatively new task for train operators and builders alike. Not only because of the changing dynamics of interior trends or the more general wear of interior components and therefore the request for in-time refurbishments, but to regain and convince travellers with these offerings into an attractive and desirable future of a sustainable transportation system.

To promote higher attractiveness for train riding, a systematic but flexible layout of interior space needs to be created, to address the recent and the upcoming demands and to exploit the “unforeseen” future possibilities. Also to withstand the competition that currently runs highly flexible and consumer orientated transportation systems such as the individual offerings of automotive units or the services being provided by the air travel industry.

Yet the train system has not taken hold of their possible advantages; the sheer size and open access of the interior space as well as the possibilities for thematic zoning and the outstanding servicing hubs and infrastructure along a journey route. Rather cost driven interior development and maintenance only refit pressure has led to an unfortunate disadvantage in the perception of travel comfort and excitement across all vessel ranges.

Our partners, NVGTR and ESCATEC are working to design and develop a hyper-flexible and intelligent new “plug & play” system as well as first single solutions for train operators, who wish to be able to reconfigure the interior layout of a train as well as the service offerings and elements that add to passenger comfort.

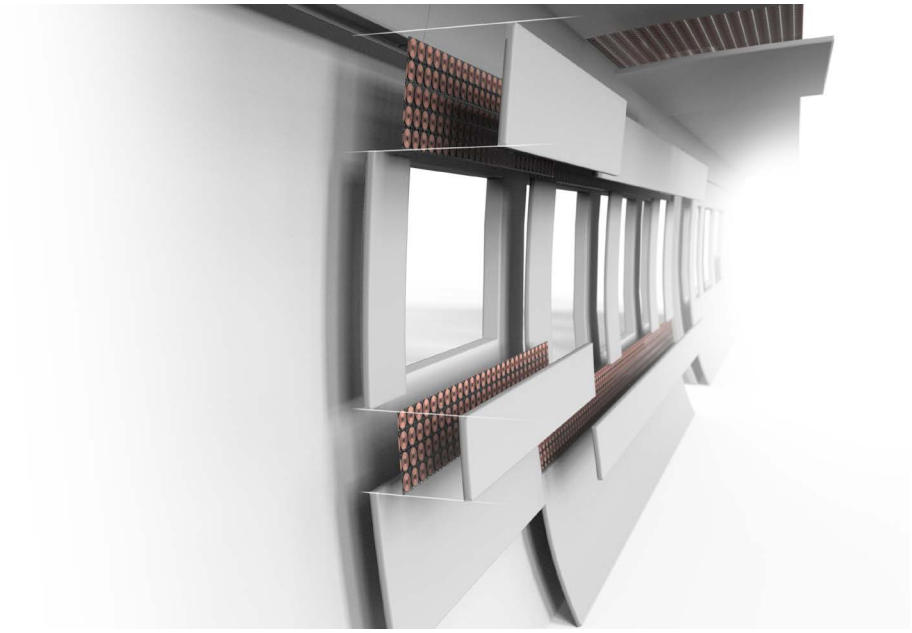

Figure 1 Renderings of the innovative plug & play system developed in Mat4Rail

Figure 2 Mat4Rail leightweight seat prototypes

Addressing and defining a general standard grid system including a new and innovative way of easy fixation points across the vessel body, a range of auxiliary offerings, electric and non-electric, that can be easily exchanged and upgraded, generate a flexibly adaptable and generous principle for a modern interior system. This will not only be operated on demand and cost-effective, but with the passenger and their future consumer needs and the desired travelling experience in the centre of this development.

One of the most relevant factors within the train interior is the seating environment. This is shaping not only the visual appearance, generating a sense of expected comfort but also structuring the interior architecture principal and therefore defining the personal passenger space on first sight.

A paradigm shift is needed to change this perception for a better, allowing for a future outlook of travelling and a new understanding of personal space, community areas and envisioning the poetic expression of travelling lightweight and sustainable.

The Mat4Rail team with NVGTR and Grammer in the lead took on this opportunity of change, starting with the interface and the overall layout principles of the seating building blocks, pushing the boundary of lightweight architecture yet providing superior comfort and reducing seat weight by up to 60%.

Achieving this set goal in a first prototype form of this new seating concept with the highest possible flexibility and super ultra-lightweight solution true a 3D knitted approach. A change in the way seats will be produced, used, upcycled, refurbished - aiming for the best possible passenger user experience and addressing the upcoming transportation challenges.

Generating a tangible vision of future train seat layouts.

Figure 3 Different versions of the seats, varying heights, materials and functionalities

Mat4Rail on Tour

Spreading results and influencing the trains of the future

The Mat4Rail consortium joins existing events, exhibitions, tradeshows, workshops and information days to communicate and reach out to interested stakeholders and to disseminate and demonstrate Mat4Rail related information and results. Starting in the second project year, Mat4Rail partners have attended a number of national and international events to present the Mat4Rail results and prototypes.

Design meeting: Innovative driver's desk

Mat4Rail and PIVOT partners have been holding collaborative design meetings to support knowledge distribution and facilitate discussions between both projects from the start of the projects.

The collaboration and exchange of information between Mat4Rail and PIVOT is essential in order to facilitate knowledge exchange and efficient use of resources. On 16th of January 2019, representatives of the Mat4Rail work package 8 (WP8) met up with PIVOT partners in Vienna, Austria to discuss the further design and implementation of the Innovative driver's desk which is currently being developed led by SPIRIT. Feedback about design concept was received which helped to align further design developments with industry demands.

Stakeholder Board meeting on standardisation

During the Stakeholder Board meeting held on the 1st February 2019 in Madrid, Spain, Mat4Rail together with PIVOT and representatives of external advisors of CEN (European Committee for Standardization) took first steps towards standardisation of composites and dissimilar joints for use in structural carbody parts.

In summary, Mat4Rail members have already established the required contacts and are represented in the key relevant standardisation working group(s). They are in an optimal position to feed their results into the next generation of standards currently under development.

Transfiere 2019

Mat4Rail partner, AIMPLAS, participated at Transfiere in Málaga, Spain, 13th -14th February 2019. Transfiere is known in Spain as the largest professional and multisector event to transfer scientific knowledge and technological research.

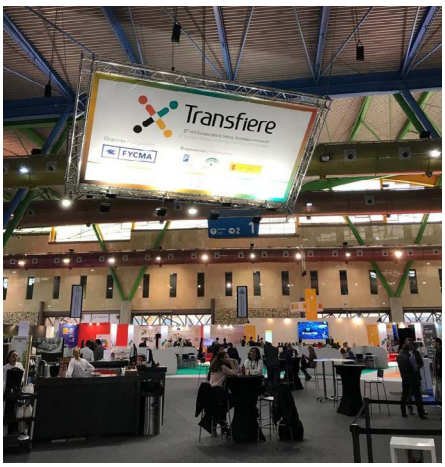

Figure 4 Impressions from Transfiere 2019

AIMPLAS, for the fourth consecutive year, were present at Transfiere and used this ideal platform to promote Mat4Rail's objectives and innovations to other research groups and companies.

AIMPLAS have an excellent track record in developing new thermoset resin formulations and improve transformation processes. They are involved in WP2: New materials for rolling stock, to improve fire performance as well as supporting WP4: Testing and characterisation of resins, composites and joints.

Design meeting: Plug & play systems

Mat4Rail and PIVOT partners working on innovative plug & play systems (WP6) met in Paris, France to exchange their final results on the 19th February 2019. The aim of WP6 has been to design and develop a hyper-flexible and intelligent new "plug & play" system for train operators. The system should allow operators to reconfigure the interior layout of a train as well as the service offerings and elements that add to passenger comfort.

The Mat4Rail designers, NVGTR, have previously met the PIVOT partners on the 27th November 2018. During this collaborative workshop, they discussed the strategic requirements planning and the various innovative design solutions created by NVGTR.

Standardisation CEN/TC 256 Kick-off

Mat4Rail partners joined the CEN/TC 256 kick-off meeting held in Brussels, Belgium on the 20th February 2019. The CEN/TC 256 Implementation and Approval of New Materials focuses on the Standardisation of all applications (except electrical and electronic subjects), in the field of railways, including urban transport, specifically intended for vehicles and fixed installations. Mat4Rail partners joined the meeting as part of the Survey Group to support the implementation of results derived from Mat4Rail into the standards.

4th Mat4Rail General Assembly

From the 27th – 28th February 2019 representatives of the 16 Mat4Rail partners travelled to Basel, Switzerland for the 4th General Assembly. The meeting was hosted by our partner HUNTSMAN and offered the opportunity to further discuss project results and make decisions on how these should be best implemented. The work streams for materials and for interior design also held smaller meetings to discuss their advancements and results in their fields which supports the outcomes and effectiveness of the project as a whole. We look forward to what the last six months of the project will bring.

JEC World 2019

A number of Mat4Rail partners travelled to Paris, France in March 2019 to participate at the JEC World 2019 which was held 12th – 14th March 2019. The JEC World is known to be the leading international show on composites featuring ground-breaking research and solutions and unique manufacturing and business opportunities. In total, the event attracted over 43,300 visitors and members from CIDETEC, COEXPAIR, AIMPLAS and HUNTSMAN were also part of this 3-day event.

Our partners used this platform to facilitate networking with targeted audiences in the field of composites and to present the new Mat4Rail brochure for the first time. Over 1,300 exhibitors presented their innovative solutions to a large audience. One of these was our partner COEXPAIR, a highly innovative SME from the aeronautics sector.

For Mat4Rail, they use their expertise in composites to make their know-how of innovative processes, the development of out-of-autoclave technologies, their tooling and peripheral equipment available. During the JEC World, COEXPAIR was on site to present themselves but also their contributions to Mat4Rail where they lead WP5 on access door systems.

Figure 5 COEXPAIR's booth at the JEC World 2019

Figure 6 Further impressions from JEC World 2019, with Mat4Rail brochures at the desk

Shift2Rail JU IP1 – Steering Committee meetings

Mat4Rail is a Shift2Rail project, funded under the call S2R-OC-IP1-01-2017, targeting the Shift2Rail IP1 (Innovation Program 1). It is an OPEN CALL (OC) project which runs parallel to the complementary project PIVOT from the Call for Members (CFM) S2R-CFM-IP1-2017. Both PIVOT and Mat4Rail run in parallel to address the challenges from the technological demonstrators TD 1.3; Carbody shell demonstrators, TD 1.6; Doors and Access systems demonstrators and TD 1.7; Train modularity in use. To support the implementation of projects part of the IP1, Shift2Rail Project Officers and the Project Coordinators meet online every 2 to 3 months to discuss the status of the project. So far in 2019, Mat4Rail has already presented its results on two occasions, on 15th January and 27th March.

Design Meeting: Innovative seats

Representatives of the Mat4Rail design team, NVGTR, GRAMMER and ESCATEC met with PIVOT partners in Paris, France on 10th April 2019 to present their final results from WP7 innovative seats.

The concept and ultralight seats our partners have been developing over the past 18 months were presented. The participants discussed the design process and the different options which include different materials and heights of the seats for optimal passenger comfort. The highlight of the meeting was when the PIVOT partners had the opportunity to physically test the different prototypes themselves. All participants were positively surprised at the level of comfort of the seats and congratulated Mat4Rail on their innovative and "crazy" ideas.

Figure 7 NVGTR presenting the new innovative and lightweight seats developed in WP7

Figure 8 PIVOT partners testing the various seat prototypes

Planned Events

Mat4Rail partners plan to use the last six months of the project effectively to promote Mat4Rail and related project outcomes and results to interested stakeholders within the railway network. Listed below are a number of future events where members of the project plan to represent Mat4Rail.

- CEN/TC 256 "Implementation and Approval of New Materials Survey Group 2nd meeting" in Brussels, Belgium 24th April 2019
- International Paris Air Show, France, 17th – 23rd June 2019
- FPRM 2019, Fire Retardant Polymeric Materials, Turku, Finland, 26th – 28th June 2019
- MATCOMP 2019, Galicia, Spain, 2nd -4th July 2019
- AB2019 - 4th International Conference on Structural Adhesives, Porto, Portugal, 11th – 12th July 2019
- Euromat 2019, Stockholm, Sweden, 1st – 5th September 2019
- Final project event in collaboration with PIVOT, to be held in Paris, France, 17th September 2019.
- Advanced Engineering 2019, United Kingdom, 30th – 31st October 2019
- ALUS 09, 9th International Aluminium Symposium, Istanbul, Turkey, 10th – 11th October 2019

Standardisation of composites and dissimilar joints for the use in train carbodies

Mat4Rail's and PIVOT's first steps towards standardisation

Mat4Rail organised hand in hand with PIVOT the first stakeholder board meeting on standardisation of composites and joints in railway, held at the Spanish Railway Foundation, in Madrid in February 2019. The meeting was co-organised by Talgo and CIDETEC, and members of PIVOT, Mat4Rail as well as external advisors of CEN, the European Committee for Standardization.

The PIVOT project was represented by the work package (WP) leaders Eduardo de la Guerra from Talgo, Carlos Eraso from Aernnova, and Thierry Mointagné from Faiveley/Wabtec. Mat4Rail was represented by the project coordinator, Elena Jubete from CIDETEC, Markus Brede from the University of Bremen, Roland Rennert from IMADresden 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.

In addition to presenting the current results of both projects, in the field of new composites and joints for the railway sector, the productive event served to reach two important commitments:

On the one hand both Mat4Rail and PIVOT committed to participate actively in a new standardisation group within the CEN TC256 Committee for the implementation and approval of new materials in railway. The first meeting of this Working Group was held on 21st of February in Brussels with participation of representatives from both projects.

On the other hand, the representatives of CEN pledged to share with Mat4Rail and PIVOT a new standard for the development within the Working Group 52, of adhesive unions for the railway sector. It is the so-called standard in WI 000256799 "Adhesive bonding of rail vehicles and parts". CEN representatives will ensure that Mat4Rail and PIVOT have the opportunity to comment on the draft and incorporate the results derived from both projects before the final publication of this standard.

Congratulations to the members of Mat4Rail and PIVOT both for the active collaboration between the two complementary Shift2Rail projects and the effort shown in order to achieve results of their projects that serve to create new standards which contemplate the use of composite and adhesive joints for the carbody.

Figure 9 Members of the Mat4Rail/PIVOT stakeholder board on standardisation, including European Standardisation Committee (CEN) representatives and project members of both projects

Mat4Rail
a Project of the S2R JU

Designing the railway of the future

Project Coordinator
Dr Elena Jubete
CIDETEC, ES

Project Partners
- Universität Bremen, DE
- Instituto Technológico de Aragón, ES
- CENTEXBEL, BE
- RISE Research Institutes of Sweden AB, SE
- AIMPLAS Asociación de Investigación de Materials Plásticos y Conexas, ES
- IMA Materialforschung und Anwendungstechnik GmbH, DE
- Huntsman Advanced Materials GmbH, CH
- Coexpair SA, BE
- ASAŞ Alüminyum Sanayi ve Ticaret A.Ş., TR
- NVGTR Gbr, DE
- Spirit Design – Innovation and Brand GmbH, AT
- ESCATEC Switzerland AG, CH
- Grammer Railway Interior GmbH, DE
- INDAT GmbH, AT
- accelopment AG, CH

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