Final Report Summary - SUP&R ITN (Sustainable Pavements & Railways Initial Training Network)

The FP7-funded Sustainable Pavements & Railways Initial Training Network (SUP&R ITN), which started at the beginning of October 2013, aimed at forming a new generation of multi-disciplinary European researchers and professionals capable of conceiving, planning and executing sustainable road and railway infrastructures. In order to do that a European consortium was setup to couple state-of-the-art training and cutting edge research are pursued to deal with the design and environmental assessment of sustainable technologies for road pavements and railways with the following key innovations:

• To generate scientific results and best practice that can be defined and disseminated during the whole training period with the researchers being the ambassadors of more sustainable engineering technologies and practices
• To form a new generation of multidisciplinary transport infrastructure engineers able to characterise, design and assess the sustainability of pavement and railway infrastructure technologies.

The SUP&R ITN achieved these objectives with a structured programme including six Work Packages (WPs) with The Nottingham Transportation Engineering Centre (NTEC) at the University of Nottingham leading the training (WP4), management (WP5) and dissemination (WP6) and each hosting institution supporting the training and research of individual researchers through three scientific research WPs. The infographic in Figure 1 (attached) summarizes the whole lifecycle of the SUP&R ITN with ideation, consortium, projects and the driver of the overall programme.

OVERALL RESULTS AND IMPACT

Design To last. Maximise Recycling. Minimize the impact a concept that researchers applied by improving the sustainability of road and rail systems throughout their life-cycle by systematically integrating sustainability at an early stage in the product design. This was developed within three work Packages: Sustainable Pavement WP1, Sustainable Railways WP2 and Sustainability Assessment WP3.

In pavement six fellows investigated energy reduction through low-temperature asphalts by: Defining a design procedure for airport pavements (ESR1), developing an environmentally friendly bitumen emulsion (ESR5) and seeing if combining it with a high-rate of recycling (ESR6) would affect durability (ESR3). Meanwhile, two other studies investigated the successful re-using of end-of-life tyres (ESR4) and biomass (ESR2) within pavement.

In railways they investigated: Combining low temperature asphalt with recycled materials to create sustainable trackbed sub-layers (ESR8,9,12), Reducing maintenance needs through ballast stabilisation with bitumen (ESR7), And improving track monitoring by using vehicle responses to detect track damage (ESR10) or through geophysical methods (ESR11).

Finally, they investigated the definition of sustainability itself, engaging the whole consortium to create a freely available tool that can support designers to assess the sustainability of road pavement and railway track beds technologies. SUP&R MCDA The tool, that is available upon request from the website, was built upon a methodology that can actually be applied to assess the sustainability of any system (ER1, ER2 and ER3).
The results obtained and available through the website are of most interest to engineering consultancy, contractors, road and railway authorities and policy makers who are interested in supporting sustainable development in civil engineering. Most of the technologies developed/investigated by the researchers proved to be worthy of being further developed and they are already making an impact. Here some examples:

The bio-asphalt investigated by ESR2 is now being validated in full scale within another project (bioRePavation.ifsttar.fr) that further developed the technology relying on the initial results obtained within the SUP&R ITN. The ESR is now working to develop further the obtained results as a PostDoc researcher at the University of Nottingham.

ESR11, who worked at Irish Rail, joined the SUP&R ITN project after being in Australia. He’s now married, with a child and defended his PhD in July 2017. The results attracted the interest of an Irish company (murphysurveys.ie) that is now developing the concept further. The ESR is now their employee.

ESR7’s project at the University of Nottingham allowed him to have a secondment at AECOM, one of the world’s biggest engineering consultancy firms. The ESR was working on his project on sustainable railways, but was seen as bringing such a good value that AECOM offered him the first available post despite this being in the road pavements team.

The Director of AECOM Nottingham, one of the industrial partners and the biggest engineering consultancy in the world, was present at the presentation of the SUP&R ITN MCDA tool. The idea and results were so appreciated that it allowed us to have the tool in trial within the UK branch and then distribute it in all the other branches worldwide.

The other fellows have very similar stories, and in the next months their stories will be published on our website http://superitn.eu. The website will stay up at least until 2021 and contains blogs of the fellows, infographics, videos, pictures, a up-to-date library with all the publications, the details of the training programme and of course the public deliverables summarizing the findings in Sustainable Pavement (D10), Sustainable Railways (D11). Furthermore, the consortium invested in creating a movie that summarizes the whole project and the training-through-research of the fellows. The video is published on YouTube (https://www.youtube.com/watch?v=gLtAZ-ZVA5g) and on the website homepage and was tailored with professionals in order to provide the fellows with the best possible business card for their next challenge.

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**Subjects**

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