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Book review

Sustainable Automotive Technologies 2013 Proceedings of the 5th International Conference ICSAT 2013, J. Wellnitz, A. Subic, R. Trufin. Springer International Publishing, Switzerland (2014). £126 (hardback); £100.50 (eBook), ISBN: 978-3-319-01883-6 (hardback); ISBN: 978-3-319-01884-3 (eBook)

The articles in Sustainable Automotive Technologies 2013 Proceedings of the 5th International Conference ICSAT 2013 provide an informative look at automotive sustainability for those interested and working in the field. A diverse range of specialist areas are examined shedding new light on fuels, materials, manufacturing and engines. As stated by the authors "the concept of sustainable mobility is multidimensional and the challenge of achieving it is quite complex." However, the multidisciplinary research presented in this book demonstrates that the field is dynamic and showcases some of the new technologies and innovative approaches under development to meet this challenge. This is an important area of research considering that there are about one billion vehicles on the road globally. The continued increase in the world's population, matched with consistent growth in automotive sales, shrinking fuel supplies and material resources and the concerns regarding global warming related to carbon emissions as well as air pollution, are the key issues that the automotive industry needs to prepare for and respond to positively. The Sustainable Automotive Technologies 2013 Proceedings of the 5th International Conference ICSAT 2013 includes thirty articles on a diverse range of topics representing those active in the field from all sides of the globe. It should be noted that these proceedings are an engineering rather than a transport geography exploration of sustainable automotive technologies.

Transportation accounts for more than a third of greenhouse gas emissions globally and is one of the most fossil fuel intensive activities in the world. Although the green energy targets and policies in transportation in many developed countries such as the European Union (EU), Japan and South Korea, with even the USA slowly following suit, has meant positive changes, the rapid growth and increase in vehicle numbers across all modes in developing countries has negated any gains. However, it could be argued that improved engine efficiencies and lower greenhouse gas emissions, light weighting, recycling and the drive towards transport electrification, biofuels and hydrogen filtering into other countries is as a direct result of these positive actions in the EU, Japan, the USA and South Korea. From the perspective of transport geography this phenomena is interesting and perhaps shows the efforts of those working in the field of transportation in a far more positive light than the widely publicised negative slant from the global warming community. Transportation has had many positive impacts on society, with pre-modern transport we moved slowly from place to place, now one can circumnavigate the world in a matter of days or even hours depending on the mode. This has opened up the world to a wealth of cultures, opportunities and influences. This has impacted our world and thinking greatly, I would argue for the better. There is also a moral societal question regarding transportation. Can we in the developed world deny access to transportation now to those in countries far less developed than us? We, after all, produced and continue to produce much of the greenhouse gases associated with global warming and general environmental pollution. We have made efforts and strides to change our behaviours, maybe we must behave in a more mature and understanding manner in our ivory towers and support rather than force those less fortunate than ourselves into shifting to more sustainable automotive technologies. These conference proceedings show that those working in the field are considering many technology changes and improvements to re-engineer transport for the 21st century considering the challenge that is global warming.

The focus in Part I of the book is on Fuel Transportation and Storage, where Geneder et al. discuss the Function and Energy Flux Simulator (FES) developed in partnership by AUDI, AVL and Ingolstadt University to examine real against modelled driving situations to validate energy efficiency. In Part II Material Recycling, Stasinopoulos and Compston show that there are net energy benefits to be had when the steel in the car bodies-in-white (BIW) are replaced with either aluminium or composite material applying a dynamical life cycle inventory approach to the Australian car-fleet. Furthermore, a novel redesign methodology of the load bearing subassembly for an automotive seat adjuster in Part III Manufacturing and Management Costs, was proven to be more efficient by using the results of a finite element analysis (FEA) in a Multi-objective Particle Swarm Optimisation (MPSO) to find the lightest design that maximises crash resistance. Next Schlingensiepen et al. discuss that a systems approach as well as a vehicle is necessary to increase sustainability in transport and develop a generic architecture for the Autonomous Road Transport Systems (ARTS) to link vehicles to the physical intelligent transport system in Part IV Engines. Finally, in Part V Bowler et al. examine battery second use (B2U) and detail a new approach to enhance the state-of-the-art B2U evaluation methods currently used.

The variety of mobility issues addressed in the Sustainable Automotive Technologies 2013 Proceedings of the 5th International Conference ICSAT 2013 clearly indicates that both industry and academia globally are jointly and actively striving to ensure a greener more sustainable automotive transport model for the future. In conclusion it is obvious from the body of research presented that the solutions to this global challenge will be multidisciplinary and multi-sectorial in nature, involving scientists, engineers, industry, policy makers and the public as a whole with important decisions to be made in the short-term and long term.

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