



MOBILITY & PRODUCTION

Fields of Expertise TU Graz

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Mobility & Production

Source: Lunghammer – TU Graz

Despite the limited boundary conditions, we can again report on a wide range of activities and initiatives in the Field of Expertise Mobility & Production. The Faculty of Mechanical Engineering and Economic Sciences has launched an encouraging and broad-based research initiative on sustainable mobility of people and goods. Coordinated by Professors Hirz and Landschützer, several doctoral theses deal with questions of multimodal logistics processes, energy supply, drive

technologies, etc. I am sure that we will be able to report on the results of these more often in the future.

Already in the past, some articles in our journal have pointed out the manifold research activities on hydrogen within our Field of Expertise. These activities in the field of production, storage and distribution of hydrogen as well as suitable energy converters and their application in mobility will be intensified in the near future.

One still existing good example in order to further develop hydrogen technologies and to accelerate knowledge transfer and market introduction is the H2GreenTECH project. It is supported by the European Regional Development Fund, was launched on March 1st by the Institute for Chemical Engineering and Environmental Technology together with the National Institute of Chemistry in Ljubljana, the Slovenian Ministry of Education, Science and Sport, Research Burgenland, Carinthia

University of Applied Sciences and Austrian companies.

An important sector of hydrogen research is green mobility, especially the application in vehicle drivetrains, mostly in the form of fuel cells. In a research project of the Institute of Internal Combustion Engines and Thermodynamics, together with the Bosch company drivetrains based on hydrogen internal combustion engines were investigated and remarkable results were achieved, see the following report.

Last February a high-powered delegation from Graz University of Technology visited the partner University of Strathclyde in Scotland and was able to visit the substantially equipped laboratories for forming and friction welding. The strengthened scientific partnership is likely to cooperate in the digitalisation of such processes, e.g. in digital moulding, data analytics and likewise. For this the funding of the position of a PhD is in preparation.

Helmut Eichlseder, Peter Grabner, Klaus Schaffer:

Internal Combustion Engine – An Alternative Energy Converter for Hydrogen

Hydrogen is regarded as the energy carrier of the future. For mobility applications hydrogen has the potential to make an important contribution towards well-to-wheel and life-cycle CO₂ neutral mobility solutions. Usually the fuel cell is seen as the obvious energy converter, promising emission-free operation and high efficiency. The motivation for this research is a technology open assessment of whether and how hydrogen internal combustion engines (ICE) can represent an alternative for many applications.

Substantial arguments in favour of the application of hydrogen ICEs are existing manufacturing structures, robustness, low demands on fuel quality and a much more favourable cost situation, which could lead to a much faster penetration and development of the starting infrastructure. In some European countries,

as well as in several important markets, e.g. Japan, Korea and China, a network of hydrogen refuelling stations exists and is currently expanding.

In the past few years, the Institute of Internal Combustion Engines and Thermodynamics has carried out intensive studies on this topic within the framework

of bilateral activities with industrial partners, a large EU project and several FFG projects. These ranged from basic research to application in engine concepts and approved vehicles.

In cooperation with Robert Bosch GmbH the focus of the current project is on the achievable efficiency, emission >