

State Funds Hybrid Lightweight Construction Projects at KIT

Economically Efficient Production and Enhanced Stability – Cooperation with Industry

Two new hybrid lightweight construction projects at Karlsruhe Institute of Technology (KIT) will be funded by the State of Baden-Württemberg: Under “HyPro”, the KIT Institute of Production Science and partners will develop an automatic process chain for the economically efficient production of hybrid components for use in automotive industry. The “KraSchwing” project, in which the KIT Institute of Vehicle System Technology (FAST) is involved, is aimed at enhancing the stability of structures under dynamic loading.

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In total, the state government will fund five joint research projects on hybrid lightweight construction in Baden-Württemberg with about EUR 1.63 million. “The funded projects contribute decisively to the automation of production processes or the joining of hybrid lightweight components. Enhanced cooperation of science and industry in innovation partnerships paves the way towards a rapid transfer of viable lightweight construction technologies from research to the industrial production of marketable products,” says the Minister of Science Theresia Bauer. “As resources and materials efficiency is gaining importance, lightweight construction plays an increasing role for the competitiveness of companies in the processing trade. As a leading location of lightweight construction industry, Baden-Württemberg has best prerequisites to profit from this development,” the Minister of Economics, Nils Schmid, emphasizes.

KIT President Professor Holger Hanselka underlines the enormous potential of hybrid lightweight construction for a number of industrial applications: “Thanks to lightweight construction, resources consumption can be reduced for a number of applications, from the vehicle to the industrial robot. This also reduces the weight and energy consumption,” Hanselka says. “The two newly funded projects underline KIT’s research competence and its importance as one of the leading innovation partners of industry.”

Hybrid lightweight construction is based on the use of composites consisting of various materials, such as metals and fiber-reinforced

plastics, to combine the specific advantages of both materials in an optimum manner. The “HyPro” project (Technology developments along the RTM chain of values added for the economically efficient production of hybrid components) is coordinated by KIT’s Institute of Production Science. Partners are the Fraunhofer Institute for Chemical Technology (ICT) in Pfinztal near Karlsruhe and six industrial companies. The project is aimed at developing an automatic process chain for the economically efficient production of hybrid components that are increasingly applied in automotive engineering. Production is based on the so-called resin transfer molding (RTM) process: Fiber mats are inserted into a workpiece. Then, a liquid resin-hardener mixture is added for casting under pressure. Heat supply makes the resin react, as a result of which a solid body is formed. Under “HyPro”, the researchers study the individual stages of the RTM chain – layout, pre-forming, infiltration, and post-processing – and develop them further. The focus lies on pre-forming of the continuous filaments (textile semi-finished products) in combination with metallic elements. “Draping, positioning, and fixing of the fiber mats during pre-forming result in the basic structure of the component,” explains the Head of the “HyPro” project, Professor Jürgen Fleischer, who heads the Institute of Production Science of KIT. Another focus of the project are tool technologies for the infiltration of the pre-formed component with resin and on the sealing of the mold. Finally, the results will be validated using a demonstrator constructed by the project partner Porsche AG. The “HyPro” project is funded by the state of Baden-Württemberg with about EUR 400,000. The total project volume is about EUR 1.4 million.

With the framework of the “KraSchwing” project, the German Aerospace Center (DLR) in Stuttgart, the KIT Institute of Vehicle System Technology (FAST), and the Institute for Natural Sciences and Medicine (NMI), Reutlingen, together with six enterprises, are working on optimizing the technology for joining fiber-reinforced and metallic hybrid lightweight components. The project is aimed at improving the stability of both bonded and innovatively screwed structures under dynamic loading.

The call issued by the Ministry of Science, Research, and the Arts and the Ministry of Finance and Economics was won by five consortia of science and industry and is part of an extensive strategy to promote lightweight construction in Baden-Württemberg.

Karlsruhe Institute of Technology (KIT) is a public corporation according to the legislation of the state of Baden-Württemberg. It fulfills the mission of a university and the mission of a national

research center of the Helmholtz Association. Research activities focus on energy, the natural and built environment as well as on society and technology and cover the whole range extending from fundamental aspects to application. With about 9000 employees, including nearly 6000 staff members in the science and education sector, and 24000 students, KIT is one of the biggest research and education institutions in Europe. Work of KIT is based on the knowledge triangle of research, teaching, and innovation.

This press release is available on the internet at www.kit.edu.