

Stuttgart, 29th June 2018

PRESS RELEASE – ThinKing July 2018

Higher profits, lower costs and better products

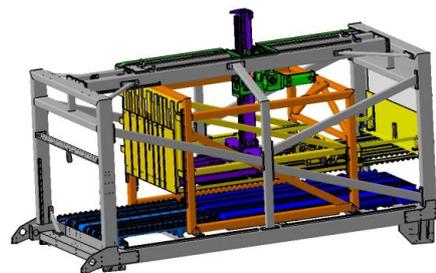
25 percent lower production costs in machine manufacturing while improving the machine’s functionality at the same time? Recent results from the research project PoKoGeLe show which benefits one can take from using lightweight technology. The project took a close look at examples of our industrial partners – including WILHELM BAHMÜLLER Maschinenbau Präzisionswerkzeuge GmbH. Thanks to optimal design using lightweighting principles, the mass of the moving parts and drive components of a corrugated cardboard processing machine could be reduced by about 50 percent. That means the machine will require around 40 percent less energy to operate. As an added bonus, the optimized machine is capable to perform faster cycle times – all while reducing the manufacturing costs by 25 percent.

The Development Agency for Lightweighting Baden-Württemberg is presenting this innovation as its ThinKing for July 2018. Leichtbau BW GmbH awards this distinction each month to offer a platform to innovative products and services in the Baden-Württemberg lightweighting sector.

PoKoGeLe is an acronym created from the German terms for “potential – cost and weight reduction through lightweighting in tooling and processing machines”. The research project focused on the question of how lightweight technologies can reduce, the manufacturing costs and the weight and resource requirements of machines while at the same time optimizing their performance. Tooling and processing machines are under significant cost pressure in relation to their productivity requirements. The working speed of a machine is directly linked to the mass of its moving parts. The competitive pressure requires manufacturers to continually deliver better and cheaper products – and lightweight technology can help to achieve it.

Greater productivity, lower costs

In order to obtain clear results, PoKoGeLe examined two concrete cases of potential optimization in industrial applications – including one of our industry partners WILHELM BAHMÜLLER Maschinenbau Präzisionswerkzeuge GmbH from Plüderhausen near Stuttgart. The study focused on their corrugated cardboard processing machine. The machine includes a carriage which moves the product batch around inside the machine during the operational start/stop cycle. This component was the one with the greatest potential for optimizing the machine’s functionality.



By applying several lightweighting principles, impressive improvement regarding the machine’s efficiency could be achieved: The overall manufacturing costs of the machine was reduced by around 25 percent. The mass of the moving parts including the drive components fell by about 50 percent in comparison to the original design – and since less mass is needed to be moved, the technicians at the processing facility estimate with energy savings of about 40 percent. “Ecologically sustainable and still profitable – only lightweight technology makes this possible,” notes Dr. Wolfgang Seeliger, managing director of Leichtbau BW GmbH.

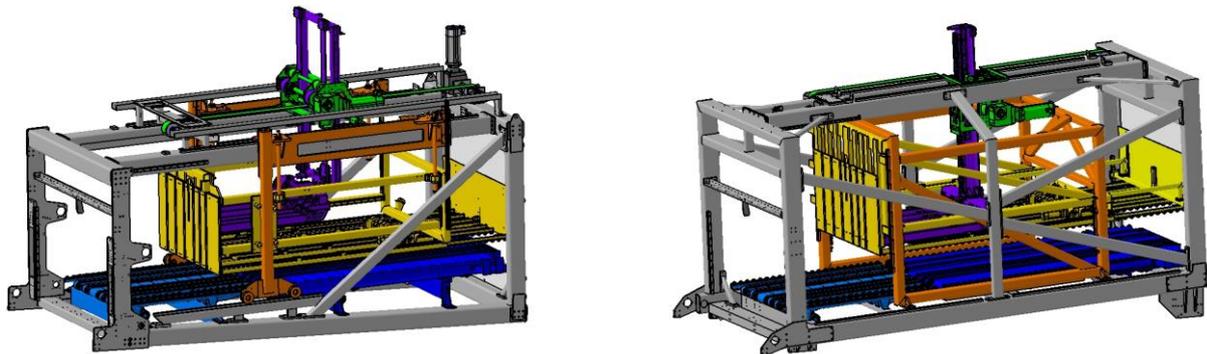
Shortened cycle times

The reduction of the carriage weight had a secondary effect that the mass of the mounting frame could be reduced as well. Since the frame has to absorb the vibrations caused by the machine's operation, it needs to meet specific requirements of strength and stiffness. Thanks to the reduction of the moving mass in the machine, the vibrations were also reduced. "This enables higher acceleration rates which results in notably faster cycle times. Therefore the machine's output is also increased," says Thomas Stober, mechanical construction director at WILHELM BAHMÜLLER noting the clear added value for customers. In addition, Stober points out that the reduced mass allows for smaller motors to be used and the energy consumption to be reduced significantly as well. The results from the pilot project are currently being implemented and the optimized lightweight version of the machine is currently under construction.

Project partners of PoKoGeLe

The research project "PoKoGeLe" is a joint project of the Institute for Engineering Design and Industrial Design (IKTD) at the University of Stuttgart, the German Aerospace Center (DLR) in Stuttgart and the Fraunhofer Institute for Manufacturing Engineering and Automation IPA. The project was subsidized by the Baden-Württemberg Ministry of Economy, Employment and Housing. Leichtbau BW is a cooperation partner of the project and served as its patron.

Images



before_optimization.jpg and after_optimization.jpg:

The project "PoKoGeLe" took a closer look at actual projects of our industrial partners to see how lightweight technologies can reduce costs. One of these projects was a corrugated cardboard processing machine built by WILHELM BAHMÜLLER Maschinenbau Präzisionswerkzeuge GmbH in Plüderhausen near Stuttgart. Thanks to lightweight optimization, the mass of the moving parts could be reduced by 40 percent and the manufacturing costs by 25 percent. As a side effect, the modified machine is capable of notably faster cycle times since it is less susceptible to vibrations.

Source: WILHELM BAHMÜLLER Maschinenbau Präzisionswerkzeuge GmbH. Reprint free of charge.

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Editorial contact:

Development Agency for Lightweighting Baden-Wuerttemberg

Alexander Hauber

PR Manager

Breitscheidstraße 4

70174 Stuttgart

Phone: +49 711 – 128 988-47

Mobile: +49 151 – 1171 10 02

alexander.hauber@leichtbau-bw.de

www.leichtbau-bw.de/en