ProLamas – Optimized Machine Tool Slide with Lightweight Construction

The ProLamas research project concerns the consistent lightweight construction of a tool slide. The consortium, consisting of manufacturing companies and research institutions, analyzes an existing machine structure and replaces the gray cast iron previously used, through targeted substitution. The aim is to significantly improve energy efficiency and response behavior through lightweight construction.

Project Title:
ProLamas – Optimized lightweight machine tool slide

Subproject:
Process development for producing a TFP-RTM structure

Project Duration:
12/01/2020 – 05/31/2023

Subproject Manager:
Michael Ziller Dipl.-Ing (FH) (Engineering Degree)

Consortium:
- Schwäbische Werkzeugmaschinen GmbH
- Hightex Reinforcement Structures GmbH
- Leibniz Institute for Polymer Research Dresden e. V.
- Center for Applied Research and Technology e. V.

Project goal:
The aim of the project is to develop a new type of machine tool slide for high-speed machine tools, in the form of a prototype lightweight design for the use of high-speed cutting (HSC) or high performance cutting (HPC) processes.

Carbon fiber reinforced plastics (CFRP) with variable-axial fiber design are to be used, whereby a serious reduction in mass can be achieved with the same or improved structural rigidity, compared to components currently used. This makes it possible, among other things, to increase the process speed with a simultaneous possible reduction in drive power.

The redesign of the lightweight component, in the form of a CFRP or CFRP-metal mixed construction, can be made possible through the targeted use of Tailored Fiber Placement (TFP) technology, which enables the production of optimized, stress-oriented fiber composite structures with variable-axial fiber design. The focus of development is structural rigidity and component

mass, thermal dimensional stability, and vibration characteristics of the component under mutual interrelationships.

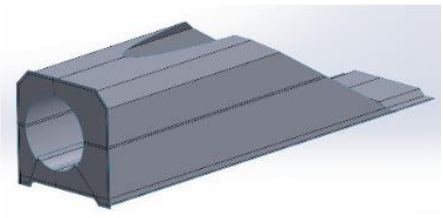

Photo captions:
High-speed machine tool (BW06) (Source: SW)
CAD model of a conventional metallic slide (Source: SW)
Shell model after analysis of the load requirements