3DGENCE
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CASE STUDY
AUTOMOTIVE

AGH RACING

PROTOTYPING - GEOMETRY VERIFICATION:
3D PRINTING OF THE STEERING KNUCKLE

COMPANY

AGH Racing - Student research group (at the AGH University of Science and Technology in Kraków) constructing Formula Student racing cars.

PROJECT

3D printout was used to examine the design topology of the steering knuckle. The project was developed to reduce the weight and increase the stiffness of the element.

GOALS

1

Creating a prototype to verify the design at lower costs

Usually, the knuckles are being made of aluminum by milling. The introduction of significant changes in the geometry of the part makes it impossible for such a complex shape to be subjected to conventional machining. In order to verify the project, without big financial investment, FDM technology was chosen.

The 3D printed steering knuckle helped to verify the project's assumptions before forming the model itself and avoid costly improvements in other technology (printing in SLS technology reached up to 20,000 €).

2

Reducing the time of prototyping

Due to the FSAE race in Michigan, AGH Racing had to make a prototype of the new model of steering knuckle in a very short time. 3D printing in FDM technology allowed to receive a prototype much faster. The use of soluble ESM-10 solution as a support material allowed for efficient post-processing of the model. SLS prototyping would take too long.

Thanks to the 3DGence INDUSTRY F340 a prototype was 3D printed in less than 2 days. This time reduction allowed students to present new details to the judges.

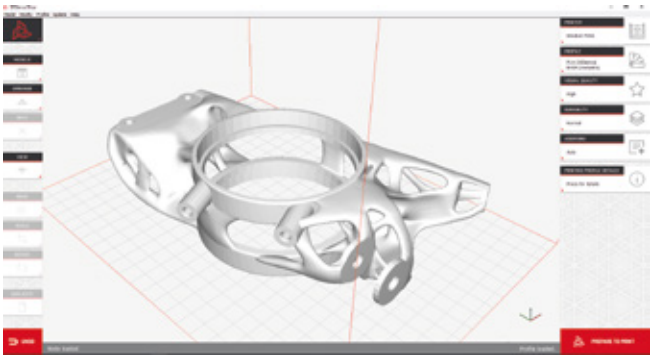
DATA PROJECT

3D print	Prototype of steering knuckle
Material	ABS + ESM-10
Dimensions	210 mm x 160 mm x 60 mm
3D printer	3DGence INDUSTRY F340

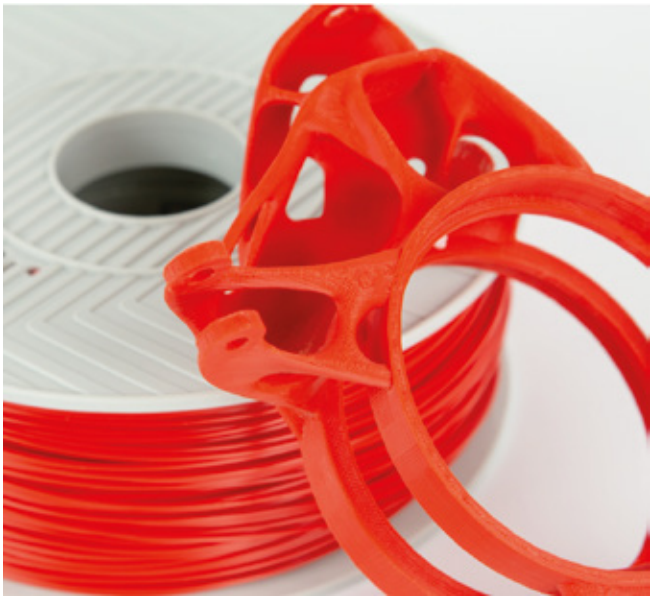
	FDM technology	**SLS technology**
Time	2 days	10 days

AGH Racing used 3D printer for creating the prototype of steering knuckle for its racing car.

Model of steering knuckle in 3DGence Slicer software.



Steering knuckle was 3D printed with ABS (model material) and ESM-10 (soluble support material).



Electric race car designed by AGH Racing.

Steering knuckle was 3D printed in two parts with the use of 3DGence INDUSTRY F340.

The 3D printed steering knuckle was presented to the judges at the international FSAE Michigan competition. Using 3DGence INDUSTRY F340 enabled us to test our original design at a very low cost and in just two days.

Konrad Pajdzik, Marketing Team Leader, AGH Racing

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