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Faculty of Design at the HAWK presents the Human Machine

[z] The first race with vehicles from the 3D printer

Power Screwdriver Race 2016

- Competition organized by the HAWK University for Applied Sciences and Art, Faculty of Design in Hildesheim
- HAWK students are already ready to present their vehicle from the 3D printer today
- Applications accepted up to 15.11.2015
- The world's first race with vehicles from the 3D printer and power screwdrivers as the drive unit is scheduled to take place in Hildesheim in the spring of 2016

The Faculty of Design at the HAWK University for Applied Sciences and Art is organizing the power screwdriver race in Hildesheim in 2016.
The idea is simple: Vehicles that are able to carry the weight of one person and are driven by a conventional power screwdriver compete against one another.

The next race, however, will be a premier in its own right: it's the world's first race in which all the vehicles have been produced in a 3D printing process.

The HAWK University for Applied Sciences and Art already presented the first vehicle to be made completely on the 3D printer in 2011. It received international awards and was featured in exhibitions throughout the world.

The current vehicle once again illuminates a very special aspect of 3D printing: the option of customization in a production process that needs no tools of any kind. Machines can and will make a direct connection with the person. The kneepads in the current vehicle made at the HAWK University for Applied Sciences and Art, for example, are adapted to perfectly accommodate the body of the driver and are connected to the driver during the drive.

As a result, the entire vehicle is adapted to the shape of a person and even takes on human-type characteristics. The power screwdriver is positioned directly at the heart of the machine as its drive.

To create inner structures that are similarly intelligent to human bones, a simulation program was used to structurally optimize the individual parts with respect to their load-bearing capacity. As a result, it was possible to reduce the weight by approximately half without compromising the overall stability. The 3D printed thorax was produced by Alphacam in a designed space of 900 x 600 x 600 mm in 173 hours with 0.33 mm and 0.25 mm layers of ASA. The aluminum parts were also optimized in terms of weight and milled at the university on the CNC.

The student team made up of Marcus Hackner, Marius Rosenthal, Andrej Jefimov, Thyll Niebergall, Tobias Brambor, Lena Popiolek developed and produced the vehicle within eight months under the direction of Prof. Andreas Schulz and Prof. Barbara Kotte.

The racer is not only an advanced development for 3D printing, it is also a physical performance test for weight-optimized structures that need to meet high design requirements.

The level of the bar has been set for all other vehicles that will take part in the Power Screwdriver Race 2016: At the starting line, each team must have a vehicle that is also able to bridge 500 mm carrying itself alone with a design from a 3D printer.

Specifications

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Software used:
Inspire/SolidThinking, Rhinoceros T-Splines-Plug in

Production:
Alphacam with FDM Fused Deposition Technology

Weight:
12 kg, of that 4.8kg 3D printed parts

Wheelbase:
1150 mm

Track width:
800 mm

Wheels:
20 inches

Length:
165 mm

Speed:
30 km/h

Student team:
Marcus Hackner, Marius Rosenthal, Andrej Jefimov, Thyll Niebergall, Tobias Brambor, Lena Popiolek

Application forms and other information is available at www.akkuschrauberrennen.de
facebook.com/Akkuschrauberrennen

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Photos on white background:
Kevin Momoh, Mark Gisler

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