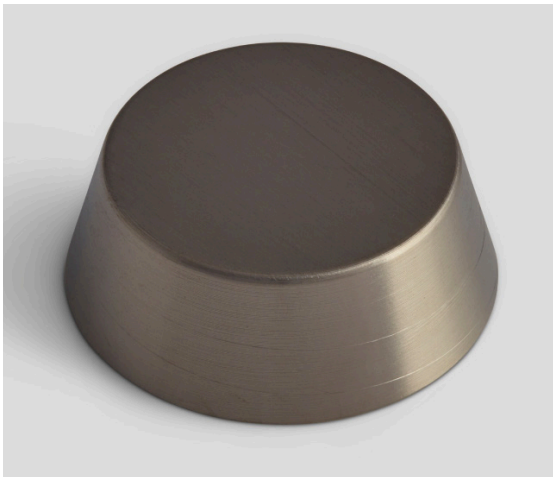
Sector focus
Automotive

Formula Student team, Instituto Tecnico, University of Lisbon

Goodfellow
Your global supplier for materials

Goodfellow provided the materials necessary for the development of an electric race car in the Formula Student project,

which is an international engineering design competition comprising hundreds of teams across the world. These teams competed with their vehicles at a series of international events. With 8 cars in the portfolio, Goodfellow supported the development of the two latest prototypes, the FST 07e and FST 08e.



Challenge

One issue which arose was the grounding of the cars parts due to it being an electric vehicle that runs with high voltage (600 V). Goodfellow would need to review different material options in order to come up with an alternative to using cables. Another issue faced was the development of bespoke electric motors which needed a specific material for the shaft, with properties that would aid the speed and durability of the car without negatively affecting the motor.

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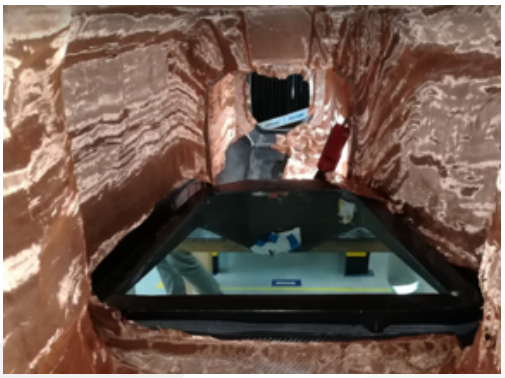
Solution

Goodfellow applied a number of innovative and creative solutions to the challenges faced on this project. To solve the first challenge regarding the grounding issue, Goodfellow supplied around 3.5m^2 of copper mesh to be used in the chassis monocoque of the FST 08e. This material was used to put all the car on the same potential, like a Faraday Cage, preventing the driver from conducting high voltage electricity. This material simplifies the process as the pieces only need to be connected to be grounded to the mesh. Goodfellow's supply of the copper mesh was highly effective as the alternative solution would have meant several metres of cables across the car to connect every metallic part that needed to be grounded. This would have led to a very confusing layout and would create difficult access points to important parts of the car.

The experts at Goodfellow knew that they needed a material that was lightweight, resistant and did not interfere with the magnetic properties of the motor. Due to this Goodfellow provided a 1-metre-long circular profile titanium bar with approximate diameter of 50mm to enable completion of the shaft production process. Titanium is a material that is compliant with all these requirements and capable of withstanding the applied forces when spinning at 20.000 rpm. Titanium has better mechanical properties when compared to alternative steels, with higher ultimate tensile strength, lower density and is magnetically inert. The magnetic properties in this case had great importance, since the team was dealing with an electric motor. It is very important that the shaft does not interfere with the magnetic field inside the motor itself.

"The support from Goodfellow enabled us to put in practice innovative and creative solutions we had developed to our car. The copper mesh, that makes the car safer and with less wires, and the titanium shaft, making our motors capable of developing its 150hp in a reliable way, are just a few examples of the students' ingenuity and show that the support from external companies is very important. We were also glad to welcome Goodfellow into our workshop and demonstrate to the academic community what we were able to achieve through this collaboration"

Henrique Karas, University of Lisbon



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