

## DESIGN & OPTIMIZATION OF CARBONFIBER-ARMORED PLASTIC PARTS WITH ANSA & META

**Thomas Wust**

Kube GmbH Ingenieurbüro, Germany

KEYWORDS –

Carbon, Lightweight, Low Cost

ABSTRACT –

### **Part 1: Procedure**

Here we will briefly discuss the new method, as well as the possible applications.

Short Trip:

The process is comparable to the production of reinforced concrete: instead of a steel framework, which is cast in concrete with a mold, a carbon fiber framework is inserted into a molding tool and is sheathed in an injection molding process with a thermoplastic resin matrix. Here too, the reinforcement creates an enormous increase in strength. This makes it possible to use it in highly stressed areas:

- Unit support
- Brake pedal
- Shaft covers
- Rims
- Etc.

### **Part 2: Interpretation**

Here, we will describe how an entire design can be carried out with ANSA and META:

#### 1. Suitability

Based on the installation space and the load assumptions, the "quick checks" are used to determine whether the component is suitable for the process.

#### 2. Topology

The next step is to develop and evaluate the framework concepts for load transfer.

#### 3. Dimensioning

An interface to LS-Opt was implemented to optimize the amount and amount of fiber.

#### 4. Manufacture

The machine can also be generated directly in ANSA.

### **Part 3: Showcase**

The method is to be presented on a shaft cover, which according to EN 124 complies with the class D 400 (up to 40t) and is thus approved for roadways and side strips of roads for all types of road vehicles. The process is now to be used to develop carbon-fiber-reinforced plastic versions according to EN124 class D, which are not only a much lighter, but also less expensive than conventional shaft covers (usually made of cast iron or steel).

---