

# PRODUCTION PROCESS OF COMPOSITE PROPELLER FOR MULTIROTOR UAV

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## Abstract

*The application of composite materials in the aerospace industry has begun since the middle of the 20th century. Their use in various elements of aircraft constructions has extended over time. Primary load carrying elements of some aircraft constructions are made of composite materials due to their excellent mechanical properties as well as the good strength-to-weight ratio. Propellers and fan blades of jet engines are increasingly made of high-quality composite materials. Besides the mechanical properties of the material, production technology has a great impact on composite structure quality.*

*The production process of two-bladed composite propeller is presented in this paper. Manufacturing of composite propeller for multicopter UAV application with suitable technology and relatively cheap materials is the main motive of this work. According to this motive, both (upper and lower) shells of the propeller are made of balanced plain weave glass fiber with epoxy matrix. The vacuum infusion process is used for shell manufacturing. After the polymerization process of shells (24h, 25°C), unidirectional carbon fabric reinforcements in the root zone and expanding polyurethane core are added during the bonding process. Then, the bonded propeller was cured 4h at 70°C.*

*The high production process quality of the two-bladed propeller with the previously described technology is partly confirmed in this paper. Namely, the checking of propeller geometry and comparison with the CAD model was performed. Results of that comparison showed that a high degree of agreement between produced and CAD model was obtained. Comparison of static test and numerical structural analysis could be subjects of future work. That would provide the final validation of manufacturing technology quality which is described in this paper.*

## Keywords

Propeller, Composite materials, UAV, Manufacturing

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