

## **Automated, Short Cycle Production of Polymer Composite Applications with Special Regards to the Complexity and Recyclability of Composite Elements**

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**Abstract :** The purpose of the project is to develop a complex composite component with visible class 'A' surface. It is going to integrate more functions, including continuous fiber reinforcement, foam core, injection molded ribs, and metal inserts. Therefore we are going to produce recyclable structural composite part from thermoplastic polymer in serial production with short cycle time for automotive applications. Our design of the process line is determined by the principles of Industry 4.0. Accordingly, our goal is to map in details the properties of the final product including the mechanical properties in order to replace metal elements used in automotive industry, with special regard to the effect of each manufacturing process step on the afore mentioned properties. Period of the project is 3 years, which lasts from the 1st of December 2016 to the 30th November 2019. There are four consortium members in the R&D project evopro systems engineering Ltd., Department of Polymer Engineering of the Budapest University of Technology and Economics, Research Centre for Natural Sciences of Hungarian Academy of Sciences and eCon Engineering Ltd. One of the most important result that we can obtain short cycle time (up to 2-3 min) with in-situ polymerization method, which is an innovation in the field of thermoplastic composite production. Because of the mentioned method, our fully automated production line is able to manufacture complex thermoplastic composite parts and satisfies the short cycle time required by the automotive industry. In addition to the innovative technology, we are able to design, analyze complex composite parts with finite element method, and validate our results. We are continuously collecting all the information, knowledge and experience to improve our technology and obtain even more accurate results with respect to the quality and complexity of the composite parts, the cycle time of the production, and the design and analyzing method of the composite parts.

**Keywords :** T-RTM technology, composite, automotive, class A surface

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