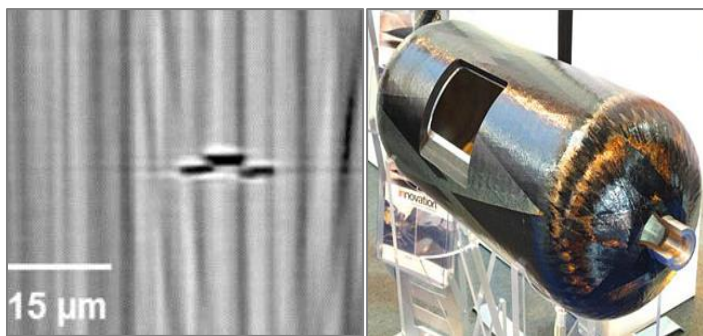# From constituent properties to the mechanical behavior of composite structures

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- Advanced characterization of composite constituents
- Industry friendly techniques for fibre testing
- Development of methodologies for analyzing strength distributions

Abstract:

The aim of the project is to advance the state-of-the-art composite failure models which are strongly overdesigned and develop advanced and industry-friendly characterization techniques for measuring the required input data. The three key data are: fibre strength distribution, matrix properties and interfacial properties. The previous work of the project partners has identified clear drawbacks in the conventional single fibre tests for measuring the fibre strength distribution. The objective now is to develop and compare methods for efficiently measuring fibre strength distributions at both long and short gauge lengths and to achieve a breakthrough in the reliability of methods for measuring input data and spread the gained knowledge to institutes all over the world.

In order to extract useful and reliable information about the fibre behavior from the obtained experimental results, some statistical analysis would be done using both classical frequentist approach and recent Bayesian approaches. This would lead to development of useful statistical tools for experimental data analysis.

Effect of matrix and interfacial properties on the composite would also be analysed. Interfacial adhesion strength would be quantified using improved versions of present models using data obtained from single fibre fragmentation tests.