

THE CURRENT STATE OF COMPOSITE MATERIALS IN THE BICYCLE INDUSTRY

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ABSTRACT

The bicycle industry is a high visibility and (perceived) high-tech industry which has a relatively high volume of composite manufacturing and is often used as a showcase of composite design and performance capabilities. This presentation will look behind the curtains to understand if this view is valid by understanding the current state of composite materials design and manufacturing in the industry and by looking to the future.

This presentation will start with a review of typical composite bicycle design, as is common in the bicycle industry now. This includes general frame manufacturing processes, key design criteria and parameters and materials used (matrix and reinforcement). Further, a high level review of the bicycle industry supply chain will be done, using this to highlight how it drives some of the manufacturing processes and materials chosen.

The main part of the presentation will examine details of typical manufacturing processes used, including tooling design, process parameters, materials and design considerations. All of this will also be related to geographical manufacturing location. We will then examine newer processes that are starting to be used at smaller manufacturers, including some of the advantages and limitations of these processes. Further, we will investigate potential new processes that could bring significant advantages to the industry, how and where these could be implemented and barriers to adoption that are faced. We will compare the bicycle industry with other industries to understand limitations and barriers to change.

Finally we will summarize with some predictions and potential directions that the industry may take in the coming years.