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Faculty of Mechanical Engineering
Institute of Lightweight Structures
Professorship Textile Technologies

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A SURVEY ON YIELD CRITERIA FOR POLYMER MATRIX FIBER-REINFORCED COMPOSITES

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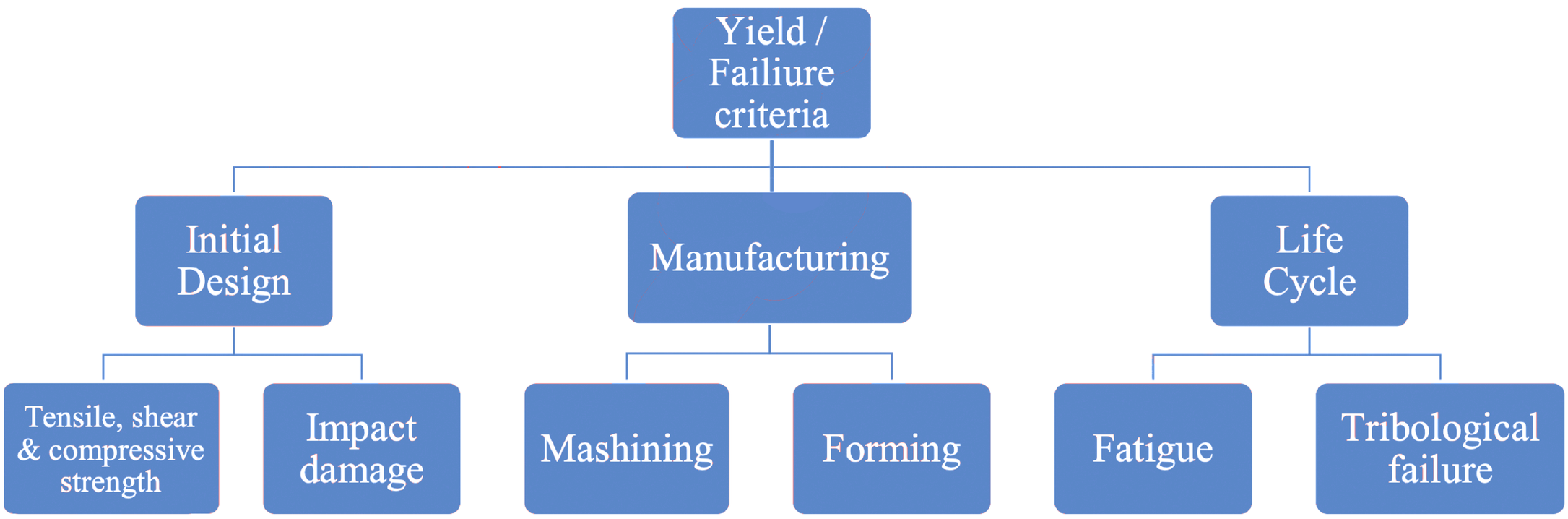
A. Farzin, M. Rezaei, J. Kaufmann, H. Cebulla*

ABSTRACT Because of their mechanical properties, composite/compound materials have been adapted in numerous products and industries. To facilitate the introduction of these materials to different applications, predicting their behaviors under mechanical loads is of great interest. Considering their nonlinear and anisotropic deformations through different loading scenarios, predicting their yield/failure point with precision is challenging. Nonetheless, in the past decades, several methods and criteria have been developed for predicting composites' behavior based on their material combinations and the type of stress to which they are prone. As a meta- review this paper will be surveying the saturated trends on the criteria which have been developed for polymer matrix composites (PMC), particularly those reinforced with fibers (FR). Due to the broad scope of the topic, the primary focus has been the identification of the correct failure criteria for polymer-matrix fiber-reinforced composites (PMFRC) in different projects, as the existing methods, depending on the application, may be far from predicting the outcome of the experiments. Based on this, the topic has broken down into several subsections to provide a road map in the literature, that would facilitate future studies on PMFRC to use the most proper criterion for specific applications.



CONCLUSION The authors of this paper have deconstructed the subject into multiple aspects, intending to create a comprehensive roadmap within the existing literature. Even though the mentioned categories and subcategories in this article cannot cover the whole field, they can show the most sought-after applications and the yield criteria for FRP. This meta-review can serve the future studies on the failure behaviors of PMFRCs, enabling new researchers to deploy the most precise/usable criteria for their applications or to figure out what has been done so far to avoid parallel studies. By establishing such a framework, the investigation to find the accurate failure criterion can become less complicated, and help the utilization of FRP.

Keywords: Fiber-Reinforced Polymer Composites, Criteria, Yield, Failure, Deformation

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