

## A Comparative Study on Creep Modeling in Composites

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**Abstract :** Composite structures, having incredible properties, have gained considerable popularity in the last few decades. Among all types, polymer matrix composites are being used extensively due to their unique characteristics including low weight, convenient fabrication process and low cost. Having polymer as matrix, these type of composites show different creep behavior when compared to metals and even other types of composites since most polymers undergo creep even in room temperature. One of the most challenging topics in creep is to introduce new techniques for predicting long term creep behavior of materials. Depending on the material which is being studied the appropriate method would be different. Methods already proposed for predicting long term creep behavior of polymer matrix composites can be divided into five categories: (1) Analytical Modeling, (2) Empirical Modeling, (3) Superposition Based Modeling (Semi-empirical), (4) Rheological Modeling, (5) Finite Element Modeling. Each of these methods has individual characteristics. Studies have shown that none of the mentioned methods can predict long term creep behavior of all PMC composites in all circumstances (loading, temperature, etc.) but each of them has its own priority in different situations. The reason to this issue can be found in theoretical basis of these methods. In this study after a brief review over the background theory of each method, they are compared in terms of their applicability in predicting long-term behavior of composite structures. Finally, the explained materials are observed through some experimental studies executed by other researchers.

**Keywords :** creep, comparative study, modeling, composite materials

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