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## The effect of prestress on the mechanical performance of composites

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### ABSTRACT

Bodies are prestressed with the intention of enhancing their load carrying capacity. The primary objective of this study is to understand the effect of prestressing the constituents in composite bodies with regard to the overall mechanical performance of the composites. This study considers composites having elastic and viscoelastic constituents. A new class of elastic and viscoelastic constitutive models with limiting strain behavior is considered for the constituents. The response of the composites with the context of limiting strain models are compared with the classical linearized elastic and viscoelastic models. The effect of stress relaxation in the constituents of the prestressed composite on the overall load carrying capacity of the composite is also investigated. The properties of the composite, whether a brittle inclusion embedded in ductile matrix or a ductile inclusion in brittle matrix are greatly influenced by the ratio of the induced prestress with respect to the external load and thereby influences the load carrying capacity of the composite.