

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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EFFECT OF CARBON NANOTUBE COMPOSITES IN AEROSPACE STRUCTURES

Abstract

The increasing trend of producing large enough quantities of carbon nanotubes (CNT's) to manufacture composite structural components is influencing how future aerospace architectures are developed. Under certain loading conditions, a CNT derived composite material will have improved structural performance that will enable future space missions. CNT materials are considered in this study as a candidate replacement to typical aerospace carbon fiber composites. This paper focuses on a systems approach into how CNT's will effect structural design of future spacecraft and exploration structures. Investigating the potential impact of composite based CNT's is conducted through development of an analytical CNT based material and using the formulation to design typical aerospace structures. Finite element analysis is performed on typical aerospace structures to develop a comparison between CNT's and conventional composites. An understanding of how CNT's outperform conventional aerospace structure materials will permit the expansion of design parameters in future mission architectures.