

Non-Circular Carbon Fiber Reinforced Polymers Chaining Failure Analysis

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Abstract : This paper presents a finite element model to simulate the teeth failure of non-circular composite chaining. Model consists of the chaining and a part of the chain. To reduce the size of the model, only the first 11 rollers are simulated. In order to validate the model, it is firstly applied to a circular aluminum chaining and evolution of the stress in the teeth is compared with the literature. Then, effect of the non-circular shape is studied through three different loading positions. Strength of non-circular composite chaining and failure scenario is investigated. Moreover, two composite lay-ups are proposed to observe the influence of the stacking. Results show that composite material can be used but the lay-up has a large influence on the strength. Finally, loading position does not have influence on the first composite failure that always occurs in the first tooth.

Keywords : CFRP, composite failure, FEA, non-circular chaining

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