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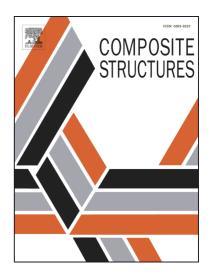
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## ACCEPTED MANUSCRIPT

A strain-based criterion for failure load prediction of steel/CFRP double strap

joints

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**Abstract** 

One of the most effective approaches to improve the strength of steel structures is using the carbon

fiber reinforced polymer (CFRP) as externally-bonded sheets. In this paper, a strain-based failure

criterion, namely the critical normal strain (CNS) is employed to predict the failure load of adhesively

bonded double strap joints which are made of CFRP and steel plates. According to this approach, the

adhesive joint fails when the normal strain along the adhesive mid-line attains a critical value at a

critical distance. This work is based on a two-dimensional linear elastic finite element analysis. Failure

load capacities are estimated theoretically for steel/CFRP double strap joints with different bonding

lengths. The predicted values of failure loads are compared with the experimental data reported in

literature. It is shown that a good consistency exists between the experimental failure loads and the

theoretical predictions based on the new strain-based criterion.

**Keywords:** 

Adhesive joint; CFRP; Failure load prediction; Double strap joint; Steel structure.

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