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**Title:** On the Lateral Compressive Behavior of Empty and Ex-Situ Aluminum Foam-Filled Tubes at High Temperature**Author(s):** Linul, E (Linul, Emanoil); Movahedi, N (Movahedi, Nima); Marsavina, L (Marsavina, Liviu)**Source:** MATERIALS **Volume:** 11 **Issue:** 4 **Article Number:** 554 **DOI:** 10.3390/ma11040554 **Published:** APR 2018**Times Cited in Web of Science Core Collection:** 6**Total Times Cited:** 6**Usage Count (Last 180 days):** 10**Usage Count (Since 2013):** 10**Cited Reference Count:** 34

**Abstract:** In this research work, the effect of lateral loading (LL) on the crushing performance of empty tubes (ETs) and ex situ aluminum foam-filled tubes (FFT) was investigated at 300 degrees C. The cylindrical thin-walled steel tube was filled with the closed-cell aluminum alloy foam that compressed under quasi-static loading conditions. During the compression test, the main mechanical properties of the ETs improved due to the interaction effect between the cellular structure of the foam and the inner wall of the empty tube. In addition, the initial propagated cracks on the steel tubes reduced considerably as a result of such interaction. Furthermore, the obtained results of the LL loading were compared with the axial loading (AL) results for both ETs and FFTs at the same temperature. The findings indicated that the application of loading on the lateral surface of the composite causes the lower mechanical properties of both ETs and FFTs in comparison with the axial loading conditions.

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