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**Title:** ASSESMENT OF SANDWICH BEAMS WITH RIGID POLYURETHANE FOAM CORE USING FAILURE-MODE MAPS**Author(s):** Linul, E (Linul, Emanoil); Marsavina, L (Marsavina, Liviu)**Source:** PROCEEDINGS OF THE ROMANIAN ACADEMY SERIES A-MATHEMATICS PHYSICS TECHNICAL SCIENCES INFORMATION SCIENCE **Volume:** 16 **Issue:** 4 **Pages:** 522-530 **Published:** OCT-DEC 2015**Times Cited in Web of Science Core Collection:** 2**Total Times Cited:** 2**Usage Count (Last 180 days):** 0**Usage Count (Since 2013):** 2**Cited Reference Count:** 31

**Abstract:** The failure-mode maps of composite sandwich beams can provide useful information about the influence of different design parameters on the failure behaviour of such components. Failure mode of sandwich beams with different cores and different faces were investigated in the experimental program. Foams with 40 and 200 kg/m(3) densities were used as core material, while Glass-Fibre Reinforced Polymer (GFRP), polyester, epoxy and aluminium are the faces materials. Three-point bending tests were carried out for sandwich beams. In order to characterize these sandwich materials first were carried out a statistical analysis of the cellular structure for two different densities of the core material above mentioned. The sandwich core morphology and cells dimensions were studied before testing through scanning electron microscopy (SEM) and pore diameter versus frequency of pores histogram were plotted. After statistical analysis were performed static compression tests. These compression tests have had as objective the determining of the main mechanical properties such as Young's modulus and yield stress values. The results obtained from the static compression tests were used for the analytical determination of failure-mode maps of sandwich beams. Finally, the failure-mode maps were constructed for five considered sandwich types and validated by the experimental results. Each failure-mode map is characteristic for a family of sandwich beam designs.

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