عنوان مقاله:

Experimental Investigation of Energy Absorption Behavior of the Empty Expansion Joints under the Lateral Loading

محل انتشار:

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نویسندگان:

Abbas Niknejad - *Assistant Professor, Mechanical Engineering Department, Yasouj University, Yasouj, Iran*

Jafar Rouzegar - *Assistant Professor, Mechanical and Aerospace Engineering Department, Shiraz University of Technology, Shiraz, Iran*

Yashar Abdolzadeh - *Master of Science student, Mechanical Engineering Department, Yasouj University*

Mohammad Abbasi - *Undergraduate Student, Mechanical Engineering Department, Yasouj University*

خلاصه مقاله:

In the present research, energy absorption behavior of steel specimens subjected to the quasi-static lateral loading is investigated by the experimental method. For this purpose, three types of thin-walled specimens with the circular cross-section consist of circular tubes, semi-preformed expansion joints and also, the preformed expansion joints are laterally compressed between two rigid platens. The semi-preformed and preformed expansion joints were prepared and produced by the hydro-forming method. In each group, several specimens with the different wall thicknesses, inner diameters and lengths were prepared and laterally compressed. For each specimen, diagrams of the lateral load per unit of mass and absorbed energy per unit of mass are sketched versus the lateral displacement. Experimental measurements show that the instantaneous lateral load and also, the specific absorbed energy of the preformed expansion joints are higher than the semi-preformed expansion joints and circular tubes with the same characteristics. Also, the results show that by thickening the specimen wall, the specific absorbed energy by the specimen increases. Totally, a preformed expansion joint with the thicker wall and with the smaller diameter is the optimum energy absorber system, comparing with the investigated cases. Therefore, when the circular tube transforms into the preformed expansion joint, a better energy absorber system with the higher capability is achieved.

کلمات کلیدی:

Circular tubes, expansion joints, experiment, Lateral compression, thin-walled structure