

عنوان مقاله:

Investigating the density of Polyurethane foam on crashworthiness and energy absorption parameters in foam filled tubes under axial quasi-static loading

محل انتشار:

مجله علم مهندسی خودرو، دوره 13، شماره 2 (سال: 1402)

تعداد صفحات اصل مقاله: 9

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خلاصه مقاله:

Thin-walled tubes can avoid the transition of injurious acceleration and excessive forces to the protected section and minimize the damage severity. They absorb energy under axial loading circumstances as crashworthiness structures. The present study deals with the investigation of the density effects of foam on the quasi-static loading response of foam filled and empty cylindrical tubes. To investigate energy absorption parameters by varying in foam density, two different densities of polyurethane foam were used to evaluate the efficacy of polyurethane foam density under axial quasi-static loading. According to the results, the use of foam as a filler also influences the tubes' deformation behavior in addition to the effects of thickness. It was revealed that by incrementing the thickness to ۲۰٪، the peak load increased by ۲۵.۲٪. Two densities of foam were considered as ۴۰ and ۸۵kg/m^۳ to assess the effect of density of polyurethane foam as filler on the energy absorption behavior of tubes under axial loading. Result showed that when foam density increased by about two times, the peak load increased by ۱٪. According to the results, filling tube by foam also influences the tubes deformation behavior in addition to the effects of thickness

کلمات کلیدی:

Polyurethane foam, Foam filled cylindrical tubes, Foam density, Axial loading, Crashworthiness

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1865237>

