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# 具有诱导结构的铝合金薄壁方管轴向压缩吸能性能试验研究

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# EXPERIMENTAL INVESTIGATIONS ON THE ENERGY ABSORPTION BEHAVIOR OF ALUMINUM TUBES WITH INDUCTIVE STRUCTURES SUBJECTED TO AXIAL LOADING

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摘要 该文提出了三种新型的诱导结构设计方案来降低薄壁方管结构在轴向载荷作用下的初始屈曲载荷峰值。诱导结构设计在方管的加载端,在压缩开始的时候起作用,并且不会显著影响结构在正常工作时的强度和刚度。利用AA 6063 T6 铝合金薄壁方管进行了一系列准静态和动态试验来研究了具有诱导结构的方管在轴向压缩时的能量吸收性能,给出了完整薄壁铝方管和具有诱导结构的薄壁铝方管的载荷位移曲线,并进行了比较。实验发现,三种诱导结构均可有效降低屈曲时的初始载荷峰值、提高方管承载吸能平稳性。

关键词: 薄壁方管 轴压 屈曲 诱导结构 吸能 试验研究

Abstract: A research on the effectiveness of three kinds of new inductive designs on thin-wall aluminium square tubes which are used to reduce the initial buckling peak loads of the tubes under axial loading was carried out. The inductive structures were designed to be close to the loading end of the square tubes, and to function just before the compression happens. Moreover, they would not affect the structural stiffness under its normal working conditions. By using AA 6063 T6 aluminum alloy square tubes, a series of quasi-static and dynamic compression tests were performed. The energy absorption behavior of aluminum square tubes with inductive structures subjected to axial loading was investigated, and the load-displacement curves of original tubes and tubes with inductive structure were obtained and compared. It was found that by using these inductive structures, the initial buckling peak loads of the square tubes could be greatly reduced and the energy absorption became more stable and smooth.

Key words: thin-wall square tube axial compression buckling inductive structure energy absorption experimental investigation

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