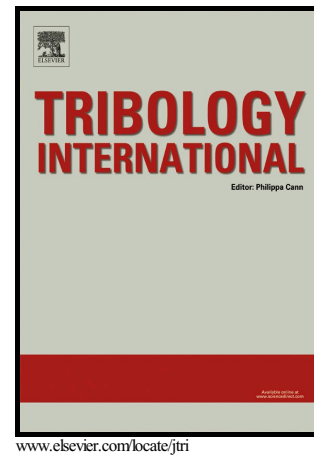


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Impact fretting wear behavior of 304 stainless steel thin-walled tubes under low-velocity

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Abstract

This study aimed to investigate the impact fretting wear behavior of thin-walled tubes under different support interfaces with a novel impact wear testing rig. A tube/cylindrical contact model was used, and V-shaped fixtures with varied angles were applied. The 304 stainless steel tubes with varied lengths and a GCr15 bearing steel roller were used as the test materials. The interface deformation, impact energy absorption, and damage behavior were investigated in terms of the influence of the support angle, tube length, and the initial impact energy. After the test, the wear mechanism of the tube was investigated. The results showed that under the same lengths, when the support angle increased, the deformation displacement increased, but the contact peak force, energy absorption, and the area of worn scars decreased. The increasing length increased the contact force, energy absorption ratio, and serious damage but reduced the deformation. The increasing kinetic energy of the initial impact will decrease the energy absorption ratio. Contact fatigue spalling and oxidation are the wear mechanisms of the impact fretting wear of 304 stainless steel.

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