摘要

随着现代科技的发展，环保意识的加强，对石油钻井机刹车块的性能要求不断提高，开发无石棉、具有稳定较高的摩擦系数、低的磨损量、高的压溃强度等性能的摩擦片材料是目前企业界和学术界所重点关注的课题。酚醛树脂基复合材料，特别是以石棉为成分的此类材料，在耐磨性、耐热性、阻燃性方面具有良好的表现，整体力学性能良好，生产工艺难度低，是理想的石油钻井用刹车块材料。但是，石棉对操作者身体和环境有害，已被列入淘汰产品。

本文以玻璃纤维替代石棉在石油钻井机刹车块中的成分，测试其冲击性能和摩擦磨损性能等，并与含石棉的材料作性能对比。研究结果表明：玻璃纤维增强材料的冲击强度为高于石棉增强材料的冲击强度 4.04J/cm^2。石棉增强材料在 200r/min,摩擦系数在 0.308~4302 范围内变化，400r/min 条件下，随载荷增加，随转速增加，摩擦系数有所下降，摩擦系数在 0.2698~0.4285 范围内。玻璃纤维增强材料的干摩擦磨损系数在 0.308~0.425 之间，与石棉材料相近。

石棉增强材料的磨损率略低于玻璃纤维磨损率，玻璃纤维可以代替石棉作为石油钻井刹车块的增强材料。

关键词:石油钻井机刹车块；摩擦磨损；摩擦系数；纤维增强

Abstract

With the development of modern science and technology and the strengthening of environmental protection awareness, the performance requirements of brake blocks for oil drilling RIGS are constantly increasing. The development of asbestos free friction material with stable and high friction coefficient, low wear, high crushing strength and other properties is the focus of the enterprise and academia. Phenolic resin matrix composite material, especially the phenolic resin matrix composite material containing asbestos, has good friction and wear properties, heat resistance, flame retardant and mechanical properties, and simple processing technology. However, asbestos is hazardous to the health and environment of operators and has been included in the list of obsolete products.

In this paper, glass fiber is used to replace asbestos in brake block of oil drilling rig. The results show that the impact strength of glass fiber reinforced material is higher than that of asbestos reinforced material 4.04 J/cm2. Asbestos reinforced materials at 200r/min, friction coefficient changes in the range of 0.308-4302, 400r/min The dry friction and wear coefficient of glass fiber reinforced materials is between 0.308 and 0.425, which is similar to that of asbestos materials.

The wear rate of asbestos reinforced material is slightly lower than that of glass fiber, which can replace asbestos as the reinforcing material of oil drilling brake blocks.

Key words: Oil drilling machine brake block；Friction wear friction；Coefficient fiber enhancement

目录