

冷間鍛造加工面における潤滑材料の 種類や分布による成形性への影響

Influence of Forging Performance by Lubricants Kinds and
Distribution State at Workpiece-Die Interface

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抄 録

冷間鍛造の精密化に伴って、冷間鍛造用潤滑皮膜にはこれまで以上に高い耐焼付き性や安定した低摩擦状態の維持が要求されている。近年、地球環境保全の観点から実用化の進む一工程型潤滑剤の設計では、潤滑材料の選択が特に重要な要素である。潤滑材料の種類や分布状態が潤滑性能に及ぼす影響を冷間鍛造加工面の表面分析によって調査した。特に、加工面の表面形状に着目すると、潤滑成分の種類によって形状が異なることがわかった。無機潤滑材料では微細な凹部形状が形成されており、これは加工面に保持されやすいことを意味し、その結果、低摩擦が維持できることを明らかにした。また、潤滑材料の分布が不均一な状態では潤滑性能が低下することを確認した。

Abstract

Cold forging technology is making significant progress by press machine technical innovation, and becomes more precise. Consequently, lubricant is demanded higher anti-seizure ability and stable lower friction than ever. In recent years, high energy loss and large amounts of waste which are generate by conventional lubrication processing have come to be close up as problems. Much progress has been made in the replacement of conventional phosphating treatment with dry-in-place type lubricants in cold forging. Choice of the lubrication material is important in particular with a design of an improved lubricant. The aim of this study is to investigate influence of forging performance by lubricants kinds and distribution state at workpiece-die interface. Especially, paying attention to forged surface, we found different surface morphologies depending on kind of lubricating materials. By using inorganic lubricating materials, surface with many hollows is formed in microscopic view point. Surface with many hollows keeps lubricating materials. And, as a result, low friction at die and substrates interface is maintained during forging operation. In addition, it was confirmed that forming performance is aggravated when the distribution of lubricating material is not uniform.

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