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抄 録

冷間鍛造分野での潤滑被膜は従来からのリン酸塩／石けん処理から、環境対策としての一工程潤滑被膜への代替が進んでいる。本報では、著者らが開発した据込み・押し出し形摩擦試験法を用いて、金型表面粗さが各種潤滑被膜の摩擦挙動に及ぼす影響を調査した。表面性状パラメータ R_{pk} で示す金型表面粗さが大きくなることで潤滑被膜は焼付を抑制できなくなり、焼付発生の臨界 R_{pk} 値を超える領域においてリン酸塩／石けん処理皮膜と比べて一工程潤滑被膜の焼付程度が急激に著しくなる傾向がみられた。さらに一工程潤滑被膜を施す被加工材表面の性状による影響を調査した結果、酸洗やブラスト処理による表面と比べて 2 段階のブラスト処理による微細な粗さ表面に一工程潤滑被膜を形成することで高い焼付抑制効果が得られることを確認した。

ABSTRACT

Lubricant Coating in cold forming area has been converted from conventional phosphating and soap coating treatment to dry-in-place type lubricant coating due to concern for environmental issues.

A series of experiments has been carried out using an upsetting-extrusion type tribometer to investigate the effect of tool surface roughness on friction behavior of Lubricant coating.

Experiments using a typical phosphating and soap coating and three kinds of dry-in-place type lubricant coatings showed that the generation of seizure becomes more striking for the alternative lubricant coating than for the typical phosphating and soap coating, when tool surface roughness R_{pk} is larger than the critical value of R_{pk} . Further experiments were carried out in the transition range of seizure for tool surface reduced peak height, and using a dry-in-place type lubricant coated on four kinds of pre-processed surface.

Furthermore, experiments as to how the results of dry-in-place type lubricant coating were affected by the preparation of the substrate surface showed that very fine microscopic roughness of the substrate surface prepared by a combination of dry-in-place type lubricant coating with two stage shot blasting process provided higher tribo-performance such as anti-seizure performance than the surface prepared by acid pickling and single shot blasting.