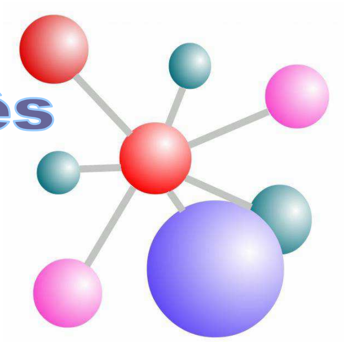
UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE

Exame de Proficiência 2015.1

Inglês



Engenharias

Instruções

1	Confira se os dados contidos na parte inferior desta capa estão corretos e, em seguida, assine no espaço reservado para isso. Se, em qualquer outro local deste Caderno, você assinar, rubricar, escrever mensagem, etc., será excluído do Exame.
2	Este Caderno contém 5 questões discursivas referentes à Prova da Língua Estrangeira escolhida pelo candidato. Não destaque nenhuma folha.
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5	Escreva de modo legível, pois dúvida gerada por grafia, sinal ou rasura implicará redução de pontos.
6	Só será permitido o uso de dicionário INGLÊS/INGLÊS.
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8	Utilize para rascunhos, o verso de cada página deste Caderno.
9	Você dispõe de, no máximo, três horas, para responder as 5 questões que constituem a Prova.
10	Antes de retirar-se definitivamente da sala, devolva ao Fiscal este Caderno.

Assinatura do Candidato: ____

COMPERVE
UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE

As questões de 01 a 05, cujas respostas deverão ser redigidas EM PORTUGUÊS, referem-se ao texto abaixo.

FRICTION CHARACTERISTICS OF MACHINED METAL WITH DIFFERENT SURFACE MORPHOLOGIES

Hsin-Min Lee A-ChengWang and Yan-Cherng Lin

This study examined the friction characteristics of SAE1045 medium carbon steel processed by milling machining (MM) and abrasive jet machining (AJM). Friction experiments were conducted with variations in load and friction distance. Experimental results show that micro craters produced by AJM help retain lubricant on workpiece surface and thus decrease friction coefficient. Consequently, for the same friction distance, the amount of wear on AJM test specimens is less than that of MM ones. Moreover, increase in load and surface roughness will also result in great wear on the test specimens.

1. Introduction

Abrasive jet machining (AJM) is to form on workpiece surface micro craters of different morphologies using high pressure gas injection. The machining characteristics of AJM are similar to the production of micropores in scraping process. These micropores serve to retain lubricants on the workpiece surface, which enables smooth sliding motion, thus contributing to lessen surface friction during machining and reducing machine wear.

During application of process technology, the machine tool is the key equipment. However, wearing of the sliding face between the loading table and slide rails often occurs. As a result, clearance is formed, creating vibration and motion of the loading table during machining, which undermines machining precision. To overcome such drawback, lubricants are provided to slow down and reduce wear of the sliding face, and the success of lubrication against wearing is dependent on the persistence of the lubricating film, friction coefficient of a material or surface, and wears resistance of the sliding face.

The literature contains plentiful studies on the effect of lubrication and its application. When lubricants are introduced, friction is reduced and surface damage processes are modified; in particular, an increase in lubricant viscosity was observed to increase wear depth. Research on effects of lubrication on artificial implants has special significance because it would help to prevent wearing and loosening of implants and thus lengthen their service life. Poor lubrication not only results in machine wear but also deteriorates machining accuracy. Consequently, the reliability and stability of the entire machining system will be undermined. Serious friction may even lead to damage of machine parts, which in turn increases production cost.

Much research effort has been devoted to enhancing lubrication effect and wear resistance of workpiece. One stream of research emphasizes workpiece surface modification through methods such as diamond-like coatings (DLC), gas nitriding, ion nitriding, plasma nitriding, nitrogen ion implantation, plasma nitrocarburizing, physical vapor deposition (PVD), and chemical vapor deposition (CVD). These approaches often form a hard and brittle compound layer on the workpiece surface that has to be polished so as to achieve wear reduction. However, smooth polished surfaces cannot retain lubricants, which in turn undermine the effects of lubrication against friction, resulting in friction-induced wear. Another stream of research focuses on incorporating additives such as aluminum nitride (AlN), TiO2, ZnS, and Cu. Although satisfactory results on enhancement of lubrication and wear resistance are obtained, not only will failure to retain them on the workpiece surface affect the lubrication effect and wear reduction efficiency, but also their continuous and rapid loss will cause pollution to the environment.

In view of the above, industries currently using scraping process seek to increase the formation of micro craters on workpiece surface for retaining the lubricant and decreasing its loss, which in turn also reduces the friction coefficient and enhances the lubrication effect. However, very high manual operation cost is incurred which affects product competitiveness. Hence, AJM which can form micro craters on workpiece surface by high-pressure gas injection of abrasives is considered.

Disponível em: <http://www.hindawi.com/journals/amse/2015/710768/abs/->. Acesso em: 03 abr. 2015.

Questão 1

Descreva, sucintamente, o estudo e os resultados obtidos apresentados no artigo.

Espaço para Resposta

Questão 2

Explique a função dos microporos.

Espaço para Resposta

Questão 3

Qual a importância da pesquisa em relação aos efeitos de lubrificação dos implantes artificiais?

Espaço para Resposta

Questão 4

Qual o foco de cada uma das duas linhas de pesquisa, mencionadas no texto, sobre o efeito de lubrificação e resistência ao desgaste?

Espaço para Resposta

Questão 5

- Traduza o fragmento textual abaixo no espaço reservado para isso.
- Seu texto deverá apresentar clareza e estar bem articulado tanto em termos estruturais quanto de sentido.

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