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HIGH SPEED CUTTING

An Approach towards Improved Machining Performance



Manufacturing and Materials Department

Kulliyyah of Engineering
International Islamic University Malaysia

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10.1 Introduction

Recent researches (Lin, et al., 2008; Yalles, et al., 2009) indicated that with high speed turning for hard materials, the cutting forces are decreased due to the high temperature in the primary zone which decreases the friction and thus on the forces.

Lin et al. (2008) claimed that increasing the cutting speed increases the cutting temperature. Therefore, the hardness of work piece material is decreased accordingly; as a result both principal cutting force and feed force will reduce.

Lima, et al. (2005) found out the machining forces reduces as cutting speed increased while it increased with the increasing of feed rate and depth of cut.

El-Tamimi and El-Hossainy (2008) proved by their experiment in turning AISI 420 Stainless Steel that increasing cutting speed up to 100 m/min reduced the cutting force components, while increasing the cutting speed above 100 m/min, will keep the cutting force components nearly constant.

Kumar and Choudhury (2008) found out that by using dry or cryogenic machining for SS202 as a work piece with 241BHN hardness, the cutting forces decreased with the increase of the cutting speed but at different rates.

The other parameter that affects the cutting forces is the work piece hardness. Lima et al. (2005) found that after turning AISI 4340 steel hardened to 42 HRC and 50 HRC using coated carbide and PCBN tools, respectively the machining forces are increased with the increasing of the work piece hardness.