Tool wear analysis of ceramic cutting tools in the turning of gray cast iron materials

Lukas S, Darmawan, Rosawan, W Winarta and H Zulkarnain

Abstract

The development of mechanical and physical properties of metal materials is so fast that it requires cutting tools that are capable of cutting the metal. Cutting tools must have high temperature resistance, high wear and toughness. Ceramic cutting tools have these properties as they are suitable for use in cutting hard metals. In the metal machining process, especially machining of cast iron which has high hardness and strength, has a strong reason to use the ceramic cutting tool.

The study was carried out experimentally on a Haas CNc series CNC machine. When the turning process is done, the cutting tool cuts the metal cast iron. Every 10 minutes, the turning process is stopped to observe and measure the wear that occurs on the ceramic cutting tool. Observations and measurements are carried out using a digital microscope. The wear criteria are determined if the tool edge (tip) has been worn at 0.3 mm. The results of the measurement indicate that the ceramic cutting tool is able to cut the metal test material with a hardness of 31.8 HRC.