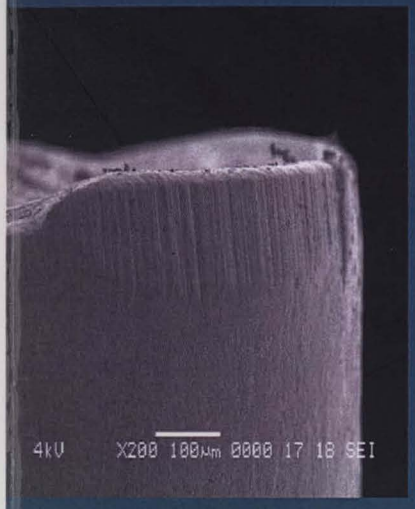

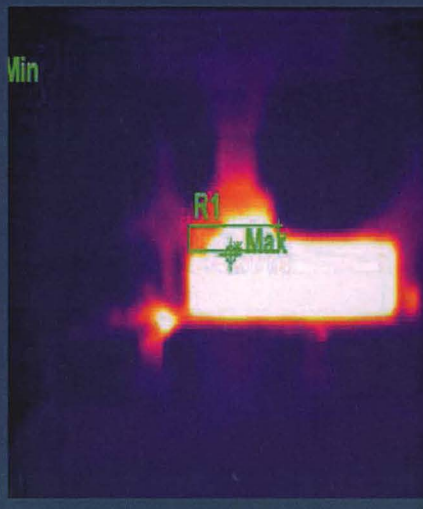

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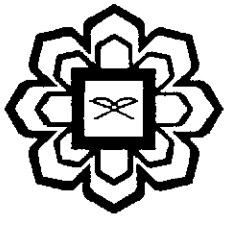

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Chapter 33

Kerf in Micro Wire Electro Discharge Machining

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5. Introduction

Recently, there has been an increasing demand for micromachining due to the reduction in size and weight of technological devices. Micro WEDM, a branch of WEDM, is more advanced and make possible to machine materials with accurate parts. It uses wire micro electrode 20–70 μm diameter 1–10 μJ per pulse discharge energy. The wire–workpiece gap usually ranges from 25-75 nm, which must be maintained by a computer controlled positioning system. Micro WEDM has many advantages compare to other non-traditional micro machining processes. The process is non-contact highly efficient. However, the most important machining responses are material removal rate, surface roughness and the kerf. The size of the kerf determines the dimensional and shape accuracy of the finished part. Kerf determines the internal corner radius to be produced in WEDM operations. The electrical discharge energy parameters have influence on kerf [2,4].

To get minimum kerf length the parameters of the process must be chosen appropriately. Selection of suitable parameters such as gap voltage and capacitance can lead into minimum kerf length. The objective of this research is to study the effect of electrical discharge energy parameters such as gap voltage and capacitance on kerf and to determine the optimal kerf size. Finally, it is to develop a mathematical model to predict the kerf size based on electrical energy discharge parameters.

According to Shichun et al.(2009), the kerf width varies with different machining parameters, such as capacitance and voltage which greatly influences the machining precision [1]. Mahapatra (2006) states that, the machining parameters that affecting the performance are discharge current, pulse duration, pulse frequency, wire speed, wire tension, and dielectric flow [5]. Vishal et al. (2010) has investigated the effects of machining parameters on the kerf width of wire EDM of 304L stainless steel. It has been observed that the machining parameters, such as gap voltage, pulse on-time, pulse off-time, wire feed and dielectric flushing pressure are the important controllable process