EFFECT OF INPUT PARAMETERS ON POWER UTILIZATION AND PERFORMANCE OF DIESINKING EDM FOR AISI D2

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ABSTRACT

Electric Discharge Machining developed in late 1940's has been accepted worldwide as a standard process in manufacturing and is capable of machining geometrically complex or hard material components, that are precise and difficult-to-machine such as heat treated tool steels, composites, super alloys, ceramics, carbides, heat resistant steels etc. being widely used in die and mold making industries, aerospace, aeronautics and nuclear industries. The effectiveness of electro discharge machine can be calculated in terms of material removal rate, relative tool wear ratio, surface roughness, etc. The total power is transferred into various parts like work piece, tool, dielectric fluid and this power erode particles from both tool and work piece. By calculating power transferred to work-piece at different input parameters we can optimize it in order to get the required parameter for the specific requirement. In this research, copper tool is used with simple kerosene oil as dielectric to have a circular impression of 9mm diameter and 0.25 mm depth on Die-steel AISI D2 which is used as workpiece. By applying simple Fourier`s conduction equation, we can calculate the power transferred to work-piece for different input parameters, even material removal rate and tool wear rate are calculated at same input parameters. However, the surface roughness is kept constant for all the experiments. Plots are drawn for variation in material removal rate, tool wear rate and the fraction of power transferred to work-piece for different input parameters. These plots are then used to obtain the optimum input parameters for required output conditions.