

**COMPARATIVE ANALYSIS OF MILLING OF COPPER
AND GRAPHITE ELECTRODES FOR EDM AND
IDENTIFYING MACHINE CAPABILITIES**

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Abstract

Copper and graphite are the two mostly used materials in Electrical Discharge Machining electrodes in injection mould making. This work is done in collaboration with a local company and a foreign tool maker. Though several research papers found on comparative analysis of copper and graphite milling, they are not applicable to the selected foreign tool maker, since the machines used are different and it is totally applications-driven and so much depends on what has to be done on the shop floor in the way of support equipment. In this work, a tool is developed to be used on the shop floor for a collaborated work done by a local company and a foreign tool maker for the comparative analysis of milling of copper and graphite electrodes for EDM.

Machine capabilities of copper and graphite milling are analyzed by experimental methods with the optimum parameters set in the machines. Material removal rate for rough milling and surface finishing rate for fine milling are found to be indicators of machine capabilities. An experienced tool maker can provide the necessary inputs to calculate the cost and time of producing electrodes, leads to a proper comparison of EDM electrode milling in economical terms rather than a guess, which is the current practice.

With the use of the calculator the costs and time of producing electrodes are analyzed and recommendations made based on the data available with EDM machines in general. The cost calculator improved by EDM analysis is to be integrated with the existing costing system of the company. Also the flexibility is provided in the cost calculator to change the values fed in the calculator, so that it can be customized for the use of any other tool shop.



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Keywords: sinking EDM, graphite and copper electrodes, machine capabilities, CNC milling, cost calculator.

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LIST OF ABBREVIATIONS

| Abbreviation | Description |
|---------------------|--------------------------------|
| MRR | Material Removal Rate |
| CAD | Computer Aided Design |
| CAM | Computer Aided Manufacturing |
| EDM | Electrical Discharge Machining |
| WEDM | Wire EDM |
| ECM | Electro Chemical Machining |
| DC | Direct Current |
| CNC | Computer Numerical Control |
| SEK | Swedish Kroner |



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