1.1 ELECTRICAL DISCHARGE MACHINING

Electrical Discharge Machining (EDM) is one of the most accurate manufacturing process for creating complex or simple shape and geometries within parts and assemblies. EDM works by eroding material in path of electrical discharges that form an arc between an electrode tool and the work piece.

EDM system consists of a shape tool and the part. The part is connecting to a power supply. Sometimes to create a potential difference between the work piece and tool, the work piece is immersed in a dielectric (electrically non-conducting) fluid which is circulated to flush away debris.

EDM comes in two basic types: wire and probe (die sinker) Sinker EDM consists of electrode and workpieces that are submerged in an insulating liquid such as oil. The electrode and workpiece are connected to a suitable power supply. The power supply generates an electrical potential between the two parts. As the electrode approaches the workpiece, dielectric breakdown occurs in the fluid and a small spark jumps. The resulting heat and cavitations vaporize the base material, and to some extent, the electrode. These sparks strike one at a time in huge numbers at seemingly random locations across the electrode. As the base metal is eroded, and the spark gap subsequently increased, the electrode is lowered automatically by the machine so that the
process can continue uninterrupted. Several hundred thousand sparks occur per second in this process, with the actual duty cycle being carefully controlled by the setup parameters. The typical part geometry is to cut small or odd shaped angles. Vertical, orbital, vectorial, directional, helical, conical, rotational, spin and indexing machining cycles are also used.

1.2 IMPORTANCE OF RESEARCH

This research is significant because of several causes:-

(i) Analysis of the effect of EDM jet flushing setting on the machine.
(ii) Deciding decision in choosing the best parameter of EDM for the material removal rate (MRR) and surface roughing (Ra) result analysis.

1.3 PROBLEM STATEMENT

Improper flushing and electrode material would cause erratic cutting. This in turn increases machining time. Under certain machining conditions, the eroded particles attach themselves to the workpiece. This prevents the electrode from cutting efficiently. It is then necessary to remove the attached particles by cleaning the workpiece.
1.4 OBJECTIVE OF RESEARCH

There are some objectives of this research;

(i) To determine the effect EDM jet flushing setting on the machining of tool steel workpiece.

(ii) To optimize the parameter of electrode material, flushing, electrode dimension, and depth of cut that influence EDM performance.

(iii) To analysis the control parameters of EDM process for each of the machining characteristics i.e. material removal rate (MRR) and surface roughness (Ra).

1.5 SCOPE OF RESEARCH

The research is limited to:

(i) 2 condition of flushing which are without flushing (low level) and with flushing (high level).

(ii) 2 main control parameter for this study are Material Removal Rate (MRR) and Surface Roughness