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## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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# A Review on EDM Wire Automatic Chopping System

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**ABSTRACT:** This Paper gives the detailed information about the design and development of automatic wire cutting machine. At present conventional method is used for wire cutting and measuring which takes more time which requires man power. The accuracy obtained by conventional method is also poor. The automation system solves the labour problems it saves cost, increases accuracy, decreases human errors. By using automation our objectives to achieve low cost cutting which works fast and reduces cutting time. The practical objective of automatic wire cutting machine is to cut required length of wire in required number of pieces. This machine is simple and portable.

**KEYWORDS:** Automatic wire cutting, Cam Operated Cutting, Transportable, cost- effective

## I. INTRODUCTION

### Automatic cutting machine

Today engineers are finding many ways to reduce human efforts which ultimately save labour cost and valuable time. Raw materials to be used, it is necessary to cut them and then take for further operations. Therefore, this cutting machine is proposed for raw materials like Pipes and wires as per requirements. This project aims to eliminate major human errors in small diameter insulation pipe or wire cutting processes.

### EDM machine

Electro Discharge Machining is a non-conventional or non-traditional machining process which is used for machining hard materials which are difficult to machine by the conventional machining process. EDM can be used in machining difficult cavities and contours. There are various types of products which can be produced using EDM with high precision and good surface quality, such as dies and molds, parts for aerospace and automotive industry and surgical component.

### CAM AND FOLLOWER

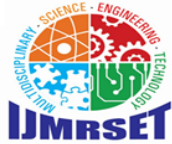
Cam and follower mechanism is a preferred mechanism due to its important functions of all most all the reciprocating machines used in transportation, medical, and production etc industries. A cam is a rotating or translating part of the cam follower mechanism that can transmit from one type motion to another.

## II. LITERATURE REVIEW

§ ACCORDING TO M. DHANUNJAYA, M. MADDULETI, GOPI CHAND BOOSA :-

Electrical Discharge Machining (EDM) Electrical Discharge Machine (EDM) is now become the most important accepted technologies in manufacturing industries since many complex 3D shapes can be machined using a simple shaped tool electrode. Electrical discharge machine (EDM) is an important „nontraditional manufacturing method“, developed in the late 1940s and has been accepted worldwide as a standard processing manufacture of forming tools to produce plastics mouldings, die castings, forging dies and etc. Major development of EDM was observed when computer numerical control systems were applied for the machine tool industry. Thus, the EDM process became automatic and unattended machining method. At the present time, Electrical discharge machine (EDM) is a widespread





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technique used in industry for high precision machining of all types of conductive materials such as: metals, metallic alloys, graphite, or even some ceramic materials, of whatever hardness.

§ ACCORDING TO Norton, R. L., Design of Machinery,

A cam-follower mechanism is a widely used mechanical system in which a cam (a rotating or sliding piece) imparts motion to a follower. It is fundamental in converting rotary motion to linear or oscillatory motion, with applications in internal combustion engines, automated machinery, textile machines, and robotics.

“Cam-follower systems are among the most important motion-control devices in mechanical engineering.”

§ According to Khin Maung Chin,

IN "Design and Kinematics Analysis of Cam-Follower System", he said high accelerations are needed to give rapid opening and closing, too rapid a change in acceleration - the 'jerk' or 'jerk rate' - will give rough operation due to the sudden changes in forces. For this reason cam profiles are designed not to give very rapid changes in accelerations. It may also be noted that as higher forces can more easily be provided by the cam than by the valve springs, it is common to us higher accelerations when starting the opening of the valves and when slowing their closing at the end of the closing phase. These aspects are controlled by the cam, whereas the slowing of the valve at the end of the opening phase and the acceleration of the valve at the start of the closing phase are controlled by the valve springs.

§ According to Prof. H.D.Desai Prof. V.K.Patel,

IN "Computer Aided Kinematic and Dynamic Analysis of Cam and Follower", the analysis of anything other than a simple configuration can be quite complex. The analysis will depend upon the type of follower and the detailed geometry. Because of these difficulties with the analysis it was common for accelerations to be determined graphically.

§ Dr. David J Grieve,

"Forces in the Valve Train of an Internal Combustion Engine", they will make some simplifying assumptions that a knife edge follower is being used. This will not be very accurate, but will give some idea of values. The most simple assumption for analysis is to assume that the opening and closing is simple harmonic motion (SHM).

§ Thomas, H. R. and Hoersch, V. A. ,

Discovered that the shearing stress on the axis of symmetry is a maximum at a distance somewhere beneath the surface under the center of the contact area. Thomas and Hoersch calculations for the stresses agreed with the experimental results. In 1936, Foepl, L. calculated the stress for the case of a cylinder and a spherical ball pressed on a flat plate. Foepl verified his findings experimentally by a photo - elastic technique.

### III. METHODOLOGY

The basic need of automatic wire cutting is to cut the wire of required length in required number of pieces, without labour, efficiently. So, we decided to make a project named “EDM wire automatic chopping system”.

For that we decided some specifications given below:

- 1) To cut required length of wire.
- 2) The diameter of wire should be automatically adjustable.
- 3) The spool is provided to store wire stock.
- 4) Guide rod is provided to keep wire in straight direction.

A. For making of the automatic wire cutting machine we will follow this procedure below:-

So firstly, we decided to make a project and then we finalize that a final design for project.

B. Industrial Wire Cutting Machine Consist of Two Systems

- 1) Mechanical system
- 2) Electrical system

C. In Mechanical System Step by Step Done Procedure for on that Format of Design Given Below

- 1) Making of a base of the mechanical part
- 2) Select the material for project work
- 3) Purchasing of required material from market
- 4) Checking of all loads acting on that frame



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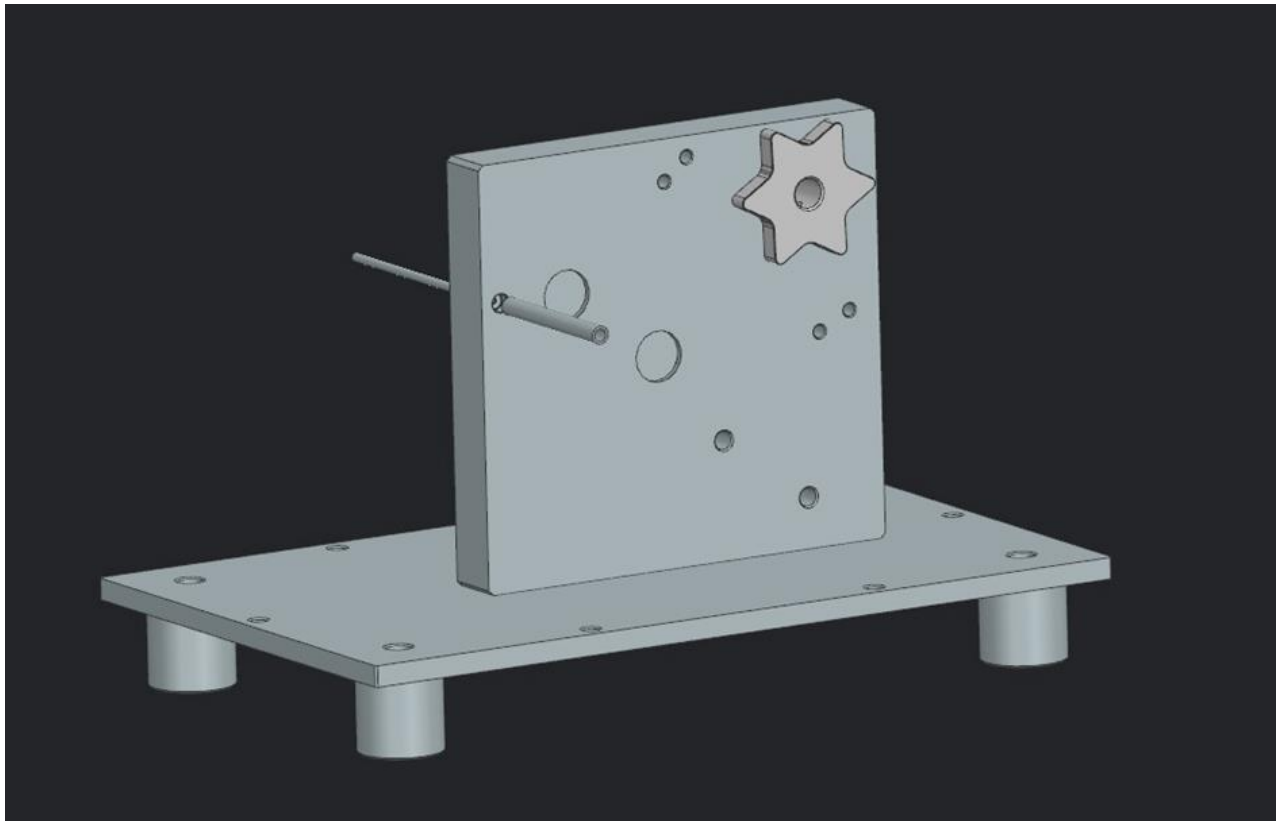
D. We Decided to Make Mechanical System into Different Sub-Category

### Mechanical material

- 1) wire cutter
- 2) cam follower mechanism
- 3) surface plate
- 4) bush
- 5) Rod
- 6) screw

### Electrical material

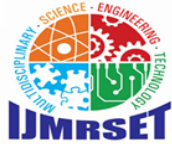
- 1) Synchronous motor
- 2) cable



**Figure 1:** 3D view

## IV. CONCLUSION

As our proposed, Wire cutting system is automatic, to handle, reduces man power, save wires from damage because it is automatic with zero error with reliable process. It is advantageous for the industries and for workers. An Automated Cutting Machine is device to help any factories which are still using the old way to manage their manufacturing. The old way like using labour for an operation using manual work is hassle, fast product generation is not possible. But by using this, user can overcome all the problems mentioned above. This system can manage all the happenings of the work needed to be done. An autonomous cutting system is built as a prototype. The basic aim of performing cutting operation with greater accuracy and precision with low expenses deposited is the motto.



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