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Design of Continuity Process of Cable in Braiding Machine in Cable Industry

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Abstract: Braiding is one of the narrow width textile manufacturing methods. Apart from the use of braids in garment and shoes, braiding found its use in a wider area of technical textile applications such as rope and cable. In addition, braiding is a more suitable method for developing seamless cylindrical textile reinforcement for developing composite structures. Fast manufacturing process with a range of fibre angles and reduced wastage are key reasons for braiding to be used in composite industries.
This article intends to provide a broader perspective of braiding technology by covering its history, process and its applications. Details of a braiding machine, process and structures were explained to provide a general background. Customary use of braided structures was reviewed as well as further discussions on the use of braiding process for composites materials.

I. INTRODUCTION

Braiding is the method of producing a structure by the intertwining of three or more strands together. Several other definitions can be found in the literature with the inclusion of shape, structure, application, the material used and so on. The principle of manufacturing though remains the same.
Plait or plaiting is a widely known term which is a class of braid. Rope, line and cord are collectively known as cordage. Although the conventional use of braided structures was limited to textile articles, however, development of industrial braiding equipment expanded its use to manufacture braids for technical applications such as rope, cables, over-braided pipes, medical textiles, composites etc. Use of braiding methods for cordage, cables, and wires are the widely used conventional technical application of braiding process.

II. HISTORICAL BACKGROUND

Braiding is one of the early inventions of mankind that appeared in the form of hair plaiting. Study on prehistoric textiles differentiates braiding waving in terms of ‘Oblique interlacing’ with the elements not being parallel or at a right angle. Archaeological findings record earliest example of artificial cordage which is a fishing net produced about 10000 years ago. Later in history, the uses of ropes were also reported in ancient Spain, Egypt and Assyria.
The documents in China and Japan indicate the use of braiding in various forms and methods in 4000 BC. Despite the early use of braid in the form of plait or rope, the manufacturing was predominantly by hand or using some hand tools. Development of mechanical equipment for producing a braid structure is relatively recent, during the era of industrial revolution. The first braiding equipment patent titled "An engine or machine for the laying or intermixing of Threads, Cords, or Thongs of different kinds, commonly called Platting" was issued in Manchester, the UK in 1748. Although the first iron-built machine was developed in Germany in 1767. Since the early development of braiding machines, various braiding methods and mechanisms for were invented. The following sections describe the widely used maypole braiding machine and its principle.

III. BRAIDING EQUIPMENT

The oblique interlacement of fibres can achieved by different mechanical means such as horn gear track pinion with cam ring etc. Typically braided structures are cylindrical produced in a circumferential . also there are equipments to develops structures with flat and complex cross sections . the two dimentional braiding machines are either vertical or horizontal According .To the orientation of track plate.

IV. TECHNICAL APPLICATION OF BRAID

Technical applications of braid span across a wide variety of industries. Tubular or solid core braids are often used for high-pressure hose, fishing line and net etc. Flat braids have application in industrial belts while square braids can be used as gasket[9]. Braiding is widely used for electrical power supply cable mainly to organise and manage the distribution of hundreds of meters of cables.

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One of the major technical applications of braiding lies in the field of biomedical textiles. Examples of the use of braiding can be found in stents for implanting inside arteries, synthetic arteries, dental floss, artificial knee ligament, composite implant rod[18], prosthetic intervertebral disc etc. Due to its high load bearing capacity, braiding is also used for rope manufacturing. The uses of rope are broad and was classified mainly in four areas[3]- industrial, marine, recreation and general utility. Ropes are used for various sports activities such as mountaineering, skipping, skiing, yachting etc. Other uses of rope are mooring lines, bridge cables, elevators and heavy duty use in lifting, mining, winching, shipping and forestry[3] to name but a few.

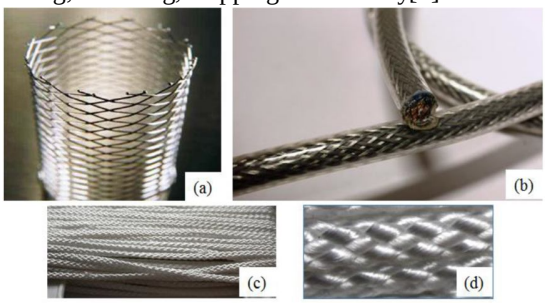


FIG:-Technical braided products (a) stent[19] for biomedical use (b) electrical cable (c) rope (d) close view of rope

V. CONTINUITY BRAIDING CONTROL USING INTELLIGENT TECHNIQUE

A. Limit Switch

In electrical engineering a limit switch is a switch operated by the motion of a machine part or presence of an object.
They are used for controlling machinery as part of a control system, as a safety interlocks, or to count objects passing a point.[1] A limit switch is an electromechanical device that consists of an actuator mechanically linked to a set of contacts. When an object comes into contact with the actuator, the device operates the contacts to make or break an electrical connection.



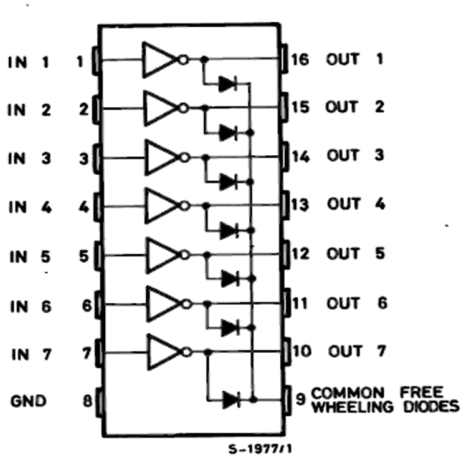
Limit switches are used in a variety of applications and environments because of their ruggedness, ease of installation, and reliability of operation. They can determine the presence or absence, passing, positioning, and end of travel of an object. They were first used to define the limit of travel of an object; hence the name "Limit Switch".

B. Microcontroller (2051)

The AT89C2051 is a low voltage, high-performance CMOS 8-bit microcomputer with 2K bytes of Flash programmable and erasable read-only memory (PEROM). The device is manufactured using Atmel's high-density non volatile memory technology and is compatible with the industry-standard MCS-51 instruction set. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C2051 is a power-ful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89C2051 provides the following standard features: 2K bytes of Flash, 128 bytes of RAM, 15 I/O lines, two 16-bit timer/counters, a five vector two-level interrupt architecture, a full duplex serial port, a precision analog comparator, on-chip oscillator and clock circuitry. In addition, the AT89C2051 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset.ULN IC2003 These versatile devices are useful for driving a wide range of loads including solenoids, relays DC motors, LED displays filament lamps, thermal printheads and high power buffers. The ULN2001A/2002A/2003A and 2004A are supplied in 16 pin plastic DIP packages with a copper leadframe to reduce thermal resistance. They are available also in small outline package (SO-16) as ULN2001D/2002D/2003D/2004D.

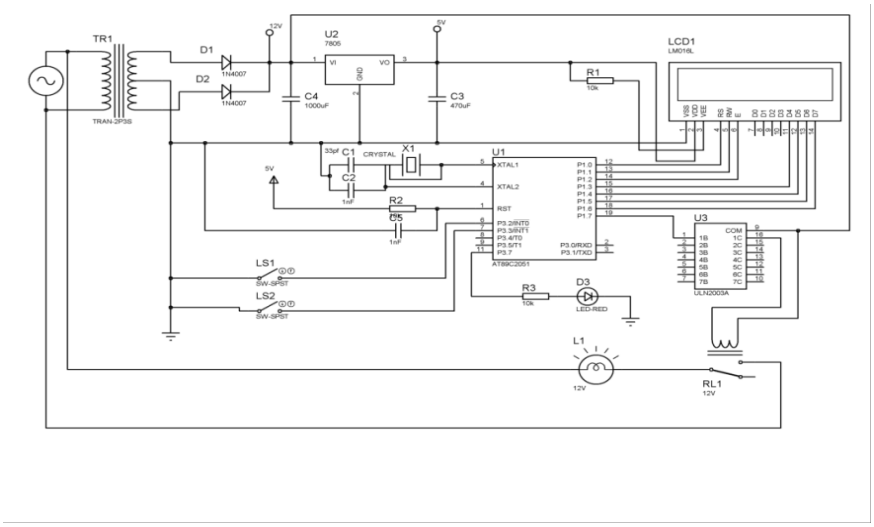
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VI. EXPERIMENTAL SETUP

A. Circuit Diagram



B. Working And Construction

220/12v Step down transformer is used which gives output to rectifier .The output of rectifier is pulsating and to filter out capacitors is used.To convert 12v AC into 12v DC we use rectifier and filter circuit.12v gives to IC regulator of 5v .5v used by microcontroller limit switches, LCD Requirement of main controller is 5v therefore, regulator IC is installed.One regulator IC is installed which generate5v. If at a time all devices will start to consume 5v so loading problem can occure due to that output voltage 5v can be decreases and due to that microcontroller can reset Again same condition will happen and again microcontroller will be reset to avoid this regulator IC of 5v stored in the stored capacitor .Whenever regulator IC's output will less than 5v at that time stored capacitor will provide voltage to all circuit. when controller is ON it should be initially restart.

In the controller multiple execution are processed. Every execution required clock pulse, to generate clock pulse used crystal oscillator which generate continuous clock pulse provided to microcontroller

Here 5v cannot operate 12v relay therefore signal which coming from microcontroller that is 5v gives to driver IC which amplify 5v to 12v and from 12v operate relay As the relay ON , load which is connected also ON. After that microcontroller continuously monitor the interrupt and display all ON in LED simultaneously working is going on therefore it may ON-OFF the LED. Apart that whenever limit switch pressed within a less than one microsecond period it will monitor. Due to monitoring it will trip the relay and display data on LED which parameter or switch can OFF or detected Here we used one resistance for contrast which character we display on LED

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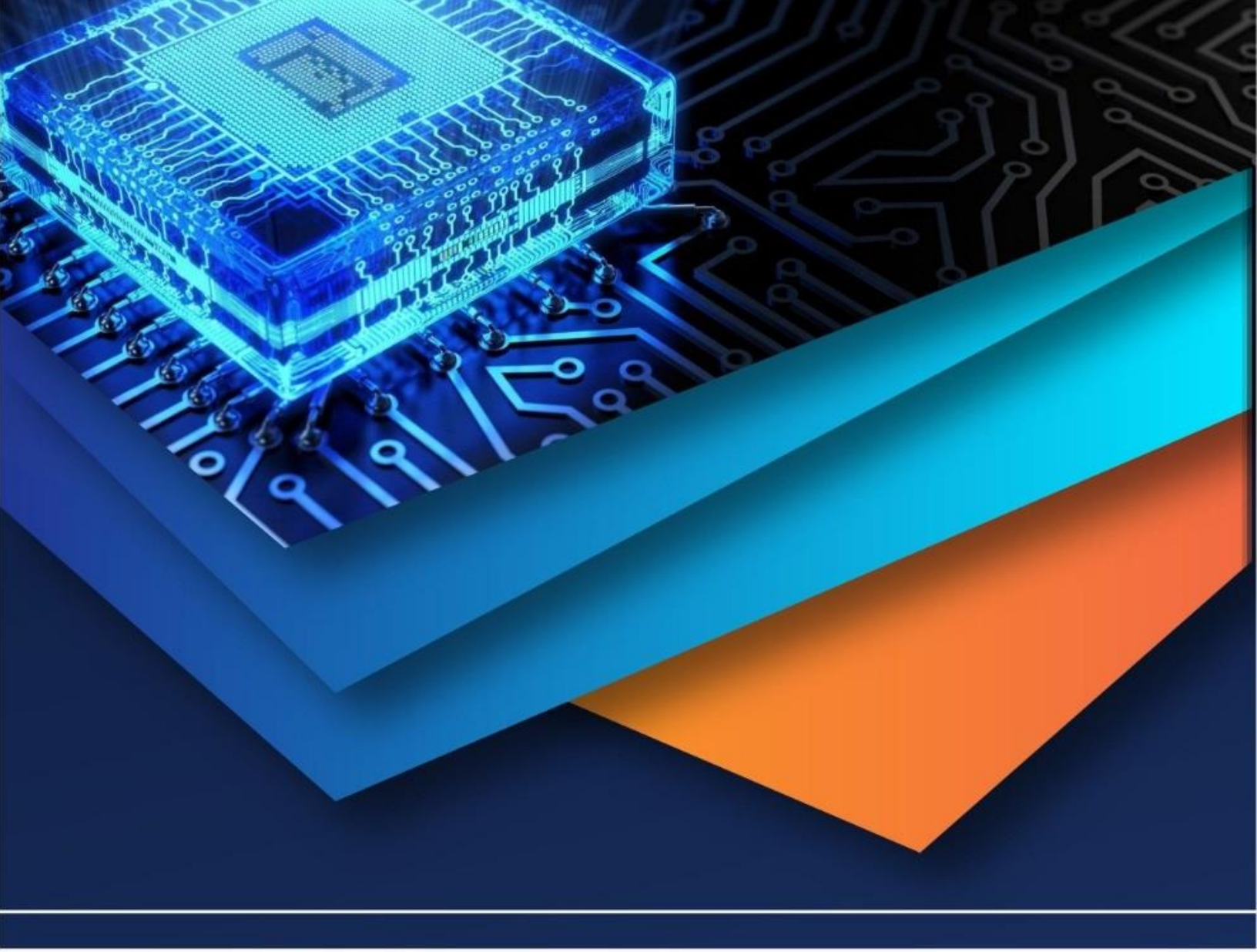
VII. CONCLUSION

The set-up of "Design Of Continuity Process Of Cables In Braiding Machines For Cable Industry" is to be designed within the prescribed time period. From this project we have concluded that we successfully detected the fault and overcome it with the help of various sensors, limiting switches and 8051 microcontroller

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