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Solar based Rope Braiding Machine

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Abstract: ***This paper describes about various types of rope. This technical paper will discuss in details about the history, science and technology, mechanism, uses, advantages and disadvantages of ropes And the machine. The formation of rope is done by braiding number of threads from different rills by twisting them together using desired mechanism.***
Keywords: Renewable energy, cost effective, ease of installation and investment

I. HISTORY OF ROPE

Rope is one of humanity's earliest inventions, and there are nearly as many types as there are fibrous materials on earth. It is made by either braiding or twisting some fibrous material together to increase its strength. The use of rope is thought to extend back substantially before recorded history, with the first recorded use occurring in Egypt sometime around 4000 B.C
No one knows when the first rope was made. We do know that sailors, builders, hunters, and farmers have long depended on rope to move and control animals, structures, and machines. 1
The Plymouth Cordage Company, founded in 1824, was world famous and produced rope The US Navy used steam power to make rope at its Charlestown yard from 1837 to 1971. In the 13th century, Europeans introduced the ropewalk, a method for making the long ropes (300 yards or more) required by tall ships. The ropewalk relied on a compound mechanical tool called a jack that allowed for multiple twisting of the strands/rope.

II. MATERIALS

Early ropes were made by hand, using cotton, dogbane, sisal, jute, hemp, flax, abaca (manila hemp), coir (coconut husks), leather, or hair, ETC. 2 As per the rquirments of ropes and application has increase tremendously and hence its quality should be maintain for this certain few new materials were used such as Aramid Fibers (Nomex, Kevlar, and Hyten) synthetic polyamides and polyethylene (HMPE)

III. ABOUT ROPE

Ropes need to be elastic, flexible, and strong. High-quality ropes should not be damaged by abrasion, heat, water, salt water, sunlight, or microbe. Common rope structures are: twisted, braided, plaited, parallel core and fiber, and wire rope. . Twisted ropes have good stretch and flexibility; braided ropes are more stable; plaited ropes are easier to grip. Both the parallel core and fiber and the wire rope constructions have an inner core of twisted fibers covered by a braided jacket for high strength and resistance to abrasion.

IV. DIFFERENT TYPES OF ROPE

A. Hawser laid rope Three strands twisted into rope.
B. Shroud laid rope Four strands twisted round a thinner rope running through the centre.
C. Cable laid rope Nine strand rope made from three hawser ropes twisted together.
D. Spliced rope The strand ends are woven back in to the rope using a fid to make a loop at the end.
E. Braided rope Rope is made on a cross laying machine. The strands are woven together like plaiting.

V. TECHNOLOGY

Rope technology progressed from (HAND TWISTING AND BRAIDING —> SIMPLE MECHANICAL TOOLS —> COMPOUND MECHANICAL TOOLS —> POWER MACHINERY). Hand twisting demonstrates the general principle of rope making. Groups of fibers or yarns are twisted in one direction to form larger stands, which are then twisted together in the opposite direction to form a cord. When subjected to tension, the tendency for the individual strands to untwist is opposed by the tendency of the rope as a whole to untwist in the opposite direction.

VI. FORMING STRANDS AND TWISTING ROPE

Forming strands Six or more yarns were twisted together to form a strand. The yarns were attached to hooks on the forming machine. The forming machine moved down the walk pulling the yarns off the bobbins. As the hooks rotated, the yarns were twisted together into strands. Twisting the strands into rope Three or four strands were twisted together to make a rope. The strands were attached to the same hook. The hook was rotated, twisting the strands into a rope. The rope stayed together because the twists

went in opposite directions. A cone with grooves in it, called a top, was placed between the strands as they were twisting to keep the twist tight and even. The final rope was approximately two thirds of the length of the yarns used.

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VII. AIM OF DESIGN MACHINE

A. To eliminate complex mechanism.
B. To reduce cost.
C. Better investment.
D. Use of renewable energy sources.
E. Semi-automatic.
F. Better output.

VIII. ENERGY REQUIRED FOR MACHINE

Solar energy is the energy from the sun. It comes to us in form of light and heat. The energy of the sun is trapped into the solar panels which contains photo-voltacic cells which are capable in storing the sun energy. Further this energy is stored into the battery (specially designed battery for solar energy) and now this electricity i.e sun energy is passed for the application.

The reason why we are using solar energy is to be manufacture a machine which runs on solar enegy which renewable, eco-friendly, and cost effective.

For this the setup required is once setup than we don't have to look for 25-30 years to change this. Only the care of maintenance should be properly done.

IX. VARIOUS COMPONENTS OF A SOLAR SYSTEM

A. Solar panels (photovoltaic PV modules)
B. Charge controller
C. Battery
D. Invertor
E. connecting wires
F. Appliances

X. SOLAR PANEL INSTALLATION

To maximize your solar panel system's energy production, your system should be installed where the panels will be exposed to the most sunlight. This is why rooftop home solar installations are so popular.

A. Parameters To Be Checked

1) *Direction of The Roof:* South-facing roofs are ideal for solar because they get the most sunlight over the course of the day.
2) *Pitch Angle of The Roof:* Solar panels can be installed on roofs with a pitch between 15 and 40 degrees
3) *The Size and Shape Of Your Roof:* It's easiest to install panels on a large square roof. A general rule of thumb is that for every kilowatt of panels you want to install, you will need about 100 square feet of roof space.

B. The Two Ways Of Connecting Solar Panels Are As Follows

1) Series connections.
2) Parallel connections.

C. Wiring Solar Panels In Series

When a solar installer wires your solar panels in a series, each panel is connected to the next in a "string." The total voltage of each solar panel is summed together, but the amps of electrical current stay the same. When you wire in series, there is just a single wire leading from the roof for each string of solar panels.

D. Wiring Solar Panels In Parallel

When an installer wires your solar panels in parallel, each panel's wires are connected to a centralized wire leading from the roof. The amps of electrical current for each solar panel are summed together, but the system voltage stays the same. Wiring your solar panels in parallel results in more wires running from your solar panel system.

XI. SAFETY PROCEDURES

A. Keep fingers and loose clothing away from moving parts such as the hooks and handle.
B. Wear gloves. Rope yarn often has splinters within the yam.
C. Wash hands after making or handling new rope as it may contain oils or other chemicals
D. If crank "runs away" or spins out of control, let it go. Do not try to stop the movement.
E. Removing "whiskers" from finished rope by burning should always be done by an adult.
F. Operation of rope making equipment should always be under adult supervision.

XII. CONCLUSION

Today globally there is tremendous development I technology in every sector of development. Which include every factory, industry, or else domestic puroses. All these consumes very large amount of electricity.
In our country we have lot of solar energy available, which we can convert to eclectricity by means of SOLAR ENERGY TECHONOLOGY , this very efficient means to consume electricity.
Our aim is to run our product i.e ROPE BRADING MACHINE on solar energy. Which will be very effective for environment.

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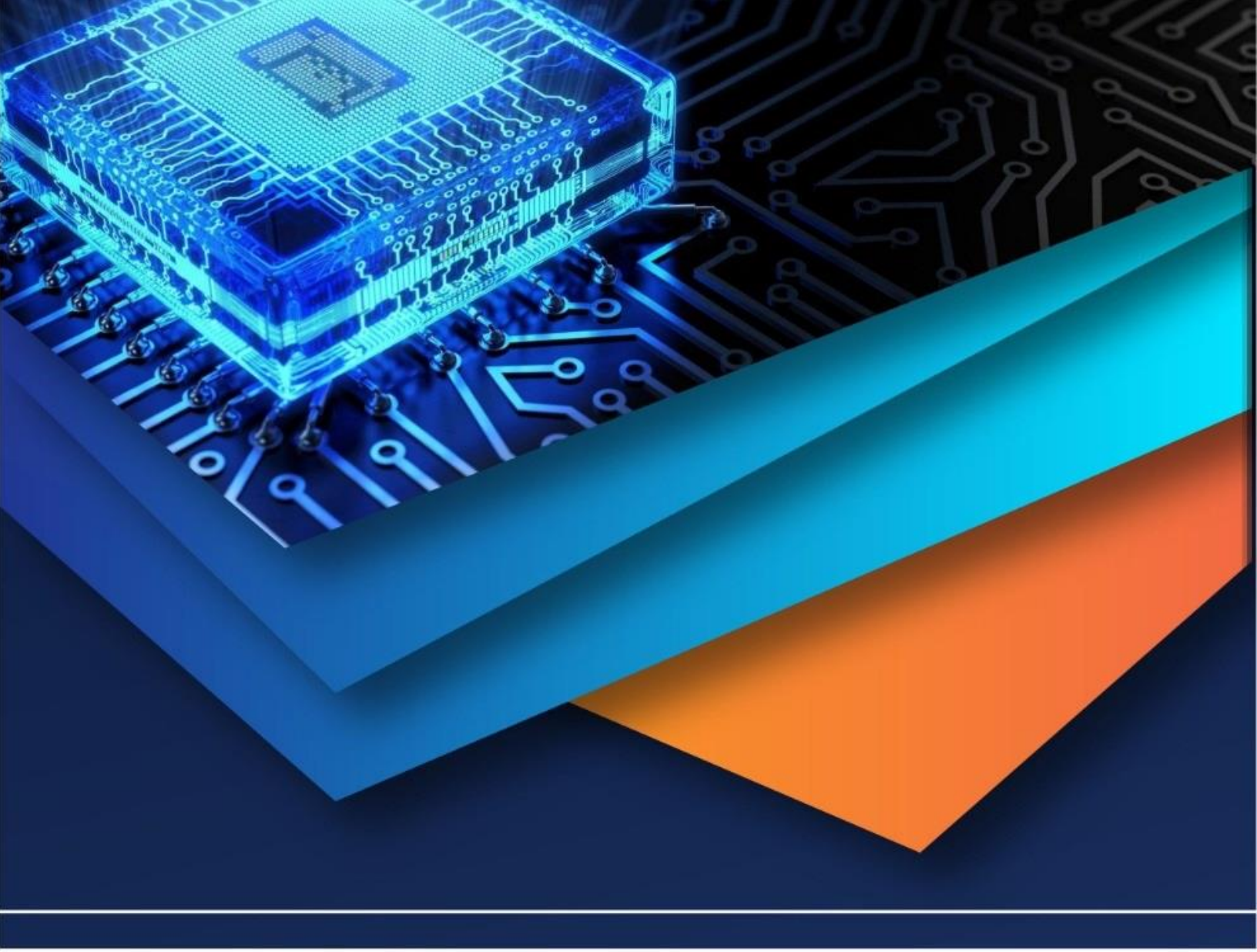

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