International Journal of Innovative Research in Advanced Engineering (IJIRAE) ISSN: 2349-2163
Issue 03, Volume 6 (March 2019) - Special Issue www.ijirae.com
SPECIAL ISSUE - 5th Inter National Level Conference - "MEEMIC – 2019"

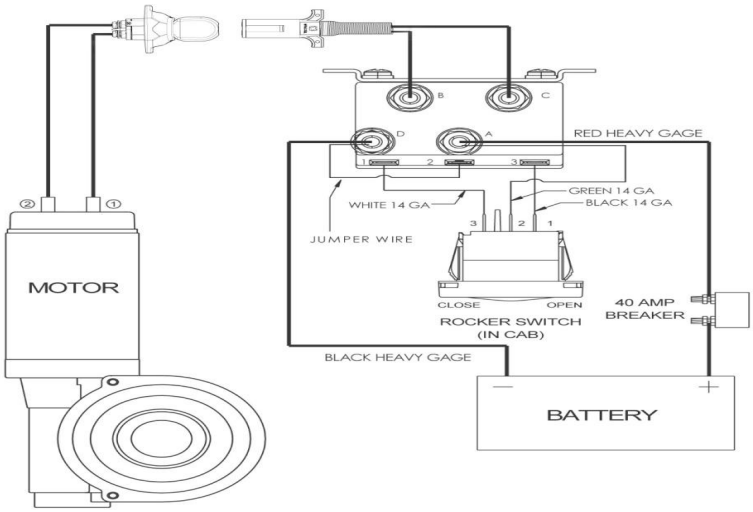
FABRICATION OF AUTOMATIC TARPAULIN SYSTEM BY USING ARCHING MECHANISM

Prasanth.S, Thamaraiselvan.R, Elamvazhuthi.S, Nandakumar.D.J
Guided by
A.Senthilkumar , HOD
Department of Mechanical Engineering,
Sengunthar College of Engineering, Thiruchengode, TamilNadu.,India

Manuscript History
Number: **IJIRAE/RS/Vol.06/Issue03/Special Issue/SI.MRAE10082**
Received: 20, February 2019
Final Correction: 05, March 2019
Final Accepted: 20, March 2019
Published: **March 2019**
Editor: Dr.A.Arul L.S, Chief Editor, IJIRAE, AM Publications, India

Abstract: This project describes lower consumption timing to tarpaulins in trucks by using arching mechanism. Generally covering tarpaulin in trucks has taken more time and required two or more man power. So we have an idea to cover tarpaulin in trucks by using arching mechanism. We adjust tarpaulin construction by the needs of our requirements and according to demands of the transported goods.

Introduction: As mentioned above, this project is about design of automatic tarpaulin system by using arching mechanism. This design will provide better comfort and also saves the time to cover the tarpaulin and reduce man power, that's why it is also the reliable for the customer. As it is also battery operated mechanism thus no fuel is required. Hence it is economical to the environment. The brief about this project and details of design, materials, its estimation etc. described in subsequent section. Most of the people use tarpaulin to cover the goods in trucks in their daily life ,But most of the time ,they have to face the problems like more man power required and more time to cover, etc. So here we have designed a automatic tarpaulin system by using arching mechanism to reduce and eliminated problems to maintain the time. An automotive manufacturer is a company that produces vehicles.



Project objective:

Truck tarpaulins correspond to EU regulations, and can be operated without necessity to climb on the truck superstructure, and there is a possibility of easy installation on pre manufactured trucks. We adjust tarpaulin construction by the needs of our customers and according to demands of the transported goods. As a standard solution we suggest tarpaulin system that meets all the demands of traffic regulations.

Block Diagram:

Parts Requirements:

- Dc motor
- Tarpaulin
- Spur gear
- Frame
- Battery
- Wire
- Welding equipments

Dc motor: In this system one DC motor is provide in one side to move forward and backward direction of arching. The specification of motor used is 12 V. When power supply from battery to DC motor then DC motor rotate in clockwise direction and when reverse current supply from battery to DC motor then DC motor will anticlockwise direction. Which will forward and backward movement of arching by gear. DC motor working is based on the principle that when a current carrying conductor is placed in a magnetic field, the conductor experiences a mechanical force. The direction of this force is given by Fleming's left-hand rule and magnitude is given by;

$$F = BIL \text{ Newtons}$$

According to Fleming's left-hand rule when an electric current passes through a coil in a magnetic field, the magnetic force produces a torque which turns the DC motor. The direction of this force is perpendicular to both the wire and the magnetic field.

Flemings Left Hand Rule: Basically, there is no constructional difference between a DC motor and a DC generator. The same DC machine can be run as a generator or motor.

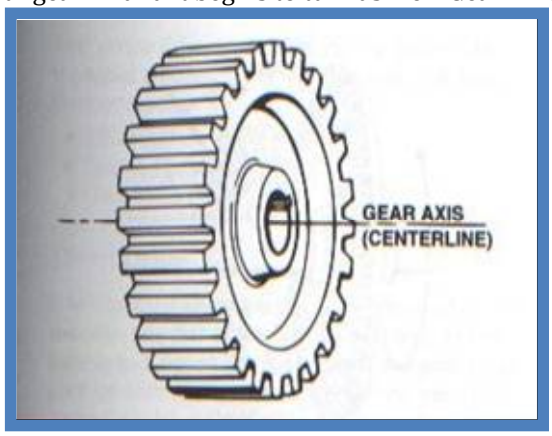
Working of DC Motor: Consider a part of a multi polar DC motor as shown in the figure below. When the terminals of the motor are connected to an external source of DC supply: the field magnets are excited developing alternate North and South poles the armature conductors carry currents. Parts of a Multi-polar DC Motor All conductor under North-pole carry currents in one direction while all the conductors under South-pole carry currents in the opposite direction. Since each armature conductor is carrying current and is placed in the magnetic field, a mechanical force acts on it. On applying Fleming's left-hand rule, it is clear that force on each conductor is tending to rotate the armature in the anticlockwise direction. All these forces add together to produce a driving torque which sets the armature rotates. When the conductor moves from one side of a brush to the other, the current in that conductor is reversed. At the same time, it comes under the influence of the next pole which is of opposite polarity. Consequently, the direction of the force on the conductor remains the same. It should be noted that the function of a commutator in the motor is the same as in a generator. By reversing current in each conductor as it passes from one pole to another, it helps to develop a continuous and unidirectional torque.

Tarpaulin: A Tarp System is an arching mechanism, featuring two long posts joined with a roll of mesh or solid material, that is used to cover the payload of any loose material in a dump truck or otherwise. Tarpaulins have multiple uses, including as shelter from the elements, i.e., wind, rain, or sunlight, a ground sheet. Tarpaulins are often used during the build process to protect brickwork and masonry from weather damage. Tarpaulins are also used for a fly in camping, a drop sheet for painting, for protecting the infield of a baseball field, and for protecting objects, such as unenclosed trucks, semi- trailers or freight cars as well as wood piles.

Spur gear: A toothed wheel that engages another toothed mechanism in order to change the speed or direction of transmitted motion. A gear is a component within a transmission device that transmits rotational force to another gear or device. A gear is different from a pulley in that a gear is a round wheel which has linkages ("teeth" or "cogs") that mesh with other gear teeth, allowing force to be fully transferred without slippage. Depending on their construction and arrangement, geared devices can transmit forces at different speeds, torques, or in a different direction, from the power source. The most common situation is for a gear to mesh with another gear. Gear's most important feature is that gears of unequal sizes (diameters) can be combined to produce a mechanical advantage, so that the rotational speed and torque of the second gear are different from that of the first. To overcome the problem of slippage as in belt drives, gears are used which produce positive drive with uniform angular velocity.

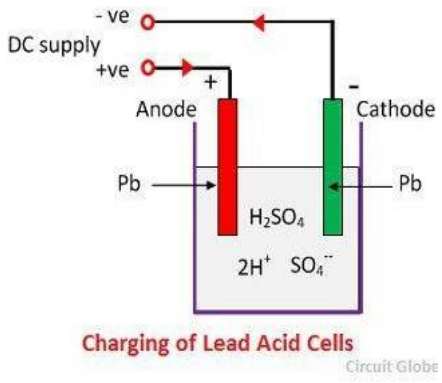
Teeth is parallel to axis of rotation can transmit power from one shaft to another parallel shaft. Spur gears are the simplest and most common type of gear. Their general form is a cylinder or disk.

The teeth project radially, and with these "straight-cut gears" Spur gears are gears in the same plane that move opposite of each other because they are meshed together. Gear 'A' is called the 'driver' because this is turned by a motor. As gear 'A' turns it meshes with gear 'B' and it begins to turn as well. Gear 'B' is called the 'driven' gear



Frame: The fixed frame forms the base of the goods carrying truck trailer. This frame is made of Mild Steel (MS).All parts are attached with the frame.

Battery: A automotive battery is a rechargeable battery supplies electrical current to a motor vehicle. Its main purpose is to feel the starter, which starts the engine. Once a engine running, power for the cars electrical system is applied by the alternator. The various parts of the lead acid battery are shown below. The container and the plates are the main part of the lead acid battery. The container stores chemical energy which is converted into electrical energy by the help of the plates. When the sulfuric acid dissolves, its molecules break up into positive hydrogen ions ($2H^+$) and sulphate negative ions (SO_4^{--}) and move freely. If the two electrodes are immersed in solutions and connected to DC supply then the hydrogen ions being positively charged and moved towards the electrodes and connected to the negative terminal of the supply. The SO $^{--}$ ions being negatively charged moved towards the electrodes connected to the positive terminal of the supply main (i.e., anode).



Each hydrogen ion takes one electron from the cathode, and each sulphates ions takes the two negative ions from the anodes and react with water and form sulfuric and hydrogen acid. The oxygen, which produced from the above equation react with lead oxide and form lead peroxide (PbO_2.) Thus, during charging the lead cathode remain as lead, but lead anode gets converted into lead peroxide, chocolate in colour. If the DC source of supply is disconnected and if the voltmeter connects between the electrodes, it will show the potential difference between them. If wire connects the electrodes, then current will flow from the positive plate to the negative plate through external circuit i.e. the cell is capable of supplying electrical energy.

Welding equipments: A *weld* is made when separate pieces of material to be joined combine and form one piece when heated to a temperature high enough to cause softening or melting. Filler material is typically added to strengthen the joint. Welding is a dependable, efficient and economic method for permanently joining similar metals. In other words, you can weld steel to steel or aluminum to aluminum, but you cannot weld steel to aluminum using traditional welding processes**.** Welding is used extensively in all sectors or manufacturing from earth moving equipment to the aerospace industry. The number of different welding processes has grown in recent years. These processes differ greatly in the manner in which heat and pressure (when used) are applied, and in the type of equipment used. There are currently over 50 different types of welding processes; we'll focus on 3 examples of *electric arc welding*, which is the most common form of welding. The most popular processes are shielded metal arc welding (SMAW), gas metalarc welding (GMAW) and gas tungsten arc welding (GTAW). All of these methods employ an electric power supply to create an arc which melts the base metal(s) to form a molten pool. The filler wire is then either added automatically (GMAW) or manually (SMAW&GTAW) and the molten pool is allowed to cool.

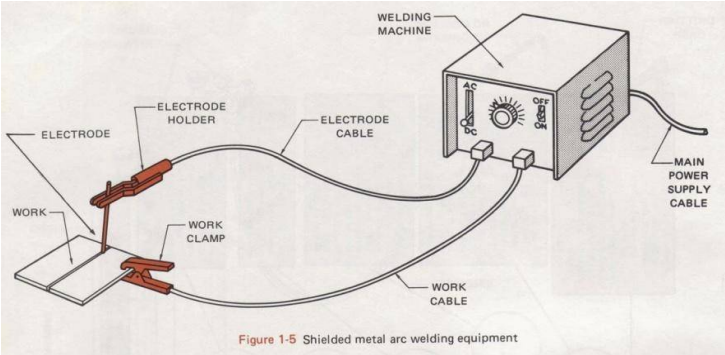


Figure 1-5 Shielded metal arc welding equipment

Wire: A wir**e** is a single, usually cylindrical, flexible strand or rod of metal. Wires are used to bear. Wire is commonly formed by drawing the metal through a hole in a die or draw plate. Wire gauges come in various standard sizes, as expressed in terms of a gauge number. The term *wire* is also used more loosely to refer to a bundle of such strands, as in "multistranded wire", which is more correctly termed a wire rope in mechanics, or a cable in electricity. Wire comes in solid core, stranded, or braided forms. Although usually circular in cross-section, wire can be made in square, hexagonal, flattened rectangular or other cross-sections, either for decorative purposes, or for technical purposes such as high-efficiency voice coils in loudspeakers. Edge-wound [1] coil springs, such as the Slinky toy, are made of special flattened wire

Working principle: A Tarp System is an arching mechanism, featuring two long posts joined with a roll of mesh or solid material, that is used to cover the payload of any loose material in a dump truck or otherwise. It's possible that the only reason you're getting a tarp system is because you don't want to get a ticket for having your truck's load uncovered. Purchasing a custom tarp system will guarantee that you're not going to be breaking any laws when traveling down the highway? You will be able to make sure that your load is completely up to code. A very important part of your tarp system knows what type of trailer you will be using. A mechanic will be able to design a tarp system for flat beds, dump bodies, and double drop trailers. If you feel a certain feature will increase your tarp system's efficiency, you will be able to have it customized.

Advantages:

- Eco Friendly
- Less Noise Operation
- Battery Operated thus No Fuel Required
- Non Toxic And No Hazardous
- Less Costly
- Less Maintenance except battery requirement
- More Efficient

- Time can be saved
- Reduce man power

Application:

- It is used in tippers and dump trailers
- In Automobiles Application
- In industries For Transportation of Raw Material
-

Conclusion:

This project is made with pre planning, that it provides flexibility in operation. This innovation has made the more desirable and Economical. This project "fabrication of automatic tarpaulin system by using arching mechanism" is designed with the hope that it is very much economical and help full to trucks for cover the goods by tarpaulin and other purpose. This project helped us to know the periodic steps in completing a project work. Thus we have completed the project successfully.

Future development:

- In our project, we use hydraulic and pneumatic to adjust the length to cover tarpaulin in normal goods carrying trucks.
- The hydraulic and pneumatic has provided better convenient to cover tarpaulin in future development.

Acknowledgement:

We are thankful to the Management of Sengunthar College Of Engineering, Tiruchengode, Tamil Nadu for providing all the amenities to complete this work successfully.

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