

# DESIGN AND FABRICATION OF COMPOSITE SOLAR ROOF FOR TWO WHEELERS

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## Abstract:

Composite materials are replacing the traditional metals due to light weight and high strength. These can be manufactured according to the design requirements easily. Most of the two-wheeler riders are facing the problems in summer and rainy seasons. So, we are developing the protecting roof for the two wheelers. This roof is equipped with solar panel to produce the electrical energy which is used for auxiliaries like mobile, charging and fog lights and music system light weight strengthening solutions are required to increase roof strengths while minimising structural mass. This paper presents the novel approach of strengthening vehicle roof structure components by bonding glass fibres to the steel surface. Such fibre strengthening systems have been shown to provide substantial increases in force and energy resistance for steel tubes strengthening the roof structure components by adding steel rather than fibre composite, and the implications with regards to vehicle light-weighting are discussed. It is shown that fibre composite strengthening of vehicle roof structures has the potential to contribute to higher roof strengths and/or light-weighting in future vehicle fleets.

**INDEX TERMS: FIBRE- EPOXY COMPOSITES, RESIN, STEEL TUBES, SOLAR PANEL.**

## I. INTRODUCTION

A portable, lightweight riding roof that covers motorcycle riders from rain. Collapsible, detachable, and features instant deployment for quick cover from weather. Older riders will enjoy increased comfort for the family. Younger riders will embrace the stylish design and privacy. During monsoon season in India we see daily riders wait under overpasses, trees, and storefront awnings. We see outfits and bags get soaked. Massive inefficiencies arise from motorcycles kept at standstill by rain. and solar roof electricity and composite sheet for roof. side walls cover for sides from rain and prevent from rain and sunlight and dust particles while travelling on the bike More than 60% of the Indian population drives two-wheeler. Considering the parking and traffic problems it is the best solution. Riding a two-wheeler in an open air is the most pleasurable part where as the car will offer the constrained and enclosed environment.

## II. LITERATURE REVIEW

### 2.1 Introduction

Be that as it may, the bike causes distress during rainstorms as the measure of inconvenience that the bike causes out loads the advantages of riding in outdoors. In downpour, the individual could wear a parka yet some piece of the rider's body will consistently be left uncovered. This shows the requirement for an overhead assurance which presented the sulked with the retractable rooftop. Storm season is unusual. A splendid, bright day can transform into a heavy deluge with abrupt power. The Rain Runner effectively overlap up to a lightweight conveying structure that can send in a split second. You never need to stress over getting trapped in a storm again. Our delicate top has total middle to mid-lower leg inclusion. We utilize waterproof texture and taped creases to guarantee you have an agreeable

### 2.2 Incineration

This roof top can be completely retractable when not being used and, in this manner, won't be a hindrance thinking about streamlined viewpoints. Streamlined angle is along these lines considered in any event, when the rooftop isn't being used and in collapsed position Monsoon season is erratic. A brilliant, radiant day can transform into a heavy storm with abrupt power. The Rain Runner effectively creases up to a lightweight conveying structure that can send in a flash. You never need to stress over getting trapped in a storm again. Our delicate top has total middle to mid-lower leg inclusion. We utilize waterproof texture and taped creases to guarantee you have a comfortable

## III. MATERIALS & METHODOLOGY

The materials which we used for roof are composite materials, stainless-steel tubes and flexible transparent glass for clear vision for rider and epoxy resin solution for composite sheet for top of the sheet with glass fibre some other components are listed below in detailed

### 3.1 MATRIX MATERIAL

In The matrix is basically a homogeneous and monolithic material in which a fiber system of a composite is embedded. It is completely continuous. The matrix provides a medium for binding and holding reinforcements together into a solid. It offers protection to the reinforcements from environmental damage, serves to transfer load, and provides finish, texture, colour, durability and functionality. The matrix binds the fiber reinforcement, gives the composite component its shape and determines its surface quality. A composite matrix may be a polymer, ceramic, metal or carbon. Here's a guide to selection.



FIGURE 3.1 Epoxy LY556 & Hardener HY951

### 3.2 STAINLESS STEEL

The stainless steel for roof frame by definition, stainless steel is an iron alloy that contains a minimum of 10.5% chromium. Alloying elements such as nickel, molybdenum, titanium, carbon, nitrogen, and copper can boost the strength, formability, and other properties of stainless steel.

#### SPECIFICATION

Diameter of pipe = 1.27 cm

Total length of pipe = 18 meters



Figure NO 3.2 Stainless steel

### 3.3. FIBRE MATERIAL

Composite fibres are built up of two or more different components, which can be of inorganic and organic origin. These so-called organic/inorganic composite fibres are prominent in the literature and applications with cellulose as organic component are especially mentioned. The cellulose builds up the backbone of the fibre, while the inorganic component is responsible for the functionalization of the fibre. The inorganic component embedded into the cellulosic fibre is the carrier of the function. Due to the broad variety of possible functions inorganic compounds can exhibit, the functionalization of cellulosic-based composite fibres can be related to many different fields of application. This chapter introduces the possible functions and the used functional inorganic additives. Main functionalization's reported are related to radiation protection, optical properties, biocidal fibres, and flame-retardant fibre materials.



FIGURE NO 3.3 FIBER GLASS

### 3.4 TRANSPARENT GLASS

Transparent glass is used for vision for rider and over come rain and dust particles while riding and also protect from winds and sunlight with clear vision

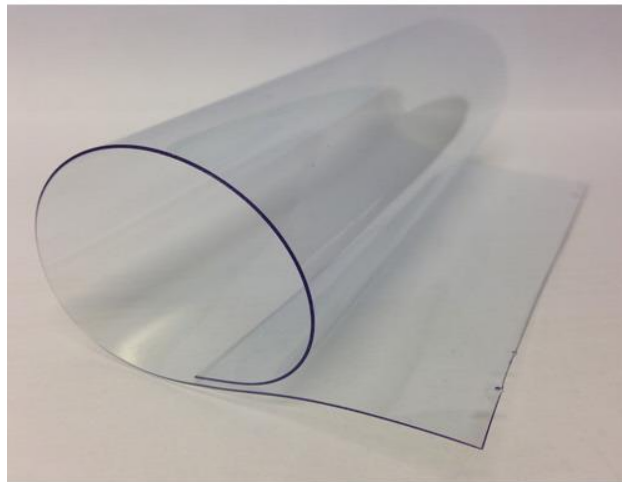


Figure NO 3.4 Transparent glass

#### SPECIFICATION

Thickness of sheet = 5mm

Area of sheet = 1600×700 mm

### 3.5 WIPER MOTOR

Wiper motor is used for cleaning the transparent glass with help of wiper arm and with help of the solar panel that energy stored in the battery. wiper arm is used for removing dust and provide best vision to the rider in the rainy

Season, summer seasons with respect to seasons conditions we use motor but in this project we fixed wiper to it. Wiper motors are devices in wiper system that functions on a power supply in order to move the wiper blades in a smooth motion. Like other motors, the wiper motor rotates continuously in one direction which is converted into a back and forth motion



Figure NO 3.5 Wiper motor

#### SPECIFICATION

Voltage = 12V

Sweep = 60

### 3.6. SOLAR PANNEL



**Figure No 3.6 SOLAR PANNEL**

#### SOLAR PANEL SPECIFICATION:

Volts= 12 volts

Nominal 12V solar panel has a Vic of about 22V

Vamp of about 17V.

It is used to charge a 12V battery

#### 3.7 DESIGN



**Figure NO 3.7 DESIGN OF ROOF (TOP VIEW)**

#### 3.8 FABRICATION OF EQUIPMENT

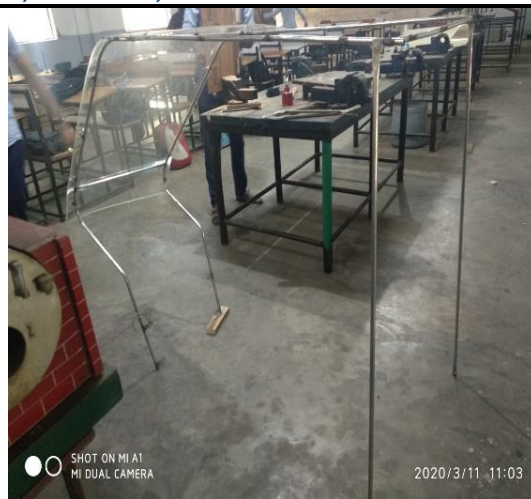
The inorganic component the composite sheet is fixed on the top of stain less steel frame by fixing bolts and nuts and transparent glass is also fixed to frame by using bolts and nuts and the equipment is prepared with some other components are as listed below

- Frame
- Transparent glass
- Composite sheet
- Wiper motor & wiper Arm
- Solar panel
- Battery

#### 3.9 FABRICATION OF FRAME

Frame is made up of stainless-steel tubes and with the specified dimensions as required for roof & we use arc welding technique for joining of tubes to make the frame





**Figure No 3.9 Frame**

### 3.10 FABRICATION OF COMPOSITE SHEET

Composite sheet is made up of hand lay-up process with glass fibre and epoxy resin solution with required ratio as per specification. resin solution mixed with accelerator to increase the quality of composite sheet and good surface finishing is abstained by laying number of layers of resin mixer and glass fibre solutions. sufficient time need to provide for after numbers of layers of solutions to achieve best strength and smoothness



**Figure No 3.10 Composite sheet**

### 3.11 WIPER MOTOR RESULT



**Figure NO 3.11 Wiper motor fixation**

## IV. RESULTS

Roof is completed with composite material and wiper mechanisms, with solar panel which is connected to a battery which stores energy from solar panel



### Inference

- It withstands up to 60 kmph speed without any vibrations to vehicle
- It reduces the vehicle mileage after fixing the roof to vehicle

## V. DISCUSSION

People have doubt whether it will be practical on road or not, this project is designed as per the bike handle bar dimensions. So, it will not make trouble while driving the vehicle and also it will raise another doubt it means while riding the vehicle if any turnings comes on the way what will happen. So, that purpose only we keep handle bar distance easily while attachment. Rider can go freely and easily while Assembling the roof to bike

## VI. CONCLUSION

• further decrease the problem of riding vehicle in rainy seasons and summer seasons effectively on the roads. Rather than the rider is safe while riding on bike. So this project works effectively and efficiently with out any failure

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