



## DESIGN AND FABRICATION OF AUTOMATIC SIDE STAND FOR TWO WHEELER

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**ABSTRACT:** Life in twenty first century is very fast and sometimes unknowingly the rider starts the bike and move forward without pulling off the side stand because of urgency which may cause unavoidable accidents. To avoid such accidents cause due to the carelessness of rider, we may produce the new advancement in bike that as we press the gear lever, the cable wire get stretched due to the hook catch lock get de-locked to lift the side stand automatically. There is a need of prevent the rider in this type of condition, which arises many times, hence, it is important to create one mechanism, which prevents the rider from the accidents caused due to ungifted side stand. The mechanism should be such that it should neither affect the original mechanism nor create make the side stand more bulky. In additional it should not increase the price of the bike. It is just a small mechanism, which operate the stand and operation will be easy. Therefore, it is necessary to have a separate attachment in a bike to lift up the side stand automatically.

**Key Words -** Automatic, Avoid Accident, Mechanism

1. **INTRODUCTION:** In all over world everywhere motor-cycle are used. These are considered to be more demanding type of automobile for a ride. Its compact size make it easy to drive in a narrow street too. The bike are also consider for racing purpose. The side stand plays major roll while the vehicle is in rest position. But it has some disadvantages takes place as while the driver starting the motorcycle, there may be possibility of forget to release the side stand this will caused to unwanted troubles. We have developed a new type of side stand which is automatically retracting the side stand through some mechanical and electronic arrangement and it also have some advance feature. In this system microcontroller, exhaust emission sensor, heat sensor with a dc battery is used. Through the sensor, sensor sense the rotation of the key from OFF position to ON and sends the signal to the microcontroller which is actuate the dc motor which is caused the disengage the stand from the road. A motorcycle side stand is nearly universal method of allowing a motorcycle rider to park his vehicle easily. If this stand is in the park position while the motorcycle is ridden through left turn a serious hazard exists. A new type stand side stand which is automatically retracting side stand is invented to prevent such type of accidents. Side stand mounted behind bottom bracket and can be bolted on either clamping the chain stays, or welded in to place as an integral part of the frame. The motorcycle side stand consists of steel rod held in both park and stopped position by an over cantered spring. It is to provide the stand stability and a support to the motorcycle. Many side stand designs, attachments, mechanisms and rider warning system. Side stand retracts automatically when the motorcycle is lifted off the support. Some retract if they contact the ground when the motorcycle is moving. Many different concepts have been applied for this hazard. There are many types of stand used in the bike:-

- 1.1 **SINGLE STAND:-** A side stand style side stand is a single leg that simply flips out to one side, usually the non-drive side, and the bike then leans against it. Side stands can be mounted to the chain stay sight behind the bottom bracket or to a

chain and seat stay near the rear hub. side stand's mounted right behind the bottom bracket can be bolted on, either clamping the chain stays, or to the bracket between them, or welded into place as an integral part of the frame.

1.2 **CENTER STAND:-** A centre stand side stand is a pair of legs or a bracket that flips straight down and lifts the rear wheel off the ground when in use. centre stands can be mounted to the chain stays right behind the bottom bracket or to the rear dropouts. &any motorcycles feature centre stands in addition to side stands. The centre stand is advantageous because it takes most of the motorcycle's weight off its tires for long term parking, and it allows the user to perform maintenance such as chain adjustments without the need for a motorcycles, but are omitted on most high performance sport bikes to save

weight and increase ground clearance

The modification in side stand in our project is that we are use a servo motor which are attach with the stand and that motor are control with the centre lock of the. Due to which when we switch on the bike the stand are remove with the help of servomotor without use of manual work to remove the side stand. In this projects we are us the some different types of parts just like gas sensor , temperture, etc that are the modifications of the or projects.

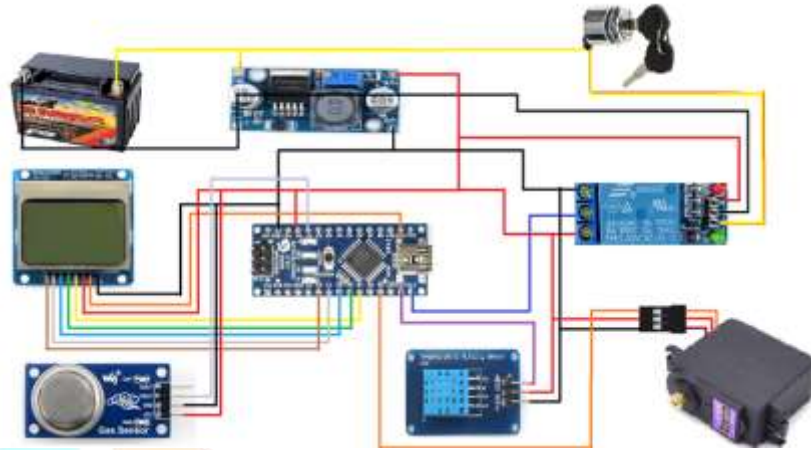
2. **RESEARCH OBJECTIVES:-** The main objective of our project is to provide a safety measure in bikes to avoid unwanted accidents and damage caused by not lifting off the side stand by providing automated side stand lifting system. Here we propose an idea for automatic side stand which is completely mechanical and electronic circuit and without using any external power.

3. **LITERARURE REVIEW:-** Vishal Srivastava, Tejasvi Gupta, Sourabh Kumar, Vinay Kumar, Javed Rafiq, Satish Kumar Dwivedi, has worked on Automatic Side Stand. If the rider may forget to retract the side stand before riding, then undistracted stand hitting the ground and affected the rider control during the turn and this will caused to unwanted troubles. In this paper the presented mechanism consist of D.C. motor powered by motorcycle battery which is connected to the worm and worm gear mechanism for reduction of speed of motor and multiply the torque. Then the motor is actuated by rotation sensor which is mounted on the front of the wheel. We observe that from the design and analysis D.C. motor and other components like as Micro-controller and speed sensor, switch are occupies less space and this space is easily available into the mechanical frame of the motorcycle. After analysis of torque the required torque to raise the side stand is 6076 N-m and the power required to raise the side stand which is 19.078 Watt.[1] Pintoo Prjapati, Vipul kr. Srivastava, Rahul kr. Yadav, Ramapukar Gon, Pintu Singh, Mr. Sandeep has worked on Sprocket Side stand Retrieve System. It is based on the Working Principle of Two Wheelers. In Motor Bike power is transmitted from engine's pinion to rear wheel (i.e Rotary motion of the pinion makes the linear motion of the chain). That linear motion of the chain is absorbed by rear wheel's sprocket and converted into rotary motion. That rotary motion of the rear wheel makes the bike to move. This system could be used in all type of two wheeler (Tvs-XL, all front, back and geared) for retrieving side stand and to control accident due to side stand problem and protect the careless rider.[2] Mr. V.V.R. Murthy, Mr. T. Seetharam, Mr. V. Prudhvi Raj, has worked on Fabrication and Analysis of Sprocket Side Stand Retrieve System. It is based on working principle of two wheeler (i.e. the power is generated in the engine's and it transmit power to the pinion and make it to rotate the pinion transmits power to the rear wheel pinion and makes the vehicle to move. This system could be used in all type of two wheeler (TVs-XL, all front, back and geared) for retrieving side stand and to control accident due to side stand problem and protect the careless rider [4]. Ritu Raj, Rupesh Kr. Verma, Yashveer Yadav, Nilesh Singh, has worked in the advancement of the automatic side stand to make it fully automatic with some additional feature which is not yet implemented in any of the above type of project. In this system, stand is fully automatic which is controlled by an Arduino micro-controller. It also have some special type of sensor like temperature sensor and emission sensor.[7]

4. **METHODOLOGY:-**

- Based on the working principle of two-wheeler (i.e. the power is generated in the engine and it transmits power to the pinion and makes it to rotate. The pinion transmits power to the rear wheel pinion and makes the vehicle to move).
- This is the basic principle followed in all type of two-wheeler, based on this "automatic-side stand retrieve system" is designed because this system works by getting power from a rotating motor driver.

- This side stand system consists of four components, which is assembled as two set up which would be explained briefly in components used and working part of this paper.
- When the power is supplied, the motor rotates in a clock-wise direction, with the teeth of the motor another gear teeth is meshed which is connected to the side stand. The movement of the gear teeth makes the stand lift.
- The retrieval assembly is also performed by the motor, as the ignition if OFF the microcontroller senses and commands the motor to perform the reversible action and let the stand to the down position.



Circuit diagram

5. **DESIGN OF SIDE STAND:-** with the help of the 3d designing software CATIA we can prepare the side stand of our project according to our requirement.

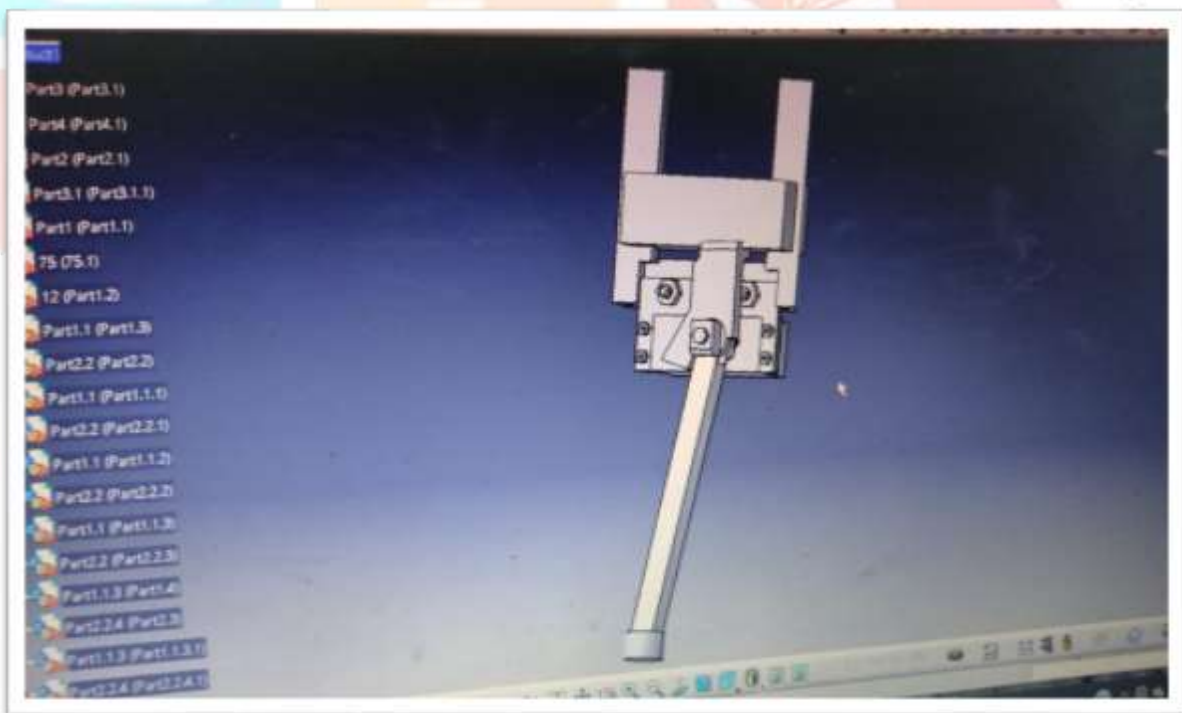


Figure1 (a): side stand

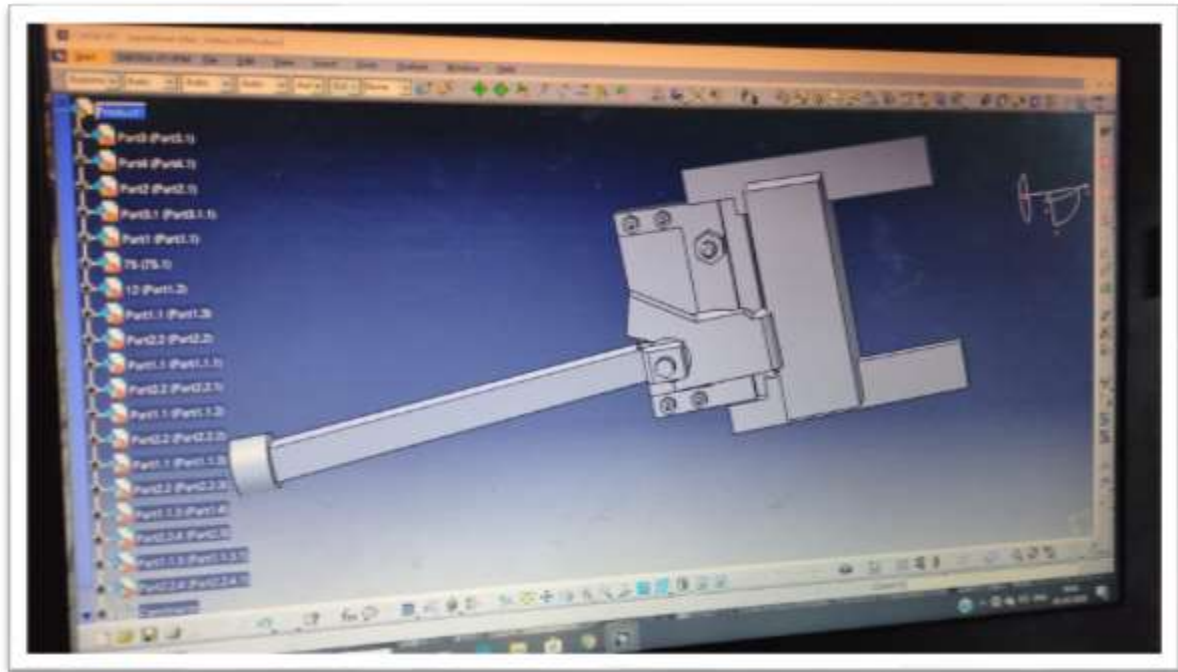


Figure (b): 3d design of side stand

## 6. MATERIAL DATA ANALYSIS:

### ➤ Geometry:

Object Name	Geometry
State	Fully Defined
Definition	
Source	C:\Users\PowerUser\Desktop\ayushman bhai_1simu.stp
Type	Step
Length Unit	Millimeters
Element Control	Program Controlled
Display Style	Body Color
Bounding Box	
Length X	69.945 mm
Length Y	84.001 mm
Length Z	192.31 mm
Properties	
Volume	84154 mm <sup>3</sup>
Mass	0.66061 kg
Scale Factor Value	1.
Statistics	
Bodies	19
Active Bodies	19



➤ **Material Data:** Structural Steel

Density	7.85e-006 kg mm <sup>-3</sup>
Coefficient of Thermal Expansion	1.2e-005 C <sup>-1</sup>
Specific Heat	4.34e+005 mJ kg <sup>-1</sup> C <sup>-1</sup>
Thermal Conductivity	6.05e-002 W mm <sup>-1</sup> C <sup>-1</sup>
Resistivity	1.7e-004 ohm mm

➤ **Structural Steel > S-N Curve:**

Alternating Stress MPa	Cycles	Mean Stress MPa
3999	10	0
2827	20	0
1896	50	0
1413	100	0
1069	200	0
441	2000	0
262	10000	0
214	20000	0
138	1.e+005	0
114	2.e+005	0
86.2	1.e+006	0

➤ **Structural Steel :Strain-Life Parameters**

Strength Coefficient MPa	Strength Exponent	Ductility Coefficient	Ductility Exponent	Cyclic Strength Coefficient MPa	Cyclic Strain Hardening Exponent
920	-0.106	0.213	-0.47	1000	0.2

➤ **Structural Steel > Isotropic Elasticity**

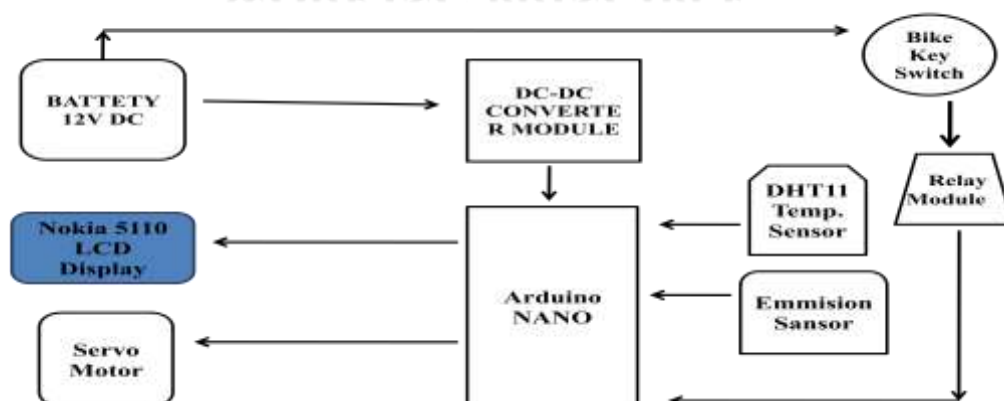
Young's Modulus MPa	Poisson's Ratio	Bulk Modulus MPa	Shear Modulus MPa	Temperature C
2.e+005	0.3	1.6667e+005	76923	

➤ **Structural Steel > Isotropic Relative Permeability**

Relative Permeability
10000

## 7. WORKING PRINCIPLE BLOCK DIAGRAM OF OUR PROJECT:

### WORKING PRINCIPLE-



In the above block diagram we describe the working of the project. In this block diagram when the bike central lock is in the on condition, the 12-volt battery provides supply to the relay through the bike's central lock. When the relay senses the supply, it transfers that supply to the Arduino, which controls the servomotor. The Arduino transfers that supply to the servo motor, causing it to move in the anticlockwise direction. The stand also moves in that direction because both are connected to each other. In our project, we use several other devices directly attached to the Arduino supply, such as the temperature sensor DHT11, which is used to sense the engine's temperature from its outer surface. The emission sensor is attached to the end of the bike's silencer; its function is to identify the mixture of exhaust gases from the silencer in terms of percentage. Both sensors are displayed on the Nokia 5110 LCD display, which is connected to the Arduino circuit.

## 8. RESULTS AND DISCUSSION:

❖ The comparison feature of our project is :-

PARTICULARS	EXISTING SIDE STANDS	INVENTED SIDE STAND
Manual	Yes	Automatic
Automatic Retraction	No	Yes
Human Error	High	Eliminated
Maintenance	Low	Low
Sturdiness	Stable	Stable
Cost	Average	Below Average
Customer Satisfaction	Average	Guaranteed
Risk Factor	High	Eliminated
Error Elimination	Not Considered	Taken Under Consideration
Manufacturing of Spares	With Ease	With Ease
Market Captivity		Improved Sales
Technology	Customary	Revolutionary/Unique
Comfort in Usage	Comfortable	Highly Comfortable

- ❖ With the help of CATIA and ANSYS SOFTWARE, we designed our project with certain parameters, and after fabrication, we found an excellent result after the completion of our work.
- ❖ In this project, we added many new parts, such as a temperature sensor and a gas sensor, which are very beneficial for the automobile sector. With the help of our project, we can control road accidents, and mainly, that stand is very cost-effective. In the future, we can modify our projects with the attachment of other things.
- ❖ The **automatic side stand** is used in all types of vehicles, whether they are gear or non-gear vehicles. It is used in new vehicles as well as in old vehicles by some small modifications in the design of vehicles. It is also applied

- ❖ in some costly cycle by using some modification in design. There may be a lot of innovative future application in automotive industries of two-wheeler bike.

## 9. CONCLUSIONS:

It is by an observation that the side stand removal by electronic based circuit is better than removing by mechanical method. The system can be maintained by a little maintenance. It can reduce the risk of accident caused by un-removal of stand. Definitely this system could be used in all type of two wheeler. This project could be a revolution in automobile industry because it provides a solution for the problem we are facing in our daily life but repeating it carelessly or unknowingly.

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