AUTOMATIC BIKE STAND FOR TWO WHEELER

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Abstract: *This project emphasis on design and fabrication of the automatic bike stand. The side stand is used for supporting the parked motor-cycle if the rider may forget to retract the side stand before riding, then the undistracted stand hitting the ground and affected the rider's control during the turn. stand is important component of bike because stand help to keep the bike upright. But most of the time accidents happen because of stand is down. At such time our automatic bike stand project will helps to reduce accidents, because the stand is automatic, now a days a sensor is used for ensure that stand condition and stand retracting. The motor-cycle stand consists of metallic rod in this project in simple words we retrieve this metallic rod automatically it will go up and down automatically. this all the system are works using bikes DC battery power. In this system we also used mechanical and electronic components because this system is based on mechatronics. In this system also included sensors motor with gear box indicators safety switches for control the stand position all the system operated by Arduino microcontroller. This system works using bike operating positions/conditions.*

***Key-Words*: Automatic Bike Stand, Stand Position, Sensor, Microcontroller.**

1. INTRODUCTION

In all over world everywhere motorcycle is used. 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.

While the two-wheelers are concerned, accidents occur due to riding the vehicle in high speed, ignores to use helmets, does not maintains the speed limit and forgets to lift the side stand while riding the vehicles. These are the major source for accidents, forgetting to lift the side stand causes huge accidents. 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, Displacement, Vibration 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.

Graph-1: Bike stand accident percentage of every year
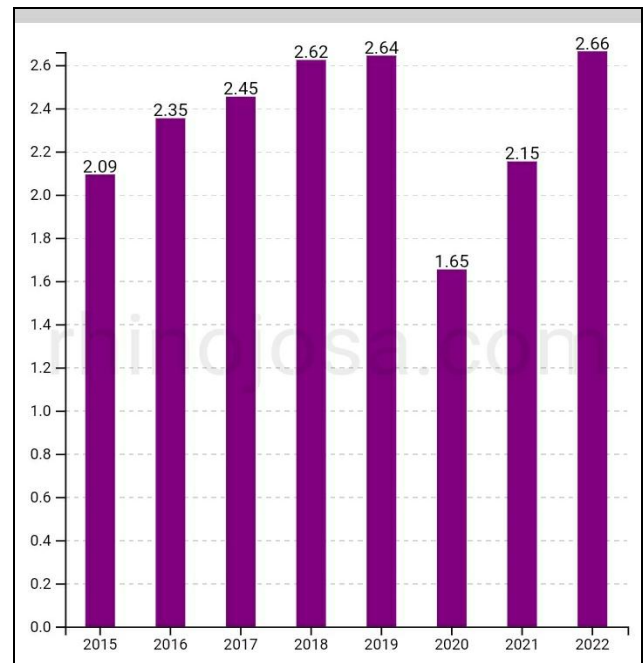
3. LETERATURE SURVEY

In the overview of literature, the paper related to the study of the actual bike stand project.

The new system "AUTOMATIC SIDE-STAND RETRIEVE SYSTEM" is to be Designed based on the working principle of bikes. Since all bikes transmit power from Engine to rear wheel by means of chain drive. Since the design setup is to be kept in Between chain drive, then setup (Sprocket) rotates and side stand get retrieves Automatically. This system can be implemented in all types of bikes by changing small variation in size and cost of this system also very low and so it will not affect the economic level also while compare to other system (K. DEVENDRA NATH) 2012.

Based on the working principle of two-wheeler (i.e the power is generated in the engine and it transmits power to the pin-ion 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 types of two-wheelers, based on this "automatic side stand retrieve

system" works. The whole construction of this system is simple and efficient. The arrangement and position of components makes the system to function. Each and every component has its own property and responsibility. The power obtained from the chain drive is transmitted to the appropriate component without power loss. The systematic design of system is made in order to consume only very low amount of power initially for few seconds to retrieve the stand. Then the power consumption doesn't occur after retrieving the stand (Ranjeet Pokharel) 2014.

Now a day's sensor is used for ensure that the stand is in Released condition. The motorcycle side stand consists of a Metallic rod and helical spring which is offset from the center. Some side stand retracts automatically when the motorcycle is Lifted up the support some other are fit with electrical interlocks, Warning devices or special retracting mechanism. In this paper There is possibility to reduce the evident which is takes place by the Side stand Automatic stand is presently in use and quite successful. Although it has certain disadvantages. Automatic stand is presently in use and quite successful. (Vishal Srivastava), 2014.

This automation is related to the limit switch. The system uses the two-limit switch which is placed two places of stand. When the limit switch is actuated, the stand will automatically place. If another limit switch is actuated the side stand will automatically returns to the initial position.

When limit switch is actuated, the signal is passed to the micro controller from the limit switch. The micro controller saves the data and actuates the relay. This relay is used to actuate the motor. Thus, by the stand is placed. If another limit switch is operated this sends the signal to the micro controller. So, this actuates the relay thus the motor is operated and the stand is return to the initial position. In this project, a novel method of automatic bike stand is been designed and developed for motorcycle bike drivers. As everyone in today's world is riding bike it is essential to take care of unwanted troubles. Each and every bike should have automatic bike stand. (Shubham Bagul1), 2017.

To avoid this problem, we do the project practically for "Automatic Side Stand Lifting Mechanism System". This project is based on simple mechanism. This mechanism operated by the total manually means on the feet power of rider. So, it is not required any external power and it is more economical also easily installable in bike. In our India 20-22% accident happened due side stand which is not removed by the rider after starting a bike. For preventing that problem, we installed this mechanism. It does not disturb the Performance of the vehicle. And it is different than other Mechanism. Other system requires battery power or chain Power but it is not requiring any external power. Moreover, it Should be economical for every class of society. It is new Product it will promote employment and vast field

development for new engineer in day period. (Aniket Gulhane) 2017.

So, we have Made the project of "Automatic Side-Stand Lifter for Two-Wheeler" is to be designed based on the working principle of Bikes. This mechanism is operated manually means on the Feet power of rider. After starting the bike immediately When the rider puts the first gear, the side stand lifts Automatically. The objective of this project is to provide the rigid and safety mechanism without changing in any standard design of bike. It does not disturb the performance of the vehicle. And it is different than other mechanism. Other system requires battery power or chain power but it is not required any external power. (Associate Professor – R. Selvendran) 2019.

We Designed based on the working principle of bikes. Since all bikes transmit power from engine to rear wheel by means of chain drive.

4.OBJECTIVES

The project of automatic bike stand is carried to achieve some of the objectives like:

➢ To develop actual implementation setup of automatic bike stand.

➢ To avoid accidents in daily life.

➢ It decreases human efforts.

5.PROBLEM STATEMENT

➢ Accident occurs due to stand at down position.

➢ Load test carried out on stand.

6.DESIGN OF STAND

The starter consists of a microcontroller circuit used to monitor the starter and then operate the stand sliding mechanism. The stand consists of a motorized system used to operate the stand. The circuit monitors the starter, on starting the bike the side stand is operated by the motor using a shaft to slide from a vertical position to a horizontal position. On turning off the key in other direction to lock bike the system moves the motorized stand shaft in opposite direction so as to move the stand in a direction perpendicular to the bottom frame rod which rests the motor bike on side stand. Thus, we have a fully automated side stand system for motor bikes.
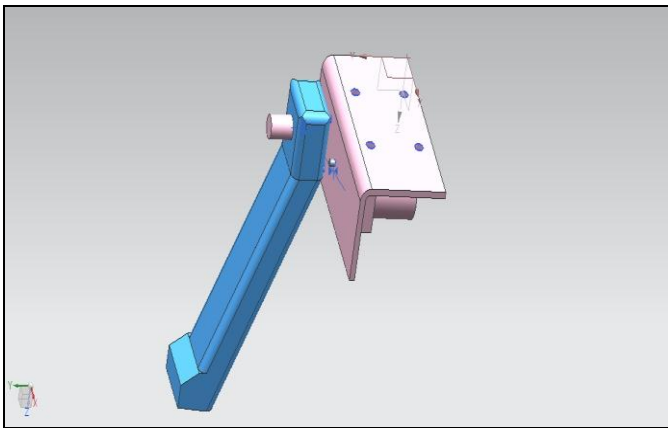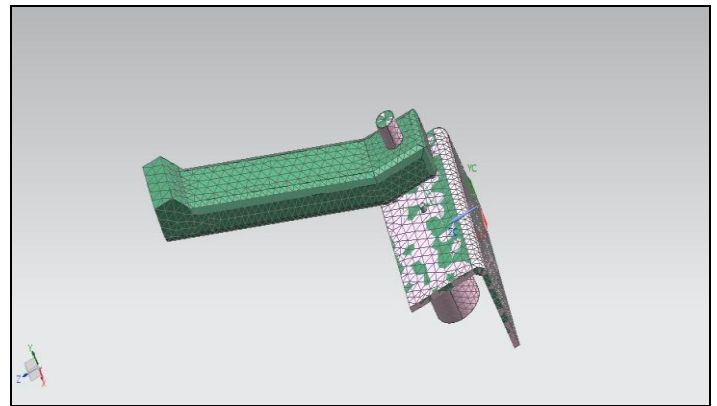
Fig. 6.1: CAD Design of Stand

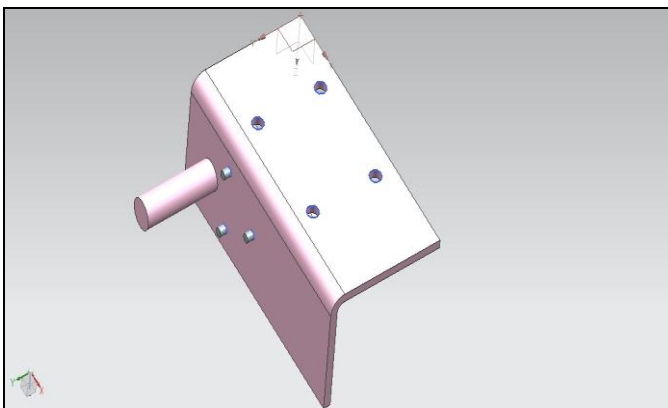Fig.6.3: Force Analysis of stand at down positions
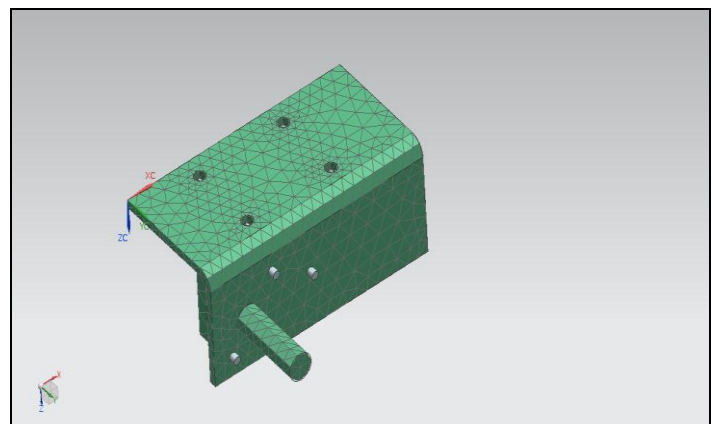

Fig. 6.2: CAD Design of Stand

Fig.6.4: Force Analysis stand supportive plate

6.1 Stress / Force Analysis:

- Load of bike – 125 kg

- Load on side stand – 50 kg

- Force develops – 460.8 N

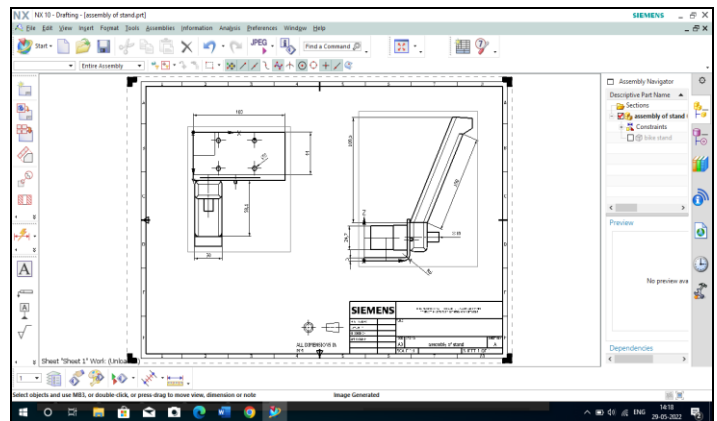- Name of bike – H F Deluxe

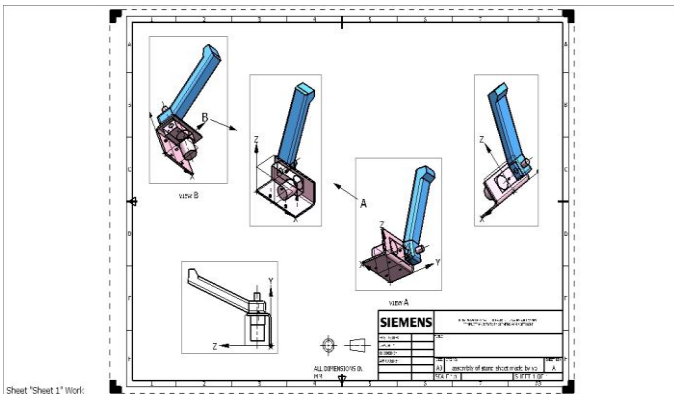- Material used – iron cast 25

- Result

Fig.6.5: Drafting Views

Fig.6.7: Assembly view of Stand

7.FABRICATION WORK

Now that we have everything we need, we must undertake a number of manufacturing procedures in order to assemble the stand. The following are the various sorts of operations:
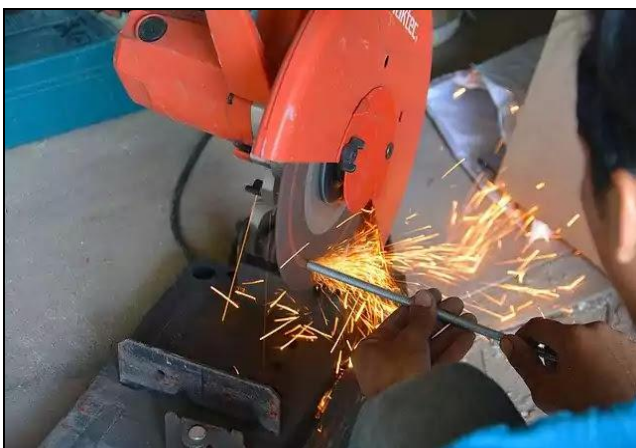

Fig. 7.1 Cutting and Grinding

Fig. 7.2 Bending and Punching

Fig. 7.3 Drilling

Fig. 7.4 Gas Welding

8.ASSEMBLY/WORKING

8.1Following electronic components we used in project-

Servo Motor, Motor Gearbox, Arduino ATMEGA328p, Two-Wheeler Battery, Ignition key.

8.2 Assembly Procedure.

➢ First, she took the angle plate and attached it to the bottom of the chassis pipe of the bike.

➢ Taking the second rubber packing, they stuck the packing to the chassis pipe.

➢ He took the Clamp and applied the rubber packing to the chassis pipe of bike.

➢ Now take the bolt and put the washer in it and take the bolt and put it in the angle and clam holes. Tighten the bolts with nuts & stand assembly done.

➢ The rest of the microcontroller circuit we didn't

Have space in the bike so we fitted it to the bike bumper.

Some assembly photos are as below-
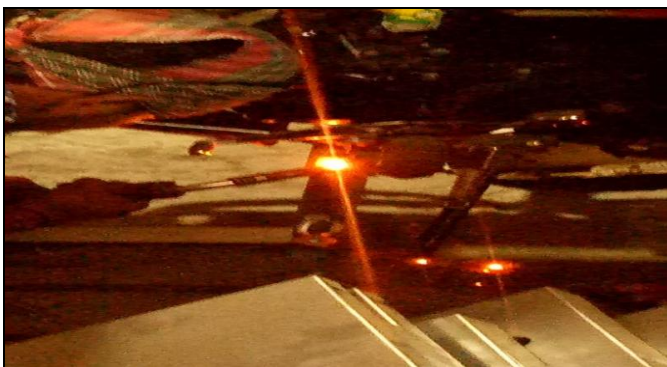

Fig. 8.2.1 Assembly in Process

Fig. 8.2.2 Stand Welding

8.3 Working

Starting from the ignition switch Then give the supply you've received to the people who need it. indicator We then give it to the microcontroller box with the indication. with the assistance of a supply circuit controller After the supply goes into the micro controller, the supply goes to the detector sensor. After the detector sensor detects the activity of the bike, the next control unit will be activated. After this process, the indicator will indicate that the microcontroller is fully activated It will then be distributed to the sensors set aside by the supply manifold the sensors mounted on the side of the bike will then detect the position of the bike's handle. All the activities of the handle will go to this micro controller then the motor running circuit will be turned on and from there the supply motors will go to the gear box and the motor will run. After the motor runs, the stand will take a moment and move to a position above or below the stand.

Fig. 8.3.1 Working Test

9.CONCLUSION

It by an observation that the side stand retrieve by mechatronic based circuit is better than mechanical method of stand retrieving It can reduce risk of accidents caused by un removal of side stand definitely this system could be used in all type two wheelers this project could be a revolution in automobile industry because it provides a solution for the problem we are facing in our daily life Running a bike with side stand in its uplift may creates problems, but with the help of our project solve this problem.

10.ACKNOWLEDGEMENT

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