

# Automatic Side stand retrieval System

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**Abstract**—In today's date accident causing in road is a common thing which is happening in most of the roads of our country. As most people can able to afford two wheeler vehicles so roads are full of vehicles. Maximum number of accidents is causing due to negligence or carelessness of driver. This project relates to a device for turning a side stand of a motorcycle from a service position to a retreated position. If a motorcycle is started, with its side stand remaining upright, the side stand tends to impinge on the road surface, particularly when the motorcycle is turned to the side of side stand, thus leading to the overturning of the motorcycle. To solve the problem described, an attempt has been made, in which the side stand of vehicle is automatically retracted using a simple sprocket.

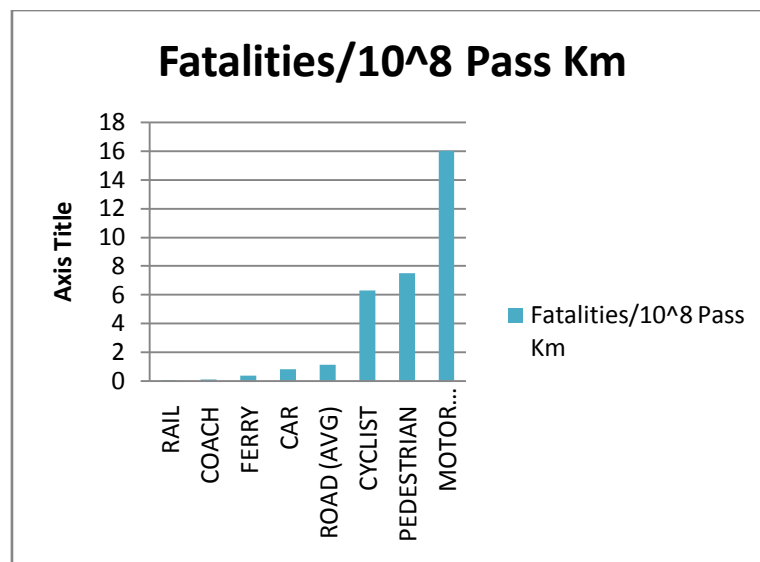
**IndexTerms**—Side stand, Sprocket, Retrieval, Automatic.

## I.INTRODUCTION

Now a day's there are thousands of two wheelers running on the road. On the same hand percentage of accidents also increasing, therefore every automobile manufacturing company trying to find causes of accidents and eliminate these causes, however there is one problem, which is unsolved up to the present day. The problem is accident causing as the driver unable to lift side stand. During driving many a times in a hurry, the driver forgets to lift the side stand which causes severe accidents. It is very necessary to have some arrangements in two wheelers to prevent these types of accidents. Some companies are trying to solve this problem, but they got success in certain extend. Therefore it is necessary to have a separate attachments, which can be attached to the vehicle for automatically lifting the stand and this can be possible with the help of sprocket side stand retrieval system. This is very cheap in the cost to apply on vehicle. It is easily acceptable in market because of its standard maintaining attractive in appearance and is smooth in work.

TYPE OF VEHICLE	Fatalities/10 <sup>8</sup> Pass Km
RAIL	0.04
COACH	0.08
FERRY	0.33
CAR	0.8
ROAD (AVG)	1.1
CYCLIST	6.3
PEDESTRIAN	7.5
MOTOR CYCLE/MOPED	16

(Table: 1.1 Types of accident by different sources)



(Fig 1.1 Average fatality risk of motorcycle riders)

## II. Literature Review

1. SaiKarthik M M, Mohamed Sameed, SushruthKashyapRakshith R YashwanthAthreya S, Karthik SMprepared a mechanism such that when the gear is actuated, the side stand gets automatically retracted or a small stepper motor is connected between the side stand and the engine. When the engine is started the stepper motor gains power and it retrieves the side stand automatically.
2. An automatic side stand lifting mechanism has been developed by PravinBarapatre, PushpakManmode, PrashantKhadatkaPratik Das, DhawalBante, SaurabhDangore, SanketBure. Main mechanism is spring mechanism by which stand is lift up automatically without any manual effort. Second one is locking mechanism which is used for locking and de-locking of the stand. Last one is lever mechanism which can operate the spring. As we press the gear lever wire which is attached to the hook catchlock get stretched pull the lock by which lock gets de-locked. With this hook it escapes from lock and stand get lifted automatically by spring action.
3. Naveen Kumar and Sukumar Reddy developed a new mechanism which is simple and efficient. They have used a trigger mechanism in which the clutch actuates the trigger. The trigger device consists of Base plate, Slider, Guider, Trigger, Sear, and Supporting Load. All these components are well arranged in a frame. The frame is welded up of iron and forms a system with these components. The clutch is the input and side stand is the output. As soon as clutch is pressed the mechanism gets activated and side stand is retrieved automatically.
4. Vishal Srivastava, Tejasvi Gupta, Sourabh Kumar, Vinay Kumar, JavedRafiq, Satish Kumar Dwivedi, has Worked on Automatic Side Standmechanism 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. They used components like D.C motor, Micro-controller, Relay and speed sensor.
5. Sanjeev N K, developed a Two wheeler Side Stand Unfolded Side Lock Link mechanism In this system the side stand lock link makes the contact with the gear lever there by indicating the person handling the vehicle about the unreleased side stand, when the rider tries to apply the gear in unreleased state of stand and prevent him from being endanger or to have unsafe ride of motorcycle. The two wheeler side stand unfolded side lock link for vehicle is one of the lifesaving mechanism which prevents the rider from riding the vehicle in unreleased position of the ride stand.

## III. Existing Methods

### 3.1 ECU Method

The modern ECU contains a 32 bit and 40 MHz processor. It will be fast as pc's microprocessor. The ECU decides timing and functioning of engine and its parts. This play its role in dashboard, this indicates the gear shifting, side stand, in digital display. People may sometimes ignore to listen those indicators and safety rules.

### 3.2 Gear lever actuator mechanism

One small flat rod is kept attached and pivoted between the gear actuator lever and the side stand of the vehicle When the gear is actuated the side stand gets lifted automatically.

### 3.3 Trigger Mechanism

In a trigger mechanism the trigger is actuated by clutch. The trigger device consists of Base plate, Slider, Guider, Trigger, Sear, and Supporting Load. All these components are well arranged in a frame. The frame is welded up of iron and forms a system with these components. The clutch is the input and side stand is the output.

### 3.4 Using stepper motor

Small stepper motor is connected between the side stand and the engine, when engine is started the stepper motor gains the source of power and retrieve side stand automatically.

### 3.5 Limitation of existing method

ECU methods are implemented only in costlier two wheelers but it does not implemented in normal domestic two wheelers due to their cost. Sometimes in a hurry we do not see the digital indicator showing side stand is lifted or not. When we come across those mechanical projects we could note some drawbacks like wear out of gears, making injuries in legs while actuating gears. Stepper motor drains huge amount of battery power. Major drawback is it cannot use in all type of two-wheelers

## IV. Proposed Method

The mechanism should be such that it should neither affect the original mechanism nor create problems. In addition it should not increase the price of the vehicle. It is just a small mechanism, which operate the stand and operation should so easy. Therefore, it is necessary to have a separate attachment in a two-wheeler to lift up the side stand automatically. 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-wheelers, based on this "sprocket-side stand retrieve system" is designed because this system works by getting power from chain drive. This sprocket system consists of four components, which is assembled as two set up which would be explained briefly in construction and working part of this paper.

## V. Construction

The mechanism consumes a very little energy during starting of the vehicle from the chain drive the assembly of modified side stand of vehicle mainly consists of following components.

- Axle
- Sprocket
- Pushing lever
- Lifting lever

### 5.1 Axle

Axle is the metallic rod made up of mild steel. It connects the lifting lever and sprocket centrally. The axle is welded centrally to the sprocket. The axle is hold by a holder. The holder is welded with the frame. The holder is used to prevent vibration and to provide support to the axle. The diameter of tube is slightly greater than the axle diameter about 2 to 4mm. This is for allowing the axle to rotate freely without friction with the tube. The other end of the metal plate is welded at the frame. The whole metallic members of holder are of mild steel. The one end of axle is welded with sprocket and other end with lifting lever and thus the power is transmitted from sprocket to lifting lever.



Fig 5.1 Axle

### 5.2 Sprocket

A sprocket or sprocket-wheel is a profiled wheel with teeth, cogs, or even sprockets that mesh with a chain, track or other perforated or indented material. It is a part of the drive train that propels the vehicle in forward direction. Hence the sprocket is considered as heart of this system

Sprocket is the major component of this system because it is power transmitting device. It gets power from the chain drive and makes this system to work. It is the device which transmits the linear motion of meshing chain drive into rotary motion by means of the tooth found on it. The sprocket with ball bearings is said to be FREE WHEEL. This action of sprocket allows attached lifting lever to adjust freely automatically or manually when it does not engages with pushing lever properly.



**Fig 5.2 Sprocket**

### 5.3 Lifting Lever

Lifting lever is the third major component of the system. The lifting lever is the rectangular rod made of ms-rod, which consists of two lifting leaves which is mounted with the edge of axle. The lifting leaves should be parallel to the sprocket pinion. The lifting lever is composed of two metal rods, where both are welded at either sides of the axle. The free ends of the lifting leaves are tapered well. The ends are machined well for tapered shape for smooth engaging with pushing lever.

This smooth engagement leads proper retrieving of side-stand. This tapered surface makes the lifting lever as capable to withstand engine impact. When stand is moved vertical in position, the pushing lever engages with lifting leaves.



**Fig 5.3 Lifting Lever**

### 5.4 Pushing Lever

Pushing lever is the component pivoted centrally to the side stand. The pushing lever is metallic rectangular plate, whose bottom end is bended in shape of C and top end is welded with a small piece of rectangular rod. This small piece of rod is used for getting lifted by the lifting lever. Since this rod engages (or) lays over tapered edge of lifting lever, thus the retrieving occur smoothly.

The pushing lever is made up of mild steel flat rod with the length according to the distance of side stand arrangement. Its top end is made tapered so as to engage with lifting lever. The bottom end of the lever is made as C-clamp, which holds the side stand.

## VI. Working

The mechanism consists of inciter assembly and retriever assembly. Inciter assembly consists of axle and sprocket and retriever assembly consists of pushing lever and lifting lever. When the vehicle is in resting condition i.e. when rider actuates the side stand of the vehicle to the ground, the pushing lever which is pivoted at the centre of the side stand gets engaged with the inciter assembly's lifting lever. In this condition, the inciter assembly is at rest and retriever assembly gets engaged with tapered end of lifting lever. Pushing lever's length can be changed according to type of two wheelers and distance calculated between the side stand and chain drive. Closed coil helical spring gets in tension and the coil of spring gets tensed while the stand is resting on ground. This is the condition of system during resting stage. When the vehicle is started, the engine's pinion transmits power to the rear wheel via the chain drive. The inciter assembly which is kept at the centre of the chain drive rotates as the sprocket gets engaged with chain drive. So when the sprocket rotates, the lifting lever mounted with the axle also rotates. Hence the lifting lever gets engaged with the pushing lever and therefore the pushing lever pushes the side stand and the spring tensed in the side stand.



gets compressed quickly. As a result, the side stand gets retrieved and the sprocket is disengaged from the chain with the help of sprocket disengaging lever.



**Fig 6.1 Working Model**

## VII. Conclusion

As one can see from reading, the primary goal of this project is to use an effective mechanism for stand retrieval in order to prevent accidents. Right from the start of our project we have developed this idea in different stages; finally we designed the mechanism, which is simplified, easy and cost effective.

We conclude that our research is in development stage; further improvement can be achieved using advanced machining processes and can be implemented successfully in our two-wheeler motorcycles.

## References

- [1] "Side Stand Retrieval System for Two Wheeler Motorcycles" International Journal of Engineering Research in Mechanical and Civil Engineering (IJERMCE) Vol 1, Issue 4, August 2016.
- [2] "AUTOMATIC SIDE STAND LIFTING MECHANISM" International Journal of Science, Engineering and Technology Research (IJSETR) Volume 5, Issue 4, April 2016.
- [3] "Side Stand Retrieval System Using Trigger Mechanism" International Journal of Emerging Technologies in Engineering Research (IJETER) Volume 4, Issue 4, April (2016).
- [4] "Automatic Side Stand", International Journal of Engineering and Advanced Technology (IJEAT), ISSN: 2249-8958, Volume- 3, Issue-4, April 2014.
- [5] Sanjeev N K, "Two-wheeler Side Stand Unfolded Ride Lock Link", International Journal of Engineering Science and Research", ISSN: 2277-9655, Volume- 2, Issue-9, September-2013.