



LOAD CELL OPERATED SIDE STAND RETRIEVAL SYSTEM

Ayush Pandey	Scholar BVDUCOE, Pune
Devagya Shanker	Scholar BVDUCOE, Pune
Karan Dhingra	Scholar BVDUCOE, Pune
Shubham Yadav	Scholar BVDUCOE, Pune
Prof. Sandip Kanase	Assistant Professor BVDUCOE, Pune-28

ABSTRACT In this paper we explain a technique to repossess the side stand, while the vehicle starts based when the force act on the seat. In the existing system, the retrieve system is only based on the movement of the front wheel or back wheel. The implementation of electronic sensors helps to reduce the complexity of system made existing system. The proposed system working based, that the load cell placed in the down state of the seat and interlinked with the controller and driving motors. The load cell sensed the maximum force above 20kg. It gives a signal to the controller and starts to drive the system based on the program dumped in the controller. The rotation of the motor depends upon the height of the stand. The prototype model is gives the clear out look of this project and proceeding the process to the next level for the future role.

KEYWORDS :Retrieval system, Load cell, Side stand, Motor.

1.INTRODUCTION:

1.1. Automation: Automation is controlling of an apparatus, process, or system automatically, by mechanical or electronic devices that take the place of human labour. Automation has been achieved by various means including mechanical, hydraulic, pneumatic, electrical, electronic devices and computers, usually in combination.

1.2. Retrieval System: It is the process of getting something back from somewhere using various mechanical or electronic components.

1.3. Strain Gauge Load Cell: The strain gauge measures the deformation (strain) as a change in electrical resistance, which is a measure of the strain and hence the applied forces.

1.4. Side Stand: It is a single mechanical leg that simply flips out to one side, usually the left side, and the bike then leans against it.

1.5. Motor: A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy.

2.LITERATURE REVIEW:

Vishal Srivastava et al, 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 Prajapati et al, 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]

Bharaneedharan Muralidharan et al, has worked on automatic side stand retrieve system. This system is based on working principle of two wheeler(i.e the power is generated in the engine's and it transmits power to the pinion and make it to rotate the pinion transmits power to the rear wheel pinion and makes the vehicle to move. The objectives of this system is to provide a device responsive to an operating condition of the engine's of the motorcycle for moving the stand to its raised position when motorcycle is in its running position.[3]

3.EXPERIMENTATION:

3.1. SIDE STAND:

Torque Analysis-

Torque (T) : $F \cdot R = 2.105 \cdot 0.11 = 0.2315 \text{ N-m}$.

Torque due to stand weight Stand: 456gm.

Weight of stand: $400 + 56 \text{ gm} = 0.456 \text{ kg}$

Force due to stand weight : $0.456 \cdot 9.81 \cdot \sin 500 = 3.4267 \text{ N}$

Torque due to stand weight : $F \cdot R = 3.4267 \cdot 0.11 = 0.377 \text{ N-m}$

Total torque (Ta) : $0.2315 + 0.3769 = 0.6087 \text{ N-m}$



Figure 3.1: Side Stand

3.2. LOAD CELL:

1. Capacity: 10/20/40/60/80kg
2. Size: 130*30*22mm
3. Single point & 4 holes
4. Aluminium material
5. Colourless anodized
6. Glue seale
7. Size: 130*30*22mm
8. Hole: 4
9. Connecting Wire: 0.45m
10. Material: Aluminium Alloy
11. Output: Digital Sensor
12. Theory: Resistance Sensor



Figure 3.2: Load Cell

3.3. MOTOR:

1. Modulation: Digital
2. Torque: 4.8V: 130.54 oz-in (9.40 kg-cm) 6.0V: 152.76 oz-in (11.00 kg-cm)
3. Speed: 4.8V: 0.20 sec/60°
6.0V: 0.16 sec/60°
4. Weight: 1.94 oz (55.0 g)
5. Dimensions: Length: 1.60 in (40.7 mm), Width: 0.78 in (19.7 mm), Height: 1.69 in (42.9 mm)
6. Pulse Cycle: 1ms
7. Connector Type: JR



Figure 3.3: Motor

3.4. BATTERY:

1. Battery specifications:- 1.3 AMP/12V
2. Maintenance-Free Sealed Lead-Acid Battery
3. Size: 95mmx42mmx50mm



Figure 3.4: Battery

3.5. COSTING:

1. Side stand:- Rs.100/-
2. Battery:- Rs.600/-
3. Fabrication cost:- Rs.1500/-
4. Electric motor:- Rs.300/-
5. Electric components and hardware cost:- Rs.1500/-
6. Total:-Rs.4000/-

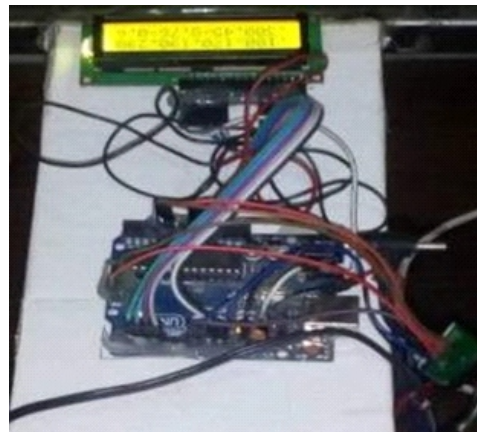


Figure 3.5: Electric Circuit with Digital Display Showing Load

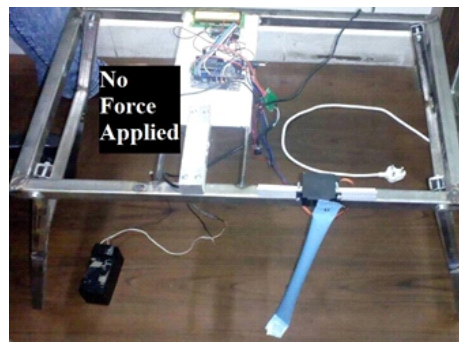


Figure 3.6: Stand Engaged

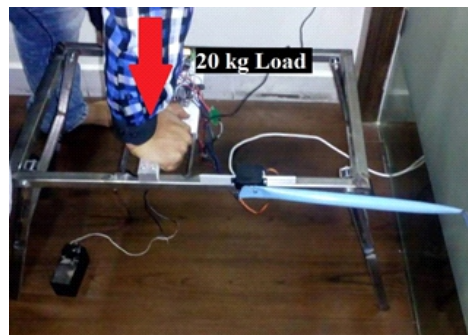


Figure 3.7 Stand Disengaged

4.ADVANTAGES:

1. It is easily hassle free.
2. It is rigid and versatile.
3. It is low cost application.
4. Less maintenance.
5. It is light in weight.

5. APPLICATIONS:

1. It can be used in all type of bikes and motorcycle which have gears, this same gear can be used to operate lift the side stand.
2. Many people while driving the vehicles forget to lift up stand and hence accident takes place with the help of these application road accident can be avoided.

6.CONCLUSION:

Load cell operated side stand retrieval system takes automation to a new level. It is compact, efficient, and completely automatic. It can be used in any type of two wheelers for retrieving the side stand. It is both economical and advanced, and also an important safety feature which would not only help the consumer, but the society as well.

7.REFERENCES:

1. R GIRIMURUGAN et al "Design And Fabrication Of Automatic Side-Stand Retrieval System", Indian Journal Of Creative Research Thoughts", Volume 3, Issue 7, July 2015.
2. PRAVIN BARAPATRE et al" Automatic Side Stand Lifting Mechanism", International Journal Of Science, engineering And Technology Research, Volume 5, Issue 4, April 2016.
3. "Introduction to mechatronics and measurement systems" by David Alciatore.
4. "Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering 4/ED" by W. Bolten.
5. "Production Technology" by HMT.
6. "Machine Tool Design" by N.K. Mehta.
7. <https://instrumentationtools.com/load-cell-working-principle/>
8. <https://prezi.com/b4ingSee7gag/automatic-side-stand-retrieval-system/>