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DESIGN AND DEVELOPMENT OF DIGITAL FUEL LEVEL INDICATOR FOR 2 WHEELER SPLENDER VEHICLE

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ABSTRACT:
Automobile is one of the largest growing sectors in India. The number of vehicles is increasing on Indian roads every day. Around 2025 India will be third largest manufacturer of automobile in the world. There are around 190 million two wheelers running on Indian road and consuming the huge amount of petrol every day. The two wheelers are available with the lock system for petrol knob. The problems with the mechanical knobs are leakage and theft of petrol. While sometimes the petrol vending pumps are not properly calibrated which leads to loss of money to the customer. Authors have developed the fuel indicator for two wheelers using Arduino. The fuel indicator system will be capable of sensing the amount of fuel poured in tank and how much is consumed using the flow sensors and level indicator.

KEYWORDS: Flow sensor, Arduino, Two Wheeler, LCD Display, Level Indicator, etc.

INTRODUCTION:

The present fuel indicator systems in two wheelers are mainly based on analog strip or the capacitive sensors. The Arduino being open hardware is very popular for various applications. The fuel like petrol is very important factor for developing economies like India.

The cost of petrol is varying almost every day as major sources are out of India. The frauds happening at petrol pumps are registered several times. There are several complaints registered against the petrol pump owners for such cases. On the other hand, the theft of the petrol from the tank of the bike often happens and not registered as a serious crime as its market values is small.

The analog displays are showing the level of fuel in tank but the owner of bike will never get exact idea about how much fuel is available in tank. The digital system will be effective to display amount of fuel present in tank with use of sensors for precision in readings. Following figure shows the block diagram for fuel level display.

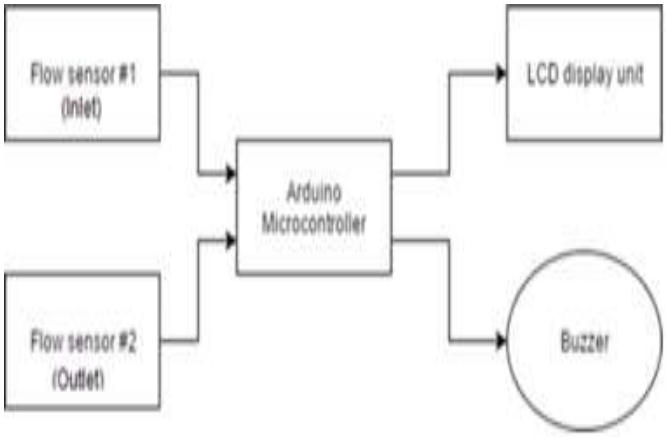

Fig.1: Block diagram

The flow sensors for inlet and outlet identify the fuel coming in and going out of tank. The LCD display connected to the Arduino display the amount of fuel available in tank. The buzzer is used to alarm if the level of fuel goes below specified limit or if someone is stealing the fuel from tank. The display for indicator is shown in figure below.

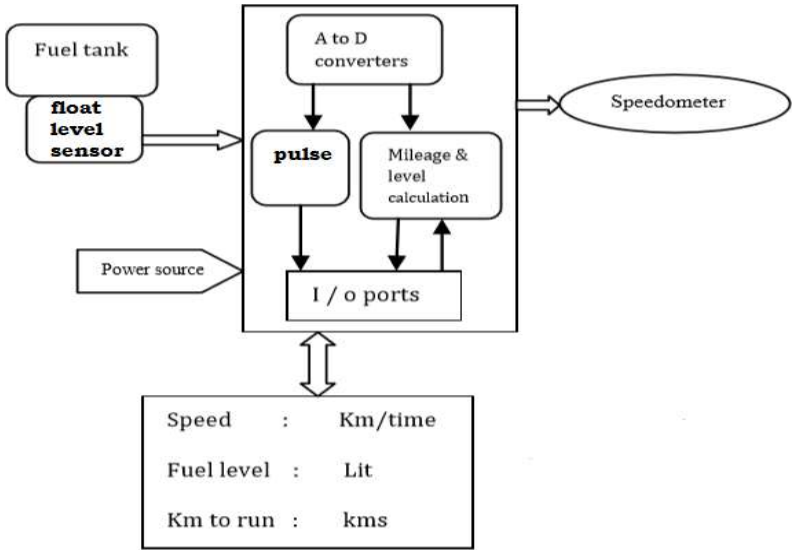

Fig.2: Digital Fuel Indicator Display

MOTIVATION OF WORK:

The numbers of vehicles registered in India are increasing every year since last decade. The theft of petrol and cheating at the petrol pumps in measuring the petrol with proper precision has registered several times in India. To overcome this problem authors have decided to develop the low cost system so that anyone can replace the existing system of two wheelers.

OBJECTIVES OF WORK:

Objectives of the work carried out are as below:

- Design the fuel detection system for two wheelers.
- Develop the system to avoid the theft of petrol using Arduino based system.
- Design the system in software environment.

SYSTEM REQUIREMENT:

Table.1: Specifications of main components

Sr. No.	Component Details	Photo of Purchased Component
1	**Float level sensor:** 10W, 0.5 A, 5V	
2	**Arduino Uno Atmega 328P:** Output 5Volts, Input 7 to 20Volts, 14Pins, Flash Memory 32KB	
3	**16×2 LCD Display:** 5x8 dots , 5 Volts	
4	**Flow Sensor:** 4.5Volts,15mAmp	

SYSTEM DESIGN:

The system is designed in ANSYS software to realize the modifications in tank of the bike as below:

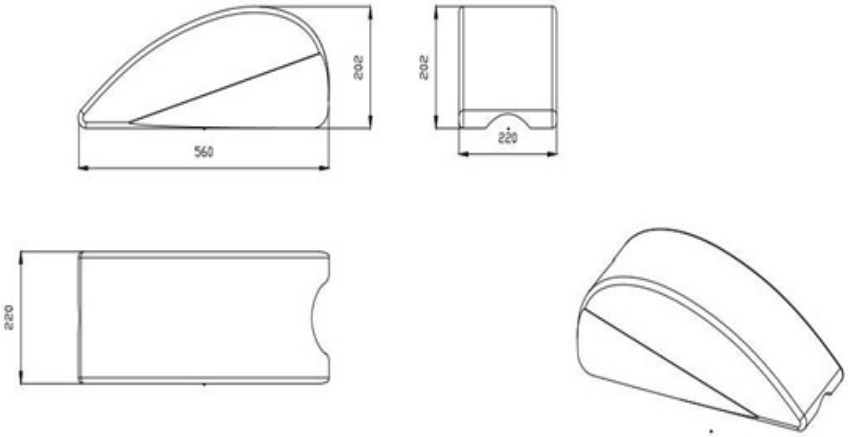

Fig.3: Various views of the fuel tank of two wheeler

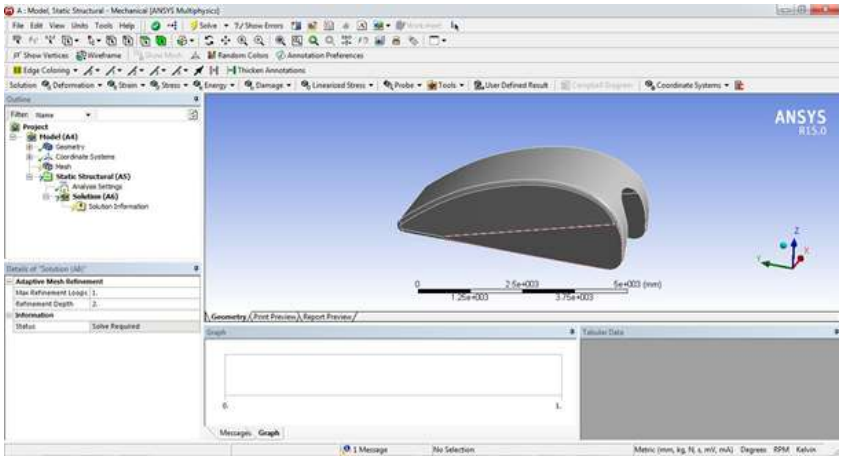

Fig.4: 3D view-1 of the fuel tank of two wheeler developed in ANSYS

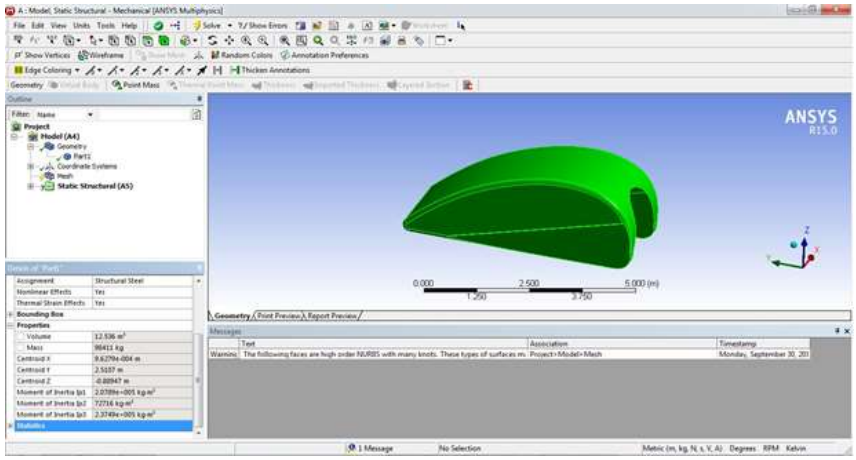

Fig.5: 3D view-2 of the fuel tank of two-wheeler developed in ANSYS

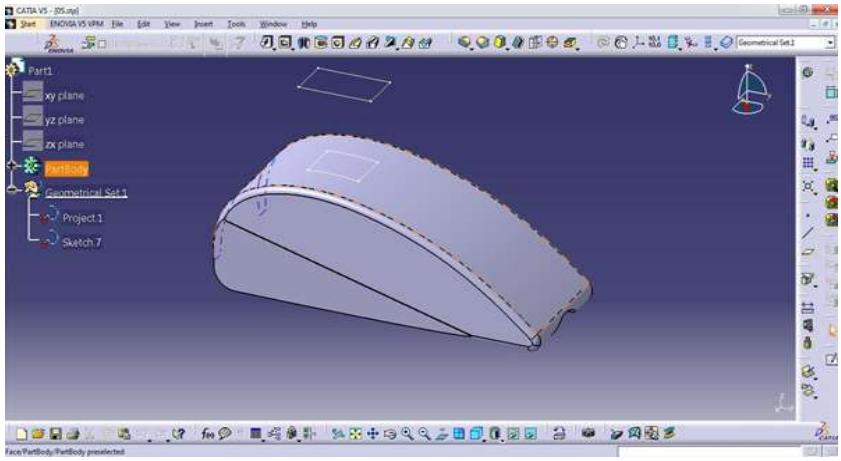

Fig.6: 3D view-3 of the fuel tank of two-wheeler developed in ANSYS

The amount of fuel added to the tank is calculated as-

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

$$\text{Volume} = \frac{\text{Mass}}{\text{Density}}$$

$$L = \frac{W-T}{0.7372199} \text{ (Lit.)}$$

CONCLUSION:

As the number of vehicles increases, petrol theft becomes very serious problem. Total 65% of total petrol is consumed by two wheelers in India. The theft of petrol is often observed in many parking's. Some of the cases are also registered against the owners of petrol pumps for improper calibration of the petrol injecting pumps. The Arduino application for detection of the petrol in fuel tank of two wheelers will be useful to avoid the theft detection of fuel. The system is cost effective and useful for all the two wheelers in India. As the system is Arduino based the supply of the petrol to the engine can be stopped in case of theft of the vehicle.

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