

## **PLANNING OF SMART ROAD AT VISHRANTWADI CHOWK, PUNE**

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**Abstract:** This project provides knowledge of techniques and methods used for smart road development. Such as, cleaning and maintenance of road surface (by using revolving scarifying brush attached with speed breaker), low cost innovative technology for smart roads, to maintain traffic and increase people safety (by using PIR motion sensors and light sensors) by using such methods loss of energy can be prevented. The aspect of intelligent transportation systems (ITS), which apply electronics, computers and control technology developed for aviation, the space program and defense to the improvement of highways, vehicles and public transportation.

**The advantages are renewability, safer driving conditions, traffic control, people's safety, energy saving.**

**Keywords:** *Smart road, sensors, Intelligent Transport System (ITS).*

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### **I INTRODUCTION**

The smart road and development (R&D) research is to develop safer and more convenient highways by means converging the highly advance road technologies. Smart highway project is composed with the road technology part. The ministry of road transport and highway spent the amount of Rs 600 cr. for road safety and cleaning purpose. During the year 2015-2016 and 2016-2017, but this process is slow to reduce the problem and temperature variation is also effect the road pavement which reason of vehicle maintenance and failure of the vehicle part.

Vehicle and highway automation is believed to reduce the risk of accident, improve safety, increase capacity, reduce fuel consumption and enhance overall comfort and performance for drivers. Some kind of automation that would help to safety increase flow has been considered as one potential solution to congested highway a smoother cruise with automated system can reduce fuel consumption and engine wear.

To avoid this problem spraying water is best solution on it. The water can be sprayed on water manually or by using different machines. Different machines are lifted in vehicles and spraying of water is done. Nowadays traffic has become a major problem for the

people in India. Due to which it causes wastages of precious time fuel and electricity. The internet of things is the network of electrical appliance's vehicles, physical devices and other items embedded with electronics, sensor, software, and connectivity which enables all these object to connect and exchange data.

### **2. MATERIALS DESCRIPTION PROPERTIES:**

#### **2.1. Revolving scarifying brush**

The machine comes with a range of accessories including vacuum and drying equipment. Vacuum cleaner use an air pump to create a partial vacuum to suck up dust and dirt, usually from the road surface vacuum cleaners remove debris and soil/ water from a surface by suction. The average cost of revolving scarifying brush is 17374.

#### **2.2. Solar Panels**

A solar panels laying above the footpath surface it is not at the optimum tilt angle its going to produce less power and it's going to be more prone to shading which is a problem as shade over just 5 % of the surface of a panel can reduce power generation by 50 %

Example – TOUROUVE AL PERCHE FRANCE- This has maximum power output of 420 KW, covers 2800sq.M and cost 37,75,90,000 RS/-

### 2.3. Traffic Sensors/ Signal Sensors Components required for intelligent zebra crossing system

1. PIR motion sensor
2. 7 segment display
3. RGB diffused common cathode
4. 5 MM LED – red, green
5. Jumper wires
6. Buzzer
7. Perforated PCB board
8. AR INO UNO RE V3

### 2.4. Steel bridge material

Steel is an ideal material for bridge it is an essential part of modern bridges because it is strong, can flex without fracturing and has a long life, the pedestrian bridges range from \$ 150 to \$ 250 per square foot, totaling a cost of approximately \$1 million to \$ 5 million per complete installation.

## 3. METHODOLOGY/ AUTOMATION:

### 3.1. Mechanical Sweeping

More mechanical sweepers are suction machines, usually assisted by one or more revolving “scarifying” brushes for dislodging adhering matter. They range in size from small or large controlled road surface sweepers to large channel sweepers, which often have an auxiliary engine to provide suction.

Work:-

In this system revolving scarifying brush is attached to speed breaker. This brush is clean the road during intervals.

This techniques clean garbage and dust from road.

### 3.2. Solar footpath surface

The solar footpath ways project is on a mission to replace concrete surfaces like standard pavement roads with panel’s fitted with photovoltaic cells to generate and store electricity. The photovalatic cells are used to converts solar energy directly into electricity using semiconductors.

Components of solar roads: - Glass surface  
LED lighting Support structure Base layer

Work:-

Sunlight falls on solar panel with generate electricity. This is same is transferred to power station.

LED’S controlled by microprocessors display information on the surface of the road.

### 3.3. Traffic signals sensors

Signal sensors are used to control the traffic by using it safe movement of road users will be done. When signal is red then sensors are activated and people cross the road from zebra crossings without disturbance, easily and safe.

Work:-

When the road signals turns red (wait 5 sec) the pedestrian side turns green (with a continuous beeping sound indicating it's safe to cross), and a countdown is initiated, which is displayed across a DUAL 7 – seg display.

After a countdown stops it wait for few seconds (5 sec) and turns the pedestrian signal to red long beep sound), and again after a very small delay (2 sec) the road signal turns to green.

This whole process is kept inside a loop where the sensor is reset after every complete execution. The small daily periods in between are included as safety feature.

### 3.4. Footpath bridge

As there is fewer parking spaces in vishrantwadi area so people park their vehicles on footpath prohibited area. It causes fluctuation in movement of pedestrians.

Work:-

A simple method will used that footpath get lift up to height 3m. So the people will pass surface of footpath way and parking of vehicles are below it.

Footpath Bridge are constructed using wooden material or steel materials and above the footpath surface solar panels are placed.

## REFERENCE:

1. Paula Hock/ Project Architect at al, “Smart Road Technologies Shaping the Future of Transportation” PreScouter (January 2019) [pg. 2-50]

2. Prof. Om Vaidya at al. “Review Paper on Self Cleaning Roads with Road Stud”. International Journal for Scientific Research & Development (Nov. 2018)Vol. 5| ISSN (online): 2321-0613
3. Shubham Upadhyay at al. “Automatic Street Cleaning and Pavement Treatment Process”. International Journal of Innovative Research in Science, Engineering and Technology (October 2017) vol. 6 ISSN: 2319-875310
4. Manish Kumar at al “the advance technology of smart road construction: using sensor”. 2017 IJCRT (4October 2017) volume 5 ISSN: 2320-2882
5. Aftab Mansoori at al “Smart Roads Using IOT Devices” International Research Journal of Engineering and Technology (June -2018) Volume: 05 Issue: 06,ISSN: 2395-0056
- 6.Elena De La Peña “Smart Roads: A vision” smart transportation alliance (January 2015) vol.1
- 7.Dr. B.P. Chandrasekhar, Director (Tech.), NRRDA, “Rural Roads Development Plan: Vision 2025”
- 8.Dr. Alexander Orlov/ Assistant Professor of Material Science and Engineering, “Developing elf cleaning and air purifying transportation infrastructure components to minimize environmental impact of transportation”, (October 2013)
- 9.Sam Enmon, “Smart Highways”,(2016), Vol.11, ISSN: 2411-3867
- 10.Street Cleansing, Chapter 11