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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).*

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.

II .LITERATURE REVIEW:

[1] Paula Hock/ Project Architect et al, “Smart Road Technologies Shaping the Future of Transportation” PreScouter (January 2019) [pg. 2-50]:- This paper discusses a wide variety of these technologies and how they will continue to be developed in the near future. The most significant driving factor for smart road technologies is increasing driver and passenger safety while also improving the user experience. Additionally, to minimize construction and maintenance

delays and prevent potential road-based vehicle damage. If roads could be utilized for energy generation along with transport, it could bring renewable energy to vast portions of the world's population. This system is an innovative application of IoT to road safety to save lives. The data collected by the installed IoT sensors is gathered in servers, where it is analyzed to provide real-time information about traffic and road conditions in IoT-equipped regions. The obtained data can be used for a number of purposes. For example, one application can be to predict and alert about possible hazards and accidents that may take place as a result of poor road and weather conditions.

[2] Prof. Om Vaidya et al. "Review Paper on Self Cleaning Roads with Road Stud". International Journal for Scientific Research & Development(Nov. 2018)Vol. 5| ISSN (online): 2321-0613[pg. 704-705]:- The accidents cause by natural calamities is not in our control. The amount of road accidents is more comparative to other ones. India is country where the death rate due to road accidents is more. In future, lots of highways will be constructing in India. In India temperature changes rapidly which causes cracks to roads leading to failure of road. These problems are solved out by following remedy. By watering the road every day and by spraying air on it, the road can be reuse within few hours. This is easy and quick method of watering of road. The cracks lead to failure of roads and friction in concrete leads to accidents. So, the problem is temperature changes observed on the road. 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 fitted in vehicles and spraying of water is done. Our solution for this kind of problem is that we provided water sprayer inside the road stud. The radium is attached to road stud so that there will not much difficulty for night drivers. In road stud the hole is made and sprinkler is fitted. This Sprinkler is fitted exactly at center of road stud. When water is supplied from the source this sprinkler will come up and sprayed the water in circular motion. And when water is stopped from the source this spraying nozzles will get back to its original position.

[3] Shubham Upadhyay et 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[pg- 19666 to 19670]:- In advance cleaning and treatment of road pavement, we set the steel pipes under the road surface which is the connected with the supply chamber. And a thin pipes also connected with the min pipe and thin pipes attached with the radium plates which is situated center of the camber. It process done when the red light sign to stop the vehicle a sensor séance the main chamber to start this process. A high intensity water

pressure release with the radium plates both sides which wash the road and nasty material and wastage flow with water pressure and makes road clean .Waste materials collected in the side of the road from where it goes into dump chamber and water flow through the drainage and collected into the filter chamber which is use after the filter process. We can use gain this water for cleaning the road and after water spray a high intensity air release which makes road dry. And in summer days water spray reduce the pavement temperature. In the side of radium plates 6 small diameter hole provided from which the pies are connected when the water pray closed the compressor release the highly pressure air. It all process done within few minutes end when the green light sighted then the process is stop. We can use this process according to area where's the city is more nasty after few times in this condition it process recycle after 8 hour and where's city is not so nasty it5 process recycle after 12 hour. According to this regulation we can reduce the dust and toxic material from rod surface and also maintain the rod temperature. According to this system we can also reduce the lots of problems of peoples.

[4] Manish Kumar et al "THE ADVANCE TECHNOLOGY OF SMART ROAD CONSTRUCTION: USING SENSIOR". 2017 IJCRT (4October 2017) volume 5 ISSN: 2320-2882 [pg- 1526 to 1529]:- This paper looks into recent developments and research trends in collision avoidance/warning systems and automation of vehicle longitudinal/lateral control tasks. It is an attempt to provide a bigger picture of the very diverse, detailed and highly multidisciplinary research in this area. Based on diversely selected research, this paper explains the initiatives for automation in different levels of transportation system with a specific emphasis on the vehicle-level automation. Human factor studies and legal issues are analyzed as well as control algorithms. Drivers' comfort and well-being, increased safety, and increased highway capacity are among the most important initiatives counted for automation. However, sometimes these are contradictory requirements. Relying on an analytical survey of the published research, we will try to provide a more clear understanding of the impact of automation/warning systems on each of the above-mentioned factors.

[5] Aftab Mansoori et al "Smart Roads Using IOT Devices" International Research Journal of Engineering and Technology (June -2018) Volume: 05 Issue: 06, ISSN: 2395-0056[pg-1526 to 1529]: - The individual traffic signals are connected with traffic control system to perform network wide traffic operation. These control systems contain a central computer, a communication network, and intersection traffic signals. Coordination of control system can be implemented through different techniques like time-base, hardwired interconnection method. Coordination between traffic signals and agencies requires the development of data sharing and traffic signal

control agreements. A traffic-signal system has only one purpose i.e. to deliver signal timings to the driver. The system provides features that improve the traffic engineer's ability to achieve this goal. These are primarily access features. They provide access to the intersection signal controller for maintenance and operations.

[6] Elena De La Peña "Smart Roads: A vision" smart transportation alliance (January 2015) vol. 1[pg-3 to 8]:- The definition of a broader, all-inclusive concept incorporating all parameters contributing to the amelioration of road infrastructures: mobility efficiency, environmental performance, advanced traffic control technology, life-cycle analysis of construction and maintenance costs and energy inputs, user-oriented designs, safety and security performance, and long-term financing solutions. At the end of the day, Smart Roads must address the people's highest expectations in relation to road transport and, in so doing, define a model for a highway of tomorrow that adapts to societal demands. The challenge lies in identifying the various positive attributes of smart roads from an infrastructural, technological and social perspective with a view to then redefining the concept of a "road" itself. This approach supports the advancement of road-based solutions for transporting people and goods which are more attractive, safer, more interesting, more reliable, more comfortable, etc., whilst also providing for a better sustainable, environmental and economic performance, both in the urban and the interurban contexts. Furthermore, this concept must not only encompass the design, construction and operation of new infrastructures, but also contribute to the improvement and adequate maintenance of existing road networks, with the objective of ensuring that all highway upgrade and modernization efforts take into account the attributes of the Smart Roads concept.

[7] Dr. B.P. Chandrasekhar, Director (Tech.), NRRDA, "Rural Roads Development Plan: Vision 2025", [pg-3]:- Government, as a part of its Poverty Reduction Strategy launched a major Rural Roads Connectivity Programme "Pradhan Mantri Gram Sadak Yojana (PMGSY)" in December 2000. During the implementation of this programme, several new initiatives taken by the Ministry of Rural Development are expected to lead to overall Sectoral Development, including development of specifications, procurement and management standards etc. Expanding on these initiatives, the Ministry decided to prepare a Vision Document for the development of Rural Roads in India on similar lines of Vision 2021 for Highways brought out by Indian Roads Congress (IRC) on behalf of the Ministry of Road Transport & Highways (MoRT&H). The IRC has accepted the responsibility of developing the Document and has constituted an Expert Group with Shri. D.P. Gupta, former DG, MoRT&H as Convener

along with Dr. L.R. Kadiyali and Shri. P.K. Lauria as Members. Roads Development Plan: Vision 2025

[8] Dr. Alexander Orlov/ Assistant Professor of Material Science and Engineering, "Developing self cleaning and air purifying transportation infrastructure components to minimize environmental impact of transportation", (October 2013), [pg.- 1-9]: - Creating transportation infrastructure, which can clean up itself and contaminated air surrounding it, can be a groundbreaking approach in addressing environmental challenges. More specifically, we have quantified the rates of removal of pollutants from the air by using self cleaning technique. The survey of the existing and future commercial projects has indicated that this technology is already leading to very exciting applications in transportation sector, where concrete, asphalt, steel, glass and masonry surfaces will become green and sustainable interfaces mitigating the environmental and health impacts of transportation.

Developing transportation infrastructure without compromising environmental quality is of paramount importance. In this work we explore a topic of self-cleaning which reduces surface contamination. The idea of using solar light and special materials is not new, but by using this object it becomes ecofriendly, and there is less consumption of energy.

[9] Sam Enmon, "Smart Highways", (2016), Vol.11, ISSN: 2411-3867, [pg-1-25]:-Managed Motorways (MM) has brought Intelligent Transport Systems from a 'nice to have' add-on facility to an integral part of a road network and is now an essential tool for a road network operator. Aim of the system is reduced congestion, more reliable journey times, reduced environmental impact from travel and improved safety – the approaches taken are markedly different. Control system, power system, Traffic Management also taken in to account. This "system" depends upon a level of infrastructure to enable it to function, including gantries, masts, equipment cabinets, ducted networks/ chambers, safety barriers, power supply networks, and control/management centers. Each approach has its merits and each could benefit from considering how and why the other has been so successful.

[10] Street Cleansing, Chapter 11, [pg-200-218]:- The sweeping of streets is such a simple and humble occupation that it rarely attracts technical interest of the managers responsible for such activities. However, many cities spend between 30 to 50 percent of their solid waste budgets on street cleansing. It is a service for which a wide variety of tools, equipment and methods, both manual and mechanical, are available, and it is one in which there is often great scope for financial saving by the introduction of more efficient methods.

This is an area in which public relations are very important. Much of the work arises directly from shortcomings in public behavior, such as throwing litter on the streets and open spaces. In some cities, however, a high proportion of street wastes arise from deficiencies in the refuse collection service as a result of which residents dispose of domestic and shop-wastes in the streets. The cost of removing wastes which have been scattered on the streets is very much higher than the cost of collecting similar wastes which have been placed in containers such as domestic wastes bins or litter containers. Also types of waste, types of waste, types of methods used for cleaning are considered.

III .FUTURE SCOPE:

The Present Study may be extended to investigate the influence of the following parameters of Smart roads:

- Reducing the vehicle maintenance by remove the dust and junk which affect the lower part the vehicle.
- Reducing the average rate of accidents by road wastage.
- To control the traffic for safe and convenient movement of vehicles.
- Energy consumption by using solar panels.

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