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Study of Smart Road with Glowing Lines

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Abstract: ***In today's globalized world, highway is the means to join countries, cities, towns etc. In recent years all the old technologies changed into new technology. All the things are changed but highways are not changed. The "Smart Highway with glowing lines" is the concept to make highway roads smarter, safer, and more energy efficient for generating energy using solar energy. In the part of Smart Highways with Glowing Lines the road glow in the dark lines is installed, called Glowing Lines. These lines collect energy during the day and give light in the evening. Here the landscape becomes an experience of light and information. As a result, this increases visibility and safety. Smart highways and smart roads are terms for a number of different proposals to incorporate technologies into roads like Smart Road with Glowing Lines, for lighting road at Night Time. This innovative concept creates an entirely new mobility experience for drivers, cyclists and pedestrians. Ideas from this testing ground are increasingly becoming part of our everyday landscape. Intelligent transportation systems usually refer to the use of information and communication technologies in the fields of road transport, including infrastructure, vehicles, users, traffic management and mobility management as well as interfaces with other modes of transport. This clearly shows that mobility can be smarter, more interactive and more sustainable without having to widen roads or lay more rail connections. It is simply a case of putting demand first.***

Keywords: Smart highways, Solar energy, Glowing Lines, Road marking

I. INTRODUCTION

A state of the art of highways innovations we can find many definitions for the term "smart" highway", but the most general is that smart highways and smart roads are terms for a number of different technologies incorporated into roads. In a deeper way, it is an extensive concept for roads of tomorrow, looking at innovative ideas that apply the opportunities offered by new technologies in smart ways. A smart highway will allow for technological integration into current transportation roadways, including connected devices and IoT, to increase transport efficiency, drivers' and pedestrians' safety, clean energy consumption, and to promote sustainability.

Img.1. Glowing lines uses luminescent paint that absorbs solar energy during day and glow for up to 10 hours when it gets dark.

The road glow in the dark lines is installed called Glowing Lines. Glowing Lines uses luminescent paint that is charged by solar energy during the day and then glows for up to 10 -15 hours when it gets dark This means that the road markings have higher visibility than those using standard paint, whilst still not requiring electricity. Here the landscape becomes an experience of light and information. As a result, this increases visibility and safety In the past 40-odd years, glow-in-the-dark materials have not had much purpose beyond this juvenile pleasure of holding a radiant toy in the dark. But now phosphorescent materials have hit the street, paving the way for a future in which our travels at night will be lit by paints and polyurethane emitting the charge they received from the sun during the day

II. OBJECTIVE

A. To study smart highways, glowing lines of highway & road marking.
B. Comparison study of methods similar to highways with glowing line.
C. To study the glowing line paint, how to apply it & it's budget.
D. To improve visibility and Safety of road by using Glowing Lines.

III. SCOPE OF A STUDY

The world has been taken over by the digital wave with several industries embracing digital innovations. Therefore, it is imperative for the Indian highways sector also to be at the forefront of this transformation. 'Smart roads with glowing lines' & 'Smart highways' gaining ground in the developed world essentially use a suite of Solar power that are intended to be both interactive and largely self-powering. The concept holds tremendous potential for considering its road network is the second largest in the world and continues to be the most important means of transport carrying almost 80% of the country's passenger traffic and around 65% of its freight so to Increase the visibility of roads at night time is important. & it's possible by using Glowing Lines on road**.** Overall, this study will be very useful for the ongoing, and upcoming future roads to increase safety and visibility at night time.

IV. LITERATURE REVIEW

A. Studio Roosegaarde, Hejimans(2013)

The aim of this paper to the focus of innovation was on the road. Heijmans and Studio Roosegaarde tackle this on a large scale by innovating the road deck with designs such as 'Glow in-the-dark Lining', 'Dynamic Paint', 'Interactive Light' and 'Electric Priority Lane'. Together they want to make the road sustainable and interactive through means of smart lighting, harvesting energy, and traffic signs that adapt to the road situation.

B. Vijay Laxmi Kalyani,Shailee Joshi,Vidhi Chaudhary (2015)

The paper showing that. Now, there is a need to make the highways a smart highway. A Smart highway is the need of present time because a lot of energy is required to illuminate the highway at night we can use Green energy and other supportive technologies like 5G, IoT, Cloud computing for faster data communication and rapid action taking as and when demanded, altogether there is a lot of scope on Indian highways specially to be converted into smart highway it has abundant sunlight so that the power can be collected into
storage batteries and that could be used at night.

C. George Justin Sebastian, Randhawane Pratik Dilip, Murhe Abhinav Vasudeo (2017)

The paper is about changing the roads now no longer remain as a medium to travel from one place to another, we can now use it to charge electric cars and harness solar energy due to its large exposed surface area. There is also technology to keep portions of the roads well-lit with more energy efficient and environment friendly technology and methods. Hopefully there will be more upcoming technology to make our roads smarter and safer to travel.

D. Pardeep Kumar, Arun Kumar, Stephen Kajesweki (2016)

This paper offers the Innovative practices in the road construction sector requires the involvement of the public and private sector and all other stakeholders for innovation to be successful. There is a need to adopt new technology and new road construction materials as well as processes. There is need to take informed decisions for adopting innovative practices and evaluating the outcomes of each decision taken in terms of the investments and the risks as well as returns and ensuring the sustainability of the road development programs.

V. RESERCH METHODOLOGY

The methodology adopted for gift study is completing study of road marking of glowing lines. elaborated study of different techniques like glowing lines road marking, it's paint & dispensed by analyzing price needed for specific methodology and so comparison, price and time needed. This study is predicated on roads & it's safety. The study target is to improve safety & visibility at night time. the sector study is split into components like – On Google website observation on smart roads to examine and observe Glowing Lines on road & it's luminous paint i.e., fluorescent paint, Phosphorescent paint, Radiolumnescent paint. Finding which is best luminous Paint, Budget & Best way of applying glowing lines paint. Study of similar methods of glowing lines on road marking & comparison study of glowing line road marking & ordinary road marking.

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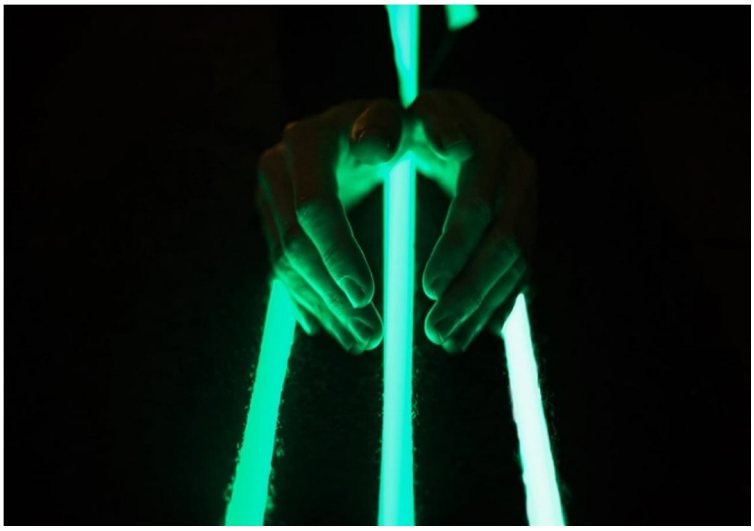
VI. RESULT AND DISCUSSION

Glowing Lines apply on edges of road like,
1.Stadard Width of Road marking Line = 100 mm
This paint mark in the format of triple Lining i.e.,10mm line - 35mm space like wise up to 100mm
2. Applying Thickness of paint = 1.6mm to 1.8mm

A. Budget

Near about 1.2 to 1.8 kg paint require for each square meter
The cost of luminous paint is 300/ kg
Its service life is near about 10 - 20 years
Smart Road with Glowing Lines is best method for increased visibility and safety & Phosphorescent paint is best luminous paint



Img.2. Glowing lines avoid the need for using additional electricity despite their glowing visibility.

VII. CONCLUSION

From above study we concluded that,

A. Indian highways specially need to be converted into smart highways by using conventional energy for making our road safer and smarter.
B. The Phosphorescent paint is best for glow in the dark to increase visibility at night time.
C. The glowing line method is useful for road safety and reduce accident.
D. Its first design GLOWING LINES charges during day-time and glow at night for several hours to create an iconic highway experience and increase safety.

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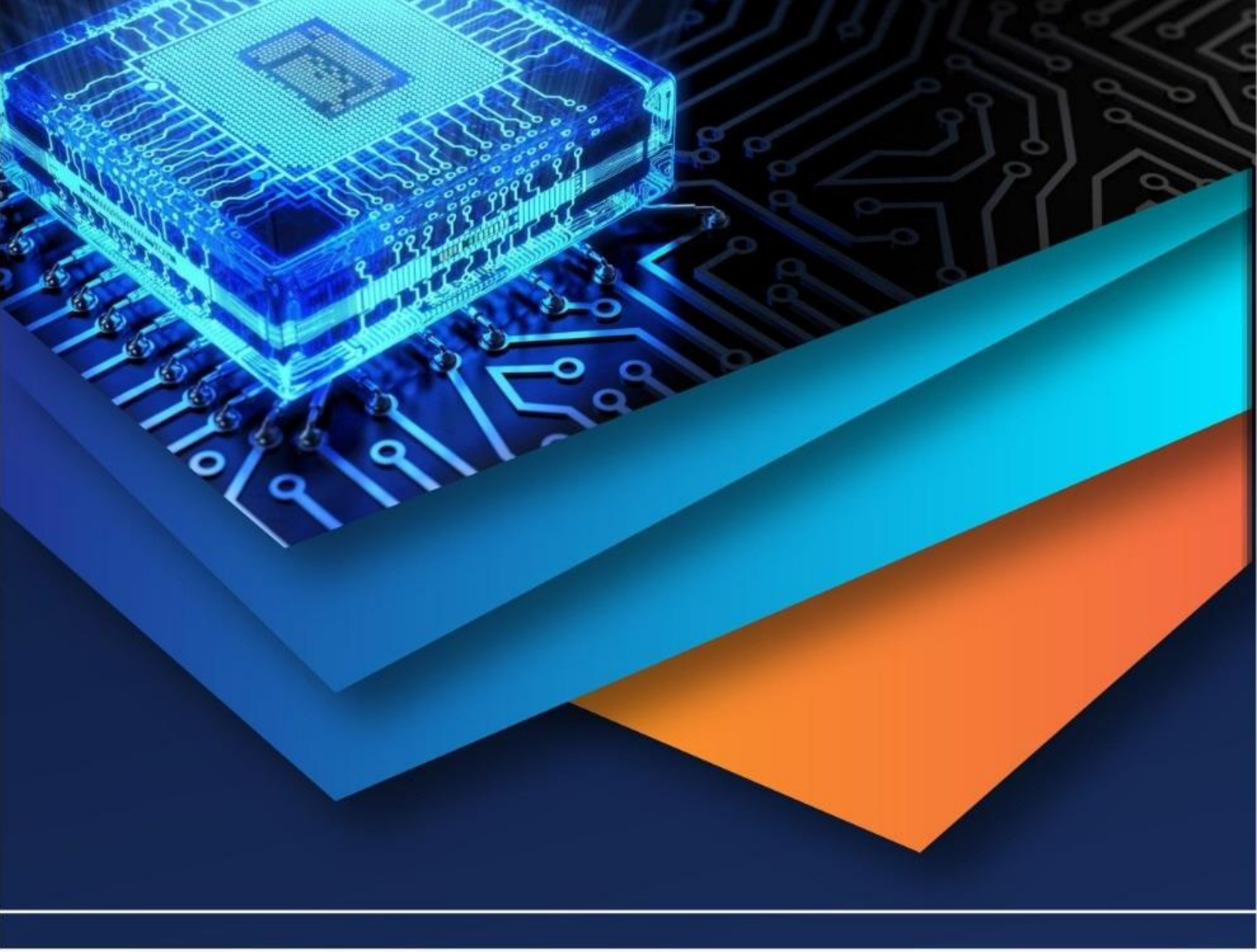

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