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Automatic Street Cleaning and Pavement Treatment Process

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ABSTRACT: The cleaning and maintenance of the street pavements is the necessity of the town and cities now a days. If the peoples stand with the current maintenance process, It will only widen and deepen the crisis. There any many harmful substances which affect human as well as environment and makes street nasty. It gives bad impact on the lower part of vehicles such as vehicles engines and plastic wastage can be causes of slip the vehicles, Which takes place of minor and major accidents. The durability of the pavement is broadly depend on the temperature variation. The change in temperature develops unwanted stresses in the pavement, Which leads to the crack formation. Removing and controlling of these type of problems is the challenging task. The process is to make clean the pavement by water and air pressure and prevention of road surface by temperature variation.

KEYWORDS : Advance Cleaning System, Prevention of pavements, To Make India Clean.

I. INTRODUCTION

In India there are many Highways, Major states roads and other district road which is the main appearance of India but these streets are covered with filthy material and wastage. Which is spoiled the beauty of the highway and streets and these wastage not only effect the human heath but also effected the environment. Some time These materials causes of accident and spread many types of disease in the environment. This types of problems mainly generate in high population cities such as Delhi, Mumbai, Hyderabad, Chennai, etc. Everyday peoples face this type of problems which is one the biggest problem of developing India. And the durability of the road in India is also poor and for this poor condition The Ministry of Road Transport & 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 the reason of vehicle maintenance and failure of the vehicle part, It to be dangerous for the running vehicle on the road.

II. EFFECT OF WASTAGE AND TEMPERATURE VARIATON

Pavement cracking is the complex phenomena that can caused by temperature variation and load f vehicle. At high temperatures the viscous component dominates and total stress relaxation takes few minutes.

Pavement cracking takes several forms which is discuss below-

- Longitudinal cracking, occurring generally in the wheel path.
- Transverse cracking, that can be in any lane.
- Alligator and crocodile cracking, where longitudinal and transverse cracking get together and forming network of cracks.

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II.A Reflective Cracking

The road surface initiated cracks generally the result of cyclic result of temperature. In thick asphalt pavements, these cyclic, diurnal and annual changes are primarily responsible for crack development. The temperature of the asphalt in summer exceed up to 50 degree C. The road temperature is normally 35 higher than the atmospheric temperature, This types of cracking is very dangerous for people and excessive loss of texture depth and rutting may affect vehicle steering and braking.



Fig.1. Reflective cracking

This mainly occur directly over the underlying cracks or joint .

II B. Transverse cracking

Transverse cracks are cracks that are perpendicular to the roadway alignment. This is generally due to the temperature changes with shrinkage during the curing which causes tension in the concrete and concrete will expand and contract with temperature.



Fig.2. Transverse cracking

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C. Alligator cracking

Fatigue cracking is also known as alligator cracking or crocodile cracking, which is common type of distress in asphalt.



Fig.3. Alligator Cracking

This types of problems generally occurs in concrete pavement which is divided into three part :

- 1-Jointed plain Concrete Pavement (JPCP),
- 2-Jointed reinforce Concrete Pavements (JRCP),
- 3-Continuously reinforce concrete pavements (CRCP).

And the temperature also increase between the vehicles tyre. And not only temperature effect the pavement but also wastage give a bad impact on human health such as plastic bags, cans, bottles and harmful medicines gives a broad impact on humanity and this types of substances is very toxic and after some time it can be react with the atmospheric agents and release the harmful gases in environment. There are many city which is suffered by the different type of diseases and infection also such as,

- Skin and blood infection resulting from direct or indirect contact of waste, and from infected wounds.
- Eye and respiratory infections resulting from exposure to infected dust.



Fig.4 Waste spread on road

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III. METHODOLOGY

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 main 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 radian 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 temperture. In the side of radium plates 6 small diameter holo provided from which the pies are connected when the water pray closed the compressure release the highy pressure air. It all process done with in few minutes nd when the green light sighed then the process is stop. We cn use this process according to area where's the city is more nasty after few times in this condition it process recylce after 8 hour and where's city is not so nasty it5 process recylce after 12 hour. According to this regulition we can reduces the dust and toxic mterial from rod surfce and also maintain the rod temperature. According to this ssysytem we can also reduce the lots of problems of peoples. In fig 5 we can see that lagre dimeter pipe nd small diameters pipe which is for water and air presure. And sides pipes connected with the drinage system and it works to when the filthy water flow through the drainage then this pipe takes fityh watre



Fig.5 pipe system beneath the road

from drainage and collect into the filtration chmber where the filthy watre get filterd and filter or clean water goes to main chamber and circulate by the main pipe which spray the water and this proces repeat agin when the ssysytem need to clean the pavment.

IV. EXPERIMENTAL RESULTS

In fig 6 there is section of automatic cleaning street, In the center of pavement a system of radium pales which spray the water and air in this process we can also use the rain water which is collected into the chamber. It process also increase the cleaning area of the surface and the effective stress which is the cause of damage of the road pavements and there are many cracks develop from temperature variation which develops cracks on streets from this process the pavement temperature which is increase more than 50 degree C and get maintained by the water wash

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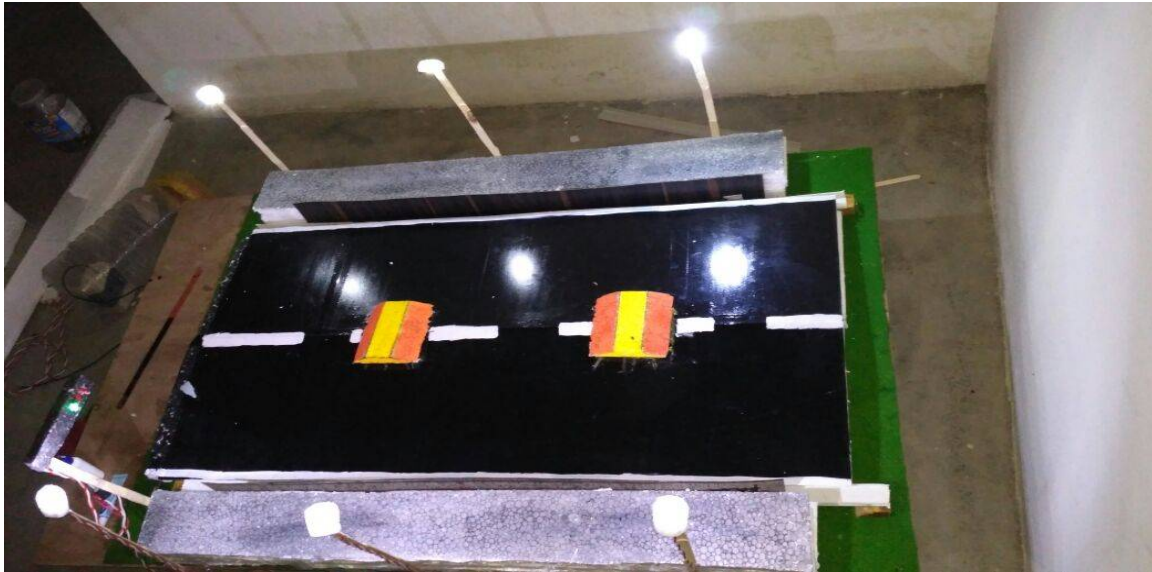


Fig. 6 Automatic cleaning street model

According to this process we can also prevent the surface of road by temperature. Some advantages of this project mention below –

- It reduce the vehicle maintenance by remove the dust and junk which affect the lower part of vehicles.
- It maintain the pavement temperature, which is the cause of pavement cracking .
- It remove the toxic and waste material from road.
- It also help to make Indian clean and follow the SWACHA BHARAT ABHIYAN
- It reduce the average rate of accidents by road wastage.

V. CONCLUSION

Based on above study and experiment we can say that the Automatic Cleaning and Treatment of road pavement process is capable to reduce the road cracking effect and it also helpful to clean the Roads, Highways which is the beauty of Indian . And all substances which gives a harmful effect on environment and also human health , we can easily remove from the road surface and dumped safely and Automatic water wash and dry system gives a broad impact of cleaning and maintenance process of road s.

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