

Impact of Pavement Material on Environment

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Abstract: In today's world pollution is one of the biggest problems and this have adverse effect on environment also. Now a day's temperature of environment is increase day by day. In 2018 the average temperature of India is 30°C to 40°C but in 2019 it is increase by 32°C- 48°C. Rise in temperature also effect the environment by reducing the rain fall. This rise in temperature affecting our life also we get exhausted, feels tired etc. In this study we are comparing the rise in temperature because of pavement material by dry bulb thermometer in an interval of 2 hours. We have taken the temperature at three different places (in bitumen road, in concrete road and in garden area) and their difference in temperature is compared. The research recommends the restructuring of the south Delhi to make provision for creation of more green areas rather than pavements and concreted areas to reduce the effects of rise in temperature and ultimately improve the comfort and living conditions of the people of south Delhi.

INTRODUCTION

In the Morden era of becoming a developed country we are observing that a huge population is moving towards urban area from rural area. This movement of population is because of jobs, services, interests, and opportunities. As a result of which the demand of housing and transportation is creasing day by day and this affect the environment directly and indirectly.

In this research paper we are working in the rise of temperature due to transportation material. As we observe there is a huge temperature difference in urban and rural area and one of the factor of this difference is material used in construction. In cities the infrastructure is made up of concrete which absorb heat and in rural area the infrastructure is made up of generally mud which maintain low temperature. We feel that in cities the area near the pavement have more temperature than the area which are away from the pavement. This is taking place because bitumen, asphalt and concrete absorbed more heat. Here we are comparing the temperature of area near bitumen, concrete road and garden area. The difference in the surrounding fields. As we know the colour, so it absorbs more heat and rise the temperature in nearby area of the pavement and in urban city the roads are made up of bitumen and asphalt they also leads to rise the temperature.

IMPACT ON HEALTH

As the temperature is rising day by day it not only effects the atmosphere but the humans also. The rise in temperature cause several deceases like skin problem, eye irritation etc. it also reducing the working efficiency of human as because of excessive sweating we get exhausted early and feel like rest less. So, the rise in temperature and pollution directly effect human and because of the

temperature is observed and recorded by dry bulb thermometer. The research found out that, there was consistency in rising temperature at different time of the day by the different road and pavement materials. Asphalt has the greatest effect of increasing the urban temperature four degrees higher, followed by concrete, three degree rise in temperature, and earth (ordinary ground) by two degree rise and vegetation (grass) by one degree rise in temperature. So, we need to work on this problem and try to reduce the rise in temperature as much as it can possible

Objective of research

The main objective of the research is to –

- I. Compare the temperature difference in area near the roads, area away the roads and in garden.
- II. To get the solution of the problem of rising temperature.
- III. And to aware people about this problem and its solution.

CAUSES OF RISE IN TEMPERATURE IN URBAN AREA

The main reason of rise in temperature in urban area is modification of land into building and as building are constructed, they use energy in the form of air conditioner, computers, auto mobile etc all these leads to increase in temperature of urban area. Some other reasons are changes in the thermal properties of surface materials and this reduce the vapor-transpiration in urban areas. Materials used in urban areas, like concrete and asphalt, have different thermal bulk properties (including heat capacity and thermal conductive) and surface radioactivity properties than the Materials used in rural areas. This leads to change in temperature than the surrounding areas nearby. The temperature is also affected by the lack of vegetation in urban areas, which constrains cooling by evapotranspiration. Therefore, there is a typical temperature difference in centre of the city and bitumen and asphalt is dark in problem the average age of human is also reduce from 78 years to 68 years. As this rise in temperature will harm us in a bigger platform, we need to reduce it as soon as possible and it can be possible by planting more and more plant and finding better option for construction which absorb less heat and reduce the temperature of atmosphere.

METHODOLOGY

The methodology used for this work include is data collection for direct measurement and reading on the road materials and pavement materials, the earth (ordinary ground), and on the vegetation (grass) on the intervals of two hours (six times) daily for three days on the sample

locations. The instruments used to collect data on the three different locations were as follows:

- Liquid in glass thermometer (dry bulb thermometer)

Liquid in glass thermometer-

This instrument is used to measure the temperature of the road at different time. The scale of the thermometer is the

Celsius scale in which the upper fixed point is chosen 100°C and lower fixed point is 0°C. This interval is divided into one hundred equal parts and each part defines one degree on the scale. The wet and dry bulb hygrometer used for measuring of relative humidity consists of two thermometers, the wet bulb thermometer and the dry bulb thermometer.

RESULTS

The results were taken for three days at four places in the interval of two hours. Road materials and pavement materials has a significant effect on surface temperature, which subsequently influences ambient temperature. This can be seen from the data in the tables for temperature for the four different locations. The temperature of the asphalt road is on the higher side as compare to all the materials. This research shows that there is the difference of at least 2°C this small difference in the temperature make a good difference in the environment. We can easily feel the difference by only standing near the asphalt road, concrete road, any earth surface & in any park. The effect of urban heat island on the residents shows that the impact of the roads and pavement materials are felt by the residents. The graphical representation for temperature in degree centigrade and time in hours, for the data obtained for the different road Materials and Pavement Materials (Asphalt, concrete, vegetation (grass) and earth (ordinary ground))The data is tabularized as follows

Results-Day 1

Time	Asphalt(°C)	Concrete(°C)	Earth (Ordinary Ground ° C)	Vegetation (Grass ° C)
8:00 AM	19	19	19	19
10:00 AM	25	23	22	20
12:00 PM	28	25	23	22
2:00 PM	32	30	27	25
4:00 PM	28	26	27	26
6:00 PM	24	22	20	19

Results-Day 2

Time	Asphalt(°C)	Concrete(°C)	Earth (Ordinary Ground ° C)	Vegetation (Grass ° C)
8:00 AM	20	20	20	20
10:00 AM	25	23	22	22
12:00 PM	29	27	25	23
2:00 PM	35	32	30	27
4:00 PM	28	26	25	24
6:00 PM	26	24	22	20

Results-Day 3

Time	Asphalt(° C)	Concrete(° C)	Earth (Ordinary Ground ° C)	Vegetation (Grass ° C)
8:00 AM	20	19	19	19
10:00 AM	24	23	22	20
12:00 PM	27	27	24	22
2:00 PM	31	31	27	27
4:00 PM	27	26	25	24
6:00 PM	24	22	21	20

CONCLUSION

The research shows that there is raise in the temperature because of material used in the road construction. We need to focus on the material we are using for road construction so that it does not raise the temperature of the environment. As we can see from the above table that asphalt is absorbing more heat because of its dark color so we have to find some alternative of asphalt which have the same strength and properties to reduce the temperature of the environment.

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