**Short Communication (NS-1)**

**STUDIES ON DUST FALL AT VARIOUS PLACES IN PUNE CITY (INDIA)**

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**ABSTRACT**

The excessive dust in atmosphere reduces the intensity of solar radiation, which can affect the photosynthesis process and further results in stunted growth of plants. Certain people who are sensitive to dust become victim of dust pollution as it accelerates asthma and other respiratory related diseases. Generally old people and infants becomes target of dust pollution.<br>

The bad roads with heavy traffic are a root cause of dust pollution in maximum Indian cites. There is a certain relationship between dust pollution and vehicle density on the road.<br>

In view of this an experiment relating to dust pollution has been conducted during January to March 2006 in Pune city of Maharashtra state (INDIA).<br>

During present experiment the maximum dust fall rate $0.1464 \text{ mg/cm}^2/\text{hr}$ was recorded at Hadapsar area while the minimum dust fall rate $0.0341 \text{ mg/cm}^2/\text{hr}$ was recorded at Koregaon Park area of the Pune city.

**Key Words:** Dust fall, Road, Traffic, Dust pollution

**INTRODUCTION**

Dust pollution is indispensable part of urbanization and industrialization. In India there is no partiality in dust pollution; it is same from rural roads to urban roads. Generally we find that where roads are not good accordingly dust pollution is higher. The quality of maximum roads is not so good especially inter-city roads. The bad roads with heavy traffic are a root cause of dust pollution in Pune city. There is a certain relationship between dust pollution and vehicle density on the road. Excessive dust in atmosphere reduces the intensity of solar radiation, which can affect the photosynthesis process and further results in stunted growth of plants. Certain people who are sensitive to dust become victim of dust pollution as it accelerates asthma and other respiratory related diseases. Generally old people and infants becomes target of dust pollution.<br>

In view of this an experiment relating to dust pollution has been conducted during January to March 2006 in Pune city of Maharashtra state (INDIA).

**MATERIAL AND METHODS**

A piece of butter paper measuring 12 x 12 cm was kept on road side corner for 12 hours at different places especially at high traffic areas. Some butter papers were kept near the traffic signal poles for dust collection. The weight of butter paper before keeping on the road and after 12 hours was measured on electronic digital balance. The difference between initial and final weight was recorded.
RESULTS AND DISCUSSION

The results obtained during present experiments are given in Table 1. The comparative graphical representation of dust fall on all roads is indicated in Fig. 1. The maximum 0.1464 mg/cm²/hr dust fall during present study was observed on Sunday at Hadapsar road while the minimum 0.0341 mg/cm²/hr dust fall was observed at Koregaon park on Monday.

Table 1: Dust fall at various places in Pune city in mg/cm²/hr

<table>
<thead>
<tr>
<th>Place</th>
<th>SUN</th>
<th>MON</th>
<th>TUE</th>
<th>WED</th>
<th>THR</th>
<th>FRI</th>
<th>SAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nagar Road</td>
<td>0.125</td>
<td>0.1377</td>
<td>0.1134</td>
<td>0.1151</td>
<td>0.1245</td>
<td>0.1215</td>
<td>0.1331</td>
</tr>
<tr>
<td>Rly. Station</td>
<td>0.1128</td>
<td>0.1215</td>
<td>0.114</td>
<td>0.1244</td>
<td>0.1087</td>
<td>0.1151</td>
<td>0.1053</td>
</tr>
<tr>
<td>City Bus Stop</td>
<td>0.1111</td>
<td>0.1261</td>
<td>0.1035</td>
<td>0.1221</td>
<td>0.1157</td>
<td>0.1215</td>
<td>0.0995</td>
</tr>
<tr>
<td>PMC Bus Stop</td>
<td>0.1053</td>
<td>0.1018</td>
<td>0.0978</td>
<td>0.1041</td>
<td>0.0868</td>
<td>0.0983</td>
<td>0.0949</td>
</tr>
<tr>
<td>Hadapsar</td>
<td>0.1464</td>
<td>0.1435</td>
<td>0.1412</td>
<td>0.1359</td>
<td>0.145</td>
<td>0.1377</td>
<td>0.1388</td>
</tr>
<tr>
<td>Swargate</td>
<td>0.1215</td>
<td>0.1024</td>
<td>0.1093</td>
<td>0.1186</td>
<td>0.1111</td>
<td>0.0966</td>
<td>0.1145</td>
</tr>
<tr>
<td>Deccan</td>
<td>0.0567</td>
<td>0.0665</td>
<td>0.0694</td>
<td>0.059</td>
<td>0.0572</td>
<td>0.0503</td>
<td>0.0509</td>
</tr>
<tr>
<td>FC Road</td>
<td>0.059</td>
<td>0.0572</td>
<td>0.0491</td>
<td>0.0561</td>
<td>0.0578</td>
<td>0.0763</td>
<td>0.0486</td>
</tr>
<tr>
<td>Bund Garden</td>
<td>0.0937</td>
<td>0.1082</td>
<td>0.1012</td>
<td>0.1053</td>
<td>0.1064</td>
<td>0.1024</td>
<td>0.0925</td>
</tr>
<tr>
<td>Koregaon Park</td>
<td>0.0358</td>
<td>0.0341</td>
<td>0.037</td>
<td>0.0405</td>
<td>0.0439</td>
<td>0.0393</td>
<td>0.0416</td>
</tr>
<tr>
<td>MG Road</td>
<td>0.059</td>
<td>0.0503</td>
<td>0.0532</td>
<td>0.0567</td>
<td>0.0584</td>
<td>0.0723</td>
<td>0.0474</td>
</tr>
<tr>
<td>Yeroda</td>
<td>0.0752</td>
<td>0.0781</td>
<td>0.074</td>
<td>0.0677</td>
<td>0.0694</td>
<td>0.0769</td>
<td>0.0763</td>
</tr>
</tbody>
</table>
The highest dust 0.1377 mg/cm²/hr were observed on Monday at Nagar road site. On Tuesday, the lowest dust fall 0.1134 mg/cm²/hr was observed at the same place. On Sunday, the rate of dust fall was 0.1250 mg/cm²/hr. On Wednesday, Thursday, Friday and Saturday the dust fall rate was 0.1151 mg/cm²/hr, 0.1244 mg/cm²/hr, 0.1215 mg/cm²/hr and 0.1331 mg/cm²/hr observed respectively.

The railway station site is one of the highly populated places in Pune city. The maximum dust fall 0.1244 mg/cm²/hr was observed on Wednesday and the minimum dust 0.1053 mg/cm²/hr was observed on Saturday. The dust fall rate 0.1128 mg/cm²/hr was recorded on Sunday. On Monday and Tuesday the dust fall rate was 0.1215 mg/cm²/hr and 0.1140 mg/cm²/hr, while it was 0.1087 mg/cm²/hr and 0.1151 mg/cm²/hr observed on Thursday and Friday respectively.

The city bus stop near Pune railway station is one of the most populated public places in Pune city. Daily thousands of commuters and passengers crowded this place. The maximum dust fall 0.1261 mg/cm²/hr was observed on Monday while the minimum 0.0995 mg/cm²/hr dust fall rate was observed on Saturday. On Sunday, 0.1111 mg/cm²/hr dust fall rate was observed. The dust fall rate 0.1035 mg/cm²/hr, 0.1221 mg/cm²/hr, 0.1157 mg/cm²/hr and 0.1215 mg/cm²/hr was recorded on Tuesday, Wednesday, Thursday and Friday respectively.

![Fig. 1: Dust fall at various places in Pune city in mg/cm²/hr](image)
Pune municipal corporation (PMC) bus stop

The PMC bus stop is one of the largest bus stops in Pune city. From this bus stop, buses go to every corner of the city and suburban areas. Near the bus stop cite the maximum dust fall 0.1053 mg/cm²/hr was observed on Sunday, while the lowest dust fall 0.0868 mg/cm²/hr was recorded on Thursday. The dust fall rate 0.1018 mg/cm²/hr, 0.0978 mg/cm²/hr and 0.1041 mg/cm²/hr was observed on Monday, Tuesday and Wednesday respectively. The dust fall rate 0.0983 mg/cm²/hr and 0.0949 mg/cm²/hr was recorded on Friday and Saturday, respectively.

Hadapser

Hadapser is one the industrial place in Pune city. As a commercial zone this place is always crowded. At this cite the maximum dust fall rate 0.1464 mg/cm²/hr was recorded on Sunday, while the minimum dust fall rate 0.1359 mg/cm²/hr was recorded on Wednesday. The dust fall rate 0.1435 mg/cm²/hr and 0.1412 mg/cm²/hr was reported on Monday and Tuesday. While the dust fall rate 0.1458 mg/cm²/hr, 0.1377 mg/cm²/hr and 0.1388 mg/cm²/hr was observed on Thursday, Friday and Saturday respectively.

Swargate

Swargate is one of the commercial and crowded places in Pune city. At this place the maximum 0.1215 mg/cm²/hr dust fall rate was observed on Sunday, while the minimum 0.0966 mg/cm²/hr was reported on Friday from the same place. The dust fall rate 0.1024 mg/cm²/hr, 0.1093 mg/cm²/hr, 0.1186 mg/cm²/hr and 0.1111 mg/cm²/hr was observed on Monday, Tuesday, Wednesday and Thursday respectively. On Saturday, the dust fall rate 0.1145 mg/cm²/hr was recorded.

Deccan

Deccan area is one of the old and central parts of the Pune city. It is also crowded place as like Hadapser and Swargate. The maximum dust fall rate 0.0694 mg/cm²/hr was reported on Tuesday, while the minimum dust fall rate 0.0503 mg/cm²/hr was recorded on Friday. On Sunday, the dust fall rate 0.0567 mg/cm²/hr was recorded, while on Monday, the dust fall rate was fluctuated up to 0.0665 mg/cm²/hr. The dust fall rate 0.0590 mg/cm²/hr and 0.0572 mg/cm²/hr was recorded on Wednesday and Thursday respectively. On Saturday, the dust fall rate 0.0509 mg/cm²/hr was recorded.

Ferguson college (FC) road

The maximum dust fall rate 0.0763 mg/cm²/hr was reported from FC road on Friday, while the minimum dust fall rate 0.0486 mg/cm²/hr was recorded on Saturday. On other days the dust fall rate 0.0590 mg/cm²/hr, 0.0572 mg/cm²/hr, 0.0491 mg/cm²/hr, 0.0561 mg/cm²/hr and 0.0578 mg/cm²/hr was reported on Sunday, Monday, Tuesday, Wednesday and Thursday respectively.

Bund garden

On Monday the maximum 0.1082 mg/cm²/hr dust fall rate was observed at Bund garden site, while the minimum dust fall rate 0.0925 mg/cm²/hr was observed on the same place during Saturday. The dust fall rate 0.0937 mg/cm²/hr was reported on Sunday. The dust fall rate 0.1012 mg/cm²/hr, 0.1053 mg/cm²/hr, 0.1064 mg/cm²/hr and 0.1024 mg/cm²/hr was observed on Tuesday, Wednesday, Thursday and Friday respectively.

Koregaon park

The maximum dust fall rate 0.0341 mg/cm²/hr was recorded at Koregaon park locality on Thursday, while the minimum dust fall rate 0.0341 mg/cm²/hr was recorded from the same locality. On Sunday, the dust fall rate 0.0370 mg/cm²/hr was recorded. On
Tuesday and Wednesday the dust fall rate 0.0370 mg/cm$^2$/hr and 0.0405 mg/cm$^2$/hr was observed. The dust fall rate 0.0393 mg/cm$^2$/hr and 0.0416 mg/cm$^2$/hr was recorded on Friday and Saturday respectively.

**Mahatma gandhi (mg) road**

The maximum dust fall rate 0.0723 mg/cm$^2$/hr was reported on Friday from MG road, while the minimum 0.0474 mg/cm$^2$/hr dust fall rate was observed on Saturday from the same spot. On other days, the dust fall rate 0.059 mg/cm$^2$/hr, 0.0503 mg/cm$^2$/hr, 0.0532 mg/cm$^2$/hr, 0.0567 mg/cm$^2$/hr, 0.0584 mg/cm$^2$/hr and 0.70000 mg/cm$^2$/hr was observed on Sunday, Monday, Tuesday, Wednesday, and Thursday respectively.

**Yeroda**

The maximum dust fall rate 0.0781 mg/cm$^2$/hr was reported from Yeroda on Monday, while the minimum dust fall rate 0.0677 mg/cm$^2$/hr was recorded from the same place on Wednesday. On Sunday 0.0725 mg/cm$^2$/hr dust fall rate was reported and it was 0.0740 mg/cm$^2$/hr on Tuesday. The dust fall rate 0.0694 mg/cm$^2$/hr, 0.0769 mg/cm$^2$/hr and 0.0763 mg/cm$^2$/hr were recorded on Thursday, Friday and Saturday respectively.

**CONCLUSION**

With the implementation of following suggestions the air quality in the urban areas would be brought within the threshold limit as per the air quality standard. This would lead to healthy environment for people living in the urban areas. Following points can be taken into consideration to control the dust pollution.

1. Sweeping of roads
2. Restriction on vehicle speed
3. Washing of vehicles’ wheels and body at an appropriate distance during traveling.
4. Development of green belt along the both sides of transportation roads.
5. Collection of dust from the road surface.
6. Use of hygroscopic salts like NaCl on road sides.

**ACKNOWLEDGMENT**

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**REFERENCES**

SAVE EARTH. WE HAVE NO WHERE ELSE TO GO!