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Introduction to the Fog Reducing Device

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Abstract:- Recently as developed countries many cities have become more suitable to live in with all facilities that people need in favor of a comfortable life style. Therefore huge migration from rural to urban areas is increasing of a term as "urbanization". Due to increasing urbanization, one of the main issues is increasing traffic conjunction. It is a condition or networks that occurs as use increases and is characterized by slower speeds , longer trip times, increased queuing, and one of the main hazard is increases of pollution at an alarming rate. Cities have becomes islands of toxic chemicals form unrestrained use of vehicle burning fossil fuel, which leads to many harmful pollutants sustaining in the environment and then the combined effect of pollutant and fog reduce the visibility on the road to a very great extent. Therefore, to resolve this issue we have designed a device that could reduce the combined effect to certain level. Our basic principle of device is removing fog from the smog and fog reduction will definitely resolve our problem of visibility which in turn will reduce accidents and delays on the affected areas. On the future prospective we can even utilize the potentiality of the moving speed of vehicles for the operation of our device. This device basically engages the mechanical and electrical phenomenon. As an aftermath we can even retain water from the device which can made further utilization. Our device basically works on the principle of negative pressure for the inlet and condensation and gravity as a separator.

Keywords:- *Along with, Environmental, Fog Issue, Gadget, Overcome.*

I. INTRODUCTION

Smog in Delhi is a recent very severe air-pollution in New Delhi and adjoining areas in the national capital city. Air pollution in 2017 has peaked up on both PM 2.5 and PM 10 Levels (*PM particulate matter). It has been one of the worst air pollution levels since 1999.

Low visibility has resulted in increasing accidents across the cities namely a 24 vehicle pile-up on the Yamuna expressway on 8th November, 2017.

"The great effects of smog" have also led to certain cancellation and delay in certain public transport, mainly trains and flights, causing many problems for the people.

➢ Sources of pollution:

- According to current analysis, sources are hitting towards colder weather, slow winds trapping the various sources of smoke.
- The primary sources of smoke are stubble burning, lit garbage, road dust, power plants, factories and vehicles.
- Air quality can be measured by the amount of PM 2.5 and PM 10 particulates suspended in air. On Nov 7, 2017 the PM 2.5 levels in Delhi shot up to 999, much above the recommended 60 micrograms. Recommended limit of 100.

The temperature in national capital Delhi during this period was from 15 to 20 degrees.

Various health problems encountered due to increase in air pollutants are breathlessness, chest constriction, irritation in eyes, asthma, allergy etc. reducing the life expectancy in the affected area.

Various main countries affected with effects of air-pollution affects are as follows:

- ✓ Canada
- ✓ Beijing, China
- ✓ United Kingdom, London
- ✓ At the same time PM 10 shot to 999 which is maximum level for the monitors instead of the
- ✓ Mexico city, Mexico
- ✓ Santiago, Chile
- ✓ Tehran, Iran
- ✓ United States – Los Angeles and the San Joaquin Valley
- ✓ Ulaanbaatar Magnolia
- ✓ Southeast Asia
- ✓ Pakistan

Introduction part of the manuscript is a beginning section which states the purpose and goals. Introductions provide a context or background for the study (that is, the nature of the problem, problem statements and its significance). State the specific purpose or research objective of, or hypothesis tested by, the study or observation. Cite only directly pertinent references, and do not include data or conclusions from the work being reported. For more formatting detail read the manuscript preparation guidelines of the journal.

The title of the manuscript should be brief and specific to the topic of the article and should include information that, along with the Abstract. Avoid use of abbreviations in the title. The first letter of all words except for prepositions, articles, and conjunctions should be capitalized in the Title. For more formatting detail read the manuscript preparation guidelines of the journal.

E.g. "Modeling and Performance Simulation on Source Initiative Routing Protocol in Wireless Network"

II. LITERATURE REVIEW

A. Content of smog:

This kind of visible air pollution consist of nitrogen oxides, Sulphur oxides, ozone, smoke or dirt particles and also less visible particles such as CFC's. Due to human activities smog is derived from coal emissions, vehicular emissions, industrial emissions, forest and agricultural fires and photochemical reactions of these emissions. In Delhi, smog severity is often aggravated by stubble burning in neighboring agricultural areas.
Main cause for the increase in air pollution in Delhi is:

B. Transportation emissions:

Traffic emissions – such as from trucks, buses, and automobiles contribute to air pollution. Airborne by-products from vehicle exhaust systems cause air pollution and are a major ingredient in the creation of smog in our capital city Delhi.

The major culprits from transportation sources are carbon monoxide (CO), nitrogen oxides (NO and NO_x), volatile organic compounds, Sulphur dioxide, and hydrocarbons. (Hydrocarbons are the main components of petroleum fuels such as gasoline and diesel fuel.) These molecules react with sunlight, heat, ammonia, moisture, and other compounds to form the noxious vapors, ground level ozone, and particles that comprise smog.

C. Main difference between industrial smog and photochemical smog:

Both industrial smog and photochemical smog are forms of air pollution. Although both appear to the eye as yellow-brown haze, they differ in two key ways: chemistry and composition. Industrial smog typically exists in urban areas where factories burn fossil fuels such as coal, which creates smoke and sulfur dioxide that mix with fog droplets to create a thick blanket of haze close to the ground.

To overcome this problem we have designed a device primarily used to reduce the fog from the environment which will directly have impact on the visibility on the road and indirectly will help reduce accidents on the road and will surely reduce delays during early winter days.

D. Background of the innovation:

➢ *Filed of the innovation*

Our present theoretical innovation relates to the device for removing fog from the combination of fog and pollutants which reduces visibility on the highways, airports, and railways during certain period of winter days. We are intending to remove the fog and our device is mainly designed for it.

➢ *Brief description of the innovated art*

We hereby are trying to propose the device mainly meant to work in the early winter days in the areas like YAMUNA EXPRESSWAY and other where this problem is predominately affective. Our device mainly works on the principle of negative pressure which is created in the closed casing or the top most portion of the device. Thus the negative pressure will allow the polluted air to enter the casing where initially the pressure will be lower than the atmospheric pressure. After entering the casing the air will be forced download where with the help of created pressure the fog particles will be removed from the smog with the help of condenser. This effect is preferred for the further cooling of fog particles i.e. simply condensation or further lowering of temperature of fog particles. With further lowering the density along with weight of the particles will be increased and this will force the particles themselves down to the earth and the separated air will be again exposed to the atmosphere with the outlet pipe.

➢ *Summary of the innovation.*

Therefore our device is simply intended for the transportation safety and reduces delay in the winter days. It will definitely work in increasing the visibilities on the roads and to some extend try to clear off the pollutants from the environment. This will help reduce the accidents on the highways and will allow running the vehicle on the average speed of 80kmph. Later on with the clear average speed of the vehicles the potentiality can be used to generate electricity from the moving speed of vehicles.

➢ *Description of the parts of the innovation:*

Here is a brief description of the parts of our proposed device

- Top casing: upper casing is basically use to create a negative pressure inside so that the atmospheric smog having higher pressure is forced inside. Smog forced inside is a combination of both polluted particles as well as fog. Here inside it undergoes certain process of reduction.
- Impellor: it will rotate out to create negative pressure inside the casing. With the negative pressure the smog can be forced into the casing. So, basically it is used for the suction purpose.
- Perforated plate: beneath the impellor there is a perforated plate though with the smog will be moved in downward direction.
- Pipe through each hole of perforated plate: from the plate the smog will move down into the smaller diameter pipes.
- Condenser: the pipes coming from the upward direction are connected to the condenser which will help in reducing the temperature of the fog particles of the smog and will help in separating the fog from the polluted particles.
- Outlet pipe: from the outlet pipe the separated air will be exposed out again to the atmosphere because the density of the separated air will be less as compared to the condensed fog.
- Lower casing: the separated fog particles due to lowering of temperature their density and weight will be increased and therefore with the help of gravity they will move downward to the earth.
- This is just a brief peculiar explanation about our innovation.

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III. METHOD/ REVIEW

The basic working of our project in the chronological steps s as follows:

- Suction: the impellor placed on the top most position of the device has the blades arranged in such a way which help create negative pressure inside as compared with the atmospheric pressure and because of that suction is made possible. Suction contains smog that is the combination of fog and polluted particles.
- Forcing the smog downward: after the suction the impellor blades so positioned that they force the smog downward for the separation purpose.
- Separation: all the elements of the device are so placed that the smog being forced will enter the condenser for the separation process. The separation is basically of the water particles so referred to as fog and along with them the pollution particles which are creating noticeable effects on the movement of traffic.
- Outlet of condenser: the separated out water out from the smog is allowed to flow down to the earth because of normal flow under gravity.

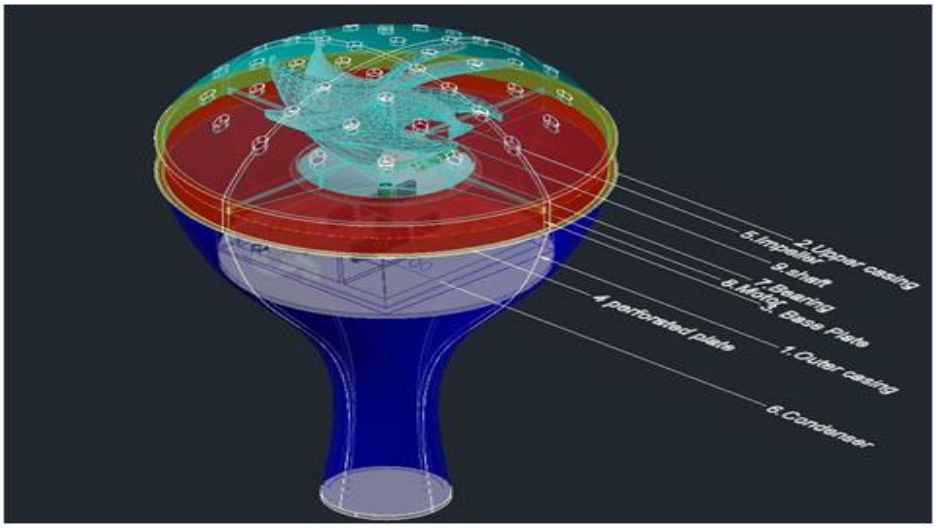

Fig 1:- Footnote: Fog Reducing Device

- *Equations*

In most flows of liquids, and of gases at low Mach number, the density of a fluid parcel can be considered to be constant, regardless of pressure variations in the flow. Therefore, the fluid can be considered to be incompressible and these flows are called incompressible flows. Bernoulli performed his experiments on liquids, so his equation in its original form is valid only for incompressible flow. A common form of Bernoulli's equation, valid at any arbitrary point along a streamline, is:

{\displaystyle {\frac {v^{2}}{2}}+gz+{\frac {p}{\rho }}={\text{constant}}} {\displaystyle {\frac {v^{2}}{2}}+gz+{\frac {p}{\rho }}={\text{constant}}}

$$\frac{v^2}{2} + gz + \frac{p}{\rho} = \text{constant}$$

IV. RESULT

MODEL	Air Flow (M3/hr)			Dust Exclusion
FRD-1	High Speed	Medium Speed	Low Speed	
	650	540	460	95%
Area				
24 M2 = 258 Sq. ft				
Performance Specifications				
Hot Side Temperature (C)			25	50
Qmax (Watts)			50	57
Delta Tmax			66	75
I max (Amps)			6.4	6.4
V max (Volts)			14.4	16.4
Module Resistance (Ohms)			1.98	2.3

Table 1

V. DISCUSSION

Discussion section: Right now for our device we have just worked out its design layout in the software.

- Our device is just on the initial stage that is just an individual parts are organized and device is drafted.
- Have taken various expert suggestions for its working and methodology to achieve changes if required.
- Faculty guidance for its assembling and drafting.
- We have assured all the aspects required by the highway, railways, airport, and authorities to reduce delay and accidents and damage to private and public property. Have started learning basic simulation to achieve the results for the same

VI. FUTURE SCOPE

Future scope section: As this problem is predominantly effective in cold weather and particularly in early winter days therefore all the areas where this effect causes problems can be targeted for the market utility. The authorities that can be concerned with the market are as follows:

- National highway authority of India
- Airport authority of India
- Railway authority of India

And all other countries where the smog causes problems can be targeted for our device.

VII. CONCLUSION

Conclusion section: Therefore here we will just like to conclude that by reducing fog from the environment at certain level the visibility on the highways can be increased to certain extend.

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