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Pollution As a Consequence of Public Transport: A Case Study of Kolkata, India

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Abstract

One of the vital activities in an urban area is transport. However it also contributes to air pollution, noise pollution and road traffic accidents. Congestion, vibration, community severance and visual intrusion are other transport related problems.

Air quality on the city of Kolkata (a metro city of India) seems to be deteriorating. Pollution level in the city and its outskirts is alarming. This is due to old vehicle plying in the road of Kolkata and illegal vehicle plying violating pollution norms, by using bad fuel such as KATATEL. Government, non-government organization, environmentalist are doing their best, but to keep the city pollution level low, it demands a total consciousness of people from all works of life to make the city green. This study has made an attempt to sensitize the issue of pollution which is a sustainable threat to humankind arising out of public transport and the

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kind of hazardous fuel namely Katatel used by these public transport owner for running their vehicle.

Keywords: disease, Katatel, pollution, transport, urbanization, vehicles.

Introduction

In today's scenario, transport, of any kind, has got an important and vital role in the developed as well as developing society especially in relation to industry and business. From the ancient times, as we know, there was three basic need of the mankind, namely food, cloth and shelter. But in today's world one more need, the most vital one, is added and that is transport. The role of transport in the process of development is of great interest. It is the basic to the operation of the economy and society (Allport and Thompson, 1990). Transportation helps to develop economic growth. It also helps to grow technological process that leads to develop the standard of living. Besides, it also helps to integrate market and reduce the cost of the factor, and encourage division of labor. It is responsible for creating increasing rate of return. As society and economic organization have become more complex, the need for transport has expanded and people have found it essential to use other form of transport service.

The story goes like this. Right from the moment when the baby is in the womb, he knocks his mother to go to hospital and he needs transport. The baby is born and growing up. He goes to school and college and almost at every moment he needs transport. After completion of his studies, he goes to work and builds his family. Still he needs transport at every step. And it goes on like this till his death. After his death he is taken to burning ghat (crematorium) and transport is needed. Truly speaking, to get all the three basic needs of life as mentioned above, we need transport at every step. So undoubtedly transport is the prime need of our life in the present day.

Amongst many modes of transport, the role of motor vehicle is the most important. It is the most popular mode also, due to its availability in different shapes and models suitable to the public need and its easy accessibility to any place connected with minimum road network. With the growth in industries and business and fast development of the society, the need vis-à-vis growth of road transport is ever increasing both for private and public use. Road transport has come a long way from being a supplementary service mainly to railways and partly to water transport in the past, and has definitely established its identity and utility in the present days.

Road transport is basically divided into two types i.e. passenger transport and goods transport. Also depending on the need of different areas transport is classified in different nature like city transport, urban transport and rural transport. It is obvious that adequate and specific plan for all these kind of transport modes must be drawn keeping an eye on the need of the society in the coming days. The continuous development in the automobile technology is to be taken into account for such planning. Such planning will ensure coordination between different modes of transport of different area.

Now a day the air of all the large cities of the world is more or less polluted. CO_2 level in the air of all those cities are too much high. Average Suspended Particulate Matter (SPM) concentration cities in developing and developed countries are noted below:

Table 1. Pollution level of various cities across the World

Developed Countries			**Developing Countries**		
Country	**City**	**SPM**(in kg/m^3)	**Country**	**City**	**SPM**(in kg/m^3)
Australia	Sydney	138	China	Beijing	305
Belgium	Brussels	24	China	Shanghai	240
Canada	Montale	59	Ghana	Accra	150
Canada	Toronto	62	India	*Kolkata*	374
Finland	Helsinki	87	India	*Delhi*	464
Germany	Frankfurt	36	Indonesia	Jakarta	175
Japan	Tokyo	60	Iran	Tehran	241
Japan	Osaka	47	Malaysia	Kualalampur	136
U.S.	Chicago	79	Pakistan	Lahore	405
U.S.	Houston	48	Thailand	Bangkok	198
U.S.	New York	62	Venezuela	Caracas	78

Average for commercial and industrial areas (centre or suburban); Source UN, 2006.

The above table shows that less polluted cities like Tokyo, Frankfurt have less SPM and higher polluted cities like Kolkata, Delhi, have more SPM. Air quality on the outskirts of Kolkata seems to be deteriorating rapidly. The air pollution level in the city and the outskirts was found to be equal in some parameters considered while monitoring the ambient air quality by the State Pollution Control Board whereas in others, the level of pollution on the outskirts was found to the exceeding that of the city even though the vehicular traffic on the outskirt is less, most of the old commercial vehicles that were phased out of the Kolkata Metropolitan Development Area (KMDA) zone after a Kolkata High Court order where found plying in the Suburbs. The High Court band 15 years old commercial vehicles as they do not have the requisite devices to check pollution. However, most of the vehicles rule the roads near Baguihati, Hatiara, Garia, Baruipur, Khardah, Alipore, Barrackpur, Dum Dum (different places of Kolkata).

The cities differ in the nature of the air pollution, as well as in the excess pollution produce due to the specific characteristics of pollutant resources and the fuel used. However, in most case the transport is the main source of pollution (World Bank-1996).

Lack of testing centers in the districts has given a free hand to the autos that use adulterated oil “KATATEL”. A highly polluting concoction of petrol, naptha and kerosene, popularly referred as "KATATEL". Engine van time and often are entering in the city from district are also highly polluting.

Superintendent of so many hospitals of this region are saying that there has been and increase a number of patient that come to the hospital with problem such as Asthma, Bronchitis, Lung cancer etc. Pollution is one of the major factors leading to the rise in the number of patient complaining about respiratory distress (Giddens, 1991). Air pollution has already reached extremely high levels in several large cities in developing countries, exceeding the limits recommendation by the World Health Organization.

Most of the illegal vehicles of the region are using a highly polluting concoction of petrol and kerosene, popularly referred as "KATATEL". Over 80,000 of auto-rickshaws, including unregistered ones, in and around Kolkata will either have to scrapped or converted to cleaner fuel like liquefied petroleum gas (LPG) by December, 2008, as per The Kolkata High Court order on July18, 2008. Air pollution has already reached extremely high levels in several large cities in developing countries, exceeding the limits recommendation by the world Health organization.

In Kolkata, the rail and tram systems built under British rule were the most important public transport mode until India's independence. In 1948 a bus system started to operate and buy 1960 it already had a higher share of the market (60 per cent), those buses are most of the time violating the pollution norms.

Review of Literature

Urbanization is a common phenomenon of modem world. At present about 27 percent of total population are living in urban areas. This high rate of urbanization generates a frequent movement of people from one part of the urban area to another part of urban area (ADB, 2007). Further due to construction of various link road between rural and urban area frequent movement is indispensable by the means of various vehicles such as auto, taxi, bus, etc. At present auto, engine van etc are generating pollution in the city, one of the fundamental problems in this respect is the emission of Carbone monoxide from various vehicles (Eduardoa et al., 2005). This problem is aggravated by the use of KATATEL (a mixture of Disel and Kerosene) in the city like Kolkata.

Katatel: Hazards

- Deadly both for the engine and for the people
- Spews cancerous fumes whose devastating effects will be seen a few years from now
- It may lead to more profits initially but the auto engine will be wrecked.
- Long term loss will keep mounting and the auto will become inoperable.
- The possible health risks are headache, eye ,nose and throat irritation, dry cough, dizziness or nausea, rising asthma attack, bronchitis and pneumonia.

To reduce the level of pollution and keeping in the view of its importance in our society, our government had taken a scheme of conversion of auto from diesel to LPG. For that purpose the government had given the whole responsibility in the solder of Regional Transport Authorities of the KMDA. The Officers of the respected department are doing their job for

the purpose. Pollutions problem is common to growing metropolitan areas throughout the world; it is particularly severe in south Asia, where over half of all vehicles are two and three wheel vehicles operating on two stroke engines. As a result most public discussion and government policy document dealing with transportation and health focused only on air pollution as the main concern. Pollution control strategies cannot be successful in isolation and can have unintended effects in worsening the health of the people by an increase in injury and deaths (Ghose et al. 2004). When these policies do not result in an appreciable environmental benefit there can be an overall deterioration in health indices. Technological solution based oil improving fuels, engines and vehicles must be accompanied by feasible and passenger friendly implementation mode. Considering this situation, the nation has been continuously making attempts at safeguarding people's health and curbing air pollution, in all cities of India, Kolkata being no exception.

"Productivity of the citizens depends on their health. In a polluted environment, health will be the first causality. The Supreme Court passed an order for converting all public transport vehicle ,which were considered to be highly polluting to compressed natural gas (CNG) more is an effort to clean the environment", Weimar 2008.

Katatel, which is accused to be the prime cause of pollution caused by the three wheeler plying Kolkata roads, comprise of two-third kerosene and one-third petrol. In this backdrop to over 80,000 auto-rickshaws including unregistered one in and around Kolkata will either have to scrap or converted to cleaner fuel like LPG or CNG by December 2009 as per High Court order 18thJuly, 2008. It gave a fresh lease of life to the city's ambient air by converting environment department notification into an order. LPG, also known as propane, is a non-renewable gaseous fossil fuel, which turns to liquid under moderate pressure. The type of LPG use as a motor vehicle fuel is a liquid mixture containing at least 90 percent propane, 2.5 percent butane and higher hydrocarbons and a balance is ethane and propylene, the mixture is commonly called 'propane' among general consumer, but motor vehicles operators using the fuel refer to it as LPG.

Kolkata high court banned pre 1993 commercial vehicles to reduce the pollution level, but all those 15 years old vehicles are now staying out of the KMDA and they are often entering into the same region, that also enhancing pollution level of the region.

Although ozone is beneficial in the upper atmosphere because it absorbs UV rays and shields us, from solar radiation, it possesses a health threat in the lower atmosphere by causing respiratory problems.

It has been observed, in the context of public vehicles in Kolkata, LPG conversion can be done in four stroke autos, replacing the use of the cancerous Katatel. CNG technology is in a state of evolution and therefore changing all commercial vehicles to single- fuel CNG might not be feasible. The entire investment in changing the vehicles to CNG mode and acquire new vehicles within a short span will lead to ageing of all the vehicles at approximately the same time. A huge cost required to set-up the infrastructure for CNG in a very short span is bound to reflect in budgetary deficit. Further, any mishap or disruption in the pipelines supplying CNG can bring the entire public transport to a standstill. Therefore, an attempt is

being made to begin with the conversion of the three wheelers to LPG driven, which will be later extended to other modes of public transport, following the success story of Delhi(public transportation in Delhi uses CNG) and Dhaka.

Control of pollution:

We have noted that the use of katatel generates atmospheric pollution to a great extent. Carbon emission from transportation growing twice as fast as emission from other sector. That difference has been accelerating since 1990. Transport emission (of CO_2) grew 5.6 percent per year in 1980-98 in developed countries of Asia (excluding the former U.S.S.R.) and 4 percent per year in all developing countries. This pollution mainly aggravates in city areas and tends to fall the air quality of the city.

Emission migration require - an integrated approach covering

- Demand management
- Encourage greater use of public transport
- Reduce reliance on private transport
- Traffic management
- Improve traffic flow
- Improve auto-mobile and clean fuel technologies *i.e.* eco-friendly use of fuel

An unpublished study predicts that more than 50 thousand additional death will occur over next 10 years (2007~2017) due to toxic particle in major cities like Delhi, Kolkata etc. If the Supreme 'Court's order, on the entire public transport to CNG are not implemented as scheduled.

A committee constituted by Kolkata High Court submitted report with recommendations which says that CNG is no better than U.L.S.D. (Ultra Low Sulfur Diesel). The Kolkata High court filed a case on environment pollution where it included all oil companies and commercial transport carriers as parties to the case. All parties sought time to respond. Court ordered all vehicles to comply with Bharat Stage-I emission standards within a year, all three wheel operators in Kolkata to adopt cleaner technology. States files affidavit saying it has no reserves of LPG and CNG. The State appeals for an extension and modification of the order in view of “tail pipe” emission in standards. High Court modifies its order and asks all vehicles to comply with tailpipe emission standards at the earliest.

Situation of Kolkata

One of' the problems associated with Kolkata, is autos run as stage carriers whereas in every other city, they run as contract carriages. "As a stage carrier, an auto cannot violate it Designated route. So, availing LPG is a problem if the dispensing station is not on the route. In other cities, autos run as contract carriages and on meter, just as taxis do. They can fuel up wherever they want," observed an expert on urban transportation, considering the fact that there are only 14 LPG filling stations in Kolkata (news:bbc.co.ukJ2/hi/south-asia/6614561.stn,

soesju.org/arsenic/Kolkata-pollution.htm).

Kolkata is ready to give up the rogue auto for the chance to breathe cleaner air, according to a poll commissioned by Metro (The Telegraph, an English daily, January 5, 2009). Sixty seven percent of the respondents to the poll, conducted GfK MODE, said they supported the high court's ban on, two-stroke autos. An Over whelming 76 percent of the 220 respondents are sure the court's order, if implemented, will help clean the air.' But fewer Kolkatans (residents of Kolkata) - 62 percent believe that the Government will implement the ban. As many as 80 percent of the respondents said that transport department was responsible for the proliferation of smoke- belching three wheelers in the city. Possible health risks, caused by indiscriminate use of 'Katatel' in three wheelers in Kolkata is not unknown to any aware citizen and well publicized to the common man through the media. The list, though not exhaustive, includes recurrent headaches, eye, nose and throat irritation, dry cough, dizziness or nausea, rise in diseases like asthma attacks, bronchitis, pneumonia etc. The use of two stroke engine and Katatel is deadly both for the engine and the people driving and plying. It spews cancerous fumes whose devastating effects will be seen a few years from now. Though it may lead to more profit initially but the auto engine will be wrecked, and long term loss will keep the auto will become inoperable. Now we see the pollution level of some area of Kolkata:

Table 2. Pollution level of various places across Kolkata

Area	Respirable Particulate Matter (RPM) (in kg/m^3)	Oxides of Nitrogen as NO_2 (in kg/m^3)
Dumdum	114	70
Barrackpur	104	53.7
Khardha	108	71.4
Dunlop Bridge	98.7	67.1
Tollygang	85.5	64.2
Behala	90.2	76.5
Belliaghata	85	59.8
Saltlake	86.3	66.9
Topsia	80	56.2
Ultadanga	90.6	68.2
Moulali	106	79
Shayambazar	97.7	64.4
Gariahat	78.9	59.3
Mintopark	76.3	66.3
Rajarhat	84.3	52.9
Paribesh bhawan	88.9	42.1
Kolkata average	88.8	60.8

Figures are annual average of the data recorded from January 2009 to December 2009.

Source: West Bengal pollution control board (2010)

The benefits of LPG use in these vehicles are not only social and environmental but also have

direct bearing on the owner and/or driver, in terms of low maintenance cost, cheaper running and maintenance costs, near- zero pollution, and a life- saver for the environment. One of the main reasons for pollution in Kolkata is the emission from auto rickshaw. From a survey it is observed that the vehicles plying in the road of in and around Kolkata are noted below:

Type of vehicle	**Number**
Auto	80000+
Taxi	60000+
Tanker	11000+
Truck	55200+
Bus	40000+
Private four wheeler	160000+
Two wheeler	210000+

From a survey it has been observed that the vehicle registered in and around Kolkata are as follows:

Type of vehicle	**Number**
Auto	56000+ (rest are illegal)
Taxi	65000+
Tanker	16700+
Truck	75200+
Bus	43200+
Private four wheeler	575750+
Two wheeler	806570+

Source: Public Vehicles Department – Kolkata, Alipur, Barackpur, Barasat (Govt. of West Bengal, India)

DISCUSSION

There are several reasons towards the pollution of the air of Kolkata. One of the basic causal factor of this pollution is fuel used by auto. Presently most of the auto rickshaw are using katatel as their fuel and it is fairly to all that emission generated by using katatel is very high.

To reduce the level of pollution and keeping in the view of its importance in our society, our government had taken a scheme of conversion of auto from diesel to LPG. For that purpose the government had given the whole responsibility in the solder of Regional Transport Authorities of the Kolkata Metropolitan Development Area. The officers of the respected department are doing their job for the purpose. Huge amount of money is required for this

purpose, but all those auto pullers have no such amount of money for that purpose our government is helping to providing them loan from the nationalized banks such as State Bank of India, United Bank of India, Corporation Bank, Andhra Bank', United Commercial Bank, Allahabad Bank, Union Bank etc. Government is just introducing all those auto-rickshaw, driver/owner before the bank through "KYC" (Know Your Customer) form, that form is attested by the competent authority of the government, prior to that they have to apply through a prescribed form. It is a huge tremendous work as merely 60,000 number of auto are plying daily in our city area but unfortunately only 35,000 have registered, rest of all are totally illegal who will give them finance a proposal uproar that all these illegal auto can receive a permit through making their auto as a scrap. There are only 203 routes for auto in our city but in reality auto are plying more than 500 routes. At first stage our government tried to convert 10,000 autos and in this process the nationalized banks i.e. S.B.I., U.B.I., Corporation Bank, Andhra Bank, UCO Bank, Allahabad Bank, Union Bank, etc. is providing financial support but this is too small pie to our actual demand.

Till March, 2009 that rate of conversion is very low, after July, 2009 it received a new dimension because the Government of West Bengal trying their best to eliminate 15year-old commercial vehicle and 2 stroke liquid fuel auto from the city.

A WHO report indicates that the total suspended particulate matter in the Kolkata air is the highest in the world and a team of researchers from Jadavpur University (a reputed university of Kolkata) also support this view. They say that an average for breathing, an average male intakes 20m3 polluted air in a day, that leads to cause cancer in 15 years. A proper maintenance of road conditions, maintenance of vehicles within strict emission standards, reallocating industrial units in conformity with a proper land use plan and provision of alternative fuel source (e.g. solar energy, wind energy) are some pre-condition for improvement of the quality of the air. Legislative measures are likely to be ineffective unless law-enforcing agencies mean business. Other approach to combating air pollution could include a massive urbane-horticulture and planning and development of a green belt around the city.

So many non-government organizations come forward to convert auto from Katatel to LPG mode. We know that auto-drivers have some tendency not only earning money but also they have some attitude to reduce the pollution level in the city because they live in this city with their family. It is high time to convert the auto from Katatel to Eco-friendly fuel and for that purpose we need not only the government help but also a social consciousness among the common people helps to convert to ply auto from a life-dangering fuel to eco-friendly fuel. We have to develop a strong socio-economic support to the auto-driver that helps the driver as well as the owner of the auto to convert their same to eco-friendly mode and make our city pollution free. Side by side we have to reduce the use of private vehicles and at the same time we have to develop common public transport system, such as mono rail, metro rail (already in place but the area of coverage needs to be expanded), solar vehicle, etc. Finally, all we have to develop a consciousness about our environment where we live and it should be pollution free. In this sustainable work many non-government organization, environmentalist are already involved and some more need to come forward to have a pollution free Earth.

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