

# How Serious is Air Pollution from Vehicles in Dhaka City?

by Dr Jasim Uddin Ahmed

*No one living in Dhaka can claim that he/she breathes air in Dhaka. Some breathe air-conditioned cool pollution, others breathe from diluted to fresh exhausts from vehicles in the ambient air.*

THE concentration of pollutants in the city air is so obvious that the nose and the eyes are the first good enough detectors to judge, and the public do not need laboratory analysis to draw an inference. The nose mask worn by many pedestrians is a clear depiction of public inference that the polluted air in Dhaka is not breathable. The nose mask is a mark of silent protest, and a message to the motor vehicle owners that they should take necessary steps to reduce the pollution to acceptable limits in order to protect the health of the public and their own families living in Dhaka.

Air pollution in Dhaka has drawn attention of some individual scientists in the city, the World Bank, and the Department of Environment (DoE) of the Government of Bangladesh. Some studies and assessments have been carried out in recent times. These studies and assessments, though not exhaustive, have already revealed that the air pollution in Dhaka is alarmingly serious. A consultative meeting on integrated approach to Vehicular Pollution Control in Dhaka was jointly organised by the DoE and the World Bank recently.

## Magnitude of Air pollution in Dhaka

The suspended particulate matter (SPM) and airborne lead are higher than the Bangladesh ambient air quality standards and much higher than the World Health Organisation (WHO) guidelines. In particular, the city's average SPM levels are about 2 times higher than the Bangladesh standard of 200 microgram per cubic meter in residential areas and are more than 10 times higher than the WHO guidelines of 120 microgram per cubic meter (24 hours) in commercial areas.

This is a quotation from a paper by three WB technical experts (Xie, Brandon and Shah) presented at the consultative meeting. The paper also stated that the air pollution in Dhaka is worsening and added: "Severe air pollution is threatening human health and economic growth in Dhaka". It further stated that "motor vehicles in Dhaka, Bangladesh, are estimated to emit more than 3,700 tons of particulate matter less than 10 microns in diameter (PM<sub>10</sub>) per year. At least 40 per cent of the PM<sub>10</sub> is from two-stroke engine vehicles (TSEV), mainly two-stroke engine three-wheeler, mopeds, and scooters". (One micron is one millionth of one meter).

The quantities of other pollutants emitted by motor vehicles are estimated as: Nitrogen oxides (NOx) - 8,500 tons, Carbon monoxide (CO) - 5,700 tons, Hydrocarbons (HC) - 21,800 tons, and Carbon dioxide (CO<sub>2</sub>) - 15,00,000 tons. Other serious pollutants are lead and methane (CH<sub>4</sub>). The shares of TSEV (baby taxis, tempos, mopeds) in total vehicular

emissions are: PM 10-40 per cent, HC-77 per cent, CO-44 per cent, and CO<sub>2</sub>-13 per cent.

It seems clear that the major contributors to the air pollution in Dhaka are the baby taxis and the tempos. The official number of TSEV in Dhaka was 31,000 in 1996. From 1990 to 1996, the number grew by 60 per cent. This growth rate is also growing with time. Since 1996 the number of baby taxis and tempos has certainly risen. If the present exponential growth continues the share of air pollution from TSEV in the city will be increasing with time at increasing rates.

## Health Effects Due to Air Pollution in Dhaka

The WB paper by Xie, Brandon and Shah, as quoted above, states that an "initial estimates indicate that PM<sub>10</sub> emissions from TSEV could cause up to 400 premature deaths, 343,000 restricted activity days, and 11 million respiratory symptoms each year." This estimate is for only particulate matter less than 10 micron in diameter (PM<sub>10</sub>). An assessment by Brandon in 1997 asserted that "severe health problems could be avoided in Dhaka if the city's annual average pollutant levels were reduced to the Bangladeshi national standards."

Although air pollution due to total particulate matter, oxides of carbon, sulfur and nitrogen, and hydrocarbons is of concern, major attention is currently being given to PM<sub>10</sub> and lead. Lead concentration in Dhaka city are resulting from vehicle exhausts is the highest in the world, particularly during the winter months and far exceeds the WHO limit of 1.5 microgramme per cubic meter of air (quarterly average). According to a paper presented by Dr Khaliquzzaman at the consultative meeting, lead has no known function in the living body, is a cumulative poison, and, when taken into the body, gets incorporated into bone and teeth which act as store for lead in the body. Biological elimination of lead from the body takes many years. Once incorporated in the body it takes 27.5 years to eliminate half the amount of lead. In other words, the amount of lead incorporated in the body in one single day will take 27.5 years to eliminate half the quantity.

Living in Dhaka city means 24 hour intake of lead by inhalation everyday, and this implies that lead in the body of city-dwellers build up continuously. Biological elimination will not help very much. Lead from vehicles can contaminate our food stuffs and drinking water by deposition from air and through surface routes. Hence, the city dwellers are also open to ingestion of lead through food and water.

Dr Khaliquzzaman added that the "symptoms of lead poisoning are: weakness, constipation, abdominal cramp,

anemia, palsy and at times psychomotor retardation and paralysis." Children particularly are vulnerable, because their growing body absorbs four times more lead than adults. Lead in children "causes interference with the red blood cells' function and delay in normal physical and mental development of young children." The children suffer from decreased intelligence, learning disability and mental impairment. Dr Khaliquzzaman's findings were also reported in the International Atomic Energy Agency News Briefs, November/December, 1996.

Results of pilot testing of current blood lead levels in Dhaka was reported at the consultative meeting by Mr M T Rahman. He presented a paper authored by N Kawanne, J Killingsworth, Y. Hedrick-wong, L. Fulton, M T Rahman and M A Amin. Non-random blood samples of 39 city residents were taken. The samples were analysed by Prof. Amir Hossain Khan of Dhaka University. Samples were collected from drivers, outdoor labourers, policeman, professionals, housewives, rickshaw-pullers, baby taxi drivers, indoors workers and students.

The minimum level was 136 microgramme per litre of blood in one student, while the maximum noted was 1320 microgramme per litre of blood. The average is about 500 microgramme per litre of blood. Higher blood lead levels are noted among drivers and traffic police. It should be kept in mind that PM<sub>10</sub> and other pollutants are also affecting the health of the city-dwellers.

Although the pilot study has been performed with a small size, yet it is indicative of the real picture. The Dhaka city-dwellers have lead levels in blood which are of real concern. The blood lead level which can initiate detectable health effects among children is 100 microgramme per litre. This is one-fifth the average lead concentration in the blood of adults. As children absorb 4 times more lead than adults the situation with the children in the city is certainly alarming.

For various organs in adults the lead levels per litre of blood that can initiate symptoms are, in microgrammes: blood forming organs 150-300, Vitamin D deficiency 330-350, anemia 400-500, peripheral nervous system dysfunction 300, kidney and liver damage 400 and reproductive system damage 300. These figures indicate that the adults in the city are not exempted from lead poisoning.

The average is a dilution of individual variations. One should feel concerned with those individuals like drivers, traffic police, children who get into their body more lead than others.

## Should the Dhaka City People Feel Concerned?

Yes, they should. No one living in Dhaka can claim that he/she breathes air in Dhaka. Some breathe air-conditioned cool pollution, others breathe from diluted to fresh exhausts from vehicles in the ambient air.

The owners of motor vehicles for public transport race for money. The consideration for using less polluting vehicles, fuel, lube oil, etc., and proper maintenance are of no concern to them. The consideration of our living or road environment seems to be out of question to them. The pleasure of acquiring more and more money at less and less investment seems to be their primary goal. They seem to forget that this is eventually costly in terms of health effects caused to the public, to themselves, and to their own family members.

It is high time to recognise that inhalation of polluted air is subjecting the inhabitants to accumulate toxic chemicals and metals in the body that will lead them to contract diseases for the rest of their lives. Lowering children's intelligence and their mental impairment are permanent damages that are being imparted by the thoughtless adults of the present generation. The WB papers presented at the consultative meeting and papers by other individual scientists amply illustrated this fact.

The question is: where are we heading for? What net benefit are we deriving by exploiting the environment? As parents or grandparents should we not realise that our ignorance or senselessness is going to cause

irreparable damage to our future generations in particular, or even cripple them in mass? Is this our show of love and care for them? Shouldn't the authorities running the show realise this fact? Should they not look for alternative transport system better than TSEV to derive the same benefit at a much lesser harm to the living environment, to the public, to themselves and their families?

Time has come to initiate a global approach to the Dhaka city management. The city is reported to have about 10 million residents. The floating population must be more than half that figure. In other words, nearly one eighth the population of the country live in Dhaka city. The state of affairs with pollution, traffic, roads, multi-storey buildings, residential complexes, water, electricity, telephones, etc., warrants establishment of a single central authority. Under this central authority, all the players handling different issues in Dhaka will be brought under one discipline and command. Disconcerted functioning by different players will then stop.

The central authority for Dhaka city may be a separate Ministry in the Government. Such a consideration is not out of place, because one eighth the population of the country is in Dhaka where enormous issues are to be taken care of. The government cannot ignore this fact. The alternative thought may be a Government of National Capital Territory of Dhaka, similar to the one for Delhi.

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Who is the Master of Dhaka City?

I had always the impression that the city corporation is the master. In practice, its roles seem to be very limited. As there are other powerful players involved, like Rajuk, BRTA, WASA, etc., the city corporation's main functions seem to have shrunk to garbage collection, street sweeping, and putting and changing street tube lights the pollution problem of the city, particularly air pollution, has evolved due to disconcerted functions of all such masters in the game. These masters are functioning without a long term Master Plan. One example is the approval of multi-storey buildings by Rajuk in countless modern slum areas, where streets are so narrow that even two rickshaws can hardly pass. Thinking of passage of larger vehicles, including garbage collection vans, is out of question.

How can such things happen if there is a Master Plan worked out jointly by all authorities concerned? BRTA is the authority to issue vehicle and driving licences. I doubt that in doing so they keep in view the road capacity and traffic management issues. Pouring vehicles on to the streets is the job of BRTA, but do they consult with traffic police authority whether they can control the additional traffic? Another example is the off and on digging of the roads, mainly during the rainy season, causing infinite pains to the traffic and pedestrians.

The management of things in the city seems to be distributed among many authorities. That means, the overall management is no body's business. The proverb, that too many cooks spoil the broth, applies fully in Dhaka city. Overlooking the large spectrum of pollution-related problems it looks that Dhaka city is dying before death under the weight of its disconcerted development.

Let us look into what is the current thinking in India with regard to TSEV. Vehicular Pollution Control Measures adopted for Delhi were presented in two papers at the consultative meeting, one from the Transport Department, Government of National Capital Territory of Delhi and the other from the Central Pollution Control Board (CPCB), New Delhi. Both papers mentioned phasing out TSEV from Delhi as one measure to reduce air pollution. It is also understood that TSEV will be phased out of Calcutta. TSEV, therefore, seems to be a dying technology in India. While India is phasing out TSEV as a measure to reduce city air pollution, ARAI favoured options to incorporate technical kits in TSEV in Dhaka as a measure to reduce air pollution. Apparently, the kits would cost money, but at no gain. The problem will continue to grow bigger only.

One point is worth mentioning here is that while currently the WB and the Ministry of Environment have been seriously studying the air pollution problems of Dhaka, the Ministry of Finance recently authorised import of 50,000 baby taxis from India, costing Tk 50 crore (The Daily Star, 24 May, 1998). Luckily, the Bangladesh Bank declined release of such fund. Otherwise, adding another 5000 baby taxis to the present fleet of TSEV in Dhaka would have aggravated the air pollution problem further (The Daily Star, 25 May, 1998).

It is understood that the government is planning to import large number of double-decker buses to reduce the demand for baby taxis and tempos, thereby to reduce air pollution. The new budget has decreased import taxes on double-deckers. This will not really solve air pollution problem. First, it will not fulfill the need of many individuals wanting speedy movement individually - the need for baby taxis will still grow. Second, the double-decker bus from India, according to some experts, is not expected to be less polluting than the TSEV. Hence, proper assessment of emission characteristics of double-decker bus should be ascertained before taking a decision on the matter.

Phasing out of TSEV from Dhaka should start with immediate effect. Allowing 3 to 5 years' time lag will be unwise, because of the fact that air pollution situation with PM<sub>10</sub> and lead is already alarming. Such a delay will cause accumulation of more toxic pollutants in the body of city dwellers, particularly children, aggravating health effects with increasing proportions.

## Recommendations for Consideration

Phasing out two stroke engine vehicles: The government should take up a policy to phase out the use of TSEV in Dhaka and start implementing it immediately. Time allowance for 3 to 5 years must not be accepted. Subsequently, a general policy to phase out the use of TSEV in Bangladesh should be implemented.

New imports of TSEV, also their manufacture in Bangladesh must be banned. Until the phase out is completed, standard, pre-mixed gasoline for TSEV should be prepared centrally and distributed to gas stations for dispensing. The use of any other combination or mixture should be banned and violators should be punishable by law.

TSEV must not be transferred from cities to rural areas. Such transfer, if thought of, will be an optical illusion of the problem; it will only transfer the health problems from the city population to the larger group of rural people.

Vehicles alternative of TSEV, such as Maxi service or similar, should be encouraged and promoted. The government should work out mechanisms to accommodate the dislocated owners, as well as the drivers of TSEV in to the alternative vehicles scheme.

Four-stroke engine three-wheelers (FSEV) should be pro-

motivated by the government. Improvements upon it should be encouraged and subsidised.

Emission control of vehicles other than TSEV: The government should take up measures to tighten the emission standards and rules for all vehicles and ensure their strict enforcement. In doing so, the government should seek sincere cooperation and active participation of vehicle owners' associations and drivers' associations and establish functional mechanism to achieve such objectives.

In setting the emission standards for vehicles, the government should take into consideration the density of population. The density of population in Bangladesh is one of the highest in the world; in Dhaka city it is even higher. Emission standards used in USA or even in India will not be applicable in Bangladesh.

Prior assessment of emission characteristics should be ensured in taking decision on the import of motorised vehicles, including double-decker buses.

Use of un-leaded gasoline and catalytic converter: The government should take up and implement a policy for the use of un-leaded gasoline in Bangladesh. It should also consider enforcing use of catalytic converter in vehicles.

Reducing traffic jams: Traffic jams forces vehicles to idle, thus enhancing air pollution. Reducing traffic jams would need opening new roads and

removing blockades caused on main roads by the property or buildings of, possibly, influential people. These are, of course, expensive propositions but, sooner or later, something will need to be done about these. Also, traffic circles, which are the common scenes of traffic jams, should be removed. Construction of multi-storey buildings in slum and already congested areas must be banned.

Cooperation among all relevant authorities: Solving the pollution problem in the Dhaka city is not the task of one single authority. All governmental and non-governmental authorities concerned should be involved and play active roles in fulfilling their respective responsibilities.

All authorities concerned should be obliged to attend meetings held on the city pollution problems.

Establishment of a central authority for Dhaka city management: The government should consider establishing a central authority for governing Dhaka city management. The different bodies handling different activities will become departments in the central authority. The central authority may be in the Government. Alternatively, it could be named as the Government of the Capital Territory of Dhaka.

The writer is Retired Head of Radiation Safety, International Atomic Energy Agency, Vienna.



## Government of the People's Republic of Bangladesh Office of the Executive Engineer PWD Division, Natore Notice Inviting Tenders No. 24 of 1997-98

Sealed tenders in Bangladesh Form No. 2911 are hereby invited from Sp 1st Class and 1st Class approved building contractors of PWD for the undermentioned works and will be received by the Divisional Commissioner, Rajshahi by the undersigned as well as by the Executive Engineer, PWD Division No. I/II, Rajshahi/Pabna/Naogaon, SDE, PWD Sub-Divn, Nawabganj up to 12:00 Noon of 9.7.98 in their tender box kept for the purpose in the room of the Divisional Commissioner, Rajshahi & by the undersigned as well as by the Executive Engineer, PWD Division No. I/II, Rajshahi/Pabna/Naogaon, SDE, PWD Sub-Divn, Nawabganj and will be opened by them in their respective offices on the same day at 12:30 PM in presence of the tenderers who may like to remain present.

Sl No.	Name of work	Estimated cost	Earnest money	Classes of contractors entitled to submit tender
1.	Constn of several Registry Office Bldg in diff dist - one at Natore during the year 1997-98 Eng.	Tk 65,22,758/-	Tk 1,30,456/-	From Special 1st Class & 1st Class of approved bldg contractor of PWD

Contract documents consisting of Bangladesh Form No. 2911, schedule of items of work, additional terms and conditions can be seen and purchased from the office of the Divisional Commissioner, Rajshahi & office of the undersigned, Executive Engineer, PWD Division No. I/II, Rajshahi/Pabna/Naogaon, PWD Sub-Division, Nawabganj on payment of usual charges (Non-refundable). The tender form may be purchased by the contractor himself or representative on producing of authorisation letter bearing the signature of the representative duly attached by the contractor along with the registration book in any day during office hours up to 8.7.98. No tender forms and schedule of items of work etc will be sold after 5:00 PM on 8.7.98 Eng.

Executive Engineer  
PWD Divn, Natore

## BCIC Press Tender Notice

বিসিআইসি'র পণ্য শিল্পায়নে জাতীয় অগ্রগতির প্রতীক

The Managing Director, Khulna Hardboard Mills Ltd., Town Khalishpur, Khulna invites press tenders in sealed cover under two envelope system as under:

Sl. No.	T/E No.	Description of goods	Terms of delivery	Date of opening
1.	International press T/E No. KHBM/FP-68/98-99 dt. 8-6-98	Nicholson Chipper Knife	C&F, Chittagong	8-7-98
2.	Local press tender Enquiry No. LP-22(3) 98-99 dt. 8-6-98	GI Wire of 28 Swg.	Mill store	30-6-98

Quotations will be received in the tender box kept in the Mills Purchase Deptt. up to 3:00 PM on the dates mentioned above & will be opened thereafter in public. Tender documents with detailed descriptions, at a non-refundable cost of Tk. 200/00 only per set will be available from the (1) Accounts Deptt., BCIC, 30-31, Dilkusha Commercial Area, Dhaka, (2) the BCIC Branch Office, 6, Agrabad Comm. Area, Chittagong and (3) the Khulna Hardboard Mills Ltd., Town Khalishpur, Khulna during office hours on all working days except on the date of opening of tender.

Md. Mozaffar Hossain  
Purchase Officer  
for Managing Director.

## Bangladesh Forest Industries Development Corporation Eastern Wood Works 185/A Tejgaon Industrial Area, Dhaka-1208 Tender Notice

Sealed tenders are invited by the undersigned from manufacturing/supplying firms of various steel and stainless steel furniture such as Food trolley, Instrument tray, Fooding tray, GI bucket, Urinal, Saline stand etc. as used in hospital.

Tender schedule will be available from Cashier, BFIDC, Eastern Wood Works, Tejgaon, Dhaka and Cashier, BFIDC, Headquarters, 73, Motijheel Commercial Area, Dhaka at Tk 100/= (one hundred) only (non-refundable) during office hours up to 24-6-98 and will be received through tender box kept at the office of the undersigned and Coordination Officer, Director (Finance), BFIDC Head Office, 73, Motijheel C/A, Dhaka up to 12-00 Noon of 25-6-98 and opened on the same day at 12-15 PM in presence (if any) of the tenderers. No schedule will be sold on the date of opening tender.

Current Income Tax clearance certificate, current Trade Licence, current bank solvency certificate and earnest money at the rate 5% (five per cent) of total quoted amount through Bank Draft/Pay-Order in favour of "Assistant General Manager, BFIDC, Eastern Wood Works, Tejgaon, Dhaka" should be submitted with the tender. DD/Pay Order should be from a scheduled bank.

The authority reserves the right to accept or reject any tender without assigning any reason.

FIDCor: 95/97-98  
DFP-13306-11/6  
G-1426  
Md Ashraf Hossain  
Assistant General Manager

## BJMC Advertisement International Tender Notice

Sealed quotations are invited by Adamjee Jute Mills Limited, Adamjeenagar, Narayangonj for Import of (1) Spares for Sewing Machines (2) Various types of Chains (3) Spares/accessories for Lesona/FLCB/Extruder/Sizing Machines (4) Foundry Chemicals and Raw materials for Central Workshop and (5) Electrical Spares from the genuine Manufacturers/Suppliers under cash or any other available Foreign Exchange allocation showing FOB & C&F (C) Chittagong Seaport/Benapole Land Custom/Dhaka Airport prices separately.

Tender schedules with full details of requirement, specification, terms & conditions may be obtained from the office of the (1) Deputy General Manager (Accounts), BJMC, Adamjee Court, Motijheel Commercial Area, Dhaka, (2) Deputy General Manager (A&F), BJMC, Chittagong Zone, Satter Chamber, 99, Agrabad Commercial Area, Chittagong and (3) Deputy General Manager (A&F), Adamjee Jute Mills Ltd., Adamjeenagar, Narayangonj on payment of Tk. 150/= for Sl. No. 1, Tk. 100/= for Sl. No. 2, 3 & 4 and Tk. 250/= for Sl. No. 5, of each tender schedule (Non-refundable) on all working days (during office hours) except on the date of opening.

Earnest money to be paid in the form of Pay Order/Bank Draft in favour of Adamjee Jute Mills Ltd. Tender schedule purchased money receipt also to be enclosed with the tender, otherwise tender will be straightway cancelled. Tender is to be dropped in the tender box kept in the office of (1) Deputy General Manager (Planning), Planning Division, BJMC, Adamjee Court (5th floor), Motijheel Commercial Area, Dhaka & (2) Dy. General Manager (SP), Adamjee Jute Mills Ltd., Adamjeenagar, Narayangonj and will be opened on 12.07.1998 at 12-30PM in presence of the bidders, if any. Tender box will be closed at 12:00 Noon. The management reserves the right to accept/reject any tender in full or part without any obligation or assigning any reasons.

BJMC : 373  
DFP-13544-14/6/98  
G-1435