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REVIEW ARTICLE

IMPACT ASSESSMENT OF NOISE POLLUTION IN RELATION TO DAMAGE ON HUMAN IN SYDNEY AND THE PRECARIOUS NOISE POLLUTION OF DHAKA

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ABSTRACT

Excessive noise causes if that exceeds the noise standard at compliance point set either by regulation, an environmental authorization or an approval. Mounting scientific evidences suggests potential serious mental and physical harms are created by the following major sources such as: Aircraft noise; Traffic noise; Noise from portable loud speakers; Construction noise; and Industrial noise. Excessive noise exposure on a regular basis will develop many indirect and direct health problems that will affect everyone (infants, children and adult) resulting various medical conditions. More damaging ones are: annoyance, sleep deprivation leading to insomnia; pregnancy and birth related problems; high blood pressure leading to cardiovascular diseases; and eventually it will cause mortality. Rampant use of Hydraulic horns on a daily basis at Dhaka city is leading Dhaka dwellers towards permanent deafness particularly the children, an unacceptable consequence therefore urgent measures are needed to ban hydraulic horns altogether. Strategies that will reduce noise generation effectively to maintain healthy living will include: Raising Community Awareness; Noise Inclusion in Academic Curriculum; Raising Media Participation; Government Sponsored Incentives; Sustainability Improvement and Of course Strict Enforcement of Smoke Regulation. In Sydney and in the western countries awareness is raising and overall noise trend is slowly declining but the accelerated traffic noise in the western world are the biggest causes of concern. It is reported that in Europe alone there are more than 50,000 deaths are taking place. European countries are increasingly adapting complete modal shift from private transport to public transport aimed to bring dual benefits - in one hand it will reduce acoustic contamination and on the other hand it will improve the environment by reducing air pollution. But in Dhaka the noise level is getting worse with the increasing number of Vehicles, Buses and big Lorries in the street 24 hours a day with increasing use of hydraulic horns in addition with increasing sound levels in every sector as country is going through economic boom. It is reported by UN that Bangladesh is on track to enter top 30 economies by 2030. While regulation and hefty fines is the best weapon to curb noise problem and there are many good regulations are in place but they still have limitations and loopholes which needs to be rectified including strict enforcement of the compliance of full forces of regulations. In addition community engagement through consultation and participation, encouragement and incentives and accompanied by effective structural changes are required to effectively reduce noise level to a healthy level amid development activities. In Bangladesh lack of education and ignorance is the main enemy. Introduction of traffic rules and the impact of noise on human health should be a mandatory part of schools and college education. Understanding of consequences of excessive noise by the drivers will definitely bring positive results.

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INTRODUCTION

The massive unplanned growth of industries during the western industrial revolution has inflicted great damages to the global environment which also have contributed in producing

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Noise problem all over the globe. Since the introduction and application of "Triple Bottom Line Principle" and "Quadruple Bottom Line Concepts", nations around the world are increasingly putting in place stringent regulatory requirements aimed to improve the environment. Scientists and researcher all over the world have agreed Noise Pollution causes Irritation, Anger and Aggression but in extreme cases it can cause Hypertension, Sleep Deprivation, Hearing Losses, Heart Disease, Mental Illness and many other health problems. The

purpose of this exercise is to identify the daily Noise doses that people in Urban Sydney areas are exposed to and the associated stresses and the challenges in relation to human health. The scope of the project is also to Identify as far as possible, the potential capabilities, constraints and opportunities of those stresses. The primary aim is to identify the effective control measures and how they can best be applied to keep the Noise Level at a level that is acceptable by mass population to avoid any potential health risk.

A. What is Noise Pollution?

Noise is referred to as a sound that is random, loud, irritating and very unpleasant. It is a mixture of sound coming from multiple sources which cannot be controlled. It originates from many sources some important ones are mentioned briefly in section I.B. The Term "NOISE" is a Latin word and it means "SEA SICKNESS".



Fig. 1. A Boeing -747 - 400 passes close to house shortly before landing Heathrow Airport (source: www.en.wikipedia.org)

Types of Noise Pollution

Aircraft Noise: Aircraft (Fig. 1) neither have noise compliance nor does it have any maximum allowed level. As the aircraft takes off it reaches the maximum level of noise within 10 seconds but normally it varies between 20-40 seconds depending on the height, type and loudness of the aircraft. Residential areas close to airport have received special grant from Australian government to install noise proof double glazing to avoid excessive noise.

Traffic Noise: Australian Road Rule 291 prohibits vehicles (Fig. 2) from emitting excessive noise other than permitted level. According to Australian Vehicle Certified Rule generated noise should ideally be limited to 2-3 decibels (EPA, 2008). According to Clause 13, 17, 18, 19 and 20 vehicles emitting noise up to 5 decibels incur a fine of \$150.00 and the fine goes up with increasing noise. The Environment Protection Authority (EPA), Police and Local Councils are empowered to enforce traffic regulations.



Fig. 2. Traffic Noise and Congestion in one of India's important city (source: www.ccclab.info/2011.....India/)

Portable Loud Speaker Noise



Fig. 3. Loud Noise Miking - a common phenomenon in the developing countries (source: www.sdmags.net...../noise-pollution)

These types of noise are generally produced in large gathering place for meeting, concert, market place and similar location

Construction Noise: Today's modern world is an era of construction boom frequently generating unbearable Noise (Fig. 4). According to EPA rule construction work should not begin before 7:00 am and must not continue after 7:00 pm between Mondays to Friday.

Construction work is not permitted during Sunday and Public Holidays, unless prior written approval is granted by the concerned public authority.



Fig - 4. Unbearable Construction Noise Pollution (source: www.vincent. wa ...nuisance_Noise/Noise)

Industrial Noise: Industrial revolution in the western world including Australia began in late 19th century and continuing till today. It is a major source of noise and developed nations have produced a series of regulations, acts and legislation to keep the noise at its minimum. The acceptable level of Noise in terms of decibel ranges between 0 dB to 194 dB. receiving a noise does of more than 90dB for a long period of time will start to generate negative effect to human hearing. Decibel level over and above 120 dB is considered dangerous for human hearing.



Fig. 5. Severe manufacturing noise from today's competitive manufacturing Environment (source: www.site.google.com.../nowheretostandstill)

Field Measurement of Noise

Field measurements of noise have been completed in various combinations covering a wide spectrum of noise scenario using the following instrument outlined in section 2.1.

Instrument Used

The following Sound Level Measurement (Fig. 6) was manufactured by American Recorder Technologies. It has the following specification: CE IEC 651 TYPE II SPL 0 8810). Sound Level: Lo = 30~10dB, Hi = 60 ~130 dB, Frequency, Weighting: A, C. Time Weighting: Slow or Fast.

Locations of Noise Measurement: Noise Measurement have been completed covering a wide variety of locations (Table. 1) ranging from Quietest (Living room in the middle of the night)

and LOUDEST (Disco). These values ranges from 35.4 (36.5) to 92.4 (79.4) decibels indicating a huge difference between these two environment.



Fig. 7. Comparison of Global Air Pollution Emission Level (source: adapted from Gregory Keoleian, University of Michigan)

Interpretation of Noise Data

Data Presentation: Measured Noise Data and the corresponding mobile sound level volume measurements are summarized in Table. 1.

Table. 1. Noise measurement carried out at various locations in Sydney

Name of Activity	Noise in dB	Volume on phone	Noise in dB
Sitting in the UTS lobby		8 bars out of 15	64.2
Studying in the UTS library	48.7	5 bars	52.5
Travelling on bus in non peak hrs - moving	68	7 bars	62
Travelling on bus in non peaks hrs - bus stops	70	7 bars	62
When the door of a bus with a ramp opens/shuts	80.6	9 bars	65.5
Train at Central station - Train stopped	65.1	11 bars on iphone	75.4
Train at Central Station - door closed	70.3	11 bars on iphone	75.4
Train at museum station	67.3	11 bars on iphone	75.4
Train at St James station	66.5	11 bars on iphone	75.4
Travelling in passenger seat of a car with windows open	68.2	7 bars	62
A night at the disco	92.4	15/15	79.4
At midnight	35.4	2 bars	36.5
Walking between UTS and Broadway shopping centre at 10:30am when heavy vehicles passed by	85.7	9 bars	65.5

Calculation and Interpretation: Sound level management is only required when the measurement values exceeds 75 dB level. In the current measurement session noise level exceeds 75 threshold levels in three occasions and They are: (1) When travelling by the bus and during doors open/shut situation; (2) During the measurement taking session at the night time Disco; and (3) While heavy vehicle passes while walking along the Broadway.

- The measurement session tool place at Disco is for 4 hours (92.4 ≈ 92).
- The measurement session continued in the Broadway Walk is about 20 mins (85.7 ≈ 85).
- The measurement session during bus ride was about 20 mins (80.6 ≈ 80).

The theoretical daily noise dose for the above environment would be:

$$10 \log ((1/8 (4*10^{9.2} + 0.33*10^{8.5} + 0.33*10^8)) = 89 \text{ dB.}$$

COMMENTS ON THE RESULTS

Hearing protection is required when noise level exceeding $L_{Aeq,8h}$ 85 dB (A). The theoretical calculation calculated noise

value is 89dB which is above 85dB hence sound protection is required. Hearing protection should be clearly defined and sign-posted according to Australian Standard AS 1319.

Fatal Consequence of Noise

Environmental Ambient sound level beyond the comfortable level causes many direct as well as indirect health effects. Major consequences diagnosed through research are: hearing loss, initial sleep problem may lead to mental problem later in life, has the potential to trigger premature illness, and in its extreme event, may cause mortality, noise can cause high blood pressure and it certainly elevates blood pressure and risk of cardiovascular disease along with the following identified sector wise consequences:

Impact on Children: Residential locations close to freeway have become a focal point of research using children residing close to freeways. Volks, Heather E *et al* (2011) has expressed their opinion that children exposed to constant freeway noise are more vulnerable to Autism. A research review conducted by Bishop (2003) on children (Day-Care, Primary and High School) in several EC countries and in USA, found that that a reduction in noise levels improved speech and word intelligibility, short- and long-term memory, linguistic skills, and good results on annual examinations. It has been known for decades that noise interferes with the communication between teachers and pupils, hampers short-term memory, reading and linguistic skills, motivation, and reaction time (Jaminez-Tejada *et al*, 2012). The research conducted by Jaminez-Tejad *et al* (2012) found that student has branded noise as a contaminant (Fig. 8) along with industry and traffic noise. Many different scholarly articles published around the world have confirmed that noise related hearing loss among children and adolescent are growing first. These are primarily due to: (1). Lack of understanding; (2) Low social awareness; (3). Poor parental engagement in relation to noise pollution issues; (4). School curriculum does not encourage teachers and students to take the noise issues seriously in relation to healthy hearing; and (5). Lack of publicity of well documented noise produced health problems.

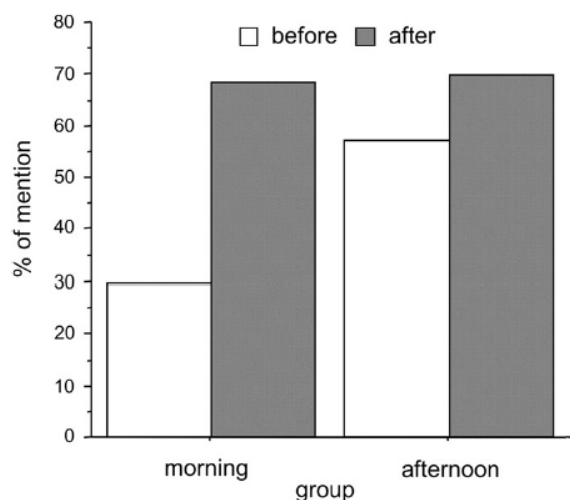


Fig. 8. Percentage of children branded Noise as a Contaminant (source: Jaminez-Tejada *et al*, 2012)

Impact on Adult: A more frequent visit to noisy places The research conducted by Vogel *et al* (2008) on Dutch students has proved that those who make more frequent visit to Noisy

places has the tendency to set the volume high on their MP3 player than those who only make occasional visit to noisy places. Exposure to excessive noise on a regular basis develops multiple problems in the later stages of life.

Most common health problems are:

- Noise-induced hearing loss (NIHL) as a result of excessive over-dose of noise pollution;
- Stimulation of autonomic nervous system is caused by noise over-doses. which leads towards high blood pressure and eventually develop cardiovascular diseases;
- Wei, sun *et al* (2012) has experimentally proved that noise exposure induces hyper-excitability of auditory cortex (AC) related to hyperacusis behavior;
- The research work conducted by Gan, Wen, Qi *et al* (2012) shown that long-term community noise and traffic related air pollution has close links to coronary heart disease mortality; Drata, Julia *et al* (2012) completed a comprehensive study on transportation noise and its implication on human health.

They have observed that mean noise exposure during the day and night was 51 dB (A) and 19 dB (A) for traffic noise, respectively, 19 dB (A) and 17 dB (A) for railway noise. Adjusted regression models yielded significant effect estimates for a 10 dB (A) increase in railway noise during the night and day. Stronger associations were estimated for participants with chronic disease and significant associations were seen only among participants with diabetes in connection with traffic noise (Drata, Julia, 2012). Their study concluded by saying that "more severe health effects were evidenced in vulnerable people with hypertension, diabetes or CVD in association transportation noise.

Impact on Female and Pregnancy: A number of medical research [(Etzel, Ruth and Balk, Sophie, 19970, (Luke, *et al*,1995), (McDonald, et at, 1988) and (Schell, 1981)] have confirmed that pregnant woman with regular noise exposure has an increased risk of shortened gestation. Women exposed to 80 dB for an 8-hour shift were at increased risk of preterm delivery with decreased birth weight.

Impact on the Environment: The health impacts of environmental noise are a growing concern for policy maker and general public in the developed world including Australia. Extensive urbanization and the increase of road transport define the main driving forces for the environmental noise exposure of the population (Vogiatzis, 2011). There are simply too many cars on the street releasing excessive noise and air pollution to the environment. Moreover Automation is creeping in to other mode of transport (scooter, motorized bike and other manually operated transport. Industrial revolution, construction boom and modernization of service industries in combination burning too much fossil fuel worsening noise and air pollution even further. The noise pollution produced by various transport medium has become an important element of annoyance. Paviotti, Marco and Voziatzis, Konstan, 2012) have evaluated the psychoacoustic annoyance in the street of Athens. Based on the literature review and on the new evidence it is clear that annoyance is reported by people actually hearing the PTW (Powered Two Wheels) within the traffic, and that PTW are amongst the most annoying sound

sources, and therefore there is an increasing need for attention (Paviotto and Voziatzis, 2012, Racioppi, *et al* , 1999).

Dhaka World's no-1 Noise Pollution City: By virtue of my employment with the world's biggest airline I have travelled most part of the world with United Airline free of charge most of the time first class and business class and have visited many major cities in the world. By volume Dhaka city still has the lowest number of vehicle but Dhaka has become world's number one noise polluted city in world.



Fig. 9. Sound Noise at its worst level at Dhaka city. (Source: Newage, newsbd.net (26 Jan, 2016): <http://newagebd.net/196732/sound-pollution-remains-a-serious-health-hazard-in-dhaka-city-what-should-the-authorities-concerned-do>)

In Dhaka city the noise of a busy street has been estimated at 60 to 80 dB, vehicles sound is measured around 95 dB, loud speakers produces 90 to 100 dB, mills and factories 80 to 90 dB. In short 15 million people at Dhaka are catastrophically proceeding towards deafness.

Reasons

Unnecessary pressing of hydraulic and other types of Horns: Most buses, trucks and big Lorries are equipped with hydraulic type of horns. These hydraulic horns emit 100 dB of noise from a close range. These noise levels could bring deafness to all human being particularly to school going students if they are regularly exposed to them and in case of Dhaka everybody is exposed to hydraulic horns on a daily basis.

Inefficient Traffic Control System: Traffic police in many instances fails to control the vehicles on the road and the main reasons behind them are: inadequate number of traffic police on the road; inadequate number of traffic lights; disobedient drivers are constantly trying to break the law; and there are a sizeable amount of traffic police who are engaged in corrupt behavior. Because of these major reasons traffic control system does not work properly.

Drivers and Conductors are illiterate and Ignorant: 95% of drivers and conductors (helpers) are inefficient; most of them have hardly completed PSC, many of the can hardly read or write. All of them come from a very poor background. They do not know how to behave properly with customers. Most of them are hot tempered, unruly, liar and disobedient. They have no respect for customers (travelers). Both Conductor and customers have poor knowledge about fare structure and most of the time they engage in haggling over fare with each other.

Unnecessary Dangerous Competition of Vehicles: All drivers particularly the bus drivers are engaged in unnecessary dangerous completion. Every bus drivers break laws to pick-up more passengers by blocking other buses to move forward. This mal practice results in traffic congestion. Rough driving and breaking speed limit makes passengers life miserable and everyday many people's are run-over by the buses and trucks and get killed. The passers-by are also responsible for this thing to happen because they do not obey traffic rules during road crossing.

No Respect for Laws by the Drivers: Both drivers and passengers are constantly engaged in law breaking activity—for example – a bus that is supposed to carry limited number of passengers only to their seat capacity. Nobody is supposed to stand inside the buses; but neither the conductor nor the passenger follows these rules. Conductors are greedy to earn more money from standing passengers, on the other hand, when conductor's wants to limit the number of passengers, then the passengers force themselves into the buses by risking their lives – the end results too many passengers in a limited number of seating bus. During rush hours (morning and evening) the number of buses carrying passengers are seriously inadequate but everyone needs to get to work therefore break the law regularly to and from work.

Corrupt Behavior of Law Enforcement Agencies: To make thing worse a sizeable amount of traffic personnel are engaged in unlawful activities. They take bribe from the buses and trucks that break the law rather than punishing them. Effective regulatory system and its strict enforcement will help reduce such a chronic noise problem.

Solutions

Ban Unnecessary Pressing of Horn by Upgrading Law: According to World Health Organization (WHO) desired sound level should be 25 dB in the bedroom, 40 dB in the dining or drawing room, 35-40 dB in the office, 30-40 dB in the class room, 35-40 dB in the library, 20-35 dB in hospital, 40-60 dB in a restaurant and 45 dB in the city at night. WHO recognized that 60 dB sounds can make a man deaf temporarily and 100 dB sounds can cause complete deafness. At Dhaka the hydraulic horns must be banned immediately as well as all unnecessary pressing of horns should be monitored everyday on a regular basis at as many location locations as possible. The offenders must be caught and punished with a hefty fine and their driver licence suspended for at least three months.

Drivers Pass Marks Should be 100% in the Examination: I am holding three driver licences (British, Australian and Bangladesh). Getting a driver licence in England was the toughest of all. I failed sixth time before getting a British driver licence. One has to get 100% marks to get a British Driver licence no exception. I want to request the appropriate authority to follow British model to produce world class drivers because we must remember that driving kills if not driven correctly.

Remove corruption in obtaining Drivers Licence: Unfortunately various level of corruption does exist in every government departments and RTA is not an exception. Time

has come to uproot all types of corruption from all departments including RTA Licencing authority.

Strict Enforcement of Traffic Infringement: The entire city of Sydney is covered by red light speed cameras, mobile speed cameras and highway patrol police is scattered in such a way that any offenders can be caught without fail. All offenders are caught and punished with hefty fines, and based on the seriousness of offences suspension period of licences are determined. This practice can be implemented at Dhaka city without any delay.

Introduction of Traffic Rules Lesson at Schools and Colleges: Most drivers come from a poor family and who does not have adequate education and a large section can hardly put their signature to get a driver licence yet they manage to get licences. I want to stress here that there should not be any compromise with the quality of driving skills. I recommend very strongly that traffic rules, driving skills and the consequences of faulty driving must be taught at schools and colleges. Every driver should know that faulty driving makes people sick but a few seconds of mindlessness can kill many people including driver.

Achievement of 100% Education: Our current education rate is about 70%. It is a great news that our honorable Prime Minister - Desh Ratna - Sheikh Hasina has declared that every citizen of this country should be able to read and write very basics of education so that they can read and write their names and put down their signature by 2021. I would ask everyone concerned in this program should work hard with sincerity and devotion to attain the objective on time. Without adequate education it is impossible to produce good drivers.

Construction of New Roads and other Modes of Travel: It is a fact that Dhaka city does not have enough roads for the exiting vehicle on top of that every month thousand cars are added to the existing fleets making traffic congestion worse. It is also true that Dhaka is one of the unplanned cities in the world. I am sorry to say that RAJUK has certified big multistorey building but never thought of keeping enough road space to pass two cars even in areas like Gulshan, Banani and Baridhara. Rajuk has made Dhaka city inhabitable. Getting a new road within Dhaka city is impossible therefore alternative mode of transport is the only answer. There were many governments in the past who were so busy in governing that they did not have any time to think about the increase of population, necessity of new roads, they did not have the capacity to think that Dhaka city will become a mega. They were busy in looting people's money under the protection of notorious home minister Lutfuzzaman Babar siphoning thousands of crores of taka to foreign banks and left every difficult task to be completed by Sheikh Hasina the current prime minister. Sheikh Hasina has already proved that she is a true patriot like her father - Bangabandhu – Sheikh Mujibur Rahman and she has already established our economy on very strong footings. UN has declared that under her (Sheikh Hasina) leadership Bangladesh is on its way to become one of the top 30 economies of the world by 2030. She has begun revolution to build mega infrastructural projects. Construction of "Light Rail" roads and many u-loops, under passes and over passes have begun under the supervision of Transport Minister. Once done things will be lot better. The country therefore needs her to govern with her rock solid determination, courage

and statesmanship for many years to come to build Bangabandhu's "Sonar Bangla" a job nobody else can do.

Noise Control Measures

Injection of noise related lessons. This is the best way to deliver the benefits noise reduction so that they get the lessons for life and embrace the learning in work place environment and in everyday life situation. The other obvious benefit will come from this early training will work as a positive catalyst for the parents to become knowledgeable about acoustic contamination and its injurious effects on human health.

Raising Community Awareness: One of the fundamental barriers to overcome in preventing damage associated with acoustic contamination is the lack of public perception of the hearing problems due to excessive noise exposure (Holmes *et al*, 2007). People tend to justify noise as being unimportant or weak when they themselves produce it (Sanchez, 2001). Raising community awareness is one of the objectives of health education (Busqueis & Leal, 1993). Raising awareness is very important about the consequences of acoustic contamination and the related health problems that may arise from excessive noise exposure. A multidisciplinary approach is needed and would be very effective to increase the awareness by combining general public, students and their parents and school teachers to design an effective program. A well trained and well informed teacher community would be very effective to raise the awareness of student community which will have snowball effect in raising the awareness of the parent's community by the well informed student children.

Awareness rising is also vital to school teachers who will deliver the message effectively among the children. Therefore effective training program catered specifically for the teachers should remain in place as an ongoing program.

Raising Media Participation: Electronic media (radio, television), Computer based web media, Newspapers and billboard and other news transferring media should run regular program in educating general mass about the impacts and consequences of acoustic contamination particularly in connection with health deterioration. This combined action will bring visible positive results. Free mandatory vocational and other TAFE training particularly designed for unemployed, people on benefits and workers engaged in construction and other noise generated employment will be very effective in dealing with noise contamination.

Introduction of Government Sponsored Incentive: A research work on night time aircraft movement (Tetreault *et al*, 2012) at Toronto Airport have revealed that maintenance of 15 dB sound level makes very few night time awaking. The Government sponsored incentive of free sound proof double glazing installation was very welcomed and effective to thousands local residents close to Sydney Kingsford-Smith airport to reduce aircraft noise to an acceptable level. Similar incentive may be negotiated with other Manufacturing and Construction industries producing excessive noise. It is proven that repeat message always works it may start on slow footing but gradually they gets their momentum and serves the purpose. It is therefore very important that government sponsored educational programs are in place for in seminar, workshop and public lectures on acoustic contamination for general mass with the benefits of noise reduction. Better

understanding will bring improved realization to put in practice the noise reduction measures in work place situation and in everyday life environment.

Inclusion in Academic Curriculum: A multidisciplinary academic curriculum covering sound, noise, environment and health should be introduced as a mandatory subject from beginners to HSC (A-Level) level students designed for continuous

Sustainability Improvement: EC countries are engaged in research to find out the best for complete modal shift in transport framework. As an affluent society buying a car is not a big deal for them anymore. In the same token motor vehicle has become the principal mode of transport for going to work and for everything else. Motor vehicle is no longer a luxury; it is a necessity paving the way to increase the number of cars astronomically. The developed world is fast realizing that the convenience of having cars is increasingly being offset by environmental degradation caused by air pollution and noise problem. Air pollution has brought greenhouse gas effect, ozone depletion and sea level rising and global warming. Acid rain is a very big problem for the entire Europe. Too many cars on the other hand bring excessive noise problem creating huge health problem and death to more than 50,000 people every year in Europe alone. Since the London Olympic UK has taken the lead in transport research to work out the mechanism for modal shift from private transport to public transport system. The astronomical growth of cars needs to be slowed down and the trend must be reversed for environmental sustainability. Prior to London Olympic during the infrastructure construct they have given priority to public transport system, established dedicated path for cycling and encouraging people to use public transport, bring back the cycling habits and encourage walking via the dedicated walk way designed during and after Olympic. Regular advertising are going on air advising people to engage in moderate physical activity as low as 30 minutes a day for 5 days which will dramatically reduce cardiovascular diseases by one third. For the legacy, the London Olympic Environmental Statement states that a new highway hierarchy is provided across the area with improved pedestrian and cyclist facilities, plus better connectivity with public transport mode. Indeed, International, national, London and local policies for transport and health all point in the same direction - a modal shift away from road motor vehicle and towards active travel through walking, cycling, and public transport (McCarthy *et al*, 2012). This will reduce number of cars, less air pollution, less noise and above minimizing premature loss of precious human life.

Strict Enforcement of Noise Regulation: Australia has developed a series of Guidelines, Acts and Regulations targeting particularly on Noise and Acoustic Contamination (See References). Although there is a tendency to respect those regulations but major breaching are still taking place it is about time that EPA, Police and Local Councils strictly enforce these regulations to maintain a healthy lifestyle. There is a growing need of well trained law enforcement personnel to make their job effectively done. Hence a provision of ongoing specialized noise training will produce quality outcome in reducing noise pollution thereby contributing in producing a healthy nation. Australia has a high reputation in the world on many other fronts. It is about time that Australia leads again by being a noise free nation which will encourage other nations to follow suit and will try to catch up our examples.

Conclusion

Elevated uncomfortable noise develops much direct and indirect health condition. Major consequences originating from noise includes high blood pressure, mental illness, cardiovascular diseases leading to eventual mortality. In Bangladesh, Dhaka city in particular the rampant pressing of hydraulic and other horns on a regular basis slowly developing permanent deafness, a catastrophic consequence is waiting to happen unless authorities are urgently acting to ban hydraulic horns. In Europe alone more than 50,000 deaths are cause by unacceptable noise pollution (www.transportenvironment.org). WHO recommendation (2009-2019) has identified night time noise is more injurious to health if threshold level exceed 40 decibel (dB) and is more likely to develop sleep disorder and insomnia. Regular night time exposure above 55 decibel (dB) will trigger blood pressure symptoms. As the wisdom increases, evidence about the danger of acoustic contamination has become evident with increasing public awareness. Due to increased community demand, health and safety issues the government has become more active in devising effective regulatory measures as well as its effective application and enforcement in the western countries and Bangladesh should their footsteps without any delay. It is great news that the danger of acoustic contamination is widely recognized and its negative consequences understood by the local as well as international community, which are forcing everyone engaged in noise producing activities to take appropriate measures to keep noise level to acceptable level. The world as well as Australia is now more intelligent with the gift of knowledge and technological advancement. Traditionally Australia has taken leading role in many sectors and the time is ripe now to make significant contribution in reducing acoustic contamination. This will encourage other nations to follow suit in order to make healthy noise free environment. The current calculation exercise produces a dB value of 89 which above the threshold Laeq,8h (=85dB). Although this value is not very high but monitoring, alert and watch is recommended. Like Australia, Bangladesh needs to act quickly and decisively to curb the noise pollution producing by the rising transport industry, booming construction industry and other industries to protect millions of people from deafness. Australians are educated but Bangladeshis are not, Australia is a rich country but Bangladesh is not, Australians are law abiding society but Bangladeshis are not, Australians law enforcing agencies are honest but Bangladeshis agencies are not. A radical change is required and I believe under the leadership of Sheikh Hasina – Desh Ratna – honorable Prime Minister of Bangladesh everything is achievable.

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APPENDICES

Appendix – 1

ADJUSTMENTS TO NORMALIZED NOISE EXPOSURE LEVEL $L_{Aeq,Sh}$ FOR EXTENDED WORKSHIFTS

Shift length, h	Adjustment to $L_{Aeq,Sh}$, dB
< 10	+0
≥ 10 to < 14	+1
≥ 14 to < 20	+2
≥ 20 to 24	+3

Example

A person works a 16 h shift in an equivalent continuous noise level $L_{Aeq,T}$ (T=16) of 87 dB(A). The normalized total daily noise exposure level $L_{Aeq,Sh}$ is therefore 90 dB(A) (i.e. $87 + 10\log_{10}(16/8)$). Adding the 2 dB adjustment given in Table 2 for a 16 h shift gives an adjusted $L_{Aeq,Sh}$ of 92 dB(A). This value should be used when planning noise management action for this person.

Appendix - 2. Decibel to Pascal – Squared Conversion

dB	Pa ²	dB	Pa ²	dB	Pa ²	dB	Pa ²	dB	Pa ²
75	0.013	85	0.13	95	1.3	105	13	115	130
75.5	0.014	85.5	0.14	95.5	1.4	105.5	14	115.5	140
76	0.016	86	0.16	96	1.6	106	16	116	160
76.5	0.018	86.5	0.18	96.5	1.8	106.5	18	116.5	180
77	0.020	87	0.20	97	2.0	107	20	117	200
77.5	0.023	87.5	0.23	97.5	2.3	107.5	23	117.5	230
78	0.025	88	0.25	98	2.5	108	25	118	250
78.5	0.028	88.5	0.28	98.5	2.8	108.5	28	118.5	280
79	0.032	89	0.32	99	3.2	109	32	119	320
79.5	0.036	89.5	0.36	99.5	3.6	109.5	36	119.5	360
80	0.040	90	0.40	100	4.0	110	40	120	400
80.5	0.045	90.5	0.45	100.5	4.5	110.5	45	120.5	450
81	0.050	91	0.50	101	5.0	111	50	121	500
81.5	0.057	91.5	0.57	101.5	5.7	111.5	57	121.5	570
82	0.063	92	0.63	102	6.3	112	63	122	630
82.5	0.071	92.5	0.71	102.5	7.1	112.5	71	122.5	710
83	0.080	93	0.80	103	8.0	113	80	123	800
83.5	0.090	93.5	0.90	103.5	9.0	113.5	90	123.5	900
84	0.10	94	1.0	104	10	114	100	124	1000
84.5	0.11	94.5	1.1	104.5	11	114.5	110	124.5	1100

NOTES:

- The pascal-squared values in the table above have been rounded to two significant figures. This will result in an accuracy of at least ±5% or ±0.2 dB.
- This Table can be extended to include both higher and lower sound pressure levels. A change of 10 dB results in a tenfold change in the Pa² value. For example, the 133 dB value will be 10 times the value of 123 dB, that is, 8000 Pa². Also, the 67 dB value will be one tenth the value of 77 dB, that is 0.002 Pa².
