ENVIRONMENTAL AND ECONOMICAL IMPACT OF TRAFFIC JAM (EMISSION OF CO2 INTO THE ATMOSPHERE) IN SILCHAR TOWN OF CACHAR DISTRICT, ASSAM

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Abstract:

Traffic jam and Air pollution is directly inter-related. In the recent study carried out at three distinct areas of Silchar town, Cachar, Assam viz- Tarapur (450m), Sadarghat to Old Lakhimpur(200m) and Premtala to Rangirkhari (1300m). In the study, it is found that an average of 465 bikes, 497.5- Autos and 312.5- Private cars daily suffers traffic jam within Silchar. It is estimated that on average 2393.455 L of Extra pertol is consumed daily in a the Trafiic jam that leads to average economic loss of Rs- 166991.36 daily and Rs- 60951854 anually. After calculation of amaount of CO2 per litre petrol released into the atmosphere , it is estimated that 5528.88kg of extra CO2 is added into atmosphere daily and 2018041.5 kg annually.

Introduction:

Air pollution is very persistence and global concern which catching the eye of every people. In recent days, the impact of air pollution is always in the highlight specially in the cities(example – " Los Angeles smog in Delhi (www.britannica.com). Globally 3.3 million of people die each year due to air pollution (WHO) , these deaths due to health effect like difficulty in breathing, wheezing, coughing, asthma and aggravation of respiratory and cardiac condition etc. In India, air pollution kills approximately 1.5 million people per year from chronic respiratory and asthma(WHO). Along the health effect, environmental effect – acid rain, hazardous ground ozone, decreased crop yield and the economic effect like expenses to sustain life and prevention of pollution are associated. Hovoc causing invisible bullets are the Oxides of Sulphur(SOx), Oxides of Nitrogen(NOx), Carbon monoxide, ammonia, particulate matters etc. High rate of air pollution is contribution of deforestation, industrialization, automobiles ,land conversion, forest fire, volcanos etc(Dr MP Choudhury "Cause, Consequence and Control of Air Pollution"2015, P2-4).

Motor vehicles contribute 25-35% PM in Asian countries(IARC Scientific Publication -161, p-52). In India , automobiles alone contribute more than 14% of total pollutants (https://en.m.wikipedia.org). In 2013, automobiles contributed more than 50% of carbon monoxide and nitrogen oxides and around 25% hydrocarbons (https://ucsusa.org)

Traffic problem in Indian cities and towns is daily trouble for city dwellers .Study conducted by Global consultancy firm in four major cities of india- Delhi, Mumbai, Bengaluru and Kolkata suggests , traffic delays journey by 1.5times leads to consumption of more fuel and costing 1.47 lakh crore annually (https://times ofindia.com). As traffic

jam leads to consumption extra fuel ei excess than need and as a results there is excess emission of pollutants adding more to the trouble.

Study area:

Silchar, the township of Cachar, Assam , situated at 24.83N and 92.8E, covers approximately 8km busy road. Peak time in the town is 9.am to 11am and 2pm to 6pm. . Traffic jam in Silchar is very common and daily phenomenon which the dwellers have to face on way to their work place .

Methodology:

For the study, three areas are taken , viz are (i) Premtala Point to Rangirkhari point(1.3km), (ii) Sadarghat to old Lakhimpur bus stand (0.2km) and (iii) Tarapur over bridge to India club point(o.45km). Three categories of vehicles are considered for the study, viz are bikes, auto and private cars (Rikshaw and E-rikshaw are not taken under observation as these do not release any harmful pollutants and public transports also not taken asa their number is very less)

Following observations are recorded:-

1> Average speed and mileage of bike , auto and cars in the free road condition(Data gathered after discussion with riders/ drivers).
2> Calculated time taken by these vehicles to travel 20meter separately (3600 second/metre)
3> Calculated the fuel consumption by these vehicles per metre separately (1000ml/ distance in metre)
4> Consumption of fuel per second by the vehicles (point number3/Point number 2)
5> Time taken by these vehicles during traffic jam to travel 20m metre)
6> Fuel consumption during jam (Point number 4 * point number5)
7> Calculation of excess fuel consumption (6-3)
8> Average duration of traffic jam in three different point(data from traffic police)
9> Calculation No. of vehicles stuck in jam everyday (No of vehicles per 20 metre of road * no. of point distance(20metre=1pont).
10> Total amount of excess fuel consumption (7*9)
11> Calculation of excess Carbon monoxide emission (Amount of excess fuel * CO per litre of fuel from internet)

Tables of Observation:

Table 1

Observation of no. of different vehicles per 20 metre long road during trafiic jam.

Sl. No.	Name of location	Average no. of bikes		Average no. of auto/20metres		Average no. of private cars	
		Per 20 metre	Within total area	Per 20 metre	Within total area	Per 20m	Within total area
1	Tarapur (450 m)	6	135	5	112.5	3	67.5
2	Sadarghat(200m)	7	70	6	60	5	50
3	Rangirkhari(1300m)	4	260	5	325	3	195

*(Average no. of vehicles are recorded after 3 successive reading on same location on three different days)

Table2

Average speed of different vehicles during normal hour within town

Type of vehicle	Average speed
Bike	32km/h
Auto	28km/h
Car	30km/h

*(This table is prepared after discussion with a number of bike riders(5-riders), auto driver(5-drivers) and 5-car drivers).

Table3

Average mileage of different vehicles while driven at normal speed(30km/h to 50km/h)

Types of vehicle	Average mileage
Bike	43km/ltr
Auto	30km/ltr
Cars	18km/ltr

*(This table is prepared after discussion with a number of bike riders(5-riders), auto driver(5-drivers) and 5-car drivers).

Table4

Average duration of Traffic jam at the selected location and length of jam area

Jam area	Total distance	Duration of Traffic	Duration in second
Tarapur over bridge to India club point	450 m	Average 2.5 hours	9000 sec
Sadarghat point to Old lakhimpur busstand	200m	2 hours	7200 sec
Premtala to Rangirkhari	1300m	3.5 hour	12600 sec

*(Distance is measured by using bikes riding meter and average duration of traffic is taken after discussion with Traffic police on duty at those location)

Table5

Time taken to cross the jam

Vehicle	Sadarghat to old Lakhimpur bus stand	Tarapur to India club point	Premtala torangirkhari
Bike	150 sec	300 sec	630sec
Auto	240 sec	480 sec	960 sec
Car	290sec	480sec	960 sec

*(This time is using Stop watch while riding bike in the jam and for Auto and cars, time is calculated based on their statements)

CALCULATION:

Table1

Jam area	Total distance	Time taken to travel the distance during normal hour			Time taken to travel during jam		
		Bike	Auto	Car	Bike	Auto	car
Tarapur over bridge to India club point	450 m	50.36sec	57.47 sec	54 sec	300 sec	480 sec	480 sec
Sadarghat point to Old lakhimpur busstand	200m	22.3 sec	25.42sec	24 sec	150 sec	240 sec	270 sec
Premtala to Rangirkhari	1300m	146.15 sec	167.11 sec	156 sec	630 sec	960 sec	960 sec

*(Time taken to travel at normal hour is measured when speed is 32km/hour as =3600 sec/32000m ×distance)

Table 2

Extra time consumed due to traffic

Jam area	Bike	Auto	Car
Tarapur over bridge to India club point	249.24sec	422.13 sec	426 sec
Sadarghat point to Old lakhimpur busstand	127.3sec	214.18 sec	246 sec
Premtala to Rangirkhari	483.45 sec	792.49sec	804 sec

Table 3

Consumption of fuel (Petrol) by different vehicles per second

Types of vehicle	Mileage	Fuel consumption Per metre(1000ml/distance in metre)	Speed within towmship area	Time taken per metre (3600sec/distance in metre)
Bike	42km/L	.0238ml/m	32km/H	.1125 sec/m
Auto	30Km/L	.0333ml/m	28km/H	.1286 sec/m
Car	18Km/L	.0556ml/m	30km/H	.12 sec/m

Table4

Total no. of vehicles suffers every day due to traffic jam

Traffic jam area	Bike		Auto		Car	
	No of suffered	Total Extra time	No of suffered	Total Extra time	No of suffered	Total Extra time
Tarapur to India club point	4050	1009033sec	2109	890272 sec	1266	539136 sec
Sadarghat to Old Lakhimpur bus stand	3360	427728 sec	2250	481905 sec	1333	327918 sec
Premtala to Rangirkhari	3033	1467214 sec	2438	1932090 sec	1368	1099872 sec
Total	10443	2903975 sec	6797	3304267 sec	3967	1966926 sec

Table 5

Total Extra fuel consumption on a day

Type of vehicle	Consumption of fuel in a day	Amount of Fuelin litre	Economic loss in a day Price of petro as on 25/06/2019 is Rs. 69.77	Economic loss in a year
Bike	614,352 ml	614.352L	Rs- 42863.34	Rs-15645119
Auto	867761 ml	867.761L	Rs-65543.69	Rs-23923447
Car	911342 ml	911.342L	Rs- 63584.33	Rs- 23208281
Total	2393455 ml	2393.455 L	Rs- 166991.36	Rs- 60951845

*(Consumption of fuel is calculated based on Table 4 and Table3 as= fuel consumption per metre/Time take to travel one metre *Overall extra time)

Results:

Extra amount of Carbon dioxide added to the atmosphere in a day within Silchar area due to traffic jam.

Consumption of 1 L of Petrol releases 2.31 kg of Carbon dioxide(http://people.exeter.ac.uk)

Therefore, total amount of extra CO_2 added to atmosphere due to Traffic jam in Silchar is= 2393.455L ×2.31 kg=5528.88 kg.

Amount of Extra CO_2 released in a year= 5528.88kg×365=2018041.5 kg

Cause of traffic jam in Silchar:

1> Width of road: Width of road is not up to the mark, lack of divergent on bilane or no bilane system in most of the places.
2> Succession of footpath: Footpaths are mostly occupied by the vendors and as a result pedestrians have to walk on the road.
3> Parking: Most of the riders or drivers park their vehicles on the road which reduce road's width.
4> Rushing of vehicles: Rushing of vehicles without following traffic rules

Discussion:

In the survey that is carried out in the Silchar town of Cachar District, Assam , India, it is found that approximately 5528.88kg of CO_2 is added into the atmosphere daily and 2018041.5kg annually. The CO_2 emitted into the atmosphere , 40% will remain for 100 years, 20% will remain for 1000 years and 10% for 10000 years (www.ucsusa.org). Global warming is caused by Green House Gases, of which, 72% of total emitted gas is CO_2(http://timeforchange.org). Study suggest that , with increase of 450ppm (Part Per Million) will result in increase of 2

degree Celsius temperature (http://timeforchange.org) . Amount of CO releasing due to incomplete combustion of fuel causes several chronic and acute diseases like- head ache, nausea, dizzines, weakness, vomiting and inhalation of high dose may cause loss of consciousness ` or even death to the inhaler.

Conclusion:

In today's situation, air pollution and global warming main environmental concern. CO2 is the most abundant GHG and major component of air pollution. Transport industry or automobiles are one of the major contributors of CO2 into the atmosphere. Traffic jam is most important factor that every city/town dweller has to suffer every day. Due to traffic, journey delayed, excessive noise, excessive use fuel as a result excess amount of air pollutan-CO2 is added everyday. Small city like Silchar is emitting 2018041.5kg of CO2 annually into the atmosphere, then the matter in large cities like Kolkata, Dehli, Mumbai etc are of great concern. Such problem may be mitigated by proper and scientific urban planning.

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