

Fuel assessment and design of public transportation model by using movement based approach for Dr. Panjabrao Deshmukh Polytechnic Amravati Premises

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Abstract - The world is fast changing in every way for the betterment of mankind, and India is no exception. At the same time, the globe is confronted with numerous difficulties, including climate change, for which everyone is responsible. People's living standards are rising, resulting in an increase in the number of automobiles on the road, as transportation is an essential component of human life. As a result, gases are released spontaneously, leading to climate change. The data and findings of the analysis were positive in favour of long-term development and will be fruitful if put into practice. This will not fix the entire global climate change problem, but it will undoubtedly start the process of improving it. Oil releases a huge amount of carbon when burned - approximately a third of the world's total carbon emissions. There have also been a number of oil spills in recent years that have a devastating impact on our ocean's ecosystem. Natural gas is often promoted as a cleaner energy source than coal and oil. However, natural gas is still a fossil fuel and accounts for a fifth of the world's total carbon emissions.

Key Words: Public transportation system, Automobiles, Global climate change, Carbon emissions, Oil spills, Ocean's ecosystem, Cleaner energy source.

1.INTRODUCTION

With rapid urbanization, Amravati now has a population of around 7.8 lakhs. Simultaneously, most of the city's outskirts are being absorbed into the metropolis as it expands, with a population growth rate of 1.76 percent for the current year.

People use numerous modes of transportation on a daily basis. Amravati is the second educational hub after Nagpur, with students coming from all around Maharashtra for educational purposes.

As Amravati is a major educational center, there are educational institutes every few kilometers. Many students from various parts of Amravati used to travel to the institute on a daily basis using their own conveyance. It has been found that the majority of students travel in their own vehicles. The data of Dr Panjabrao Deshmukh Polytechnic in Amravati has been gathered for the purpose of assessing the amount of fuel consumed by students and staff. The data is

gathered on the basis of origin and destination study, via google

The personal automobile makes one's travel comfortable and time-saving. However, the public transportation system in Amravati is not very strong, resulting in high levels of air pollution, dangerous gas emissions in the environment, traffic congestion, and inconvenience to road users.

When fossil fuels are burned, they release large amounts of carbon dioxide, a greenhouse gas, into the air. Greenhouse gases trap heat in our atmosphere, causing global warming. Already the average global temperature has increased by 1C. Warming above 1.5°C risks further sea level rise, extreme weather, biodiversity loss and species extinction, as well as food scarcity, worsening health and poverty for millions of people worldwide.

The Intergovernmental Panel on Climate Change (IPCC) has found that emissions from fossil fuels are the dominant cause of global warming. In 2018, 89% of global CO2 emissions came from fossil fuels and industry.

An article published in The India Forum named "How and why India's climate will change coming decades" in July 2022 provided following forecast regarding the effects of Global Warming on India:

Table -1: How and why India's climate will change coming decades

GLOBAL WARMING EFFECT ON INDIA		
Parameter	Current	Projected - 2050
Rainfall	Decrease By 6% in Last 60 Years	May Experience Extreme Rainfall With Uncertainties
Temperature	risen by 0.7° C since 1901	1.9° To 2.2° C
Heat Waves		2.5X With 20% longer in duration on average

Rise in Sea Level	3 Cm Per 10 Years (17 M of Encroachment of Water For Each 3 Cm)	5 Cm Per 10 Years
Ocean Warming	Rise by 1° (Since From 1950)	1.2° To 1.5°

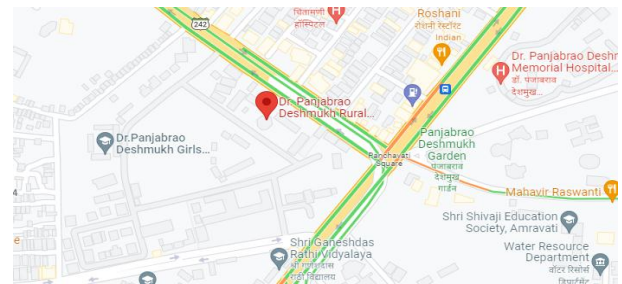


Fig-1: Satellite view of the study site

2. LITERATURE REVIEW

Yashraj Dhiraj Ingole, Abhijit Sanjay Khone [2019] had conducted a study regarding trip generation model from Pote Township to various localities of Amravati using movement based approach of users. The trip was designed on the basis of data collected through origin and destination study. The generation of trip to achieve the optimum effectiveness the time zone carrying maximum users on a specified route is allotted with dedicated trip.

Abhishek L Hedau, S.S. Sanghai. (2014) Development of Trip Generation Model Using Activity-Based Approach studied the trip generation by using activity-based model, in which activity patterns determined on the basis of dependent and independent variables and trips were generated for Trimurti Nagar, Nagpur.

Jones et. al. (1990) evolved an overarching definition of interest evaluation as it's far a "framework wherein journey is analyzed as every day or multi-day styles of behavior, associated with and derived from variations in existence and interest participation most of the population." The "rising features" of interest evaluation are identified (Jones et. al., 1990).

Sheppard (1986) studied cross-type fashions that have been broadly used extra for long- variety residential journey technology evaluation to conquer the inherent issues alongside the regression evaluation. Cross-type fashions had been found with inside the past due 60s. Similar to regression-primarily based totally approaches, cross-type fashions of pertaining to traits of families to call for journey.

3. STUDY AREA & METHODOLOGY

STUDY AREA

The institute Dr. Panjabrao Deshmukh Polytechnic Amravati is considered as study area for the project which is located near Panchavati square. The Panchavati square is used to contribute the traffic from 5 various directions. The data collection is done from students and faculty of Dr. Panjabrao Deshmukh Polytechnic by using Google forms.

METHODOLOGY:

For this research, we used origin and destination survey, in which we used the web based survey, which is more convenient than other types of survey and helped us collect the data.

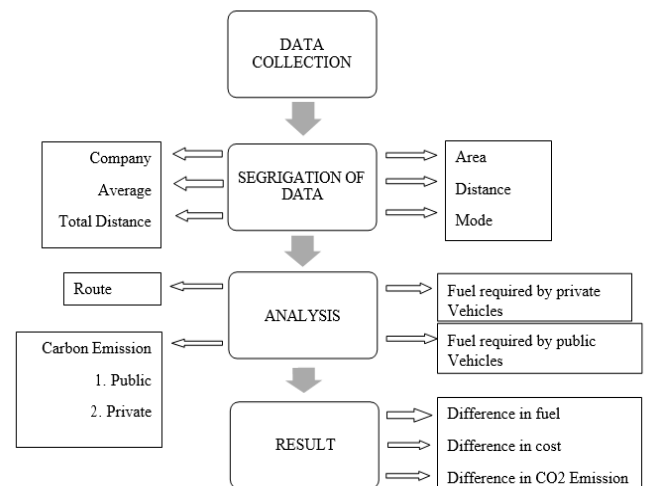


Fig-2: Following flow diagram can be referred for the methodology adopted for project work.

4. RESULT

The following results were obtained in terms of Carbon Emission, Fuel Consumption and Cost of Fuel utilized for per day, per month and per annum by the students whose data has been received during survey. Additionally, the trips were formed according to the need of the users travelling on the specific routes.

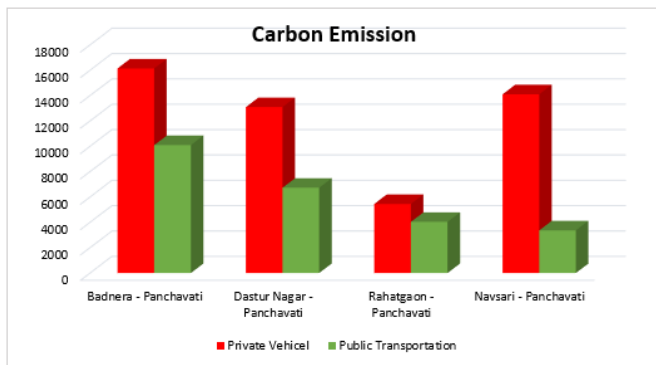


Fig-3: Comparison of daily carbon emission (Private Vs Public transportation)

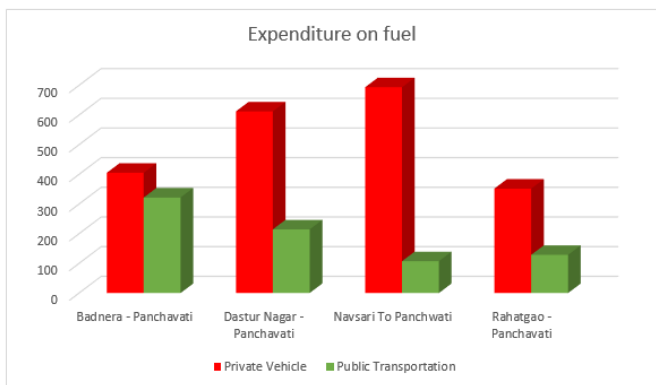


Fig-4: Comparison of daily expenditure on fuel (Private Vs Public transportation)

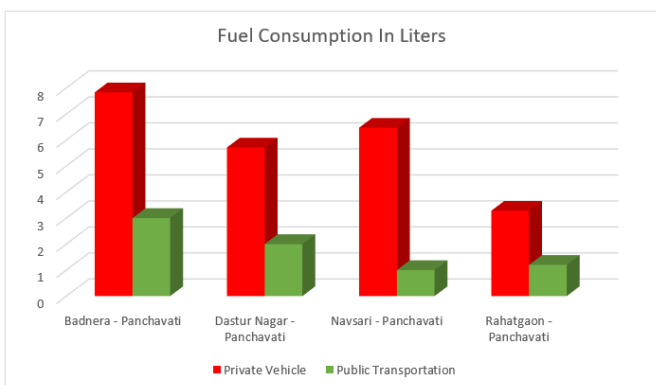


Fig-5: Comparison of daily expenditure on fuel (Private Vs Public transportation)

Trips	Carbon Emission in gm		Fuel consumed in liters		Fuel Cost in Rs.	
	Private	Public	Private	Public	Private	Public
Badnera - Panchavati	16138.5	10095	3.78	3	405.178	321.57
Dastur Nagar - Panchavati	13095.5	6730	5.71	2	612.05	214.38
Navsari To Panchavati	14104.44	3365	6.47	1	693.519	107.19
Rahatgaon - Panchavati	5444.6	4038	3.28	1.2	351.58	128.628
Total	48783.04	24228	19.24	7.2	2062.327	771.768
Monthly (20)	975660.8	484560	384.8	144	41246.54	15435.36
Per annum (260)	12683590.4	6299280	5002.4	1872	536205.02	200659.68
Difference (Yearly)	6384310.4		3130.4		335545.34	

Fig-6: Overall result of survey

5. CONCLUSION

It's not easy for anyone to get out of their comfort zone BUT for the survivable future one must initiate to contribute in the betterment of the clean environment. Though the above data is analyzed on the basis of the effective date of 77 personals, still the outcomes are shocking. If we start using Public Transportation System on daily basis, defiantly we will be able to create survivable future for us as well as for upcoming generations.

Limitation

- [1] Persuading people to utilize PTS will take time.
- [2] The current PTS needs to be updated in terms of safety, comfort, connectivity, privacy, serviceability, punctuality, and technology.
- [3] Door-to-door connection is difficult but not impossible to achieve.
- [4] In the event of a traffic jam, the system may incur a delay.
- [5] The user may first be inconvenienced.
- [6] If the bus stop is a long distance from the user's starting point, the user may choose not to use it.

1) Future Scope

- [1] A similar study might be conducted in large commercial zones.
- [2] The results of the study can be used to improve trip generation.
- [3] For the aim of trip generation, a mathematical model can be created.
- [4] For operational purposes, a dedicated department under Municipal Council can be constituted.

- [5] The ITS concept can be included during the implementation of the aforementioned system.
- [6] The effective implementation of a public transportation system could be referred to and analyzed for the same.

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