SUSTAINABLE URBAN TRANSPORTATION DEVELOPMENT WITH ITS

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ABSTRACT

This research mainly emphasis on the challenges faced during operation and fuel consumption in city buses in the Nagpur city. In the present scenario the operation of buses are very slow due to traffic and large number of stoppage in between starting and end point. This takes more time to travel from one place to another place by public transport in the city. The speed of the buses are very low and due to this the fuel consumption is more. The detail investigation were carried out to overcome from the problem faces by the user the solution are suggested to the operator to overcome from the problem, this will help to increase the speed of buses and to decrease the consumption of fuel. The passenger number in each stoppage can decide the bus stop or to eliminate the stop. By eliminating the stop the operator saves fuel. The stoppage has less then 2 number of passenger are eliminated in this research.

Keywords: Sustainable Transportation , Alighting Number, Boarding Number, Bus Fleet Management.

1 INTRODUCTION

Sustainable development refer to a mode of human development in which resource use aims to meet human needs while ensuring the sustainability of natural system and the environment, so that these need is not only for this generation , but as well as for the future generation. Sustainable development was put upon by the Brundtland Commission, which coined what has become the most often times quoted definition of sustainable development:' development that meets the requirement of the present without compromising the ability of future generation to meet their own needs. Some cities in world, particularly in the developing countries, have adopted bus ways and bus lanes as cheap and feasible methods to alleviate the problems associated with high traffic demand and congestion. Time, specially nowadays considered to be the most preciously resource of modern life. Within public transport system time is arguably the most crucial parameters, both for operator and passengers. Buses are the most dominant mode of public transport, in Nagpur city over 250000 passenger travel per day from the city bus. The city buses are the only mode of transportation which are provided by the Government. Some other mode of public transportation are going to be introduce like Metro rail. But city bus are the main source to travel in every direction or throughout city. The main objective is to investigate the bus operation and

to increase the average speed of the bus and less fuel consumption. In Nagpur city the consumption of diesel (fuel) is more due to this the public transportation is not economical with respect to other cities in India. This research will help to save fuel, achieve high speed, time, if the consumption of fuel is less then automatically the fare will decrease this make economical in travelling and increases the passenger in city bus.

II. NEED FOR STUDY

The current transportation system is not sustainable and the effective use of ITS concepts available is not incorporated , hence it is necessary to improve the existing transportation system using various ITS concepts to make the transportation system sustainability, user friendly and to make the effective use of ITS. The passengers are facing problems while travelling from public transport especially from city buses. The buses takes more time to reached their destination, the passenger does not fell comfort and safe. Public transportation system provides people with mobility and access to work, medical facility, recreational opportunity to the communities across India. Over 80 percent of percent of public rely on public transportation. Due to late running of buses or takes more time in travelling the public are diverting from the public transport. This may cause the huge losses for operator and the private vehicles owner or auto rickshaw are charging more fare from the public. The buses are not in good condition and the number of stoppage are provided in each route so that the fuel consumption is more . the city bus operation and maintenance is given to VANSH NIMAY INFRAPROJECT LTD. The company are facing so many obstacle in operation of buses in city and have lack of ITS. The other aspect for this research is that the most of the people are depend on public transport for fulfill her daily needs like offices, college, hospital and for shopping also and while in travel a minute distances they expend more time. Due to large number of stoppage the driver always use of break and accelerator and from this the fuel consumption is more and ultimately the fare is high.

The Nagpur in Nagpur city as it is the largest city in central India and the winter capital of the state of Maharashtra. It is a fast growing metropolis and is the third most populous city in Maharashtra after Mumbai and Pune, and also one of the country's most industrialized cities Nagpur is the city and 13th largest urban agglomeration in India.

III. METHODOLOGY

1. SELECTION OF ROUTE

   After literature survey the selection of route is a initial step, from the selected route we will observe and analysis about the operation of buses. In this research the two consecutive route are selected.

2. COLLECTION OF DATA FROM THE SOURCE

   The collection of data from the source means the data was collected from the operator office, the data gives the details of selected route like number of bus-stoppage, route detail with timing of buses, number of buses and the other details.

3. COLLECTION OF DATA FROM THE FIELD

   This data give the actual details of buses in that particular route, the average of a month give the accurate fuel consumption in each buses , number of passenger alighting in each bus stoppage and number of passenger boarding in each bus stop, average speed of the buses and time consuming in

round trip or single trip. When this all data is collected we can find the maximum and minimum number of boarding and alighting passenger number in each stoppage.

Table 1-Details of Passenger at each stoppage from Sitabuldi to Hingna

BUS STOP ID	BUS STOP NAME	DISTANCE(M)	CUM.DISTANCE (M)	TIME	SPEED (Km/hr)	ALIGHTING PASSENGER NO.	BOARDING PASSENGER NO.	BOARDING RATE	ALIGHTING RATIO
0	SITABULDI	0	0	7.37 AM	0	0	28	128.57	0
1	BHOLE PETROL PUMP	1400	1400	7.39	42	2	4	120	0.071
2	TRAFFIC PARK	600	2000	7.41	18	1	0	124.14	0.033
3	DHARAMPETH	500	2500	7.42	30	3	6	112.5	0.103
4	SHANKAR NAGAR	500	3000	7.44	15	6	19	80	0.187
5	GANDHI NAGAR	400	3400	7.45	24	9	5	87.8	0.2
6	WARMA LAYOUT	700	4100	7.47	21	0	8	73.46	0
7	AMBAZARI T POINT	300	4400	7.48	18	9	6	78.26	0.183
8	SUBHASH NAGAR	900	5300	7.5	27	2	7	70.58	0.043
9	G.H.RAISONI VIDYANIKETAN	500	5800	7.51	30	0	0	___	0
10	HINGNA T POINT	800	6600	7.53	24	1	14	56.25	0.019
11	SIM TAKLI	300	6900	7.54	18	0	7	50.7	0
12	YASHODA NAGAR	300	7200	7.55	18	7	9	49.31	0.098
13	GADGE NAGAR	300	7500	7.56	18	3	5	48	0.041
14	HINGNA NAKA	500	8000	7.58	15	16	7	54.54	0.214
15	BALAJI NAGAR	800	8800	8.01	16	12	3	63.15	0.181
16	MAHINDRA COMPANY	500	9300	8.03	15	0	4	59.01	0
17	CRPF GATE	600	9900	8.04	36	24	3	90	0.393
18	V.I.P FACTORY	200	10100	8.05	12	0	0	___	0
19	IC CHOWK	200	10300	8.06	12	1	7	78.26	0.025
20	ELECTRONIC ZONE	900	11200	8.08	27	8	12	72	0.173
21	RAJIV NAGAR	500	11700	8.1	15	10	1	87.8	0.2
22	YCCE COLLEGE	800	12500	8.12	24	15	0	138.46	0.365
23	WANADONGRI	600	13100	8.15	12	6	2	163.63	0.23
24	MAHAJAN WADI	600	13700	8.17	18	4	1	189.47	0.181
25	JINNING PRESS	700	14400	8.19	21	8	0	327.27	0.421
26	HINGNA RAIPUR	800	15200	8.21	24	7	0	900	0.636
27	HINGNA	600	15800	8.22	36	4	0	___	1

4. ANALYSIS AND STUDY BOTH DATA

Discuss on both the data which has collected from field and from operator both. Analyse all the present and future aspects of that route.

V1. DATA COLLECTION

The details of data from the field are below. The project stretch has two route from (SITA BURDI – HINGNA and (HINGNA – SITA BURDI) bus stop. The distance are 15.8 km and 14.9 km respectively.

Phase 1; Data collection

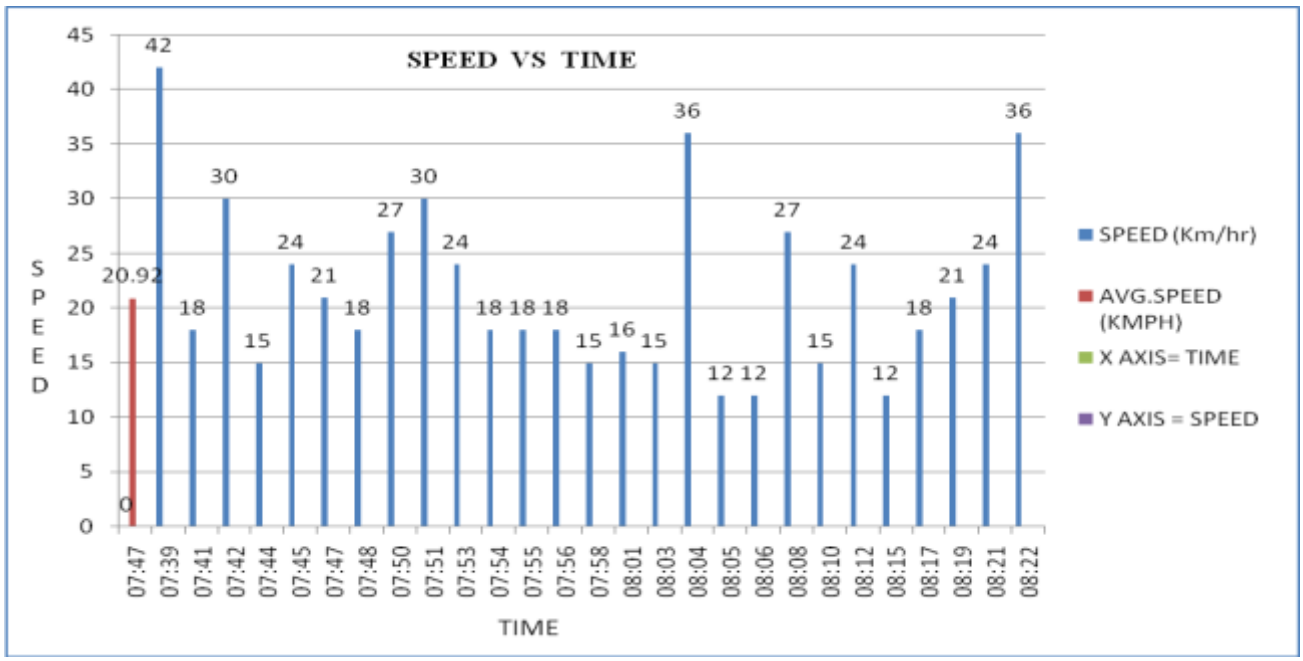

Fig.1 Variation of Speed with Time

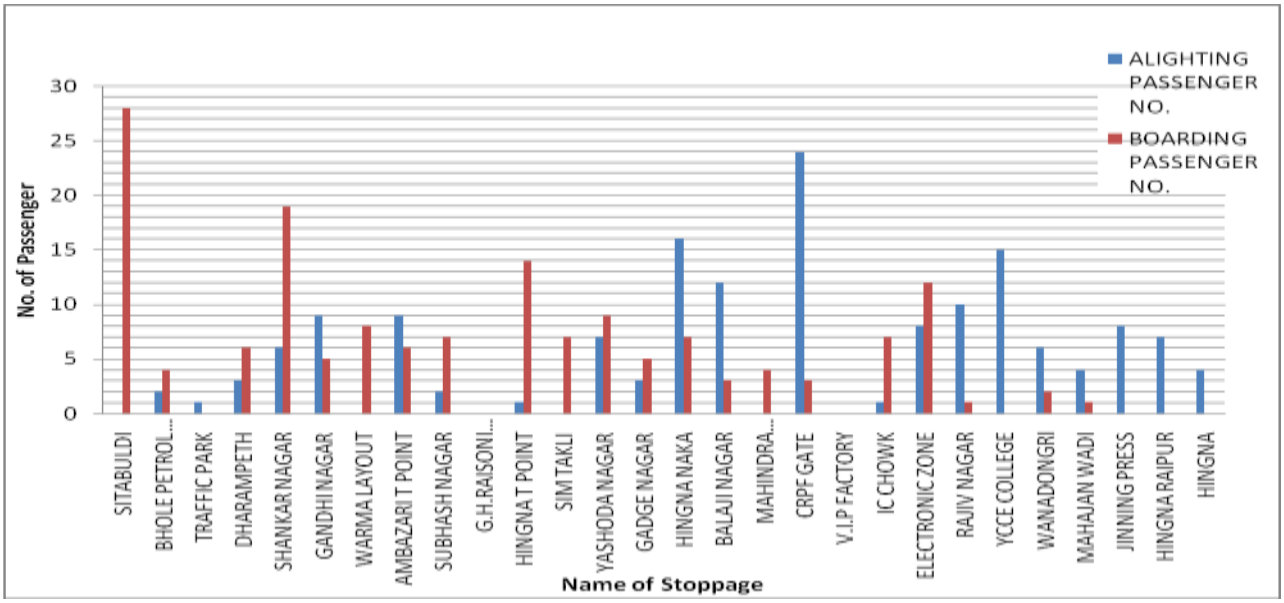

Fig.2 Details about alighting and boarding of passengers.

Phase-2 (From Hingna to Sitabuldi)

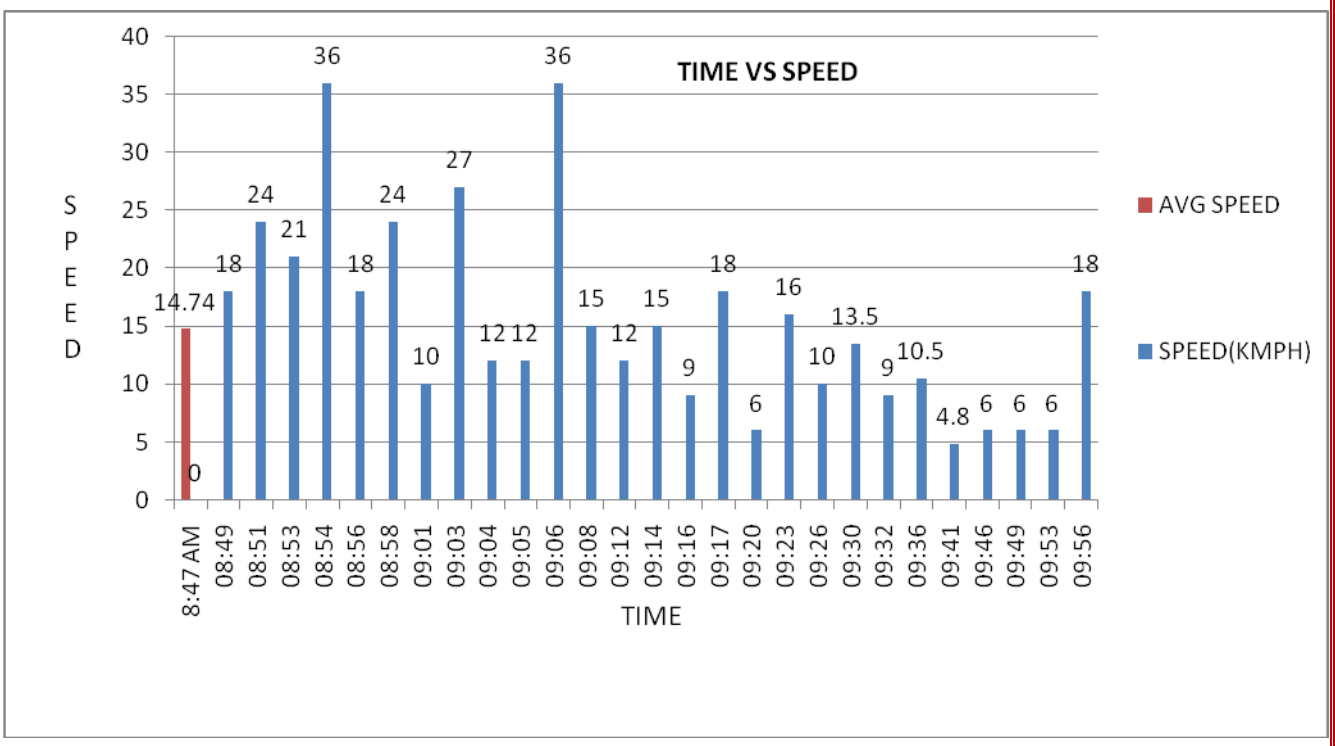

Fig.3 Variation of speed with time.

Table 2. Details of Passenger at each stoppage from Hingna to Sitabuldi

BUS STOP ID	BUS STOP NAME	DISTANCE (M)	CUM. DISTANCE (M)	TIME	SPEED(KMPH)	ALIGHTING PASSENGER NO.	BOARDING PASSENGER NO.	BOARDING RATE	ALIGHTING RATIO
0	HINGNA	0	0	8.47 AM	0	0	20	180	0
1	HINGNA RAIPUR	600	600	8.49	18	0	26	78.26	0
2	JINNING PRESS	800	1400	8.51	24	0	11	63.15	0
3	MAHAJAN WADI	700	2100	8.53	21	2	9	56.25	0.035
4	WANADONGRI	600	2700	8.54	36	15	16	55.38	0.234
5	YCCE COLLEGE	600	3300	8.56	18	18	4	70.59	0.276
6	RAJIV NAGAR	800	4100	8.58	24	2	21	51.43	0.039
7	ELECTRONIC ZONE	500	4600	9.01	10	3	6	49.31	0.043
8	IC CHOWK	900	5500	9.03	27	1	7	45.56	0.014
9	V.I.P FACTORY	200	5700	9.04	12	0	0	-	0
10	CRPF GATE	200	5900	9.05	12	17	13	48	0.216
11	MAHINDRA COMPANY	600	6500	9.06	36	4	5	47.37	0.054
12	BALAJI NAGAR	500	7000	9.08	15	8	2	51.43	0.106
13	HINGNA NAKA	800	7800	9.12	12	14	1	63.16	0.2
14	GADGE NAGAR	500	8300	9.14	15	4	3	64.29	0.07
15	YASHODA NAGAR	300	8600	9.16	9	2	6	60	0.036
16	SIM TAKLI	300	8900	9.17	18	0	0	-	0
17	HINGNA T POINT	300	9200	9.2	6	7	12	55.39	0.117

18	G.H.RAISONI VIDYANIKETAN	800	10000	9.23	16	0	0	-	0
19	SUBHASH NAGAR	500	10500	9.26	10	3	10	50	0.047
20	AMBAZARI T POINT	900	11400	9.3	13.5	19	2	65.46	0.264
21	WARMA LAYOUT	300	11700	9.32	9	0	2	63.16	0
22	GANDHI NAGAR	700	12400	9.36	10.5	17	1	87.8	0.299
23	SHANKAR NAGAR	400	12800	9.41	4.8	6	3	94.74	0.147
24	DHARAMPETH	500	13300	9.46	6	10	4	112.5	0.264
25	KHARE TOWN	300	13600	9.49	6	0	0	_	0
26	VIDHYAPEETH GRANTHALAYA	400	14000	9.53	6	0	0	_	0
27	SITA BURDI BUS STOP	900	14900	9.56	18	32	0	_	1

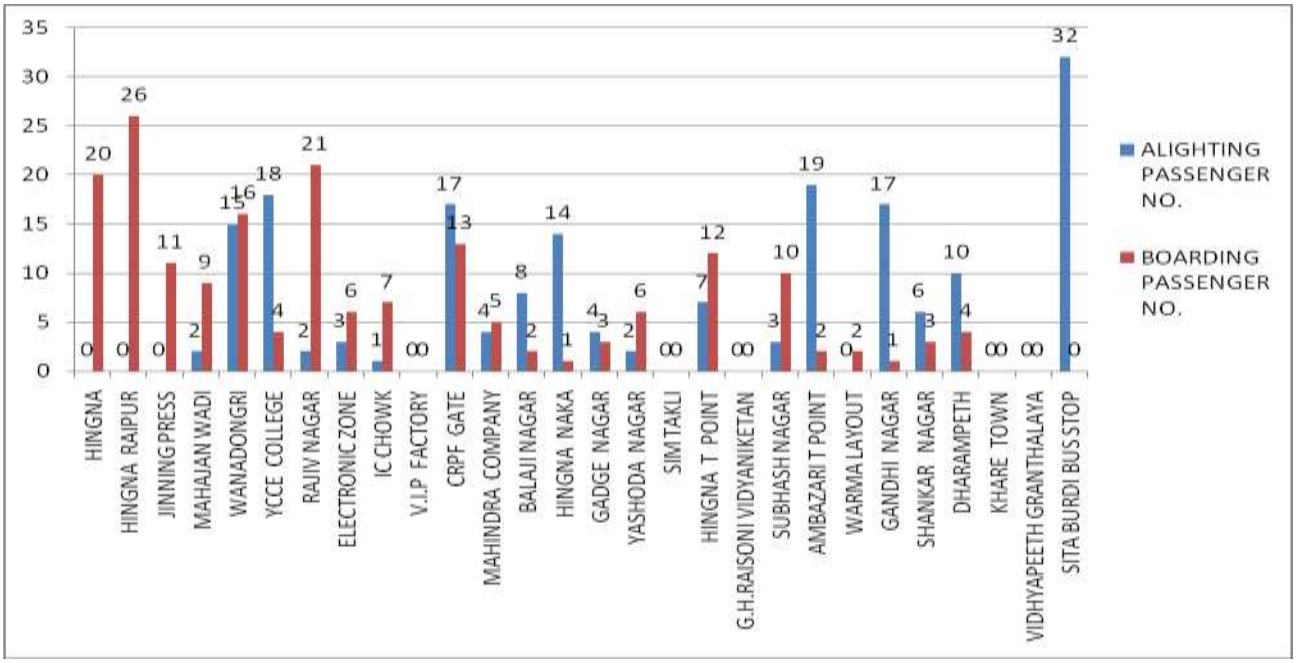

Fig. no-4 variation of No. of passengers with alighting and boarding

V. RESULT AND CONCLUSION

The figure 2 & 4 clearly reflects that the stoppages has very less alighting and boarding passenger number. The stoppage which has less then two number of passenger so we proposed to eliminate these stoppage by eliminating these stoppage we can save the fuel, time resulting in the increase in average speed of the buses leading to the sustainability by means of reducing operating cost, fuel air pollution and noise pollution.

If we eliminate 1 stop we can save "D" litre of fuel.

Assume D = 0.04 litre of diesel.

Therefore, 4 bus stop save = 4D

$4 \times 0.04 = 0.16$ litre of diesel in one single trip.

Let T is no of trip .

One bus make 8 round trip

Therefore 8 round trip =(2 T) = 2 × 8 = 16.

In one day 1 bus can save = 0.04 ×16 = 2.56 litre

In one month 1 bus can save = 2.56 × 30 = 76.8 litre of diesel.

Assume Coast of 1 litre diesel is 55 INR.

In one day 1 bus can save 2.56 × 55 = 140.8 INR

In one month 1 bus can save = 2.56×30× 55 = 4224 INR.

For 20 buses in 1 day 20 × 140.8 = 2816 INR.

For 20 buses in 1 month = 2816×30=84480 INR.

20 number of buses are plying on this route everyday, so this can be applicable for all 20 buses. The city has divided in 64 different route so this research will help to reduce the consumption of fuel in all different route in city or in other metropolitan city in India. Hence we can say that this can achieve the sustainability.

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