

TECHNICAL ANALYSIS ON THE CONTEMPORARY STATUS OF BUS STOPS: A CASE STUDY IN YELAHANKA NEWTOWN

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ABSTRACT: Bus stops are one among few indicators which first speaks about the development of that particular city. A well designed public space for bus stops may leads to overcoming pessimism towards mass transit facilities. The current work highlights the necessity of designing an acceptable bus stop i.e. safety, comfort, wind protection, visual comfort, accessibility and integration. This study seeks to improve the environment related to infrastructure at bus stops. These objectives are achieved by several techniques i.e. lighting, seating and surfaces, cover, amenities, information, vegetation, pedestrian infrastructure and facilities for disabled person. In this study analysis on traffic parameters related to bus stops like peak-hour volume of commuters and peak-hour frequency of buses, etc. along with questionnaire survey is conducted to understand the perception of commuters related to bus stop infrastructure

Keywords: Bus stops, questionnaires, mass transit system.

1. INTRODUCTION:

This study was initiated with identification of location, Yelahanka New Town was the answer due to various considerations like population, location of institutions, economical activities, and connectivity to other places. Many schools, colleges, government institutions are located in selected work area. Railway station, satellite bus stands are part of this location. 6 bus stops in both the direction in location are identified following a route from NES to Dairy Circle Yelahanka New Town, ranging from major exchanges to minor stops.

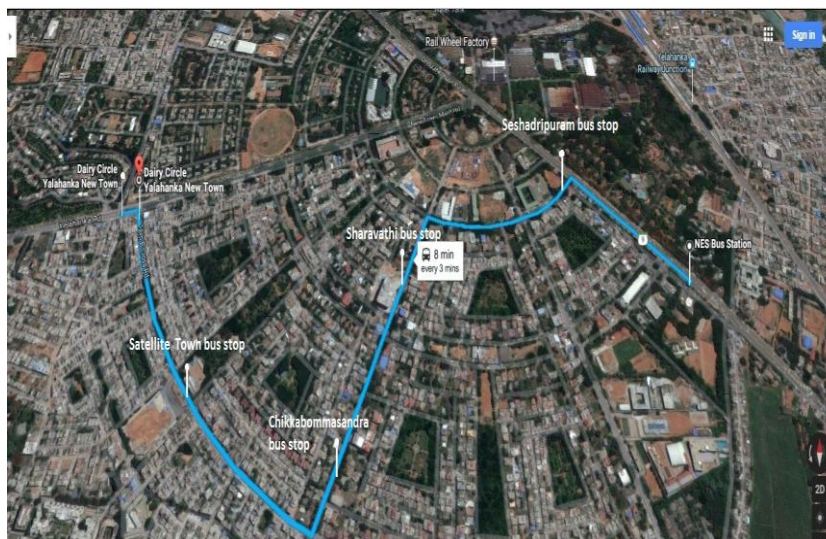


Figure 1: A pictorial Google map view of the study area (Blue Line follows the route)

2. METHODOLOGY

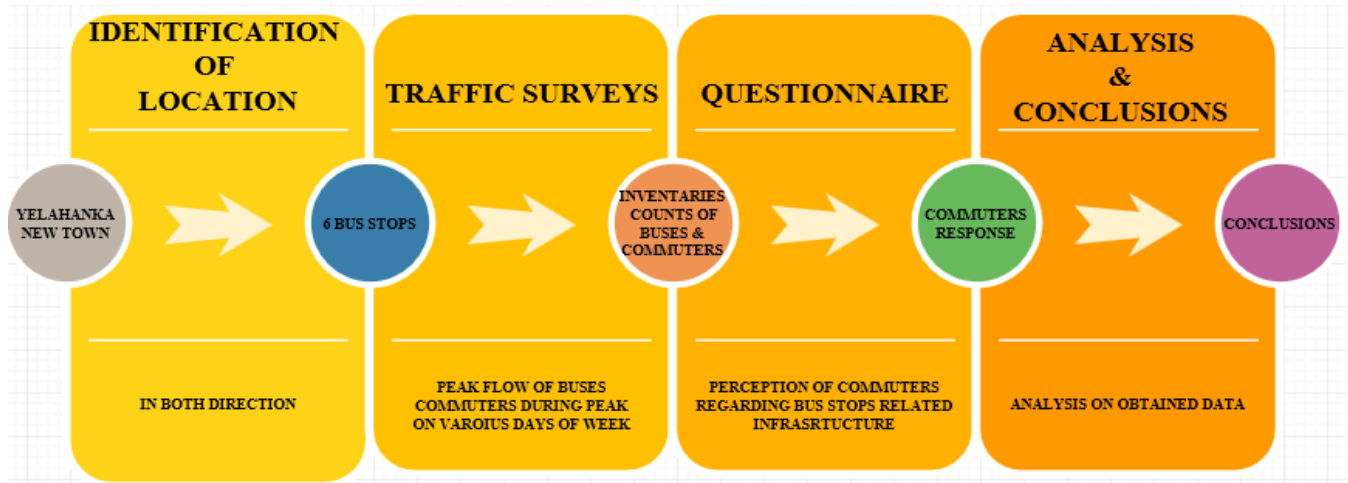


Figure 2: Flow chart of the methodology carried for work

Yelahanka NewTown is identified as location. With totally, 6+6 bus stops are available in selected route in both the direction. Questionnaire/check list template for Bus stop infrastructure, traffic related parameters and user perception are formulated. In infrastructure related template data on existing inventories are collected. In traffic related template data on peak hour flow of busses & Commuters are obtained for various days of week. In questionnaire template related to perception of commuters, opinions of commuters are recorded. Finally, data are analyzed and conclusions are drawn.

BUS STOP DATA SHEET		DIRECTION: TOWARD AIRPORT/ TOWARD HEBBAL		SHEET NO:	
NAME:		LOCATION:		DATE:	
INFRASTRUCTURE RELATED PARAMETERS					
1	LANGUAGE USED FOR NAME :	KANNADA/ENGLISH/BOTH			
2	SHELTER PRESENT: (tick suitable): Y or N:.....				
3	BUS STOP SHELTER DIMENSIONS:	Length:	Width:	Height:	
4	AVAILABILITY OF SEATS:Y or N:.....		IF YES THEN: APPROX SEATING CAPACITY:		
5	PLATFORM TYPE:(tick suitable):	CONCRETE:	STONES:	MENTION IF OTHER:	
6	PLATFORM LEVEL with respect to pavement :				
7	AD SPACE FACILITY AVAILABILITY :Y or N:.....		IF YES THEN: APPROX AD AREA:		
8	LIGHTING FACILITY AVAILABLE :Y or N:.....				
9	APPROACH PATH TO BUS STOP:	FOOTPATH :	OBSTACLES IF ANY(Mention it):		
10	CLEANLINESS:	MAINTAINED:Y or N:.....		ANY OTHER COMMENTS:	
11	SAFETY RAILINGS PRESENT:Y or N:.....				
12	VENDING ACTIVITY:Y or N:.....		TYPE:Mention if any:		
INFORMATION DISPLAYED FOR COMMUTERS:					
13	ROUTE MAP:Y or N:.....		IF ANY OTHER INFORMATION (Mention it below)		
	BUS TIMINGS:Y or N:.....				
	HELPLINE NUMBERS:Y or N:.....				
14	ANY OTHER COMMENTS IF ANY:				

Figure 3: Checklist related to bustop infrastructure

TRAFFIC RELATED PARAMETERS			
1	DISTANCE FROM PREVIOUS BUS STOP:		
2	INTERSECTION: Y or N:.....	IF YES THEN ,DISTANCE UPTO INTERSECTION:	
3	AUTO STAND: Y or N:.....	IF YES THEN ,DISTANCE UPTO AUTO STAND:	
4	SIGN BOARDS: Y or N:.....	IF YES THEN, Mention it:	
5	ROAD MARKINGS: Y or N:.....		
6	PEAK TIME:	AM:	PM:
7	FREQUENCY FOR PER 15 MINUTES:		
8	ANY OTHER COMMENTS OR OBSERVATIONS:		

LOCATION RELATED PARAMETERS	
1	LATITUDE:
2	LONGITUDE:

Figure 4: Checklist related to traffic parameters

QUESTIONNAIRE SURVEY

Questionnaire No: _____ Bus stop Name: _____ Date: _____ Surveyor: _____

1	Name:	
2	Gender: (tick suitable)	Male / female
3	Age group: (tick suitable)	<18 18-35 >35
4	Frequent user : (tick suitable)	Regular / Non Regular user
5	Purpose of travelling:	Work Based / Non work Based
6	Are you satisfied with the (tick suitable)	1. Placement of bus stop here:..... Yes or No
		2. Seating Facility here :..... Yes or No
		3. Frequency of buses :..... Yes or No
		4. Approach Path to bus stop :..... Yes or No
		5. Traffic control at bus stop :..... Yes or No
		6. Maintenance of bus stop here :..... Yes or No
7	Distance to bus stop from your origin place	
8	Modes used to reach the bus stop:	Walking / Own vehicle / Auto Rickshaw
9	Time taken to reach bus stop (In Minutes)	
10	Waiting time in bus stop (In Minutes)	
11	Any other comments:	

Figure 5: Questionnaire related to user perception

In format as shown in figure 3, data regarding, infrastructure parameters like presence of any information to commuters like sign boards, route map, helpline numbers, bus frequency, timings etc. are obtained.

In format as shown in figure 4, information regarding, presence of nearby intersection, rickshaw stand, markings, time of maximum flow etc. are obtained. In format as shown in figure 5, user opinion survey is recorded

3. DATA & ANALYSIS

Various data obtained are tabulated as follows

Bus Stop Name	Length (M)	Width (M)	Height (M)
N.E.S	12.6	2.1	2.8
SESHADRIPURAM COLLEGE	12.9	2.7	2.7
SHARAVATHI	8	2.4	2.7
CHIKKA BOMMASANDRA	7.65	2.06	2.75
YELAHANKA SATELLITE TOWN	Nil		
DAIRY CIRCLE	8	2.5	2.75

Table 1: Shelter dimensions of each stops

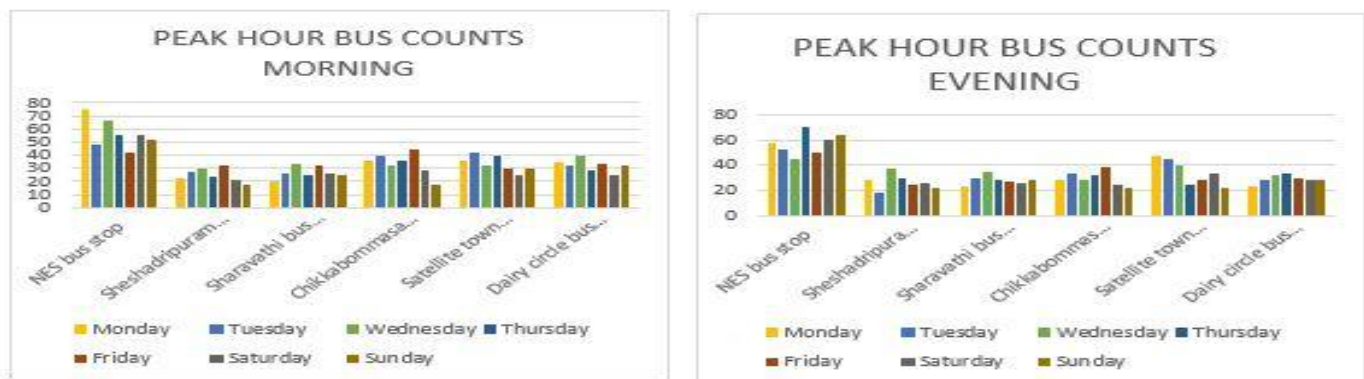
Bus Stop Name	Distance	Sign Boards	Road Markings
N.E.S	600 m	Yes	No
SESHADRIPURAM COLLEGE	550 m	No	No
SHARAVATHI	800 m	Yes	No
CHIKKA BOMMASANDRA	750 m	Yes	No
YELAHANKA SATELLITE TOWN	500 m	No	No
DAIRY CIRCLE	Nil	No	No

Table 2: Distance in between bus stops, Sign boards & Road markings

Days	Peak hour bus counts											
	NES bus stop		Sheshadripuram college bus stop		Sharavathi bus stop		Chikkabommasandra bus stop		Satellite town bus stop		Dairy circle bus stop	
	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening
Monday	75	58	23	28	20	24	36	28	36	48	35	24
Tuesday	48	53	27	18	26	30	40	33	42	45	32	28
Wednesday	67	45	30	37	33	35	32	29	32	40	40	32
Thursday	55	70	24	30	25	29	36	32	40	25	28	34
Friday	42	50	32	25	32	27	44	38	30	28	34	30
Saturday	55	60	21	26	26	26	28	25	25	34	25	29
Sunday	52	64	17	22	25	28	18	22	30	22	32	28

Table 3: Peak hour bus counts during morning and evenings

FIGURE 6: Peak hour bus count variations during morning & evenings throughout week



Days	Peak hour pedestrian counts									
	NES bus stop		Sharavathi bus stop		Chikkabommasandra bus stop		Satellite town bus stop		Dairy circle bus stop	
	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening
Monday	460	550	36	22	54	32	41	27	58	44
Tuesday	430	510	39	27	48	42	36	25	61	49
Wednesday	445	523	30	18	41	48	28	31	52	40
Thursday	410	495	34	23	51	37	33	29	56	45
Friday	435	540	40	29	72	67	38	33	62	51
Saturday	260	384	27	21	31	39	23	27	49	57
Sunday	242	366	11	7	28	50	17	24	33	48

Table 4: Commuters peak hour count

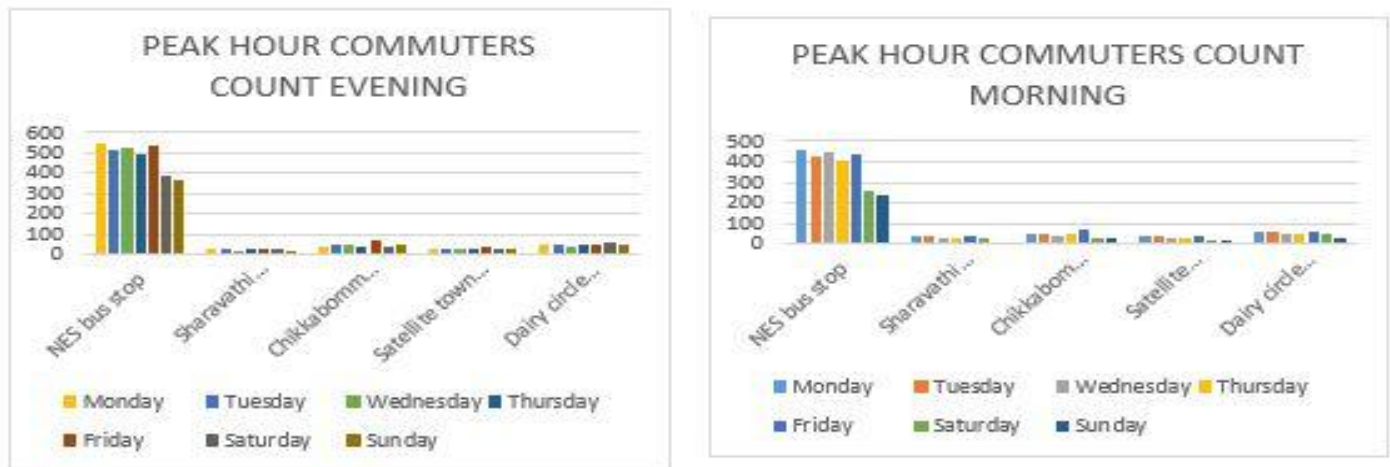


FIGURE 7: Peak hour Commuters count variations during morning & evenings throughout week

4. CONCLUSIONS FROM ANALYSIS:

Firstly, to start with questionnaire, three questionnaires were formulated for data collection relating to infrastructure, traffic & location based parameters in and around bus stops.

The peak hour bus counts in each of bus stops, in both the directions showed a trend which was just sufficient to cater the demand of commuters. Bus stop shelter dimension were adequate, with 8m x 2.5m x 2.75m (Length x Width x Height). Platform height from road level was ranging from 16 cm to 40 cm. This maximum height of 40 cm is not at all desirable for disabled persons, elderly commuters for boarding and alighting buses. The maximum height must be less than 15 cm. Only 3 bus stops were utilizing advertisement board space. The potential financial earning can be increased by providing sufficient space for advertisement with proper maintenance against damage. The earnings generated can be used for maintenance for bus stops. The distance between bus stops to bus stops is more than 500 m in all bus stops. As such desirable distance is 300m. Choice surveys or opinion surveys were conducted for few commuters from each bus stops. They shared a view on improvement of safety facilities at bus stops, internet connectivity, difficulty in boarding and alighting buses, as some bus drivers stops the bus far from platform.

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