



## PARKING EVALUATION: A CASE STUDY OF AMUL DAIRY ROAD ANAND

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### ABSTRACT

*Traffic management is presently a challenge for the traffic authority. In developing countries, city traffic is growing at a fast rate. Rapid urbanization, industrialization, insurance and loan facility etc. are some of the important factors, which accelerate the growth of traffic in urban areas. Parking policy plays a vital role in the overall development of a city. The study includes detail of volume and parking data analysis for the study section. The study section is a commercial hub of Anand city. A tentative parking norms obtained from the analysis are also suggested for this study section.*

### Keywords :

#### 1.1 INTRODUCTION

Urbanization gives rise to problem of congestion. As cities are growing, it will be important to plan and build new facilities for both public and private transport. There is a strong relationship between parking facilities and traffic flow characteristics in the city. Unplanned urbanization and transport facilities cause parking problems. Inadequate parking facilities result in decreased road capacity and many side effects such as air and noise pollution. Beside these, it also causes economic consequences by losing time and fuel, loss of productivity, high energy consumption and increased accidental death rates. Thus, all parking facilities as well as other should be designed and planned properly in order to provide a better life for the people and for the prosperity of the city.

#### 1.2 NEED FOR STUDY

Anand is considered to be an educational and cultural centre of Gujarat. Parking is directly related with every element of community life. A substantial portion of urban land is required for parking of vehicles. Every car owner would wish to park the car as closely as possible to his destination so as to minimize his walking. Amul dairy road is entrance of Anand city. High volume of traffic consisting of both fast and slow moving vehicles is plying through the road. Major traffic generators like banks, restaurants, commercial centers, shopping complexes, residential flats, government offices, city bus stop, railway station etc are located along Amul dairy road. In the absence of adequate off-street parking facilities, vehicles are parked haphazardly along the curb causing traffic congestion and hazards. To mitigate this problem, suitable parking management plan has to be developed and implemented on a concerted and continuous basis taking into account the various aspects of transportation problems of the area.

#### 1.3 OBJECTIVES AND SCOPE

The objectives for the present study are entitled below:

1. To study the traffic volume composition and temporal Variance.
2. To study geometrics and land-use along study corridor.
3. Assessment of parking demand and supply characteristics on Amul Dairy Road of Anand city.
4. Evaluation of adequacy of parking facility to meet the parking demand.

#### 2. LITERATURE REVIEW

##### 2.1 PARKING LAW IN INDIA

Parking is one of the essential components of the Development plans of various cities in India. The total number of cars produced in India touched 15 million cars in 2011 while the road based traffic volume is set to increase to 12456 passengers-kilometers in 2030. The average speed of a truck on Indian roads is 25 km/hr and is only able to travel a distance of 250-300kms per day compared to 600-700 kms travelled in western countries as per an IIM Kolkata Study. All vehicles produced in the country need space to park somewhere. As per Indian Road Congress (IRC) Standards, a vehicle takes 25 sqm of space on an average. Parking is a major concern when it is not able to accommodate the ever increasing traffic volume, keeping in mind that parking space are public spaces. It is at this juncture that the state has to intervene in balancing the interest of the automobile population and the need to effectively utilize public space for the public good. What amounts to public good is a serious predicament faced by the state and the law is still unclear on whether providing parking space is a public utility service to be done by the state to achieve public good.

##### 2.2 PARKING POLICY IN INDIA: - GETTING THE PRINCIPLE RIGHT

Parking policy has become an integral part of the sustainable mobility strategy globally. It has also been taken on board for transportation reforms in Indian cities. In fact, parking policy is now included in the reforms mandated under the JNNURM programme. Many Indian cities are in the process of designing parking policy. In the conventional paradigm, the parking policy is expected to continuously satisfy the growing demand for parking spaces as vehicle numbers are growing. The policy then seeks to ensure adequate parking supply by stipulating parking requirements. But clearly, this wisdom is not accepted any more when it comes to meeting the goals of sustainable mobility. Globally, cities are now adopting multiple goals for parking policy.

##### 3. STUDY AREA – AMUL DAIRY ROAD OF ANAND

Amul dairy road is the lifeline of station area of Anand city. High volume of traffic consisting of both fast and slow moving vehicles is plying through the road. Major traffic generators like banks, restaurants, commercial centers, shopping complexes, residential flats, government office, super market etc. This in turn, generates high parking demand along this road.

In the absence of adequate off street parking facilities, vehicles are parked haphazardly along the curb causing traffic congestion and hazards. To mitigate this problem, suitable parking management plan has to be developed and implemented on a concerted and continuous basis taking into account the various aspects of transportation problems of the area.

Data is collected by both primary and secondary sources. Primary data are collected by performing surveys of study area and secondary data are one's that are collected from secondary sources without performing survey. Sources can be Census Department, Regional Transport office, Police Department, Institutions etc.



**4. RESEARCH METHODOLOGY**

The study methodology developed is shown in fig.1. Detailed surveys required and steps involved in the study are well explained in flow diagram.

**Fig. 1: Study Methodology**

**5. FIELD SURVEY**

To understand the existing conditions of study area, the following primary survey have been carried out with the help of trained surveyor for transport data collection. The B.E (C) students are explained trained to collect the required data for the study. The surveys carried out are,

1. Traffic volume count survey
2. Parking space inventory survey
3. Land use survey
4. Parking survey

**TABLE 5.2 CVC DATA ON AMUL DAIRY ROAD (FROM R. STATION TO AMUL DAIRY)**

Time (Min.)	2 Wheeler	3 Wheeler	Car	Bus/Truck	Cycle	Hand Cart	Animal Driven	Total
10:00 to 10:15 am	132	130	18	10	18	3	0	311
10:15 to 10:30 am	137	165	23	4	21	0	0	350
10:30 to 10:45 am	173	160	29	11	10	1	0	384
10:45 to 11:00 am	151	165	29	10	18	1	0	374
11:00 to 11:15 am	181	128	32	14	21	0	0	376
11:15 to 11:30 am	205	152	46	14	19	0	0	436
11:30 to 11:45 am	181	141	40	11	16	0	0	389
11:45 to 12:00 am	213	134	53	8	15	0	0	423
Total	1373	1175	270	82	138	5	0	3043
PCU Value/Vehicle type	0.5	1	1	3	0.5	4.5	6.5	
Total PCU	686.5	1175	270	246	69	22.5	0	2469

**TABLE 5.1 CVC DATA ON AMUL DAIRY ROAD (FROM AMUL DAIRY TO RAILWAY STATION)**

Time (Min.)	2 Wheeler	3 Wheeler	Car	Bus/Truck	Cycle	Hand Cart	Animal Driven	Total
10:00 to 10:15 am	165	159	29	6	15	1	0	375
10:15 to 10:30 am	192	157	32	11	16	4	0	412
10:30 to 10:45 am	212	157	52	14	13	1	0	449
10:45 to 11:00 am	208	151	43	13	12	0	0	427
11:00 to 11:15 am	219	153	34	10	19	1	0	436
11:15 to 11:30 am	227	147	42	12	24	0	1	453
11:30 to 11:45 am	254	159	35	12	24	1	0	485
11:45 to 12:00 am	225	163	56	12	13	1	0	470
Total	1702	1246	323	90	136	9	1	3507
PCU Value/ Vehicle type	0.5	1	1	3	0.5	4.5	6.5	
Total PCU	851	1246	323	270	68	40.5	6.5	2805

**5.1 DATA COLLECTION AND ANALYSIS**  
**5.2 CLASSIFIED VOLUME COUNT SURVEY**

During the Peak-hours of traffic on Amul Dairy oad video recording was carried out at mahatma Gandhi statue and data for classified volume extracted. Table 5.1 & 5.2 shows data.

Fig 2 shows temporal variation of traffic on Amul Dairy Road.

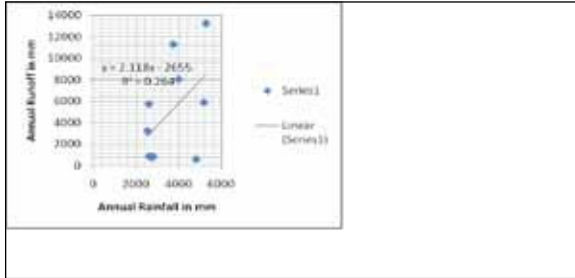
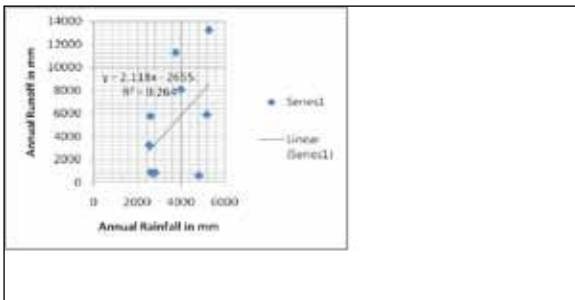
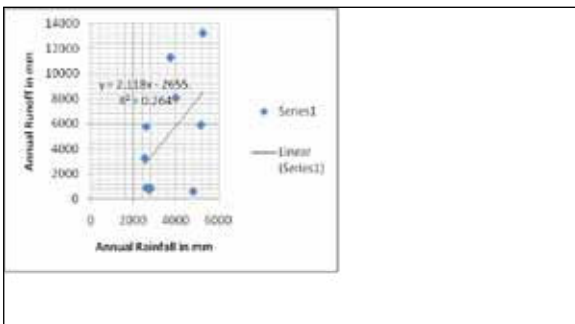


Fig 2. Temporal variation of traffic on Amul Dairy Road



The composition of traffic volume is given below in fig. 3. The animal driven vehicles and carts are negligible. The directional split observed is 55/45 to 53/47 as shown in Table 3.



**Table 5.3 Directional split in traffic volume**

Time (Min)	Traffic Volumevehicles		Directional Split (%)
	R. Station to Amul Dairy	Amul Dairy to R. Station	
10:00 to 10:15 am	375	311	55 / 45
10:15 to 10:30 am	412	350	54 / 46
10:30 to 10:45 am	449	384	54 / 46
10:45 to 11:00 am	427	374	53 / 47
11:00 to 11:15 am	436	376	54 / 46
11:15 to 11:30 am	453	436	51 / 49
11:30 to 11:45 am	485	389	55 / 45
11:45 to 12:00 am	470	423	53 / 47

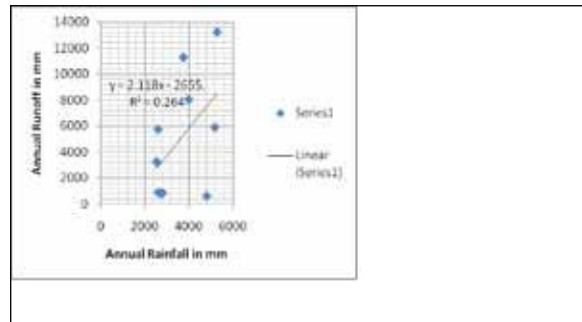


Fig 3. Composition of traffic in PCU

**5.3 LAND-USE AND PARKING LOVENTORY**

Parking inventory and land use survey is coupled with road geometric data. For Amul Dairy Road the data is presented in table below. Anand Railway station is taken as 0.00 m chainage in the study data collection.

**Table 5.4 Land use geometric data**

For study purpose the land use in land parcel is taken as offices, shops, residential, educational, parking lots, bus stops. The survey reveals type of land use and available parking supply.

Carriage way	Right (m)	Left (m)	Median (m)	Right of way (m)	Land use	Chainage (m.)
					Right	00 to 500
					Super market, hospital, vegetable market	501 to 1000
					Govt. office, Commercial centre	1001 to 1500
					Shops	
					Left	
					City bus stop, gov. office, Residential colony	
					Residential Colony, shops, commercial centre,	
					Amul Dairy Area	

Zoning of Amul Dairy Road is presented in figure below.



Figure 4: Zoning of Amul Dairy Road

ing at base year. The survey is primarily carried out on all the sections of road wherever on-street parking is prevalent. On-street parking is prevalent on the entire section of survey area. The parking Survey was carried out on Amul Dairy road. Using number plate registration techniques. Table 5.5 shows existing parking demand for various types of vehicles on A to Radhakrishna Temple zone 3.

**5.4 PARKING SURVEY**

The purpose of this survey is to assess the demand of park-

**Table 5.5 Parking of Vehicles on District Panchayat to Radhakrishna Temple Zone-3**

Time Duration	Type Of Vehicle					Total Parked Vehicle
	Car	2- Wheeler	3 Wheeler	Cycle	Other	
15	95	202	37	35	1	463 (85.26%)
30	22	42	4	25	0	
45	22	9	1	0	0	
1:00	8	3	0	10	0	66 (12.16%)
1:15	2	3	0	0	0	
1:30	1	3	0	0	0	
1:45	1	2	0	0	0	
2:00	1	0	0	0	0	
2:15	1	0	0	0	0	14 (2.58%)
2:30	0	4	1	0	0	
2:45	1	2	0	0	0	
3:00	0	1	0	0	0	
3:15	0	1	0	0	0	
3:30	1	0	0	0	0	
3:45	0	0	0	0	0	
4:00	0	0	1	0	1	

The parking activity from 1 to 30 minutes is considered short term, greater than 30 minutes to 2.00 hours medium term and greater than 2.00 hours are considered as long term. The analysis shows that on selected stretch 85.26% short –term parkers, 12.16% medium term parkers and 2.58% are long term parkers.

- Parking spaces during peak-hours when data was collected.
- Parking spaces available in zone -3 on Amul Dairy Road is

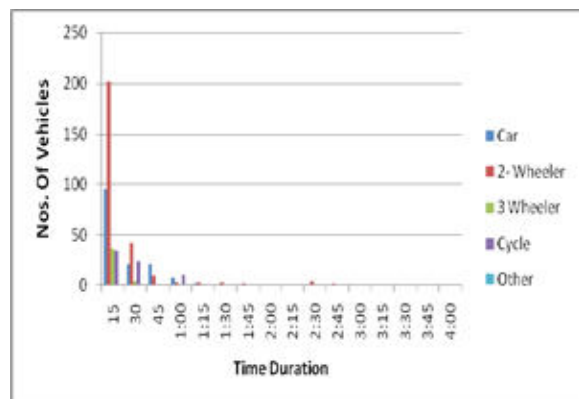


Fig.5: Parking of Vehicles- Zone-3

**5. CONCLUSION**

The following conclusions are drawn from the analysis of data.

- Amul Dairy road is having mixed land use – parking lot, offices, restaurant, industry and residential.
- Good right of way is 30 m.
- The traffic volume on Amul Dairy road is 5274 PCU/hr having directional split as 55/45 average.
- Traffic composition shows maximum proportion of 2-wheelers (47%) followed by 3-wheelers (37%) and cars (9%) and other (7%).
- Parking data analysis shows that short-term parkers are 85.26%, medium-parkers 12.16% and long-term parkers being only 2.58%.
- Amul Dairy Road experiences problem of parking during peak hours only.
- The parking demand on study zone 3 & 4 was 543 park-

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