

Study of Traffic Volume and Level of Service of Panjab University, Chandigarh

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Abstract

A significant effort has been made in order to study the Traffic Volume of Panjab University Campus, Chandigarh. Established in 1882, Panjab University is one of the oldest universities in India. As one of the most renowned Universities in India, Panjab University itself attracts a lot of vehicular population. The Panjab University itself becomes a major traffic generator in a way. Campus is large and contains places to work, learn, socialize and live each with its own trip purpose. In recent years, usage of automobiles on campus has increased considerably. In addition to going to class, students also are likely to use vehicles for employment, recreation, shopping and social activities. The objective of the study is to analyze the prevailing traffic conditions on the University roads. Traffic Volume study is carried out in the campus and existing level of service is calculated. Due to mixed nature of traffic it gets difficult to accommodate all the kinds of traffic on these roads. The basic problem arises during the peak hours of the day when the traffic volume is highest on the road. The volume study were done at Gate no.1 and Gate no. 2 which are the major entry points in the University. The data was analyzed for the peak hour of traffic.

Index terms: Capacity, Level of Service

I. INTRODUCTION

With the increase in the growing population in the Chandigarh, the number of motorized vehicles registered alone is approximately 8.5 lacs which makes it a city with the highest per capita vehicle density in India. If we add the floating vehicular population from the adjoining cities the situation becomes grimmer. The Panjab University itself becomes a major traffic generator in a way. Campus is large and contains places to work, learn, socialize and live — each with its own trip purpose. Four main types of traffic exist around the university: the traffic that would be there regardless of the presence of a university, the traffic composed of faculty and staff as they travel to and from work, the traffic from

commuting students as they arrive and depart for classes and then leave for home, and the traffic from students as they travel between different places within the university. In recent years, usage of automobiles on campus has increased considerably. In addition to going to class, students also are likely to use vehicles for employment, recreation, shopping and social activities. With vehicular traffic on the campus becoming chaotic every day, a lot of problem is being faced by the administration of the Panjab University. The long-standing problem of cars parked on roads on Panjab University (PU) campus leading to traffic snarls and chaos.

A. Study area

hours. Later this video was rewinded and viewed again was for data analysis with the help of computer and required data sheets were made. In the present study, 1 hour time interval is chosen for the variation of traffic coming in and going out of the campus. Different data sheets are then made for hourly and daily variation in the traffic and also for the weekly variation in traffic. PCU equivalent data sheets were

also made. The peak hour of the traffic coming in and going out was computed which is then used for capacity computation. The value of PCU Equivalent for Urban roads as per IRC: 106-1990 is taken as:1 for Cars/Jeep (4-wheelers), 0.75 for scooter (2-wheelers) and 1.2 for Auto rickshaws (3 wheelers).

Table 3.1:Hourly and daily traffic volume variation at Gate 1

COUNT HOUR	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
08:00 am- 09:00 am	400	364	438	395	504	437	565	378	343	283	127	89
09:00 am- 10:00 am	696	784	731	787	761	819	920	872	803	502	302	271
10:00 am- 11:00 am	533	504	577	542	595	633	680	534	793	523	335	302
11:00 am- 12:00 pm	563	492	600	515	646	563	604	546	552	508	271	262
12:00 pm- 01:00 pm	474	477	542	535	627	558	586	584	578	652	284	274
01:00 pm- 02:00 pm	661	466	715	501	773	667	719	649	741	747	339	275
02:00 pm- 03:00 pm	693	741	687	761	768	778	751	728	877	731	260	238
03:00 pm- 04:00 pm	713	697	822	766	791	756	506	699	679	679	238	224
04:00 pm- 05:00 pm	770	780	777	830	823	845	652	750	744	781	210	257
05:00 pm- 06:00 pm	533	605	603	659	652	752	530	650	599	703	240	310
TOTAL VOLUME	6036	5910	6492	6291	6940	6808	6513	6390	6709	6109	2606	2502

From the hourly variation plot for Gate 1 for 6 days a week as shown in Table 3.1, it is seen that the maximum number of vehicles which arrive in the campus are 920 vehicles during 09:00 am to 10:00 am on Thursday while a maximum of 872 vehicles leaves the campus at the same time on Thursday.

Table 3.2:Hourly and daily traffic volume variation at Gate 2

COUNT HOUR	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
08:00 am- 09:00 am	323	272	364	303	375	319	333	305	322	259	167	129
09:00 am- 10:00 am	727	502	741	507	807	554	829	498	733	543	350	294
10:00 am- 11:00 am	815	575	859	609	857	563	788	483	770	572	342	312
11:00 am- 12:00 pm	690	589	745	630	610	555	503	448	517	494	326	337
12:00 pm- 01:00 pm	648	654	652	702	654	678	597	651	557	614	300	277
01:00 pm- 02:00 pm	800	805	833	854	830	782	735	736	695	699	230	217
02:00 pm- 03:00 pm	885	803	918	874	874	708	866	730	820	729	213	193
03:00 pm- 04:00 pm	703	719	763	826	709	707	683	635	665	687	202	210
04:00 pm- 05:00 pm	729	709	745	715	797	810	764	796	703	750	231	236
05:00 pm- 06:00 pm	638	721	676	771	668	766	621	707	581	644	326	295
TOTAL VOLUME	6958	6349	7296	6791	7181	6442	6719	5989	6363	5991	2687	2500

From the hourly variation plot for Gate 1 for 6 days a week as shown in Table 3.2, it is seen that the maximum number of vehicles which arrive in the campus are 918 vehicles during 02:00 pm to 03:00

pm on Tuesday, while a maximum of 874 vehicles leave the campus at the same time on Tuesday.

COUNT HOUR	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
08:00 am- 09:00 am	723	636	802	698	879	756	898	683	665	542	294	218
09:00 am- 10:00 am	1423	1286	1472	1294	1568	1373	1749	1370	1536	1045	652	565
10:00 am- 11:00 am	1348	1079	1436	1151	1452	1196	1468	1017	1563	1095	677	614
11:00 am- 12:00 pm	1253	1081	1345	1145	1256	1118	1107	994	1069	1002	597	599
12:00 pm- 01:00 pm	1122	1131	1194	1237	1281	1236	1183	1235	1135	1266	584	551
01:00 pm- 02:00 pm	1461	1271	1548	1355	1603	1449	1454	1385	1436	1446	569	492
02:00 pm- 03:00 pm	1578	1544	1605	1635	1642	1486	1617	1458	1697	1460	473	431
03:00 pm- 04:00 pm	1416	1416	1585	1592	1500	1463	1189	1334	1344	1366	440	434
04:00 pm- 05:00 pm	1499	1489	1522	1545	1620	1655	1416	1546	1447	1531	441	493
05:00 pm- 06:00 pm	1171	1326	1279	1430	1320	1518	1151	1357	1180	1347	566	605
TOTAL VOLUME	12994	12259	13788	13082	14121	13250	13232	12379	13072	12100	5293	5002

Table 3.3 Hourly and daily traffic volume variation of total traffic from Gate 1 and Gate 2

The composition of vehicles which arrives in the campus from Gate 1 comprises of 43 percent 4-wheelers, 5 percent 3-wheelers and 52 percent 2-wheelers while from Gate 2 the traffic composition comprises of 44 percent 4-wheelers, 5 percent 3-wheelers and 51 percent 2-wheelers. The average composition of vehicles arriving in the campus comprises of 43 percent of 4-wheelers, 5 percent of 3-wheelers and 52 percent of 2-wheelers

Capacity was calculated along the road from the Gate no. 1 and Gate no. 2. These are the major roads in the University as every person coming in or going out from the University has to move from these roads. The road along Gate no. 1 is opposite to the boy's hostel, while the road along Gate no. 2 is opposite to the Panjab University (P.U.) market and girl's hostel. The features of these roads were:

From the hourly variation plot for Gate 1 and Gate 2 combined for 6 days a week as shown in Table 3.3, it is observed that the maximum number of vehicles going inside the campus are 1749 vehicles 09:00 am-10:00 am on Thursday and the maximum number of vehicles coming out of the campus are 1655 vehicles 04:30 pm-05:00 pm on Wednesday.

IV. LEVEL OF SERVICE COMPUTATION

Width of the road along Gate no. 1 (opposite to boy's hostel) = 13.5m

Width of the road along Gate no. 2 (opposite to P.U. Market) = 12.8m.

Using the results from volume analysis, peak hour flow can be determined for both the gates for traffic going inside and coming out as shown in Table 4.1.

Table 4.1: Peak Hour PCUs at Gate 1 and Gate 2

LOCATION	PERIOD	Vehicles/hr	PCU/hr
Gate no. 1	Peak Hour For Traffic Going In(09:00am-10:00am) on Thursday	920	805
	Peak Hour For Traffic Coming Out(09:00am-10:00am) on Thursday	872	755
Gate no. 2	Peak Hour For Traffic Going In(02:00 pm-03:00 pm) on Tuesday	918	811
	Peak Hour For Traffic Coming Out(02:00 pm-03:00 pm) on Tuesday	874	779

For the calculation of level of service, the Volume/Capacity ratio was first determined and then the level of service is computed as shown in Table 4.2.

Table 4.2: Level of Service

Location	Time	Peak Hour Traffic in PCU/hr (V)	Total Width Of Road (m)	No. Of Lanes	Design Service Volume (C)	V/C RATIO	Level Of Service
Near Gate No. 1 (Opposite To Boy's Hostel)	Peak Hour For Traffic Going In (09:00am-10:00am) on Thursday	805	13.5	4	1500	0.53	C
	Peak Hour For Traffic Coming Out(09:00am-10:00am) on Thursday	755	13.5	4	1500	0.51	C
Near Gate No. 2 (Opposite To P.U. Market)	Peak Hour For Traffic Going In(02:00 pm-03:00 pm) on Tuesday	811	12.8	4	1500	0.54	C
	Peak Hour For Traffic Coming Out(02:00 pm-03:00 pm) on Tuesday	779	12.8	4	1500	0.52	C

V. CONCLUSIONS

The present study has been conducted to analyze the traffic characteristics of Panjab University campus, Chandigarh. The following main conclusions are drawn from the work:

1. As per the data collected from the traffic volume study, it was found that the maximum number of vehicles which arrives in the campus is on Wednesday i.e. 6940 vehicles from Gate 1 and 7181 vehicles from Gate 2 giving a total of 14121 vehicles, while on leaving the campus, it is seen that 6808 vehicles leaves from Gate 1 and 6442 vehicles leaves from Gate 2 giving a total of 13250 vehicles.
2. The minimum traffic is observed on Saturday i.e. on arriving 2606 vehicles arrives from Gate 1 and 2687 vehicles arrives from Gate 2 giving a total of 5293 vehicles, while during leaving the campus 2502 vehicles leaves from Gate 1 and 2500 vehicles leaves from Gate 2 giving a total of 5002 vehicles.
3. The traffic composition of the vehicles which arrives and leaves the campus constitutes of 43 percent of 4-wheelers, 5 percent of 3-wheelers and 52percent of 2-wheelers from both Gate 1 and Gate 2.

4. The peak hour of the traffic going in the campus is found be between 09:00 am – 10:00 am on Thursday (920 vehicles) from Gate 1 and 02:00 pm – 03:00 pm on Tuesday (918 vehicles) from Gate 2.
5. The level of service as calculated for both the roads opposite to boy's hostel and P.U. market were found to be of C level of service against all the peak hour traffic.

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