

57 ANNUAL PETROL CONSUMPTION

corresponding times of the day in 1947 (see Table 82). It was found that the increase varied from more than 160% in the morning peak on a road leading to residential suburbs, to 33% in the evening peak on a road carrying a high percentage of industrial traffic. An explanation of the generally lower increase in the evening peak is that, with the introduction of a 40-hour week, the evening peak is spread over a longer period and the peaks from industrial and office workers do not coincide to the same extent as previously.

From the foregoing it will be noted that between 1947 and 1951:

- (a) Traffic over city bridges increased by 51%.
- (b) Victorian motor registration increased by 68%.
- (c) Petrol consumption in Victoria increased by 68%.

It has therefore been assumed for purposes of these investigations that between 1947 and 1951 there has been an increase in the total daily traffic of 60%.

Components of Road Traffic

The volume and characteristics of road traffic between different parts of the city will vary according to the manner in which the land is used. For example, traffic to a residential area will show marked differences from traffic to an industrial area. Therefore, for a proper understanding of the traffic problem and to enable realistic and intelligent estimates to be made of future traffic conditions it is necessary to understand the characteristics and effect of the different components, which together constitute the total traffic flow. For this purpose traffic may be classified as follows:

Worker Traffic consists of the vehicles conveying persons to and from work. This traffic forms varying proportions (20% to 50%) of the total twelve-hourly traffic. It is concentrated in well-defined morning and evening peak periods and is usually the major contribution to the total traffic during these times. From the economic viewpoint it is not of very great importance. The bulk of it is in clearcut competition with the public transport facilities over which it has the advantage in time, flexibility and freedom, but disadvantage in cost.

Industrial and Commercial Traffic consists of vehicles travelling between centres of industrial and commercial activity and includes the following movements:

Raw materials to factories.

- Produce to warehouse or wholesaler.
- Communication between head office and factory.
- Communication between branch factories.
- Servicing of retail shops by wholesalers' vehicles.
- Retailers' trips to wholesalers and wholesale market.
- Deliveries direct from factory to retailers.

Commercial travellers' trips.

In industrial areas this traffic forms nearly all of the total flow, and near large shopping centres forms a greater proportion of the total than is usually thought. From the viewpoint of economics it is the most important component because its cost is reflected in the cost of living.

Shopping and Delivery Traffic consists of the vehicles travelling between retail centres and the home, and comprises both shoppers' cars and retailers' delivery vehicles. The volume of this traffic is influenced mainly by the number of homes in an area and the degree of car ownership.

Census Point	Peak Half-hourly Traffic (vehicles)								
		Morni	ing	Evening					
	1947	1951	% Increase 1947 to 1951	1947	1951	% Increase 1947. to 1951			
Spencer St. at Latrobe St.	365	630	73	605	804	33			
Elizabeth St. at Latrobe St.	269	564	110	375	629	68			
Latrobe St. at Exhibition St.	173	424	145	262	441	68			
Nicholson St. at Albert St.	239	567	137	310	586	89			
Albert St. at Spring St.	284	707	149						

Table 82TRAFFIC COUNTS, 1947 AND 1951

Statistical Subdivision	Resident	Resident Workers (1000's)	Number of Jobs (1000's)	Cars and Utility Trucks		Residential Workers Who Travel by Car	
	Population (1000's)			Total Garaged (1000's)	Per 1000 of Popul'n	Number (1000's)	% of all Workers
1 (a)	16	6.1	163.6				
1 (b)	143	72.3	124.6	8.8	62	4.9	7
2	99	47.2	63.2	6.7	68	4.1	9
3	108	45.2	50.8	8.9	82	5.4	12
4	131	56.8	24.9	16.3	124	10.5	18
5	159	70.5	38.1	13.3	84	10.4	15
6	128	50.3	20.8	15.7	123	10.4	21
7	133	49.0	17.4	20.3	153	11.2	23
8	119	58.3	33.1	13.3	112	10.1	17
9	134	57.1	16.9	24.9	186	12.9	23
0	134	54.3	27.5	18.7	140	10.8	20
$\mathbf{X}_{\mathbf{c}}$	23	9.1	4.3	2.7	117	1.3	14
$\mathbf{X}_{\mathbf{s}}$	41	16.2	7.2	4.3	105	2.5	15
Total	1,368	592.4	592.4	153.9	113	94.5	16

Table 83BASIC DATA FOR TRAFFIC ESTIMATION, 1951

Entertainment Traffic occurs mainly in the evening when the important components of worker, industrial and commercial traffic are negligible, and generally is not included in traffic census figures. Its importance lies usually in the provision of parking spaces near places of amusement.

Recreation and Sporting Traffic occurs chiefly at the week-ends and on holidays when other forms of traffic are at a minimum. It is important only on roads near beaches and the hills, and in the immediate vicinity of large gatherings of spectators such as occur at racecourses, football and cricket grounds. For beach and hill traffic its volume was obtained by the Country Roads Board's records and for racecourses from records of the vehicles parked.

Passenger Vehicle Traffic consists of the trams and buses used for public transport purposes, the number of which were available from the authorities concerned. On account of the frequent stops for passengers these vehicles have an effect on the capacity of a road far greater than their actual numbers, and in the case of trams on relatively narrow roads add appreciably to the trip-time and therefore the cost of other traffic. Therefore, on roads where there are any great number of public transport vehicles, the road capacity available for other road uses is reduced disproportionately.

Traffic to general centres such as wharves and railway goods yards requires special consideration when dealing with roads in the vicinity of such centres, because it will generally be additative to the normal traffic on such routes. For the purpose of our studies its volume has been ascertained from the Melbourne Harbour Trust and the Victorian Railway Department. Traffic to and from the country is also included in this class. Its amount was available from Country Roads Board's census figures.

The Gallup statistical survey made available data which enabled much light to be thrown on the movements of worker traffic. Some limited observations were also made of specially selected industrial and commercial areas to enable a quantitative conception of the magnitude and importance



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of industrial and commercial traffic to be obtained. The information so gathered is recorded hereunder. While by no means complete it did enable the problem to be viewed in proper perspective.

Characteristics of Worker Traffic

An analysis of the movements of worker traffic, as disclosed by the information obtained by the statistical survey, was the first step in the traffic investigation. For the purposes of the survey the metropolitan area was divided into twelve subdivisions (see map 59). Basic data for each of these subdivisions is given in Table 83.

The movement between these subdivisions of workers who travelled to work by car is given in Table 84.

In perusing this table, it should be noted that the figures representing small numbers of movements were derived from a very small sample in the statistical survey and individually would not be of sufficient accuracy on which to base calculations. However, by grouping them to numbers of a reasonable size, the accuracy is improved and it is for this purpose that they have been extracted. The data in Table 84 may be converted to numbers of vehicular trips between each region by allowing for the average number of persons in each car. This information is given in Table 85. The results of the analysis of the data contained in Tables 83 to 85 may be summarised as follows:

- (a) The total worker traffic was calculated at 151,700 vehicles each working day.
- (b) The number of cars and utilities for each 1,000 people varies from 62 in the inner industrial areas to 186 in Malvern and Caulfield, the average being 113.
- (c) Up to a car ownership figure of 150 for each 1,000 people, the percentage of workers who travel by car is greater in the high car ownership regions than the direct proportion.
- (d) Where car ownership is in excess of 150 for each 1,000 people, worker traffic does not appear to be increased probably owing to a large number of two-car families in this range.
- (e) The number of workers who use cars and utility trucks to travel to work varies from 7% in the inner areas to 23% in some of the outer areas. The average for the whole metropolitan area is 16%.
- (f) As was noted with all workers, city workers who travel by car are drawn from all portions of the metropolitan area without any appreciable evidence of distance affecing the numbers who so travel. For inter-suburban movements, however, the influence of distance is well marked and the numbers who travel by car vary approximately in inverse proportion to the square of the distance of travel.

The total worker traffic shown in Table 84 was distributed over the existing road network. Its relation to the total estimated traffic at representative points in the road system is shown in Table 86.

Thus worker traffic accounts for approximately one-fifth of central area traffic and from one-third to one-half of inter-suburban traffic depending on the locality.

In preparing this table, roads in the same locality have been grouped. This has made the distribution of movements between subdivisions more reliable as such factors as alternative routes and the effect of traffic congestion at peak periods are largely eliminated. For example, many South Melbourne workers who live in Northcote might prefer to travel along Swanston Street, but because of congestion at the peak periods an alternative route may be selected. By grouping all central area outlets together this worker traffic is accounted for whichever route is selected. It should also be noted that a worker travelling through the central area to a location outside of it crosses the boundaries four times during the day as compared with two for central area workers.

Characteristics of Industrial Traffic

An analysis of traffic crossing the Napier Street Bridge over the Maribyrnong River and a special check of traffic from a small completely industrial area in that vicinity indicate the volume of traffic that can be generated by industry. The information was obtained by noting vehicle registration