

Some Characteristics of Truck Ownership in Australia

Occasional Paper

This paper presents estimates of the concentration of ownership and the geographic distribution of the Australian trucking fleet.

Subject ☐

Series ☐

Date ☐

A to Z ☐

Search ☐

Results ☐

Print ☐

Exit ☐

Some Characteristics of Truck Ownership in Australia

P. B. Thomas



Business and Economics Series

© Commonwealth of Australia

1981

ISBN 0 642 05979 9

FOREWORD

This paper presents estimates of the concentration of ownership and the geographic distribution of the Australian trucking fleet.

The information has been produced as a by-product of an exercise which generated a comprehensive list of firms providing road transport services, either for the carriage of their own products, or for sale to other firms.

The absence of a comprehensive list of road freight operators has been a major problem for researchers in the road transport industry. The method described in this paper provides a quick and relatively inexpensive means of identifying the population of road transport operators which may be used as a base for sampling.

The method has been applied to all States. Additional hand checks were undertaken for the Tasmanian records to assess the validity of the approach and provide a more detailed understanding of truck ownership and operating patterns in that State.

The work was carried out by Mr P. Thomas, of the Bureau of Transport Economics, with Mr J. McKinley, of the Data Processing Branch, Department of Transport, undertaking the data processing involved. Dr Howard Quinlan (BTE) provided the results shown in Chapter 4. Much of the groundwork for the production of the statistics shown in this paper was willingly undertaken by Mrs D. Hardy (BTE).

The co-operation of the State Motor Registries in supplying the information used in the study and of the Australian Bureau of Statistics for advice and assistance at various stages in the study is gratefully acknowledged.

P.W. Blackshaw
Assistant Director
Finance Branch

CONTENTS

	<u>Page</u>
FOREWORD	iii
SUMMARY	x
CHAPTER 1 INTRODUCTION	1
CHAPTER 2 METHOD OF DERIVING THE STATISTICS	3
CHAPTER 3 GEOGRAPHIC DISTRIBUTION AND CONCENTRATION OF OWNERSHIP OF FREIGHT CARRYING VEHICLES	26
CHAPTER 4 TASMANIAN ROAD TRUCK FLEETS	48
ANNEX A PROCESSING MOTOR REGISTRY DATA	58
ANNEX B PROCESSING PROCEDURES	70
ANNEX C INDUSTRY CODING KEY	93

TABLES

	<u>Page</u>
2.1 Number of Fleets in Each Fleetsize Group, Tasmania: Mechanical Count	8
2.2 Number of Vehicles in Each Fleetsize Group, Tasmania: Mechanical Count	9
2.3 Number of Fleets in Each Fleetsize Group, Tasmania: Manual Count	10
2.4 Number of Vehicles in Each Fleetsize Group, Tasmania: Manual Count	11
2.5 Number of Fleets Not Identified in Each Fleetsize Group, Tasmania	13
2.6 Proportion of Fleets Split by Cause of Split: Tasmania	14
2.7 Comparison of Estimated and Actual Distribution of Vehicles by Fleetsize Group, Tasmania	19
3.1 Proportion of Vehicles Registered in Statistical Divisions by Size of Vehicle: New South Wales	28
3.2 Proportion of Vehicles Registered in Statistical Divisions by Size of Vehicle: Victoria	29
3.3 Number of Vehicles Registered in Statistical Divisions by Size of Vehicle: South Australia	30
3.4 Number of Vehicles Registered in Statistical Divisions by Size of Vehicle: Western Australia	31
3.5 Number of Vehicles Registered in Statistical Divisions by Size of Vehicle: Tasmania	32
3.6 Proportion of Vehicles in Each Fleetsize Group, States: 1976	33
3.7 Proportion of Vehicles in Each Fleetsize Group, State Capital Cities: 1976	34
3.8 Proportion of Vehicles in Each Fleetsize Group, States Excluding Capital Cities: 1976	35
3.9 Proportion of Fleets in Each Fleetsize Group, New South Wales: 1976	36

	<u>Page</u>
3.10 Proportion of Vehicles in Each Fleetsize Group, New South Wales: 1976	37
3.11 Proportion of Fleets in Each Fleetsize Group, Victoria: 1976	38
3.12 Proportion of Vehicles in Each Fleetsize Group, Victoria: 1976	39
3.13 Proportion of Fleets in Each Fleetsize Group, South Australia: 1976	40
3.14 Proportion of Vehicles in Each Fleetsize Group, South Australia: 1976	41
3.15 Proportion of Fleets in Each Fleetsize Group, Western Australia: 1976	42
3.16 Proportion of Vehicles in Each Fleetsize Group, Western Australia: 1976	43
4.1 Number of Fleets and Trucks by Size of Fleet, Tasmania: 1976	49
4.2 Number of Fleets and Trucks by Industry Served, Tasmania: 1976	51
4.3 Number of Fleets by Size of Fleet and Industry Served, Tasmania: 1976	55
4.4 Number of Trucks by Truck Size and Industry Served, Tasmania: 1976	56
4.5 Number of Fleets by Truck Size and Industry Served, Tasmania: 1976	57
A.1 Format of Registration Records Received	61
A.2 Number of Vehicles Without Postcode Details	62
A.3 Stratum Number, Tare Weight Interval Relationship	64
A.4 Standard Body Type Codes	65
C.1 Correspondence between Industry and Occupation	93

FIGURES

	<u>Page</u>
2.1 Proportion of Trucks in Fleetsize Groups: Mechanical and Manual Processing Methods. Hobart	20
2.2 Proportion of Trucks in Fleetsize Groups: Mechanical and Manual Processing Methods. Southern	21
2.3 Proportion of Trucks in Fleetsize Groups: Mechanical and Manual Processing Methods. Northern	22
2.4 Proportion of Trucks in Fleetsize Groups: Mechanical and Manual Processing Methods. Mersey-Lyell	23
2.5 Proportion of Trucks in Fleetsize Groups: Mechanical and Manual Processing Methods. Total	24
3.1 Proportions of Trucks in Each Fleetsize Group, Australia, 1976	44
3.2 Proportions of Trucks in Fleetsize Groups, Capital City and Rest of State, Australia, 1976	46
4.1 Number of Private and Corporate Fleets in Tasmania by Industry Group	52
4.2 Number of Private and Corporate Vehicles in Tasmania by Industry Group	53
B.1 System Flowchart. Analysis of State Motor Registration Data	72

ATTACHMENTS

Page

B.1	BTE-TRUCK-SELECT	73
B.2	BTE-TRUCK-FLEET-OWNER	77
B.3	POSTCODE-IS-CREATE	81
B.4	A00 600-POST-AMEND	85
B.5	BTE-IS-POST-SET-UP	90

SUMMARY

The lack of any comprehensive list of operating units in the road freight transport industry has presented serious problems to potential researchers in this field. This project was concerned with the development and testing of a method of extracting such a list from records held by the State Motor Registries. As a by-product of this exercise, statistics on the ownership and distribution of the road transport fleet were produced, and are presented in this paper. Information in this paper has been derived from data provided to the RTE by the State Registries. It relates to vehicles on the register in mid-1976.

Major practical difficulties arose in identifying owners of fleets because the owner's (or company) name and style were not consistent throughout the registry records. This was overcome by defining as a keyword the first six contiguous characters in the registered owner's name, excluding a list of common business terms, courtesy titles, etc.

The process of building up lists of fleet owners then fell into three major steps:

- . the identification of the keyword from the name field;
- . the determination of the ABS Statistical Division in which the owner was located; and
- . a sorting process to group like fields together.

Using this process, tables of fleet owners have been generated and statistics on the degree of concentration of ownership and the geographical distribution of fleets have been produced.

The results for the State of Tasmania have been checked manually in order to make an assessment of the potential errors in the automated process. The results indicate that the process is sufficiently accurate for most purposes and provides a reasonable framework for sampling fleet owners.

The processing of the Tasmanian data was extended to provide a more detailed impression of the patterns of freight vehicle ownership and utilisation in that State. Using telephone books, electoral rolls and business directories, it was possible to identify the primary occupation of the registered owner of each fleet. From this information, the numbers of vehicles engaged in operations related to specific industries may be inferred. The estimates are necessarily incomplete in that vehicles engaged in hire and reward operations may be utilised by any other industry sector.

CHAPTER 1 - INTRODUCTION

The absence of adequate information on road transport operations has been a continuing problem in transport research. While the Motor Vehicle Usage Survey conducted by the Australian Bureau of Statistics provides valuable information on the physical operations of vehicles, it does not provide any financial information or information relating to the operating strategies of firms involved in road transport, nor is the information on physical operations complete in detail.

The large number of units involved in road freight transport activities hinders any attempt to study operations on a broad scale. The industry is highly disaggregated, with the majority of fleets consisting of one or two vehicles, often operated in conjunction with some other primary business activity. At the other end of the fleet size scale are bodies like the Postal Commission, Telecom, and a small number of other large public and private authorities operating very large numbers of vehicles.

In developing a method by which operators providing road transport services can be identified, a range of statistical information on the ownership and geographic concentration of the Australian road transport fleet has been produced. This paper presents a summary of statistics produced, and outlines the method used for identifying road fleet operators in Australia.

The primary data sources were the registration records of freight carrying vehicles held by each State Motor Registration authority. These records were processed to produce the required information. Any sample framework and the statistical distributions generated by this method are expected to remain generally valid for a number of years, despite the obvious problems of vehicle turnover which have plagued vehicle surveys based on registration records. While operators buy and sell

individual vehicles it is anticipated that turnover in operating units (or firms) would proceed at a much slower rate, with the size and composition of individual fleets remaining relatively stable over longer periods of time.

To evaluate the procedures used, registration records for the State of Tasmania were examined manually, errors introduced by the processing amended, and an amended list of fleetowners produced. The evaluation provided a measure of both the adequacy of the method in identifying individual fleets and the bias inherent in any statistics generated. Tasmania was chosen because of the relatively small number of vehicles on register. The implicit assumption is made that the experience in Tasmania will be reflected in the results for the other States.

As with any research, the benefit of hindsight offers the possibility of some more efficient methods and improvements in methodology generally. However, the results represent a useful first step towards providing a better understanding of the road freight transport industry. Perhaps more importantly, it provides a methodology by which the exercise can be updated at relatively short notice.

Chapter 2 of the paper outlines the major steps in the processing and the production of the statistical data and presents an evaluation of the reliability of statistics produced using this process. The source data (State Motor Registry records) and the processing methods used are presented in more detail in Annexes A and B. Broad statistics on the concentration of ownership and the distribution of the Australian road transport fleet are shown in Chapter 3. As an extension of the evaluation process, further statistics were produced on the utilisation of trucks in Tasmania, and these are contained in Chapter 4.

CHAPTER 2 - METHOD OF DERIVING THE STATISTICS

There are two major steps in the processing which are vital to both the accuracy of the statistics produced and the reliability of the method used to identify fleet owners. The first is the identification of the 'keyword' in the name field, and the second the assumption that discrete operating units (i.e. fleets) will be registered at a location or locations within a single postcode region.

Previous processing of motor registration data from the ACT (see Annex A) had suggested that direct use of the information on name and/or address recorded on registration records would be unsatisfactory because of lack of consistency. Significant variations frequently occurred in the address shown on the registration records of vehicles in the one fleet (e.g. use of post office box and street address) and in the manner of recording the name of registered owners. A major cause of variations in the name of owner was the use of different style in recording courtesy titles of both individuals and corporate bodies.

It was decided to construct a keyword from the name field on the registration record to avoid these differences in style. The keyword was defined to consist of the first six contiguous characters in the name field, excluding blanks and a number of courtesy titles. If six characters were not present, then five were used and so on to a minimum of three characters. Having constructed the keyword, the vehicle registration records were then sorted by postcode (of registered address) within keyword order, within each statistical division⁽¹⁾.

(1) Statistical divisions had previously been determined by using a correspondence between postcode areas and statistical divisions.

Each group of vehicles with common keyword and postcode details was then assumed to represent a single operating unit or fleet.

The validity of such an assumption needs to be tested both from the point of view of the accuracy of the statistics generated and the reliability of the individual fleet identification process for any sampling or survey purpose.

The results of the computer processing for the State of Tasmania were examined manually and amendments made where errors in the mechanical processing were detected. By noting the errors which occurred, it was possible to quantify the problems which arose in the processing of records of this State. It is expected that the experience in Tasmania (in terms of both the proportion of fleets not identified and the types of error) will be reflected in the other States.

The evaluation of the results for Tasmania has produced evidence of some problems inherent in the processing method used. These problems have certainly recurred in the processing of other States, although no attempt has been made to quantify the size of these errors in the other States. The results so far indicate that the bias in the results is probably consistent between the States, and in the judgement of the author the extent and nature of the bias in the statistical results for Tasmania may serve as indicative for the other States.

However this assumption is one which future work should aim to test exhaustively.

Scope for error

There are three sources of error generated by this mechanical approach to the identification of road transport operators:

- . the keyword/postcode combination may not be unique;
- . differing forms of name of the registered owner may be used, causing a different keyword to be generated; and
- . an alternative address in a different postcode area may be used for the one fleet.

Two types of error then arise. Where the keyword/postcode combination is not unique, more than one truck operator will be included in the single computer identified fleet. Under the rules adopted in the processing, the owner of the vehicle appearing first in the sequence will be credited with ownership of all vehicles in that sequence. As a result subsequent fleets in the sequence are not recognised, and the average size of fleet is overestimated. This problem is generally apparent on inspection of the full name and is easily overcome⁽¹⁾.

It is difficult to give an accurate estimate of the size of problems caused by differences in recorded name and address. It was the objective of this current exercise to identify all truck fleets - defined as independent operating entities. Recurrent problems included:

- . vehicles registered in the name of a partnership, while others were registered in the name of individual partners, (this was a particular problem with husband and wife partnerships, and family companies generally);

(1) Particularly for larger fleets, the merging of two or more operators is usually obvious. However, some smaller units, generally in rural regions or smaller urban centres, where there are a number of vehicles registered under the one family name, but with different initials and sometimes at different addresses, the situation is not so clear. However, short of approaching the truck owners, there would seem to be no solution to the problem of identifying the character of the vehicle operations.

- . branch office locations of major companies (in particular, government departments, freight forwarders, retailers and so on);
- . the use of street addresses and post office boxes in a different postcode area;
- . apparent errors in recording name; and
- . the inconsistent use of abbreviations or initials in the name of registered owner.

A practical problem of defining an 'independent' operator also arose. While smaller partnership operations might be expected to operate all vehicles owned by partnership members as a single operating entity (if not as a single tax unit), the degree of control exercised by companies over branch office operations would vary.

Treatment of these operators was necessarily subjective. Where it was judged that the vehicles would be operated as a single unit, then the fleets were amalgamated; this was done with partnerships⁽¹⁾, and where either an alternative post office box address was used, or there was an apparent error in the name or address. In other cases, mainly branch offices of larger companies, freight forwarders and the like, fleets were not combined⁽²⁾.

-
- (1) In most cases the use of the keyword had usually amalgamated fleets where this sort of anomaly existed.
 - (2) Although it must be noted that there were several instances where it was expected that larger fleets would be operated as several smaller units, the registration of vehicles was concentrated through one or a small number of central points, apparently head office locations. Where this occurred and the different addresses did not appear to form the focus for independent operations, the fleets were merged.

The method of the evaluation

The mechanics of the evaluation involved three distinct stages.

- . The production of a set of labelled cards, one for each fleet, as identified by the mechanical process. The owner of the first vehicle appearing in each unique keyword/postcode group was assumed to own all vehicles in that group, and an address label was prepared for that vehicle.

At the same time, a count of the number of fleets and the number of vehicles in each fleetsize group was made in each statistical division. The results are shown in Tables 2.1 and 2.2.

This process gave a complete set of cards, one for each machine identified fleet, which provided the basic tool for evaluating the method.

- . Each card was inspected and matched against a listing of all vehicles arranged in order of fleet (as determined by keyword/postcode). Where it was apparent that two independent operators had been merged, a separate card was made out for the second operator. Where vehicles belonging to the one operating entity were split into two (or more) fleets because of differences in the keyword or the postcode as recorded in the address, the fleets were merged onto the one card, and the excess cards kept separately, the cause of the split having been noted.
- . The cards were counted to obtain:
 - an amended total of the number of fleets and the number of vehicles in each fleetsize group (Tables 2.3 and 2.4);

TABLE 2.1 - NUMBER OF FLEETS IN EACH FLEETSIZE GROUP, TASMANIA: MECHANICAL COUNT

Statistical Division	Size of Fleet														Total
		1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
701 Hobart	No.	1 179	237	92	46	20	20	16	9	5	6	27	7	9	1 673
	%	70.5	14.2	5.5	2.7	1.2	1.2	1.0	0.5	0.3	0.4	1.6	0.4	0.5	100
702 Southern	No.	661	142	51	28	11	10	10	2	3	1	2	-	-	921
	%	71.8	15.4	5.5	3.0	1.2	1.1	1.1	0.2	0.3	0.1	0.2	-	-	100
703 Northern	No.	1 090	281	118	46	31	25	15	3	5	10	19	4	2	1 649
	%	66.1	17.0	7.2	2.8	1.9	1.5	0.9	0.2	0.3	0.6	1.2	0.2	0.1	100
704 Mersey-Lyell	No.	987	239	97	53	32	15	14	10	3	5	10	6	2	1 473
	%	67.0	16.2	6.6	3.6	2.2	1.0	1.0	0.7	0.2	0.3	0.7	0.4	0.1	100
Total	No.	3 917	899	358	173	94	70	55	24	16	22	58	17	13	5 716
	%	68.5	15.7	6.3	3.0	1.6	1.2	1.0	0.4	0.3	0.4	1.0	0.3	0.2	100

TABLE 2.2 - NUMBER OF VEHICLES IN EACH FLEETSIZINGROUP, TASMANIA: MECHANICAL COUNT

Statistical Division	Size of Fleet														Total
		1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
701	No.	1 179	474	276	184	100	120	112	72	45	60	407	167	889	4 085
Hobart	%	28.9	11.7	16.8	4.5	2.4	2.9	2.7	1.8	1.1	1.5	10.0	4.1	21.8	100.0
702	No.	661	284	153	112	55	60	70	16	27	10	29	-	-	1 477
Southern	%	44.8	19.2	10.4	7.6	3.7	4.1	4.7	1.1	1.8	0.7	2.0	-	-	100
703	No.	1 090	562	354	184	155	150	105	24	45	100	264	100	104	3 237
Northern	%	33.7	17.4	10.9	5.7	4.8	4.6	3.2	0.7	1.4	3.1	8.2	3.1	3.2	100
704	No.	987	478	291	212	160	90	98	80	27	50	153	146	85	2 857
Mersey-Lyell	%	34.5	16.7	10.2	7.4	5.6	3.2	3.4	2.8	0.9	1.8	5.4	5.1	3.0	100
Total	No.	3 917	1 798	1 074	692	470	420	385	192	144	220	853	413	1 078	11 656(a)
	%	33.6	15.4	9.2	5.9	4.0	3.6	3.3	1.6	1.2	1.9	7.3	3.5	9.2	100

(a) Excludes 74 vehicles where a keyword/postcode could not be formed from the name and address.

TABLE 2.3 - NUMBER OF FLEETS IN EACH FLEETSIZE GROUP, TASMANIA: MANUAL COUNT

Statistical Division		Size of Fleet														Total
		1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+		
701	No.	1 217	193	85	41	16	17	12	13	6	7	21	10	9	1 647	
Hobart	%	73.9	11.7	5.2	2.5	1.0	1.0	0.7	0.8	0.4	0.4	1.3	0.6	0.5	100	
702	No.	846	146	42	18	13	8	-	2	2	-	1	-	-	1 078	
Southern	%	78.5	13.5	3.9	1.7	1.2	0.7	-	0.2	0.2	-	0.1	-	-	100	
703	No.	1 416	258	78	33	25	20	11	7	4	6	18	4	1	1 881	
Northern	%	75.3	13.7	4.1	1.8	1.3	1.1	0.6	0.4	0.2	0.3	1.0	0.2	0.1	100	
704	No.	1 441	215	70	37	15	12	11	4	3	4	11	3	5	1 831	
Mersey-Lyell	%	78.7	11.7	3.8	2.0	20.8	0.7	0.6	0.2	0.2	0.2	0.6	0.2	0.3	100	
Total	No.	4 920	812	275	129	69	57	34	26	15	17	51	17	15	6 437	
	%	76.4	12.6	4.3	2.0	1.1	0.9	0.5	0.4	0.2	0.3	0.8	0.3	0.2	100	

TABLE 2.4 - NUMBER OF VEHICLES IN EACH FLEETSIZE GROUP, TASMANIA: MANUAL COUNT

Statistical		Size of Fleet													
Division		1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	Total
701	No.	1 217	386	255	164	80	102	84	104	54	70	283	258	1 017	4 074
Hobart	%	29.9	9.5	6.3	4.0	2.0	2.5	2.1	2.6	1.3	1.7	6.9	6.3	25.0	100
702	No.	846	292	126	72	65	48	-	16	18	-	11	-	-	1 494
Southern	%	56.6	19.5	8.4	4.8	4.4	3.2	-	1.1	1.2	-	0.7	-	-	100
703	No.	1 416	516	234	132	125	120	77	56	36	60	240	95	44	3 151
Northern	%	44.9	16.4	7.4	4.2	4.0	3.8	2.4	1.8	1.2	1.9	7.6	3.0	1.4	100
704	No.	1 441	430	210	148	75	72	77	32	27	40	156	69	193	2 970
Mersey-Lyell	%	48.5	14.5	7.1	5.0	2.5	2.4	2.6	1.1	0.9	1.3	5.3	2.3	6.5	100
Total	No.	4 920	1 624	825	516	345	342	238	208	135	170	690	422	1 254	11 689(a)
	%	42.1	13.9	7.1	4.4	3.0	2.9	2.0	1.8	1.2	1.5	5.9	3.6	10.7	100

(a) Excludes 33 vehicles where the name and/or address was corrupt or missing.

- the number of fleets not identified by the mechanical process (by size of fleet) (Table 2.5); and
- the number of fleets which were split because of vehicles with different keyword/postcode details (Table 2.6).

An appraisal

There is now a need to evaluate this method as a means for identifying fleet operators. Any evaluation must concentrate on two issues.

- . Are all operators identified?
 - and if not, are all important operators identified?
- . Is there a reasonable measure of the size of each operator?
 - on which some stratification by size may be based.

For the purpose of producing statistics on the concentration of ownership of the Australian road transport industry, these two problems may be considered to offset one another - at least to a degree. To the extent that individual operators are not identified - i.e. they are merged with others because of a coincidence of keyword and postcode data - the number of fleets will be understated and the average fleetsize overestimated: conversely, to the extent that operating entities are split because of differences in these data, the reverse will occur.

The subjective nature of determining what constitutes an individual fleet has already been noted. There is also considerable practical difficulty in identifying all possible variations of name from which keywords might be formed. Where the organisation or abbreviation is well known, and the variation anticipated, no problems will occur, but this may not always be the case. The scope of the problem is illustrated by the number of different places at which vehicles owned by the Hydro Electricity Commission were found (keyword underlined):

TABLE 2.5 - NUMBER OF FLEETS NOT IDENTIFIED IN EACH FLEET SIZE GROUP, TASMANIA

Statistical Division	Size of Fleet													Total
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
<u>701 - Hobart</u>														
Total Fleets	1 217	193	85	41	16	17	13	6	6	7	21	10	9	1 647
No. Missed	146	23	8	4	3	2	1	2	-	-	3	-	-	192
% Missed	12.0	11.9	9.4	9.8	18.8	11.8	8.3	15.4	-	-	14.3	-	-	11.7
<u>702 -Southern</u>														
Total Fleets	846	146	42	18	13	8	-	2	2	-	1	-	-	1 078
No. Missed	113	24	6	2	1	1	-	-	-	-	-	-	-	147
% Missed	13.4	16.4	14.3	11.1	7.7	12.5	-	-	-	-	-	-	-	13.6
<u>703 -Northern</u>														
Total Fleets	1 416	258	78	33	25	20	11	7	4	6	18	4	1	1 881
No. Missed	303	50	11	5	3	7	1	-	-	-	4	-	-	384
% Missed	21.4	19.4	14.1	15.2	12.0	35.0	9.1	-	-	-	22.2	-	-	20.4
<u>704 -Mersey-Lyell</u>														
Total Fleets	1 441	215	70	37	15	12	11	4	3	4	11	3	5	1 831
No. Missed	273	35	10	5	-	-	2	-	-	-	-	-	-	325
% Missed	18.9	16.3	14.3	13.5	-	-	18.2	-	-	-	-	-	-	17.7
<u>Total Fleets</u>														
Total Fleets	4 920	812	275	129	69	57	34	26	15	17	51	17	15	6 437
No. Missed	835	132	35	16	7	10	4	2	-	-	7	-	-	1 048
% Missed	17.0	16.3	12.7	12.4	10.1	17.5	11.8	7.7	-	-	13.7	-	-	16.3

- . H E C
- . HEC
- . Hydro Elec Comm
- . Hydro Elec Commission
- . Hydro Electricity Commission

For some of these categories, vehicles also appeared at a number of different postcodes. The variation in postcode was however of minor relevance, as the sort sequence ensured that similar keywords are in close proximity to each other, and a visual check of fleets will normally identify any errors of this sort.

It is probable that there are a small number of instances where the need to combine fleets identified as separate entities has not been recognised.

Nevertheless, it is estimated that less than 3 per cent of fleets are split due to a difference in either the keyword or postcode. Particular care was taken to minimise the number of instances missed in our evaluation, and 3 per cent is considered an upper limit. A dissection of this total by the cause of error is shown in Table 2.6.

TABLE 2.6 - PROPORTION OF FLEETS SPLIT BY CAUSE OF SPLIT: TASMANIA^(a)

<u>Difference in Keyword</u>		<u>Difference in Postcode</u>		<u>TOTAL</u>
<u>Variation in</u>	<u>Misspelling</u>	<u>Error in</u>	<u>Different address</u>	
<u>presentation</u>		<u>postcode</u>		
		(per cent)		
47	7	20	26	100

- (a) Based on over 300 identified splits of fleets. Several fleets, for example, the Hydro Electricity Commission fleet referred to above, appeared in more than two locations. Each split has been included as a separate observation.

A large part of the difference due to problems with the postcode can be attributed to apparent errors in recording postcodes⁽¹⁾. The remainder is due to the owner registering the vehicle at a different address in another postcode area.

Variations in the keyword were caused by two main factors (apart from simple misspelling):

- . varying use of abbreviation (see the HEC example above);
- . presenting the owner's name in a different form, e.g.:

Municipality of Glenorchy
City Council of Glenorchy
City of Glenorchy
Glenorchy City Council

However in all cases where this occurred, the majority of the vehicles controlled by the organisation were registered under one (or two) of the alternative forms.

A potentially more severe problem is illustrated in Table 2.5. Here the definition of the keyword has not been sufficiently precise to separate vehicles belonging to two different fleets: the assumption of a keyword/postcode combination unique to each fleet has failed. This was due to three main causes:

- . Common family names - where the family or surname of the private owner, or the firm name has been shared by two apparently independent operators. This has been a particular problem in the rural areas of Tasmania, where it would seem that there are a number of family groups farming in small localities.

(1) In one instance, a medium sized processing company with 3 vehicles, had registered all vehicles in the same name at the same address, but had attributed three different postcodes to the one address.

- . Common or popular placenames - where the town or region name has been included in the business name. Prominent examples were as follows:
 - . Hobart
 - . Glenorchy
 - . Tasmania
 - . Australia
 - . A/Asia
 - . Metropolitan
 - . Launceston
- . Trade or activity descriptors - where the activity is commonly included in the business name, e.g.
 - . Motors
 - . Foods
 - . Transport
 - . Council

On the basis of these results, it would be dangerous to use this method as a means of identifying truck fleet owners, without at least some visual checking of the results. Problems occasioned by fleets being split between different keyword/postcode groups were not severe and could be ignored for most purposes. However, more serious problems arose where different fleets had the same keyword/postcode combination. This sometimes led to relatively large fleet owners remaining unidentified, while the ownership of these vehicles was attributed to others.

This problem can be solved in two ways:

- . a more comprehensive definition of common terms which are to be precluded from forming the keyword, (i.e. tighter definition of the keyword); and
- . by a visual inspection of the larger fleets to insure that fleets of significant size (whatever that is defined to be) are not merged with other fleets and lost in the processing; or

. a combination of both.

It would be possible to use the unamended list of vehicles sorted into fleets for the selection of a PPS (probability proportional to size) sample of fleets⁽¹⁾. More complex sample schemes (specifically involving stratification by fleetsize) could encounter some difficulty in design and may require some refinement of the sample framework. The need for refinement will depend on the definition of a sample unit and other aspects of sample design, and will certainly involve a need to visually inspect at least the larger fleets (as identified) to ensure that all major operators are identified⁽²⁾.

In view of the preponderance of fleets in the smaller fleetsize categories a visual scan of these larger fleets is certainly feasible.

In short, the method of identifying fleet owners from registration records, basing the identification on a keyword or main word identified in the name field, along with the postcode in the address is successful. Some refinement by way of manual checking of the larger fleets, as identified by this process, is desirable but not essential unless fleet size is to be used as a means of stratifying the sample. The intensity of the checking required will depend on the sample design, primarily the degree of stratification required.

(1) By ordering vehicles into fleets, selecting a random sample of vehicles from the list, and then surveying the fleets selected, the probability of selection of any individual fleet is proportional to the size of that fleet.

(2) On the assumption that there will be a completely enumerated sector which will aim to cover all fleets above a given size.

The above partial appraisal has concentrated on assessing the value of the results as a means of identifying individual operators in the road transport industry. It remains to provide some measure of the accuracy of this method of data processing in providing a profile of the concentration of vehicle ownership.

Table 2.7 provides a direct comparison between the fleetsize distribution found by the mechanical count of vehicles with the same postcode and keyword details, and that found with a manual examination of the data.

The mechanical identification of fleets tends to understate the incidence of single truck fleets. While the degree of error between the estimated and actual proportion of fleets (and vehicles) may be relatively significant in individual fleetsize ranges the overall pattern of distribution is preserved.

Figures 2.1 to 2.5 compare the distributions of vehicles by fleetsize group shown in Tables 2.2 and 2.4. The results have been presented separately for each statistical division and in total to highlight the consistency in the results of the evaluations between the statistical divisions within Tasmania.

With the exception of the capital city statistical division (Hobart, 701) the results are generally similar, lending some strength to any assumption that the nature and extent of any bias may be similar between the States. For Hobart there is generally a much closer correspondence between the estimated and actual fleetsize distribution. There is no immediately obvious explanation for the difference between Hobart and other regions, and while it is possible to postulate that the difference is due to factors such as the more urbanised nature of the Hobart region, there is no direct evidence to support this thesis.

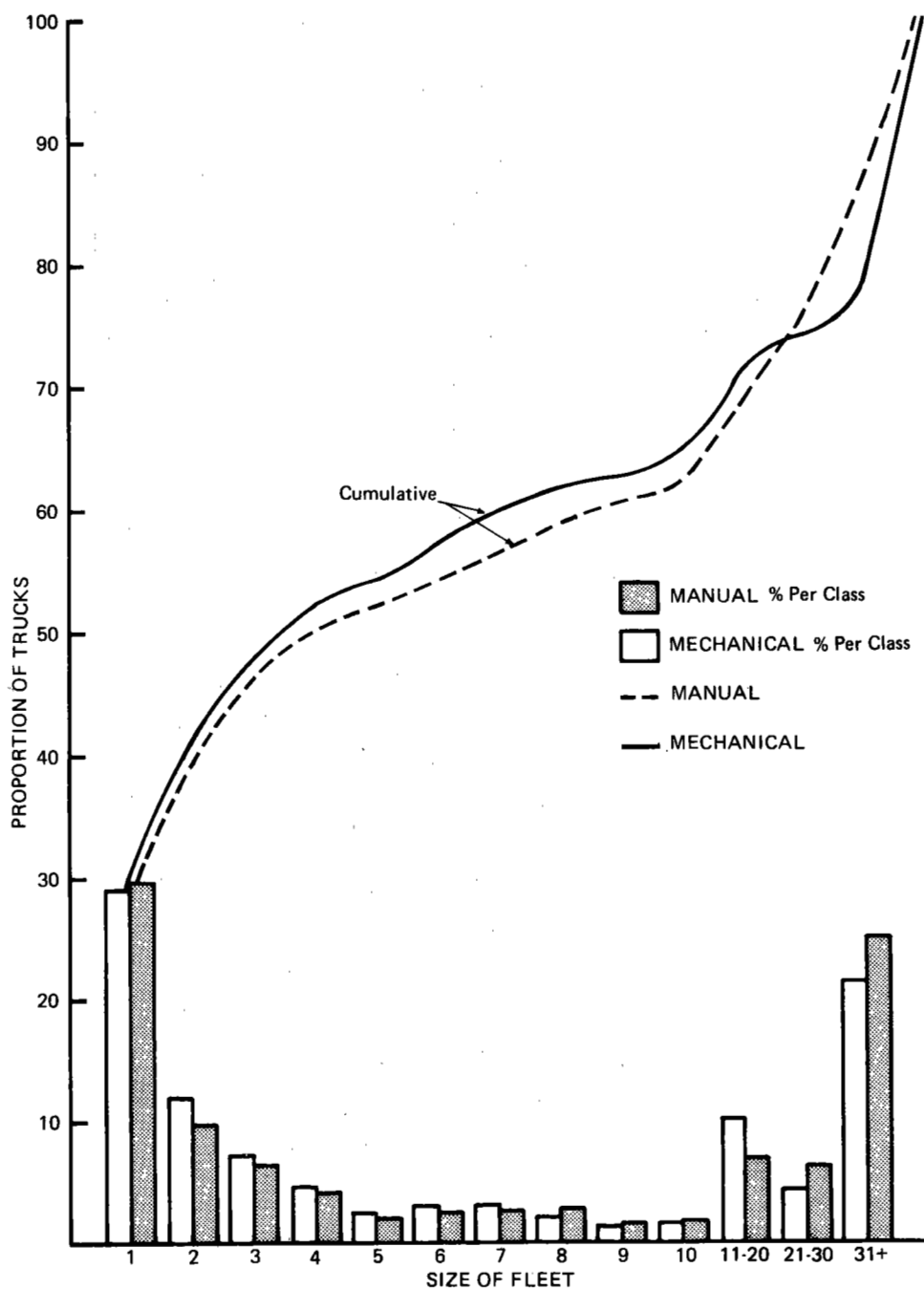
(a)

TABLE 2.7 - COMPARISON OF ESTIMATED AND ACTUAL DISTRIBUTION OF VEHICLES BY FLEETSIZE GROUP: TASMANIA

(per cent)

Statistical Division		Size of Fleet													Total
		1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
701	Estimated	70.5	14.2	5.5	2.7	1.2	1.2	1.0	0.5	0.3	0.4	1.6	0.4	0.5	100
Hobart	Actual	73.9	11.7	5.2	2.5	1.0	1.0	0.7	0.8	0.4	0.4	1.3	0.6	0.5	100
702	Estimated	71.8	15.4	5.5	3.0	1.2	1.1	1.1	0.2	0.3	0.1	0.2	-	-	100
Southern	Actual	78.5	13.5	3.9	1.7	1.2	0.7	-	0.2	0.2	-	0.1	-	-	100
703	Estimated	66.1	17.0	7.2	2.8	1.9	1.5	0.9	0.2	0.3	0.6	1.2	0.2	0.1	100
Northern	Actual	75.3	13.7	4.1	1.8	1.3	1.1	0.6	0.4	0.2	0.3	1.0	0.2	0.1	100
704	Estimated	67.0	16.2	6.6	3.6	2.2	1.0	1.0	0.7	0.2	0.3	0.7	0.4	0.1	100
Mersey-Lyell	Actual	78.7	11.7	3.8	2.0	0.8	0.7	0.6	0.2	0.2	0.2	0.6	0.2	0.3	100
Total No.	Estimated	68.5	15.7	6.3	3.0	1.6	1.2	1.0	0.4	0.3	0.4	1.0	0.3	0.2	100
	Actual	76.4	12.6	4.3	2.0	1.1	0.9	0.5	0.4	0.2	0.3	0.8	0.3	0.2	100

(a) 'Estimated' refers to the number of trucks estimated to be in each fleetsize category by the use of keyword/postcode correspondence to identify fleets. 'Actual' refers to the distribution of trucks after all manual adjustments have been made to correct for errors occasioned by the assumptions made in processing.



**Figure 2.1: PROPORTION OF TRUCKS IN FLEETSIZE GROUPS:
MECHANICAL AND MANUAL PROCESSING METHODS. HOBART.**

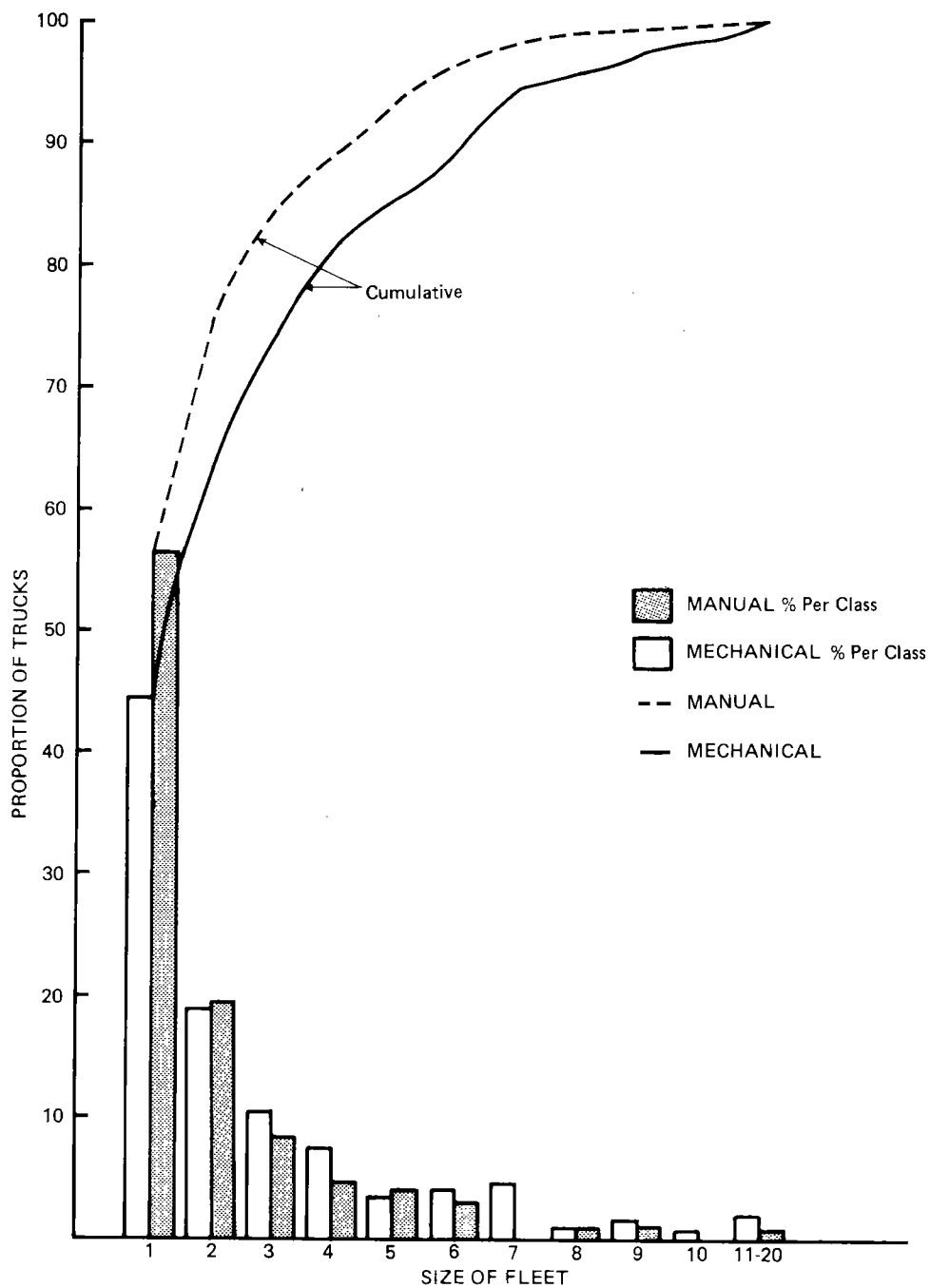
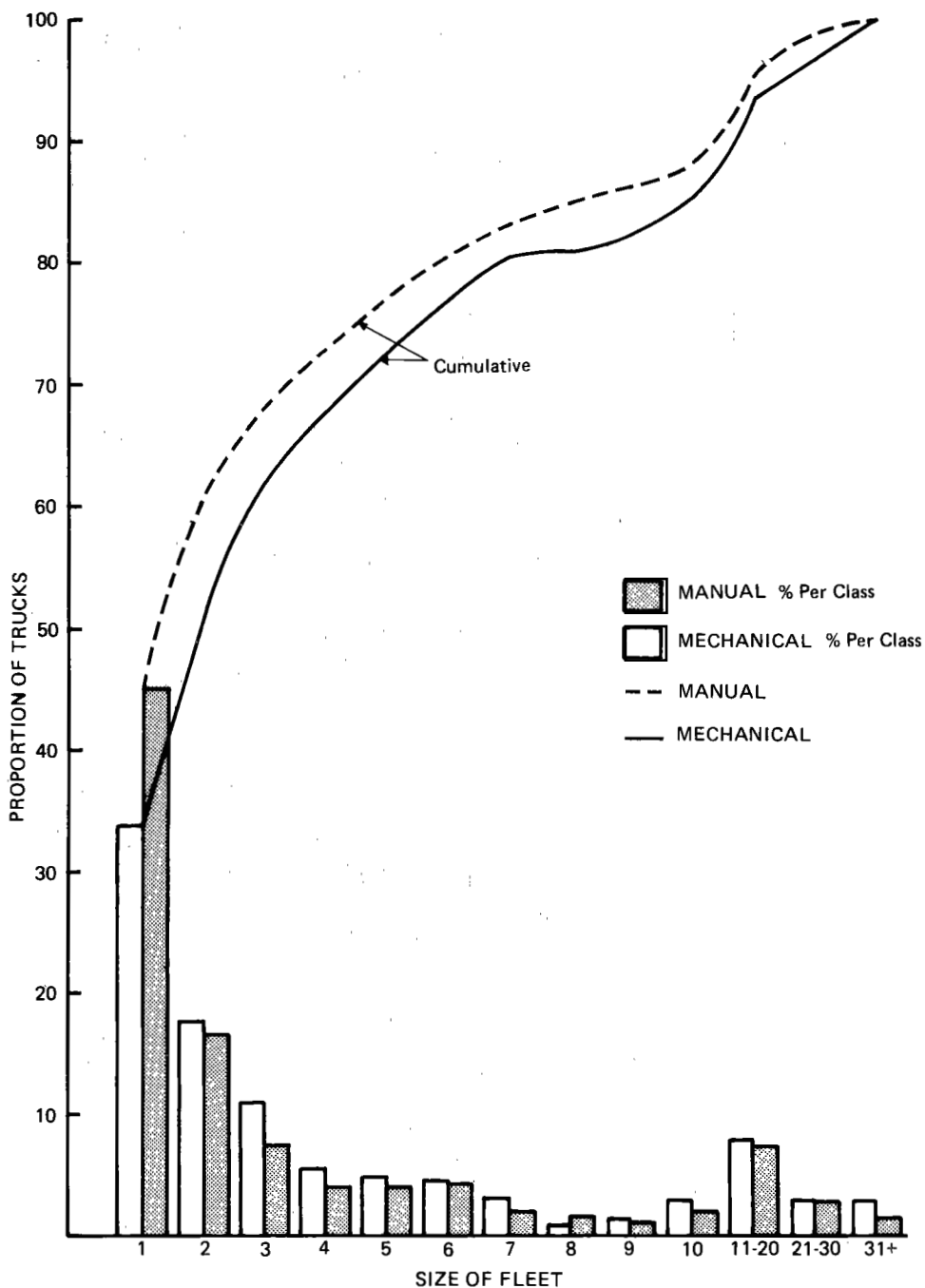


Figure 2.2: PROPORTION OF TRUCKS IN FLEETSIZING GROUPS: MECHANICAL AND MANUAL PROCESSING METHODS. SOUTHERN.



**Figure 2.3: PROPORTION OF TRUCKS IN FLEETSIZE GROUPS:
MECHANICAL AND MANUAL PROCESSING METHODS. NORTHERN.**

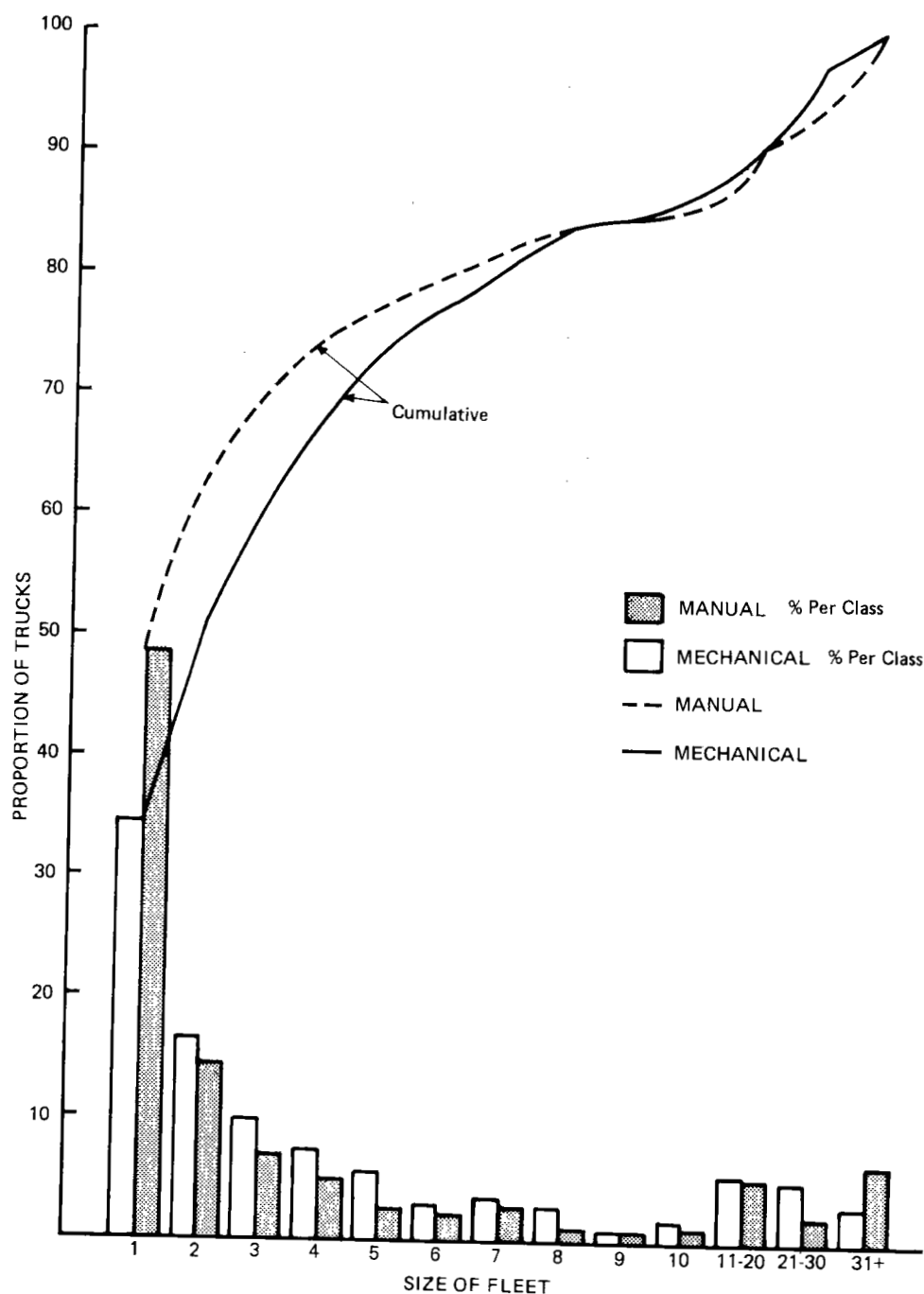
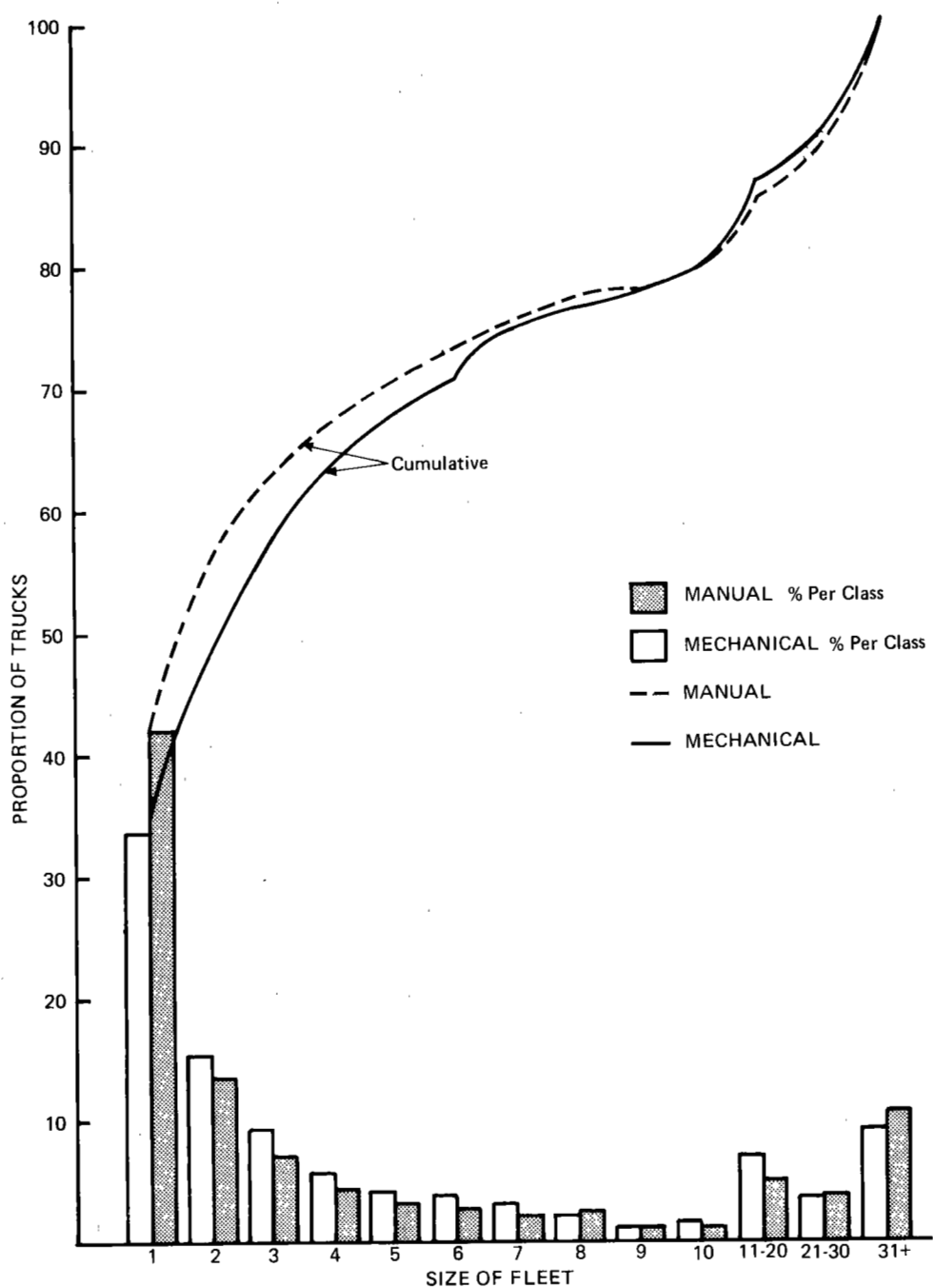


Figure 2.4: PROPORTION OF TRUCKS IN FLEETSIZING GROUPS:
MECHANICAL AND MANUAL PROCESSING METHODS. MERSEY LYELL.



**Figure 2.5: PROPORTION OF TRUCKS IN FLEETSIZE GROUPS:
MECHANICAL AND MANUAL PROCESSING METHODS. TOTAL.**

The number of vehicles in single truck fleets is understated by the mechanical identification process by an average of 25 per cent across all statistical divisions. Conversely the total number of vehicles in fleets up to around 8 vehicles in size is usually understated, and generally by a similar order of magnitude.

For other fleetsize intervals the results of the evaluation are more erratic (possibly due to the relatively small number of observations of larger fleets) and it is difficult to confidently interpret the results.

CHAPTER 3 - GEOGRAPHIC DISTRIBUTION AND CONCENTRATION OF
OWNERSHIP OF FREIGHT CARRYING VEHICLES

This chapter presents summarised details of the number of fleets by fleetsize group and the number of trucks by type registered throughout the States of Australia. The regional groupings used are the statistical divisions as defined by the Australian Bureau of Statistics for the 1976 Census of Population and Housing. Individual trucks have been allocated to statistical divisions on the basis of the postcode contained in the address of the registered owner.

Proportions of trucks in each cell, rather than the actual numbers of trucks have been presented in the following tables for several reasons. Firstly, the tapes received from the State registries had not been completely vetted to remove all duplications, unregistered vehicles and other errors which may have existed. These problems would have led to variations in the total numbers of trucks estimated and actually on register at the time when the data was obtained. Secondly, the snapshot of the State Motor Registry files was taken at different times in each State over a period of several months. On the other hand the Australian Bureau of Statistics (ABS) has undertaken a Census of Motor Vehicles providing accurate estimates of the numbers of vehicles on register at 30 September 1976.

To avoid the confusion which may have arisen with two different estimates of the numbers of vehicles on register, it has been decided to accept the ABS estimates of total vehicles on register in each State, and publish only BTE estimates of the proportions of vehicles in each class. For most States, the difference between the BTE and ABS estimates of total trucks was within 5 per cent. For Queensland, however, the difference was considerably greater, and there were other apparent discrepancies between the statistics produced by the BTE and the ABS. For this reason results for Queensland have not been produced here.

Tables 3.1 to 3.5 show the proportion of trucks, by truck type, registered in each statistical division. Details of the number of trucks registered in each postcode area are available from the BTE.

Tables 3.6 through 3.16 show the proportions of fleets and of trucks in each fleetsize group throughout Australia. Several qualifications must be borne in mind when interpreting these results.

- . The distortion inherent in the method used, as evidenced in the Tasmanian results (see Chapter 2).
- . On the Victorian register a large number of vehicles appeared without name or address. These were vehicles which changed ownership during the year. This has had the effect of reducing the average size of fleet.
- . The results of this analysis are influenced to a great extent by the choice of vehicles to be counted in each fleet. The current analysis excludes all passenger sedans, station wagons, commercial vehicles of less than one tonne tare, as well as special purpose, non freight carrying vehicles (e.g. tow trucks). Any change in definition - for example to exclude a larger number of the smaller freight type vehicles - could have a considerable effect on any fleetsize distribution.

A comparison of industry structure between States

Figure 3.1 presents a graphic comparison of the fleetsize distributions between all States. Between 48 per cent (NSW) and 57 per cent (WA) of vehicles are operated as part of a one or two truck fleet whereas between 15 per cent (SA) and 23 per cent (NSW) are operated as part of a ten or more truck fleet. The differences may be due to differences in State transport

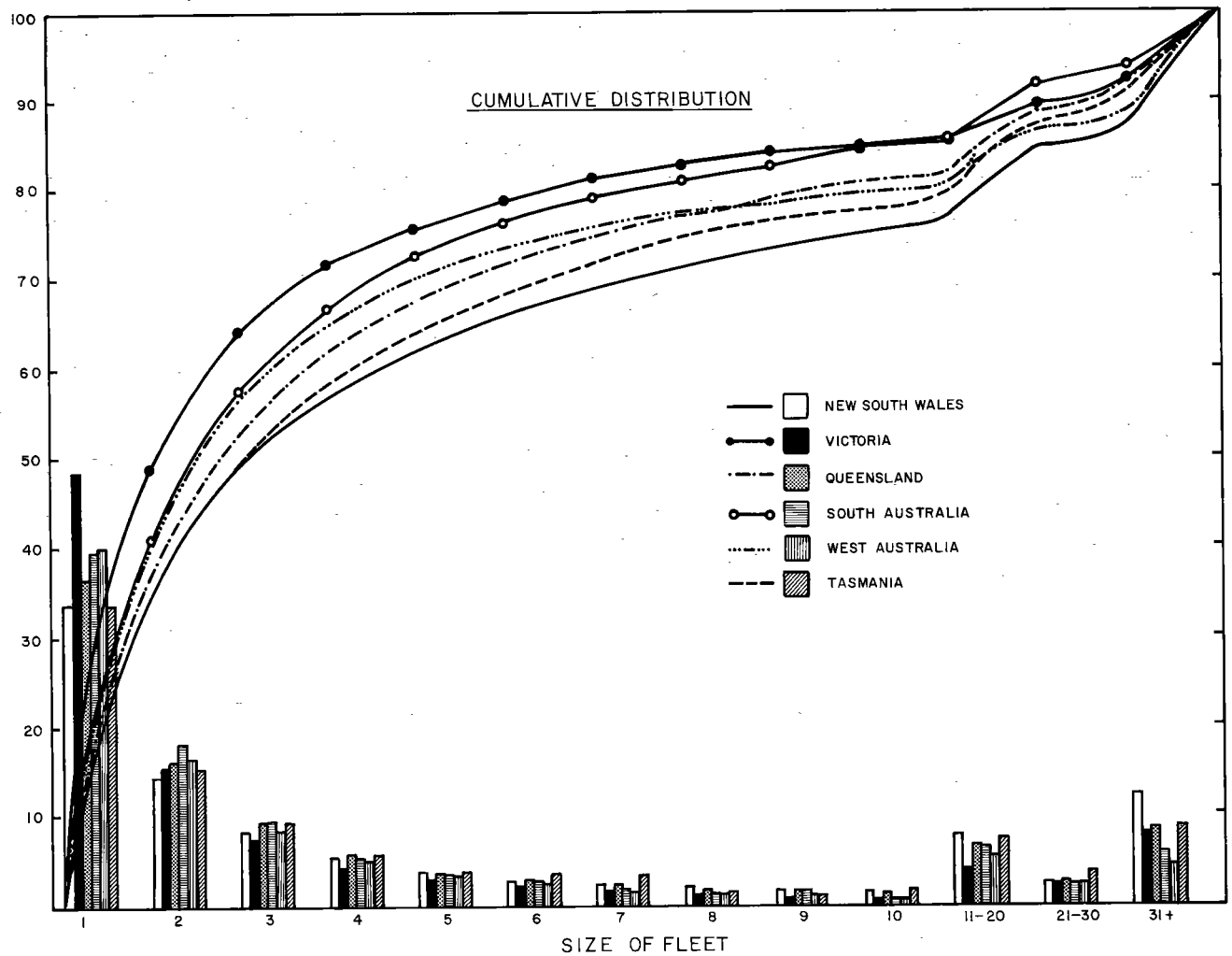


Figure 3.1: PORPORTIONS OF TRUCKS IN EACH FLEETSIZ GROUP, AUSTRALIA, 1976

TABLE 3.2 - PROPORTION OF VEHICLES REGISTERED IN STATISTICAL DIVISIONS BY SIZE OF VEHICLE:

(a)
VICTORIA

Statistical Division	SIZE OF VEHICLES (Tonnes Tare)						
	RIGID TRUCKS			ARTICULATED TRUCKS			TOTAL
	Under 3	3 and less than 4	4 and over	Under 9	9 and less than 11	11 and over	
301 Melbourne	26.6	6.4	7.0	1.4	0.8	0.6	42.8
302 Barwon	2.5	0.7	0.7	0.3	0.1	0.1	4.4
303 South Western	2.5	0.9	0.6	0.2	0.1	0.1	4.3
304 Central Highlands	1.9	0.9	0.6	0.2	0.1	-	3.6
305 Wimmera	1.2	1.2	0.5	0.2	-	-	3.3
306 Northern Mallee	1.3	1.0	0.5	0.2	0.1	0.1	3.2
307 Loddon-Campaspe	2.6	1.2	0.7	0.3	0.1	0.1	4.8
308 Goulburn	2.5	1.2	0.7	0.3	0.1	0.1	4.9
309 North Eastern	1.2	0.4	0.3	0.1	-	-	2.1
310 East Gippsland	1.0	0.3	0.3	0.1	0.1	0.1	1.8
311 Central Gippsland	1.7	0.6	0.6	0.2	0.1	0.1	3.2
312 East Central	0.8	0.4	0.3	0.1	-	-	1.7
INTERSTATE	-	-	-	-	-	-	-
UNKNOWN AND INVALID	12.6	2.7	3.1	0.6	0.4	0.4	19.9
TOTAL	58.4	17.9	15.8	4.3	1.9	1.6	100.0

(a) At 30 September 1976, the Australian Bureau of Statistics estimated that there were 127 530 freight carrying vehicles registered in Victoria. See ABS, Motor Vehicle Census, 30 September 1976, Catalogue No. 9302.2, Table 4.

**TABLE 3.3 - NUMBER OF VEHICLES REGISTERED IN STATISTICAL DIVISIONS BY SIZE OF VEHICLE:
SOUTH AUSTRALIA^(a)**

Statistical Division	SIZE OF VEHICLES (Tonnes Tare)						
	RIGID TRUCKS			ARTICULATED TRUCKS			TOTAL
	Under 3	3 and less than 4	4 and over	Under 9	9 and less than 11	11 and over	
501 Adelaide	16.4	6.5	9.2	1.1	1.7	3.6	38.6
502 Outer Adelaide	5.2	2.2	2.3	0.2	0.1	0.2	10.2
503 Yorke and Lower							
North	3.9	2.8	2.8	0.2	0.1	0.2	10.1
504 Murray Lands	3.8	2.6	2.5	0.3	0.4	0.9	10.5
505 South East	5.0	1.6	2.0	0.3	0.5	0.8	10.2
506 Eyre	2.3	1.8	2.6	0.3	0.2	0.2	7.5
507 Northern	3.2	1.5	1.8	0.2	0.1	0.2	7.1
INTERSTATE	0.1	0.1	-	-	-	-	0.2
NOT STATED	2.0	1.5	1.9	0.1	0.1	0.2	5.7
TOTAL	41.9	20.6	25.2	2.6	3.4	6.3	100.0

(a) At 30 September 1976, the Australian Bureau of Statistics estimated that there were 41 432 freight carrying vehicles registered in South Australia. See ABS, Motor Vehicle Census, 30 September 1976, Catalogue No. 9301.4, Table 4.

TABLE 3.4 - NUMBER OF VEHICLES REGISTERED IN STATISTICAL DIVISIONS BY SIZE OF VEHICLE:
(a)
WESTERN AUSTRALIA

Statistical Division	SIZE OF VEHICLES (Tonnes Tare)						
	RIGID TRUCKS			ARTICULATED TRUCKS			TOTAL
	Under 3	3 and less than 4	4 and over	Under 9	9 and less than 11	11 and over	
601 Perth	28.0	6.4	15.7	0.7	1.7	2.6	55.1
602 South West	3.4	1.3	2.2	0.1	0.2	0.5	7.6
603 Lower Great Southern	2.9	1.2	1.4	0.1	0.2	0.1	6.0
604 Upper Great Southern	1.9	2.1	2.4	0.1	0.1	0.1	6.7
605 Midlands	3.5	3.0	4.1	0.1	0.2	0.1	11.1
606 South Eastern	1.3	0.6	1.4	0.1	0.1	0.2	3.7
607 Central	2.8	1.2	2.4	-	0.1	0.2	6.7
608 Pilbara	1.0	0.1	0.6	-	-	0.1	1.8
609 Kimberley	0.6	0.1	0.4	-	-	0.1	1.3
INTERSTATE	-	-	-	-	-	-	-
NOT STATED	-	-	-	-	-	-	-
TOTAL	45.5	16.1	30.6	1.3	2.6	3.9	100.0

(a) At 30 September 1976, the Australian Bureau of Statistics estimated that there were 47 206 freight carrying vehicles registered in Western Australia. See ABS, Motor Vehicle Census, 30 September 1976, Catalogue No. 9303.5, Table 4.

TABLE 3.5 - NUMBER OF VEHICLES REGISTERED IN STATISTICAL DIVISIONS BY SIZE OF VEHICLE:
(a)
TASMANIA

Statistical Division	SIZE OF VEHICLES (Tonnes Tare)						
	RIGID TRUCKS			ARTICULATED TRUCKS			TOTAL
	Under 3	3 and less than 4	4 and over	Under 9	9 and less than 11	11 and over	
701 Hobart	17.6	6.0	8.3	0.6	0.3	1.1	34.8
702 Southern	5.1	3.5	3.0	0.3	0.4	0.7	13.1
703 Northern	11.4	5.8	7.1	0.5	1.2	1.7	27.6
704 Mersey-Lyell	10.5	5.1	6.3	0.5	1.1	0.9	24.4
INTERSTATE	-	-	-	-	-	-	-
NOT STATED	0.1	-	-	-	-	-	0.1
TOTAL	44.7	20.3	24.8	1.8	3.9	4.5	100.0

(a) At 30 September 1976, the Australian Bureau of Statistics estimated that there were 11 537 freight carrying vehicles registered in Tasmania. See ABS, Motor Vehicle Census, 30 September 1976, Catalogue No. 9302.6, Table 4.

TABLE 3.6 - PROPORTION OF VEHICLES IN EACH FLEETSIZE GROUP, STATES: 1976
(per cent)

State	FLEETSIZE GROUP													TOTAL
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
33 New South Wales	33.7	14.6	8.4	5.5	3.9	2.8	2.4	2.1	1.9	1.6	7.8	2.8	12.4	100.0
Victoria	48.4	15.6	7.5	4.4	3.0	2.2	1.8	1.2	0.8	0.7	4.0	2.4	8.0	100.0
South Australia	39.3	18.1	9.5	5.5	3.8	2.8	2.0	1.5	1.6	0.9	6.6	2.3	5.9	100.0
Western Australia	40.0	16.6	8.3	5.2	3.3	2.3	0.7	1.3	1.2	0.8	5.6	2.2	11.5	100.0
Tasmania	33.6	15.4	9.2	5.9	4.0	3.6	3.3	1.6	1.2	1.9	7.4	3.8	8.9	100.0
All States	39.0	15.8	8.5	5.3	3.6	2.7	2.2	1.7	1.5	1.2	6.3	2.6	9.6	100.0

TABLE 3.7 - PROPORTION OF VEHICLES IN EACH FLEETSIZE GROUP, STATE CAPITAL CITIES: 1976

(per cent)

Capital Cities	FLEETSIZE GROUP													TOTAL
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
Sydney	31.4	12.0	6.9	4.6	3.2	2.4	2.3	2.0	2.1	1.5	7.6	3.4	20.7	100.0
Melbourne	47.9	11.9	5.6	3.4	2.6	1.9	1.8	1.1	0.7	0.7	5.3	3.5	13.6	100.0
Adelaide	36.4	13.0	7.0	4.8	3.0	2.4	2.4	2.0	2.0	1.2	10.3	4.5	11.0	100.0
Perth	37.8	12.3	6.0	3.6	3.0	2.0	1.9	1.5	1.3	0.7	7.2	3.9	18.9	100.0
Hobart	28.9	11.6	6.8	4.5	2.4	2.9	2.7	1.8	1.1	1.5	10.0	4.1	21.8	100.0
All Capitals	37.8	12.0	6.5	4.1	2.9	2.3	2.1	1.7	1.5	1.1	7.3	3.6	17.0	100.0

TABLE 3.8 - PROPORTION OF VEHICLES IN EACH FLEETSIZE GROUP, STATES EXCLUDING CAPITAL CITIES: 1976
(per cent)

Country areas in	FLEETSIZE GROUP													
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	TOTAL
New South Wales	35.7	17.0	9.7	6.3	4.4	3.2	2.6	2.3	1.7	1.7	7.9	2.3	5.2	100.0
Victoria	48.9	20.0	9.7	5.7	3.5	2.6	1.7	1.3	0.9	0.8	2.4	1.1	1.4	100.0
South Australia	41.4	21.7	11.1	6.0	4.4	3.1	1.8	1.2	1.3	0.7	4.0	0.9	2.4	100.0
Western Australia	42.7	22.0	11.1	7.2	3.7	2.6	1.5	1.0	1.1	1.0	3.5	0.1	2.3	100.0
Tasmania	36.2	17.5	10.5	6.7	4.9	4.0	3.6	1.6	1.3	2.1	5.9	3.2	2.5	100.0
All States	39.9	18.7	10.1	6.3	4.2	3.0	2.2	1.7	1.5	1.3	5.6	1.8	3.7	100.0

TABLE 3.9 - PROPORTION OF FLEETS IN EACH FLEETSIZE GROUP, NEW SOUTH WALES: 1976

(per cent)

Statistical Division	FLEETSIZE GROUP													TOTAL
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
201 Sydney	71.7	13.7	5.2	2.6	1.5	0.9	0.7	0.6	0.5	0.4	1.2	0.3	0.6	100.0
202 Hunter	69.3	15.3	6.0	3.1	1.8	0.9	0.7	0.6	0.4	0.2	1.2	0.2	0.4	100.0
203 Illawarra	71.1	14.5	5.7	2.8	1.6	0.9	0.5	0.7	0.2	0.4	1.0	0.2	0.4	100.0
204 Richmond-Tweed	69.4	15.1	5.0	3.5	1.6	1.0	0.9	0.5	0.4	0.4	1.5	0.2	0.4	100.0
205 Mid North Coast	68.8	14.7	6.1	3.5	1.8	1.1	1.1	0.8	0.3	0.4	1.0	0.2	0.3	100.0
206 Northern	68.0	17.4	6.3	2.9	1.7	0.8	0.6	0.5	0.3	0.3	1.0	0.2	0.1	100.0
207 North-Western	67.3	17.9	7.0	2.8	1.5	1.0	0.9	0.4	0.2	0.1	0.8	0.2	0.1	100.0
208 Central West	67.6	17.1	5.7	3.1	1.8	1.2	0.8	0.5	0.3	0.4	1.1	0.1	0.1	100.0
209 South	68.6	15.7	6.5	2.6	1.9	1.5	0.7	0.2	0.6	0.4	1.0	0.1	0.1	100.0
210 Murrumbidgee	68.4	16.8	5.9	3.1	1.4	1.1	0.7	0.7	0.3	0.3	1.0	0.2	0.1	100.0
211 Murray	66.6	16.9	7.3	3.4	1.8	0.8	0.3	0.6	0.5	0.4	1.2	0.1	0.2	100.0
212 Far Western	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL ^(a)	69.8	15.2	5.8	2.9	1.6	1.0	0.7	0.6	0.4	0.3	1.1	0.2	0.4	100.0

(a) Excluding Far Western

TABLE 3.10 - PROPORTION OF VEHICLES IN EACH FLEETSIZINGROUP, NEW SOUTH WALES: 1976
(per cent)

Statistical Division	FLEETSIZINGROUP													TOTAL
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
201 Sydney	31.4	12.0	6.9	4.6	3.2	2.4	2.3	2.0	2.1	1.5	7.6	3.4	20.7	100.0
202 Hunter	34.3	15.2	8.9	6.1	4.3	2.7	2.3	2.4	1.9	0.9	8.3	2.5	10.0	100.0
203 Illawarra	35.0	14.2	8.5	5.5	3.8	2.7	1.8	2.8	1.0	1.8	6.9	2.5	13.5	100.0
204 Richmond-Tweed	34.3	15.0	7.4	6.9	4.1	3.1	3.2	1.9	1.9	1.8	10.2	3.3	7.0	100.0
205 Mid North Coast	34.6	14.8	9.2	7.0	4.6	3.3	3.7	1.2	1.4	2.2	7.2	2.7	6.0	100.0
206 Northern	37.1	19.0	10.3	6.3	4.6	2.5	2.2	2.2	1.6	1.9	7.5	2.4	2.5	100.0
207 North-Western	37.3	19.8	11.6	6.2	4.2	3.3	3.6	1.8	0.8	0.6	7.0	2.1	1.8	100.0
208 Central West	35.3	17.9	8.9	6.6	4.7	3.8	2.9	2.1	1.6	2.2	8.4	1.9	3.7	100.0
209 South	37.1	17.0	10.5	5.7	5.0	5.0	2.6	0.9	2.8	1.9	7.8	2.0	1.6	100.0
210 Murrumbidgee	36.7	18.0	9.5	6.6	3.9	3.6	2.4	2.9	1.6	1.5	7.9	2.9	2.5	100.0
211 Murray	34.0	17.4	11.3	6.9	4.6	2.6	2.4	2.5	2.3	2.1	8.9	1.0	4.0	100.0
212 Far Western	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL	33.7	14.6	8.4	5.5	3.9	2.8	2.4	2.1	1.9	1.6	7.8	2.8	12.4	100.0

TABLE 3.11 - PROPORTION OF FLEETS IN EACH FLEETSIZE GROUP, VICTORIA: 1976

(per cent)

Statistical Division	FLEETSIZE GROUP													
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	TOTAL
301 Melbourne	81.7	10.1	3.2	1.4	0.9	0.5	0.4	0.2	0.1	0.1	0.6	0.2	0.3	100.0
302 Barwon	78.0	12.7	3.9	1.7	0.9	0.7	0.6	0.3	0.3	0.1	0.5	0.2	0.1	100.0
303 South Western	73.8	16.3	4.9	2.1	0.9	0.6	0.4	0.2	0.2	0.2	0.3	-	-	100.0
304 Central														
Highlands	69.3	18.2	5.6	2.9	1.5	0.9	0.4	0.3	0.2	0.2	0.4	0.1	-	100.0
305 Wimmera	68.0	18.6	6.8	3.0	1.4	0.9	0.5	0.2	0.2	0.1	0.3	-	-	100.0
306 Northern Mallee	72.1	16.4	6.3	2.1	1.5	0.7	0.3	0.1	0.1	0.1	0.2	-	0.1	100.0
307 Loddon-Campaspe	74.5	15.3	5.0	2.3	1.0	0.7	0.4	0.2	0.1	0.1	0.2	0.1	0.1	100.0
308 Goulburn	77.0	14.6	4.2	1.8	1.0	0.5	0.4	0.3	0.1	0.1	0.2	0.1	-	100.0
309 North Eastern	76.4	13.8	4.6	2.2	1.1	0.5	0.2	0.5	0.1	0.1	0.2	0.1	0.1	100.0
310 East Gippsland	77.5	13.8	4.2	2.3	0.8	0.5	0.4	0.1	0.1	0.1	0.1	0.1	-	100.0
311 Central														
Gippsland	78.0	12.9	4.8	2.0	0.9	0.5	0.1	0.2	0.1	0.2	0.3	0.2	-	100.0
312 East Central	82.1	11.9	3.4	1.1	0.4	0.1	0.2	0.1	0.1	0.2	0.1	0.1	-	100.0
TOTAL	78.3	12.6	4.0	1.8	1.0	0.6	0.4	0.2	0.1	0.1	0.5	0.2	0.2	100.0

TABLE 3.12 - PROPORTION OF VEHICLES IN EACH FLEETSIZINGROUP, VICTORIA: 1976

(per cent)

Statistical Division	FLEETSIZINGROUP													TOTAL
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
301 Melbourne	47.9	11.9	5.6	3.4	2.6	1.9	1.8	1.1	0.7	0.7	5.3	3.5	13.6	100.0
302 Barwon	49.7	16.2	7.5	4.3	2.8	2.7	2.7	1.6	1.9	0.6	4.7	2.2	3.2	100.0
303 South Western	48.5	21.4	9.7	5.5	3.0	2.5	1.6	1.2	1.1	1.4	2.9	0.4	0.7	100.0
304 Central														
Highlands	42.0	22.0	10.2	7.1	4.5	3.4	1.8	1.5	1.0	0.9	3.2	1.1	1.3	100.0
305 Wimmera	41.7	22.8	12.6	7.1	4.4	3.5	1.9	1.0	0.9	0.8	2.3	-	0.9	100.0
306 Northern Mallee	46.4	21.1	12.1	5.3	4.8	2.5	1.5	0.6	0.5	0.8	1.3	0.6	2.4	100.0
307 Loddon-Campaspe	48.9	20.1	9.8	6.2	3.4	2.7	1.8	1.3	0.8	0.4	2.1	0.8	1.7	100.0
308 Goulburn	53.4	20.3	8.7	4.9	3.3	2.1	1.7	1.7	0.6	0.5	1.4	0.8	0.7	100.0
309 North Eastern	50.5	18.3	9.1	5.7	3.8	2.2	0.8	2.6	0.4	0.4	1.9	1.1	2.9	100.0
310 East Gippsland	53.8	19.1	8.7	6.3	2.6	2.0	2.0	0.8	0.4	1.0	1.2	2.1	-	100.0
311 Central														
Gippsland	53.6	17.7	9.9	5.5	3.0	2.1	0.5	0.8	0.6	1.1	2.9	2.4	-	100.0
312 East Central	61.3	17.7	7.7	3.3	1.4	0.5	1.3	0.7	0.8	1.8	1.0	2.4	-	100.0
TOTAL	48.4	15.6	7.5	4.4	3.0	2.2	1.8	1.2	0.8	0.7	4.0	2.4	8.0	100.0

TABLE 3.13 - PROPORTION OF FLEETS IN EACH FLEETSIZE GROUP, SOUTH AUSTRALIA: 1976

(per cent)

Statistical Division	FLEETSIZE GROUP													TOTAL
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
501 Adelaide	73.5	13.1	4.7	2.4	1.2	0.8	0.7	0.5	0.5	0.2	1.5	0.4	0.4	100.0
502 Outer Adelaide	73.7	16.0	5.0	2.4	1.2	0.7	0.4	0.1	0.2	0.1	0.3	-	-	100.0
503 Yorke and Lower North	66.0	19.8	7.3	2.8	1.8	1.1	0.4	0.4	0.2	-	0.2	-	-	100.0
504 Murray Lands	70.9	18.0	5.1	1.8	1.4	0.7	0.4	0.4	0.2	0.1	0.7	0.1	0.1	100.0
505 South East	66.4	17.7	6.7	3.0	1.8	1.0	0.7	0.5	0.6	0.2	1.1	0.1	0.2	100.0
506 Eyre	65.2	20.7	7.8	2.8	1.3	0.9	0.4	0.1	0.2	0.2	0.3	0.1	-	100.0
507 Northern	71.5	17.2	6.0	2.4	1.3	0.8	0.2	0.1	0.1	0.2	0.2	0.1	0.1	100.0
TOTAL	70.8	16.3	5.7	2.5	1.4	0.8	0.5	0.3	0.3	0.2	0.8	0.2	0.2	100.0

TABLE 3.14 - PROPORTION OF VEHICLES IN EACH FLEETSIZE GROUP, SOUTH AUSTRALIA: 1976
(per cent)

Statistical Division	FLEETSIZE GROUP													TOTAL
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
501 Adelaide	36.4	13.0	7.0	4.8	3.0	2.4	2.4	2.0	2.0	1.2	10.3	4.5	11.0	100.0
502 Outer Adelaide	48.7	21.1	9.9	6.3	4.0	2.8	1.8	0.6	1.1	0.5	2.4	-	0.9	100.0
503 Yorke and Lower North	39.9	24.0	13.2	6.7	5.3	3.9	1.9	1.9	0.9	0.2	1.5	0.7	-	100.0
504 Murray Lands	41.8	21.2	9.0	4.2	4.2	2.6	1.4	1.7	1.2	0.5	6.3	1.1	4.7	100.0
505 South East	33.5	17.9	10.2	6.0	4.5	3.0	2.5	1.9	2.8	1.2	8.4	1.7	6.4	100.0
506 Eyre	39.2	24.8	14.0	6.7	3.9	3.3	1.8	0.5	1.2	1.3	2.6	0.8	-	100.0
507 Northern	46.1	22.1	11.5	6.1	4.2	3.3	1.0	0.3	0.6	1.0	1.9	0.7	1.2	100.0
TOTAL	39.3	18.1	9.5	5.5	3.8	2.8	2.0	1.5	1.6	0.9	6.6	2.3	5.9	100.0

TABLE 3.15 - PROPORTION OF FLEETS IN EACH FLEETSIZE GROUP, WESTERN AUSTRALIA: 1976
(per cent)

Statistical Division	FLEETSIZE GROUP													TOTAL
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
601 Perth	76.6	12.4	4.1	1.8	1.2	0.7	0.5	0.4	0.3	0.2	1.0	0.3	0.5	100.0
602 South West	77.2	13.4	3.7	2.7	0.7	0.4	0.2	0.3	0.3	0.2	0.7	-	0.2	100.0
603 Lower Great														
Southern	67.4	19.2	6.1	3.5	1.3	0.9	0.6	0.4	0.2	0.2	0.2	-	0.1	100.0
604 Upper Great														
Southern	65.5	20.9	7.7	3.1	1.8	0.4	0.3	-	0.1	-	0.1	-	-	100.0
605 Midlands	64.5	21.2	7.9	2.9	1.4	0.9	0.4	0.1	0.2	0.1	0.3	-	-	100.0
606 South Eastern	73.6	16.8	3.8	2.1	0.8	0.6	0.3	0.1	0.4	0.4	0.9	0.1	0.1	100.0
607 Central	70.2	16.6	6.5	3.3	1.2	1.0	0.4	0.4	0.1	0.1	0.1	-	0.1	100.0
608 Pilbara	79.6	11.5	1.5	2.2	0.9	0.6	0.6	-	-	0.6	1.9	-	0.6	100.0
609 Kimberley	76.7	13.9	4.5	2.1	0.7	0.7	-	-	0.3	-	1.0	-	-	100.0
TOTAL	73.2	15.2	5.1	2.4	1.2	0.7	0.5	0.3	0.3	0.2	0.7	0.2	0.3	100.0

TABLE 3.16 - PROPORTION OF VEHICLES IN EACH FLEETSIZE GROUP, WESTERN AUSTRALIA: 1976

(per cent)

Statistical Division	FLEETSIZE GROUP													TOTAL
	1	2	3	4	5	6	7	8	9	10	11-20	21-30	31+	
601 Perth	37.8	12.3	6.0	3.6	3.0	2.0	1.9	1.5	1.3	0.7	7.2	3.9	18.9	100.0
602 South West	48.9	16.9	7.0	6.9	2.3	1.6	0.8	1.5	1.7	1.5	6.4	-	4.5	100.0
603 Lower Great														
Southern	40.6	23.1	11.0	8.4	3.9	3.2	2.7	1.9	0.9	1.0	1.8	-	1.5	100.0
604 Upper Great														
Southern	41.1	26.3	14.5	7.8	5.7	1.6	1.5	-	0.8	-	0.7	-	-	100.0
605 Midlands	39.1	25.7	14.4	7.2	4.3	3.2	1.7	0.6	1.2	0.5	2.0	-	-	100.0
606 South Eastern	44.1	20.1	6.8	5.0	2.3	2.3	1.1	0.6	2.1	2.3	7.8	1.8	3.7	100.0
607 Central	43.2	20.5	12.0	8.1	3.7	3.6	1.5	2.1	0.4	0.9	0.9	-	3.2	100.0
608 Pilbara	41.8	12.0	2.4	4.6	2.4	2.0	2.3	-	-	3.3	14.3	-	15.0	100.0
609 Kimberley	51.0	18.6	9.0	5.6	2.3	2.8	-	-	2.1	-	8.6	-	-	100.0
TOTAL	40.0	16.6	8.3	5.2	3.3	2.3	1.7	1.3	1.2	0.8	5.6	2.2	11.5	100.0

TABLE 3.1 - PROPORTION OF VEHICLES REGISTERED IN STATISTICAL DIVISIONS BY SIZE OF VEHICLE: NEW SOUTH WALES ^(a)

Statistical Division	SIZE OF VEHICLES (Tonnes Tare)						TOTAL
	RIGID TRUCKS			ARTICULATED TRUCKS			
	Under 3	3 and less than 4	4 and over	Under 9	9 and less than 11	11 and over	
201 Sydney	21.8	6.9	11.0	1.4	1.4	1.7	44.2
202 Hunter	3.7	1.1	2.0	0.3	0.4	0.4	7.7
203 Illawarra	2.2	0.5	1.1	0.2	0.2	0.2	4.4
204 Richmond-Tweed	1.5	0.3	0.6	0.1	0.1	0.1	2.7
205 Mid North Coast	1.9	0.5	0.8	0.1	0.2	0.2	3.6
206 Northern	3.5	1.6	1.9	0.4	0.2	0.2	7.8
207 North Western	2.6	1.4	1.1	0.3	0.2	0.2	5.7
208 Central West	3.4	2.0	1.4	0.3	0.2	0.2	7.6
209 South	2.8	0.8	0.9	0.1	0.1	0.2	4.9
210 Murrumbidgee	2.6	1.7	1.1	0.4	0.2	0.1	6.3
211 Murray	1.6	1.0	0.9	0.3	0.2	0.1	4.1
212 Far Western	0.3	0.1	0.1	-	-	-	0.5
INTERSTATE	0.1	0.1	0.1	-	-	0.1	0.4
UNKNOWN AND INVALID	0.1	0.1	-	-	-	-	0.2
TOTAL	48.1	18.0	23.0	3.9	3.4	3.7	100.0

(a) At 30 September 1976, the Australian Bureau of Statistics estimated that there were 128 831 freight carrying vehicles registered in New South Wales. See ABS, Motor Vehicle Census, 30 September 1976, Catalogue No. 9301.1, Table 4.

regulations, industrial activity, population distributions and other factors, but the individual impact of these factors is indeterminate without further investigation. The weighting of the Victorian distribution towards fleets in the lower size range may be attributable, at least in part, to problems encountered in the processing of the registry data.

Fleet Composition of the Road Transport Industry within the States

Differences are apparent in the composition of fleets registered in the capital city and fleets in other areas of the states (see Tables 3.7 and 3.8).

The variation between rural and urban truck ownership patterns is illustrated in Figure 3.2. This figure compares the fleetsize distribution of all trucks registered in State capitals with those registered elsewhere. The trends evidenced in this figure are representative of the distributions in each of the individual States.

Fleets outside capital city areas tend to be smaller with much smaller numbers of larger fleets⁽¹⁾. For example, 69 per cent of vehicles registered outside capital cities are in fleetsizes of 3 or smaller, compared with 56 per cent in these size categories in the capital cities. At the other end of the spectrum, fleetsizes of 11 or more trucks account for only 11 per cent of the total outside capital cities, whereas they account for 28 per cent of trucks registered in the capital cities.

(1) However, this latter point may be explained, at least in part, by the practice of some larger firms registering all vehicles through head offices in the State capital cities, rather than where they are located throughout the State.

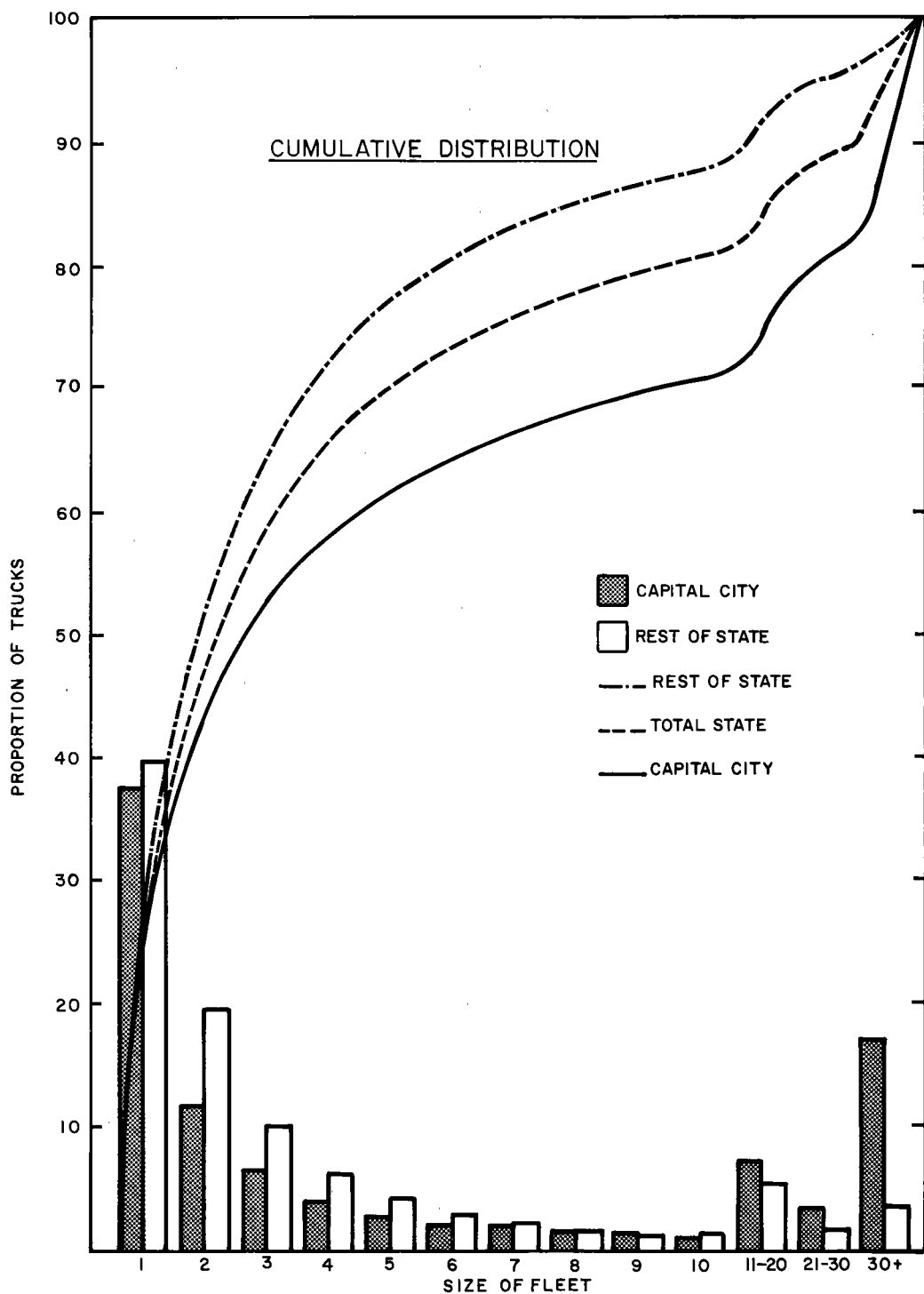


Figure 3.2: PROPORTIONS OF TRUCKS IN FLEETSIZE GROUPS, CAPITAL CITY AND REST OF STATE, 1976

The concentration of vehicle ownership in either large (10 or more) or very small (1 or 2) vehicle fleets is evident in both rural and capital city areas. In all States nearly 75 per cent of vehicles are operated as part of fleets in these size ranges.

CHAPTER 4 - TASMANIAN ROAD TRUCK FLEETS

INTRODUCTION

While evaluating the method used to produce statistics in Tasmania, a more detailed picture of the ownership of road transport resources in Tasmania was produced. The procedure adopted was to use readily available sources of information on company activity, along with details of individuals occupations available from electoral rolls and phone books. Using these data sources and a degree of local knowledge it was possible to establish the likely use of 85 per cent of the trucks in Tasmania. The industry classification used conforms with the Australian Standard Industry Classification as developed by the Australian Bureau of Statistics. The method of classifying occupations to specific industry groups is shown in Annex C.

TOTAL NUMBERS OF FLEETS AND TRUCKS

At 30 September 1976 there were 11 730⁽¹⁾ trucks registered for use on Tasmanian roads and these were organised into 6437 fleets. There were 4920 single-truck fleets, and 6354 fleets had 10 vehicles or less. Only 83 fleets had more than 10 trucks. The largest fleet, owned by the State Hydro-Electricity Commission, had 459 vehicles and the next largest, also owned by a State Government instrumentality, the Housing Branch of the Public Works Department, had 228 trucks.

Details of the number of fleets of various sizes and the total trucks belonging to these fleets are set out in Table 4.1. Corporate fleets made up only 22.3 per cent of the total fleet numbers but contributed 44.0 per cent of total truck numbers in Tasmania.

(1) Of this total, 41 trucks had insufficient name and/or address details to allow identification of owner. These have been excluded from later tables.

TABLE 4.1 - NUMBER OF FLEETS AND TRUCKS BY SIZE OF FLEET,
TASMANIA: 1976

Vehicles in Fleet	Fleets			Total Trucks		
	Corporate	Private	Total	Corporate	Private	Total
1	778	4 142	4 920	778	4 142	4 920
2	234	578	812	468	1 156	1 624
3	132	143	275	396	429	825
4	70	59	129	280	236	516
5	42	27	69	210	135	345
6	37	20	57	222	120	342
7	26	8	34	182	56	238
8	20	6	26	160	48	208
9	10	5	15	90	45	135
10	14	3	17	140	30	170
11	11	4	15	121	44	165
12	6	-	6	72	-	72
13	6	-	6	78	-	78
14	5	1	6	70	14	84
15	7	-	7	105	-	105
16	5	-	5	80	-	80
17	4	-	4	68	-	68
18	1	-	1	18	-	18
20	1	-	1	20	-	20
22	3	-	3	66	-	66
23	4	1	5	92	23	115
24	3	1	4	72	24	96
26	1	-	1	26	-	26
29	1	-	1	29	-	29
30	3	-	3	90	-	90
31	1	-	1	31	-	31
32	1	-	1	32	-	32
34	1	-	1	34	-	34
36	1	-	1	36	-	36
38	1	-	1	38	-	38
40	-	1	1	-	40	40
41	1	-	1	41	-	41
44	1	-	1	44	-	44
45	2	-	2	90	-	90
48	1	-	1	48	-	48
61	1	-	1	61	-	61
72	1	-	1	72	-	72
228	1	-	1	228	-	228
459	1	-	1	459	-	459
TOTAL	1 438	4 999	6 437	5 147	6 542	11 689

INDUSTRIES SERVED⁽¹⁾

The analyses of truck registrations by industry carried out in this study were based on the industry identification of 77.5 per cent of the fleets and 84.9 per cent of the trucks. Many of the trucks not allocated to industry were identified as belonging to labourers (4.5 per cent of fleets and 3.0 per cent of trucks) and to persons who were unlikely to use trucks in their normal occupation (10.1 per cent of fleets and 6.4 per cent of trucks). Of this latter group, many trucks would be used for private purposes but many also would be used by the owner in a secondary occupation or by someone else. Also included in the trucks not allocated to industry were those whose owners could not be identified by industry or occupation. These comprised 7.9 per cent of fleets and 5.8 per cent of trucks (Table 4.2, Figures 4.1 and 4.2).

Nearly all the trucks not allocated to industry were owned by individuals (1355 fleets and 1576 trucks) while only 94 fleets (all in the category where industry of owner could not be identified) were corporately owned.

Of those trucks allocated to industry, 39.3 per cent of the fleets and 24.7 per cent of trucks served agriculture, while 20.9 per cent of all fleets and 25.2 per cent of trucks were used by the transport and storage industry. The next most important industry groups were wholesale and retail trade (14.2 per cent of fleets and 14.0 per cent of trucks) and construction (13.0 per cent of fleets and 12.7 per cent of trucks).

(1) More detailed information on industry served by region within Tasmania is available from the BTE.

TABLE 4.2 - NUMBERS OF FLEETS AND TRUCKS BY INDUSTRY SERVED, TASMANIA: 1976

Industry	Fleets			Total trucks		
	Corporate	Private	Total	Corporate	Private	Total
Agriculture	212	1 750	1 962	353	2 101	2 454
Mining	26	18	44	143	23	166
Manufacturing -						
Timber	63	170	233	178	261	439
Other	187	11	198	541	15	556
Electricity, water and gas	6	-	6	490	-	490
Construction	192	458	650	671	596	1 267
Wholesale and retail trade -						
Petroleum	15	26	41	100	57	157
Motor vehicles	123	104	227	283	130	413
Other	246	197	443	623	243	866
Transport and storage -						
Road transport	98	148	246	753	354	1 107
Drivers(a)	-	236	236	-	268	268
Contractors(a)	40	503	543	125	885	1 010
Other than road transport	16	1	17	113	4	117
Business services	1	1	2	1	1	2
Public administration	67	-	67	525	-	525
Community services	41	-	41	84	-	84
Entertainment and recreation	12	21	33	20	28	48
TOTAL ALLOCATED TO INDUSTRY	1 345	3 644	4 989	5 003	4 966	9 969
Not allocated to industry -						
Labourers(a)	-	289	289	-	345	345
Apparent private use(b)	-	653	653	-	743	743
Other(c)	93	413	506	144	488	632
TOTAL	1 438	4 999	6 437	5 147	6 542	11 689

(a) Occupation of vehicle owner.

(b) Owners of these vehicles have occupations unlikely to be related to truck use.

(c) Owners whose industry or occupation could not be determined.

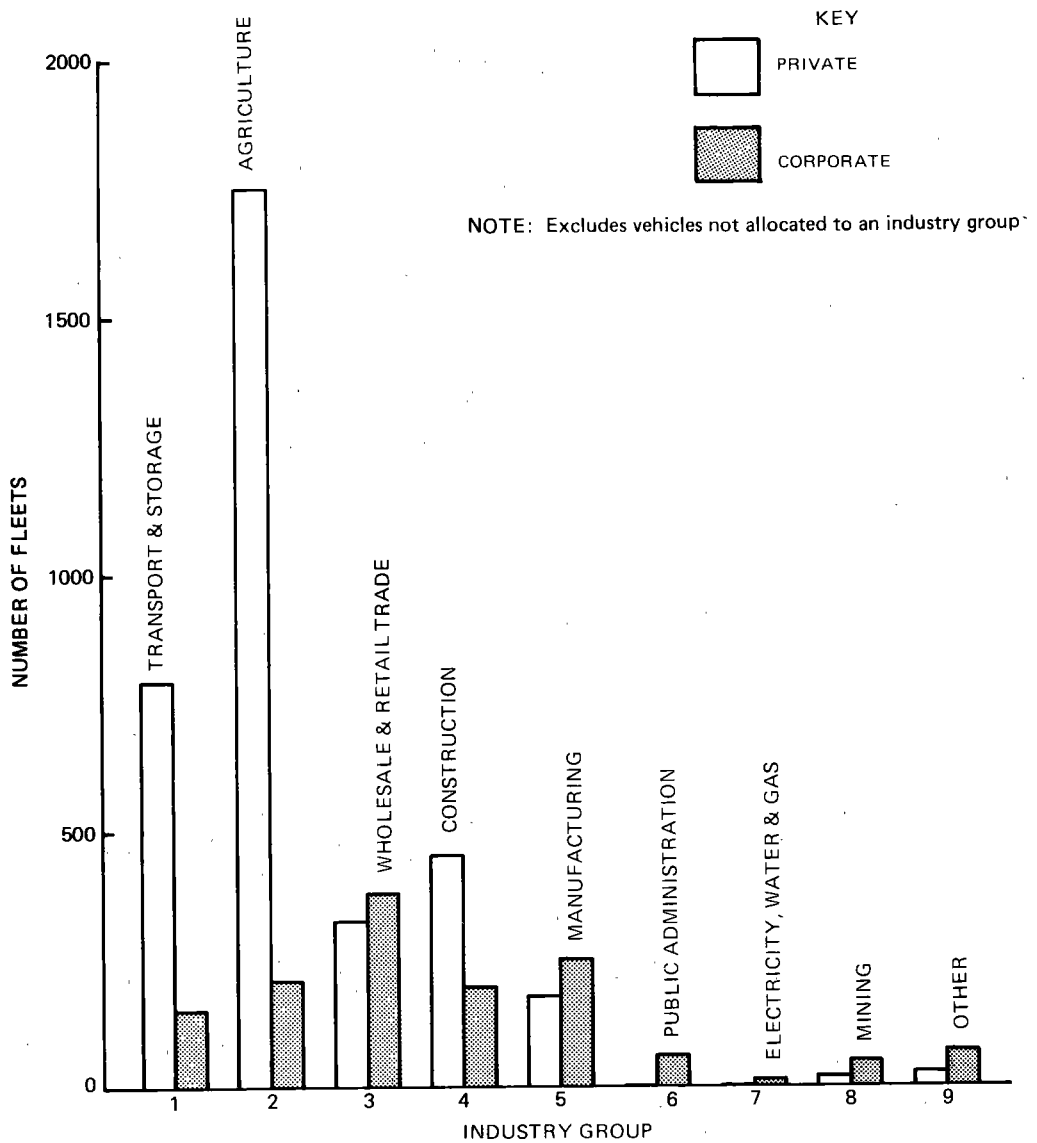


Figure 4.1: NUMBER OF PRIVATE AND CORPORATE FLEETS IN TASMANIA BY INDUSTRY GROUP

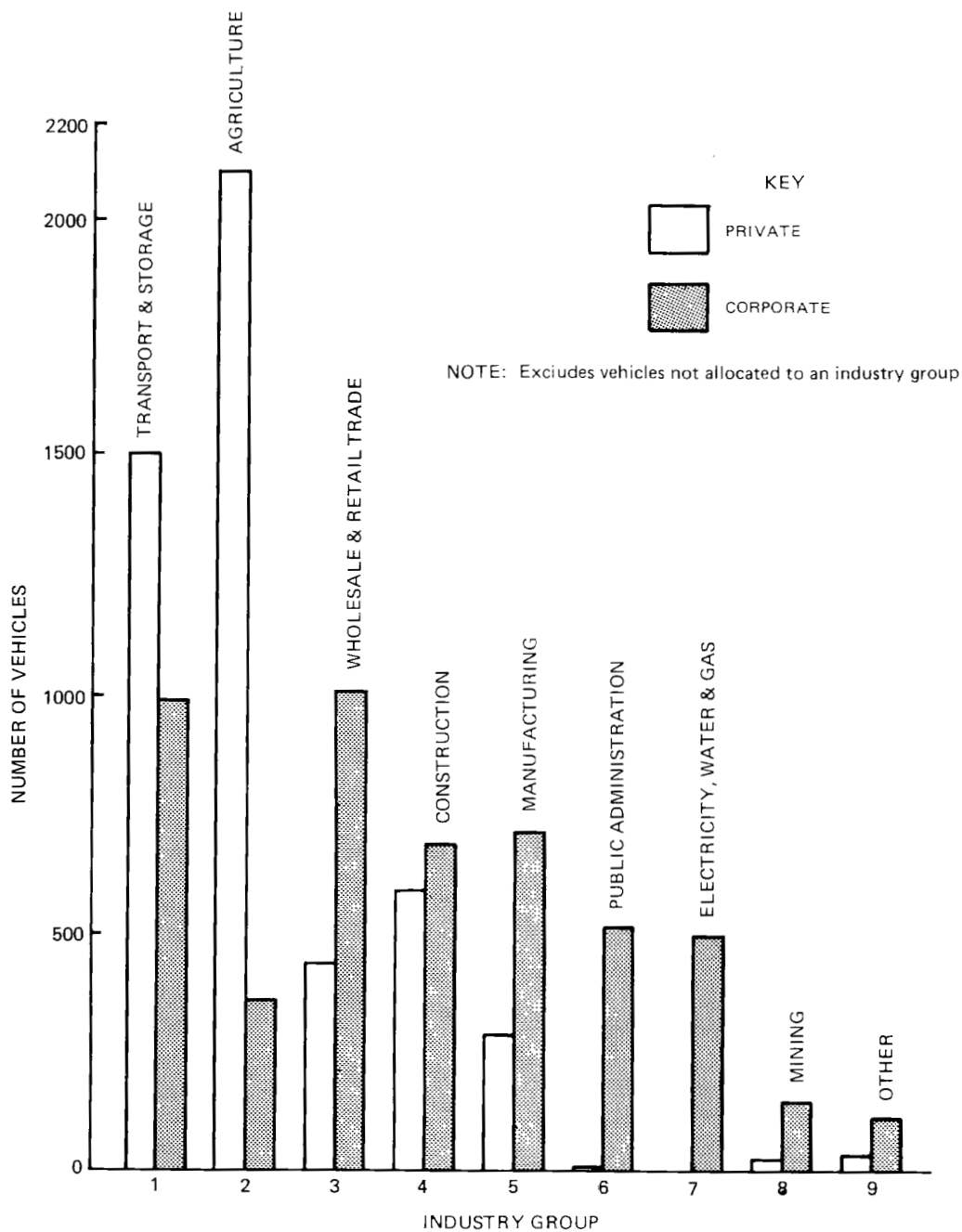


Figure 4.2: NUMBER OF PRIVATE AND CORPORATE VEHICLES IN TASMANIA BY INDUSTRY GROUP

Almost half (45.6 per cent) of the single-truck fleets and 31.9 per cent of the two-truck fleets identified to industry served agriculture. Only 80 fleets serving agriculture (4.1 per cent) had more than two vehicles compared with 13.1 per cent of all fleets identified by industry. Details of the sizes of fleets belonging to each industry are shown in Table 4.3.

Details of the numbers of each truck type serving each industry are shown in Table 4.4. Rigid trucks numbered 10 502, or 89.8 per cent of total trucks. There were only 1187 articulated trucks registered in Tasmania at 30 September 1976.

Over half of the articulated trucks (at least 618 of the total of 1187) were used by the transport and storage industry.

A comparison by industry of the numbers of fleets having trucks of various types, is set out in Table 4.5.

TABLE 4.3 - NUMBERS OF FLEETS BY SIZE OF FLEET AND INDUSTRY SERVED, TASMANIA: 1976

Industry	Size of fleet (Number of trucks owned)										Total fleets
	1	2	3	4	5	6	7	8	8+		
Agriculture	1 660	222	44	20	7	2	4	-	3	1 962	
Mining	25	9	2	3	-	-	-	-	5	44	
Manufacturing -											
Timber	151	41	16	9	5	3	1	1	6	233	
Other	102	42	22	5	4	6	3	4	10	198	
Electricity, water and gas	-	1	1	-	-	1	-	1	2	6	
Construction	505	76	30	15	7	5	2	1	9	650	
Wholesale and retail trade -											
Petroleum	11	13	5	2	1	1	1	1	6	41	
Motor vehicles	156	33	18	5	1	3	6	1	4	227	
Other	304	70	27	11	8	5	4	4	10	443	
Transport and storage -											
Road transport	100	44	25	21	14	4	5	4	29	246	
Drivers(a)	210	20	6	-	-	-	-	-	-	236	
Contractors(a)	347	109	33	16	11	12	4	3	8	543	
Other than road transport	4	3	3	1	-	2	-	1	3	17	
Business services	2	-	-	-	-	-	-	-	-	2	
Public administration	11	6	7	7	6	5	3	4	18	67	
Community services	28	2	5	3	-	1	-	1	1	41	
Entertainment and recreation	25	5	1	1	-	1	-	-	-	33	
TOTAL ALLOCATED TO INDUSTRY	3 641	696	245	119	64	51	33	26	114	4 989	
Not allocated to industry -											
Labourers(a)	252	27	5	3	-	2	-	-	-	289	
Apparent private use(b)	594	42	11	2	1	2	1	-	-	653	
Other(c)	433	47	14	5	4	2	-	-	1	506	
TOTAL	4 920	812	275	129	69	57	34	26	115	6 437	

(a) Occupation of vehicle owner.

(b) Owners of these vehicles have occupations unlikely to be related to truck use.

(c) Owners whose industry or occupation could not be identified.

TABLE 4.4 - NUMBERS OF TRUCKS BY TRUCK SIZE AND INDUSTRY SERVED, TASMANIA: 1976

Industry	SIZE OF VEHICLES (tonnes tare)						TOTAL
	RIGID TRUCKS			ARTICULATED TRUCKS			
	Under 3	3 and less than 4	4 and over	Under 9	9 and less than 11	11 and over	
Agriculture	1 197	726	418	28	41	44	2 454
Mining	87	15	59	1	1	3	166
Manufacturing -							
Timber	132	75	115	10	2	78	439
Other	220	143	157	9	19	8	556
Electricity, water and gas	298	44	145	1	2	-	490
Construction	649	196	348	14	34	26	1 267
Wholesale and retail trade -							
Petroleum	20	33	71	7	12	14	157
Motor vehicles	234	72	74	7	19	7	413
Other	540	160	133	4	16	13	866
Transport and storage -							
Road transport	164	245	378	46	149	125	1 107
Drivers(a)	94	56	70	10	13	25	268
Contractors(a)	126	169	468	49	68	130	1 010
Other than road transport	48	28	38	2	-	1	117
Business services	2	-	-	-	-	-	2
Public administration	275	90	156	3	-	1	525
Community services	63	10	7	-	3	1	84
Entertainment and recreation	35	8	-	3	1	1	48
TOTAL ALLOCATED TO INDUSTRY	4 184	2 070	2 637	194	407	477	9 969
Not allocated to industry -							
Labourers(a)	194	79	53	5	8	6	345
Apparent private use(b)	482	120	107	6	12	16	743
Other(c)	360	106	110	9	28	19	632
TOTAL	5 220	2 375	2 907	214	455	518	11 689

(a) Occupation of vehicle owner.

(b) Owners of these vehicles have occupations unlikely to be related to truck use.

(c) Owners whose industry or occupation could not be determined.

TABLE 4.5 - NUMBERS OF FLEETS BY TRUCK SIZE AND INDUSTRY SERVED, TASMANIA: 1976

Industry	SIZE OF VEHICLES (tonnes tare)						TOTAL
	RIGID TRUCKS			ARTICULATED TRUCKS			
	Under 3	3 and less than 4	4 and over	Under 9	9 and less than 11	11 and over	
NUMBER OF FLEETS (a)							
Agriculture and mining	1 148	689	371	27	32	24	2 006
Manufacturing, electricity, water and gas	232	138	150	16	36	55	437
Construction	489	103	126	10	23	20	650
Wholesale and retail trade	542	175	154	13	31	19	711
Transport and storage	309	322	515	88	127	151	1 042
Other industries (b)	120	54	55	6	2	3	143
TOTAL ALLOCATED TO INDUSTRY	2 840	1 481	1 371	160	251	272	4 989
Not allocated to industry -							
Labourers (c)	184	71	49	4	8	6	289
Apparent private use (d)	4 597	115	85	6	12	15	653
Other (e)	329	103	88	8	26	18	506
TOTAL	3 810	1 770	1 593	178	297	311	6 437

- (a) The sum of the numbers of fleets having vehicles of various types exceeds total number of fleets because of fleets with vehicles of more than one type. Where this has occurred the fleet has been included in each type category.
- (b) Business services, public administration, community services, entertainment and recreation.
- (c) Occupation of vehicle owner.
- (d) Owners of these vehicles have occupations unlikely to be related to truck use.
- (e) Owners whose industry or occupation could not be determined.

ANNEX A

PROCESSING OF MOTOR REGISTRY DATA

The BTE undertook pilot processing of the ACT Motor Registry File in late 1975. The ACT was chosen because of the small number of vehicles on register and the good prior contacts between BTE and ACT Registry staff.

Processing the ACT data was complicated by several factors. The Motor Registry does not require any processing of the type undertaken by BTE, and fields relevant to BTE's exercise were corrupt in some records. In addition the name and address (on which our sorting analysis was based) of owner was not recorded in any consistent format⁽¹⁾.

In the first stage, no attempt was made to edit or modify the data to produce more reliable results. The objective was to test the reliability of the Registry data as a source of fleet owner details, using only rudimentary sort techniques on unamended data.

The general conclusions of this exercise were:

- the name and address as recorded on the registration document were of limited use as direct sort keys for identifying vehicle fleets⁽²⁾;

(1) This is not to imply any criticism of the Motor Registry. The function of the Motor Registry is, as its name implies, to keep a register of motor vehicles. BTE's objective was to use the Motor Registry data for a purpose for which it is not designed, using data which was not critical to the efficient operation of the Registry function.

(2) Besides the variability in recording individual address and name sequences, some firms were apparently registering trucks at both private and business addresses, as well as in both private and company names.

- . the use of some 'key' word defined in terms of a sequence of characters of some minimum length, excluding blanks, punctuation marks, courtesy titles and common business terms would assist in the grouping of fleets;
- . the use of 'name' as a means of identifying single operating entities was preferable to the use of address. The variation within name was generally less critical than within address. Where vehicles were registered under 'company' and 'private' names it was most usually the case that the company name had been derived from the family name; and
- . the use of some regional grouping of vehicles would probably be of considerable value in identifying individual operating units. The 'keyword' identified is more likely to be repeated the larger the number of fleets in the set. Although the ACT was reasonably compact geographically, and the need for such grouping could not be proven, it was evident that a regional grouping within the States would be essential. The pilot study included attempts at grouping vehicles to postcode areas, prior to sorting by owner name and address. The result was counter-productive, in that it fragmented a number of vehicle groups which appeared to belong to a single operating unit. This indicated the need for a regional grouping somewhat larger than a single postcode area to identify fleets. A regional grouping of fleets may also prove useful for future sampling work.

These conclusions from the pilot test of the ACT Registry tape helped provide a basis for processing data from the States.

The remainder of this Annex describes the source data, and discusses the accuracy of data items of importance to the current exercise. The Annex then describes the major steps in the processing, outlining the more important assumptions and relating them to our objectives. Details of the processing, including listings of the programs used, are contained in Annex B.

DETAILS OF VEHICLES ON REGISTER

Information in a consistent format showing freight carrying vehicles on register in mid 1976 was received from all States. The record format is set out in Table A.1.

RELIABILITY OF SOURCE DATA

The reliability of each of the major items of relevance to the identification of the ownership and vehicle composition of truck fleets in Australia is discussed in turn.

Name and address, including postcode

In all States, except Victoria, State Registry information gave high coverage for this field. In Victoria approximately 19 per cent of vehicles registered appeared on the tape without a name or address. This is because vehicles reported as sold during the year have the old owner name deleted, but the new owner name is held in a suspense file which is not used to update the master file until immediately prior to the issue of registration notices. This limited the usefulness of Victorian Registry data as a source of fleet ownership and composition information⁽¹⁾.

For this exercise, which was essentially to test the feasibility of using registration records to identify fleet owners, no attempt was made to obtain these suspense files and update the master file. Within the constraints of our processing system, the cost of obtaining and processing the suspense files was not considered warranted in terms of our limited objective.

(1) The Victorian authority is now in the process of changing over to an on-line data-base registry system, and it is expected by the end of 1979 that the registry file will contain the name and address of the current owner (as reported to the registry) of all vehicles.

TABLE A.1 - FORMAT OF REGISTRATION RECORDS RECEIVED

Item	Item Name	Location		Item Size		Comments
		(Char.)		(Char.)		
		From	To			
1	Not used	1	8	8		
2	State code	9	9	1		
3	Stratum Code	10	12	3	Computer from tare weight,	
4	Status	13	13	1	Registration status, e.g., new cancelled	
5	Registration Number	14	20	7		
6	R.D.C.	21	21	1	Record discrimination character to make otherwise identical registration numbers unique	
7	Year of Manufacture	22	23	2		
8	Fuel Code	24	24	1		
9	Engine Number	25	28	1	First four non-blank characters only	
10	Vehicle Type	29	30	2	Vehicle body type code, see below	
11	R.A.C. H.P.	31	32	2	Decimal part truncated	
12	Month Registered	33	34	2	With respect to a specified datum month	
13	Month Expired	35	36	2	With respect to a specified datum month	
14	Tare Weight	37	41	5		
15	Carrying Capacity	42	46	5		
16	Gross Vehicle Weight	47	51	5		
17	Axles	52	52	1	Numbers of axles (rows of wheels)	
18	Vehicle Make	53	56	3	Vehicle Make Code	
19	State Use Field	57	60	4	Use of this field varies from state to state	
20	Postcode	61	64	4	Post Australia post code	
21	Name and address	65	Variable		Name and Address of registered owner. Variable length.	

Some problems of inconsistency in the recording of name and address remained in the edited tapes. The editing procedure was designed only to ensure that information on each truck was internally consistent.

It has not been possible to fully assess the accuracy of postcodes as recorded on the registration tapes. Table A.2 provides information on the number and percentage of records without postcodes.

TABLE A.2 - NUMBER OF VEHICLES WITHOUT POSTCODE DETAILS

State	<u>Vehicles without postcode</u>		Total vehicles
	Number	Per cent	
NSW	204	0.2	124 976
Vic	22 681	19.3	117 276
SA	2 357	5.7	41 330
WA	8	..	34 348
Tas	15	..	11 730

In the course of analysing the results for Tasmania more closely, it has become evident that there is also a degree of error in postcode recording. The processing of the State of Tasmania has revealed less than ten serious errors, where the postcode recorded for the address was a valid postcode, but related to a postcode area in another statistical division. A larger number of instances where an apparent error has been made in recording the last digit of the postcode have been noted. The number of occurrences is still relatively small and while it has the undesirable effect of splitting fleets, the sort sequence has generally ensured that the vehicles appear sequentially or at least are very near to each other on the listing.

The size and nature of errors in Tasmania was also discussed in Chapter 2.

Live Registrations

A problem in using Motor Registry data as a source of statistical information is the determination of the registration status of vehicles on register.

It is Registry practice not to remove vehicles which fail to renew their registration from the registration file until some time after the due registration date. This is not considered a major problem in the identification of vehicle fleets, where it can be assumed that while individual vehicles within fleets may change relatively quickly, fleet composition and ownership will remain stable over longer periods of time. The presence of unregistered vehicles on file will tend to increase the average size of fleet.

Stratum Code

The stratum code provides a measure of the size of the vehicles, based on tare weight. The individual strata classes for trucks are shown in Table A.3.

In all States, the registration fee is based on a formula which includes the tare weight⁽¹⁾. As the tare weight is directly relevant to the estimation of the registration fee, it is unlikely to contain any significant error.

(1) A summary of registration formulae for all States and Territories is available in an appendix to an Australian Bureau of Statistics publication, Motor Vehicle Registrations 1975-76, Reference Number 9304.0.

TABLE A.3 - STRATUM NUMBER, TARE WEIGHT INTERVAL RELATIONSHIP

Stratum number	Tare weight interval
6	Rigid trucks, tare weight less than 3 tonnes
7	Rigid trucks, tare weight 3 and under 4 tonnes
8	Rigid trucks, tare weight 4 tonnes and over
9	Articulated trucks, tare weight less than 9 tonnes
10	Articulated trucks, tare weight 9 and under 11 tonnes
11	Articulated trucks, tare weight 11 tonnes and over

Truck Type Code

A code had been allocated to each vehicle on the basis of information on body type contained within the registration record. The information varies in both detail and reliability between the States but provides some additional guide as to the use of individual vehicles and fleets.

The standard vehicle codes available for all States are shown in Table A.4.

MAJOR STEPS IN PROCESSING

There were three major steps in processing the information to produce lists of fleet owners:

- . the identification of the key word in the name field;

TABLE A.4 - STANDARD BODY TYPE CODES

Body type code	Body type
RIGID FREIGHT CARRYING VEHICLES	
40	Open truck
41	Closed truck
42	Tipper
43	Tanker
44	Cab and chassis, as registered, NOT including prime movers
45	Concrete agitator
46	Other rigid
ARTICULATED FREIGHT CARRYING VEHICLES (a)	
50	Open truck
51	Closed truck
52	Tipper
53	Tanker
54	Prime mover (as registered)
55	Concrete agitator
56	Other articulated

(a) Includes prime mover and trailer, except where the prime mover is registered separately.

- . the determination of the statistical division in which the registered owner lived; and
- . the sort process to group fleets together.

Counts of the number of vehicles by postcode area and statistical division were produced as a by-product of this process.

Identification of Key Words

From earlier experience in processing the ACT Motor Registry data it was obvious that a method was required to identify the main word or words in the name of the registered owner. In using automatic data processing for identifying common owners, even minor variations in the relevant fields can be critical. Unless special allowance is made in the processing, differences such as the introduction of punctuation marks or even additional blanks into the name field will cause the computer to recognise a 'new' name. Inconsistency in the use of courtesy titles, varying forms of abbreviation, and alternative presentations of both company and personal names were the cause of the most severe problems.

Examination of the results of the experimental processing of the ACT Registry data had indicated that despite the lack of consistency in recording name and address details, it should be possible to isolate the major word in the name field. Ideally the major word needed to be one which was not normally abbreviated in referring to the owner (be it company or person) and which was 'definitive' in his identification. Many company names included terms which were descriptive of the company activity (e.g. 'Motors', 'Smash Repairs', 'Boutique') and were too general to be of any use. Fortunately, most of these descriptive terms occurred at the end of the name field.

A number of test runs were tried, with keywords being formed of the first set of contiguous characters of some minimum length, but excluding a number of common business terms, courtesy titles and the like. This highlighted two major problems in the construction of a keyword:

- . where a short sequence was specified, abbreviated first names of owners were often selected as the keyword (e.g. Bob, Pat, Ern, etc); and
- . where a longer keyword was chosen, the descriptive term at the end of the company name sequence was often chosen.

It was eventually elected to define the keyword as the first six contiguous characters, excluding the common terms referred to above. If six characters were not present, then five were chosen, and so on to a minimum of three characters. Set at six, the keyword was considered long enough to avoid choosing most shortened or abbreviated first names, as well as a good proportion of the more common 'full' first names, but short enough not to take the search for the keyword through to the descriptive terms at the end of many company names.

In hindsight, there are some minor changes which might be introduced - primarily extending the list of excluded words - but generally the process described was successful in identifying the definitive word in the name field.

Allocation to Statistical Division

A regional classification was required which was in common use and for which a good range of statistical information was available. The major use of the results of this processing was expected to be as a survey framework, and there would be value in being able to compare the results from any survey with other statistical information.

It was decided to use statistical divisions, as determined by the ABS for the 1976 Population Census. These divisions provide broad area groupings by State, in sufficient detail for most purposes, and provide manageable areas for subsequent processing or survey. It would have been possible to code vehicles to individual Local Government Authority Areas, but in view of the limited resources available to the study, and the absence of any apparent need for such detail, this was not done.

Each vehicle record was coded to a statistical division on the basis of the postcode contained within the record. The postcode had already been identified and placed in a separate field in earlier processing and was easily accessed.

A directory linking placenames to postcodes, to statistical divisions and a range of other locational information was available as a result of previous BTE work in relation to the National Travel Survey⁽¹⁾. The directory provided a link between approximately 8700 placenames in Australia and their relevant postcode, L.G.A., statistical division and a number of other locational identifiers.

Despite problems of inaccuracy inherent in their use it was decided to use postcodes as a means of allocating vehicles to regions. Postcode boundaries do not coincide with L.G.A. or statistical division boundaries, and the one postcode in some instances applied to towns in different statistical divisions. However with regions the size of statistical divisions (there are less than 80 over the whole of Australia) the likely degree of error is small, and was judged of little consequence to the current exercise. Where a postcode overlapped a statistical

(1) The development and objectives of the placename directory are outlined in an earlier BTE publication, Occasional Paper 21, National Travel Survey 1977-78, Geographic Zoning and Coding System, AGPS, 1978.

division, the towns covered by the postcode were examined, and the directory amended to cause all vehicles to be coded to the statistical division containing the larger proportion of the population⁽¹⁾ within the postcode area.

Identification of Fleets

Once the Registry files had been processed to insert the additional information on the keyword and statistical division, the files were sorted to bring together vehicles belonging to the one fleet.

As a first approximation, it was assumed that each fleet would be uniquely identified by the keyword/postcode combination within each statistical division. The files of vehicle registrations were then sorted by postcode⁽²⁾, within keywords, within statistical division order, and a sorted list of vehicles obtained.

(1) Based on the 1971 Census figures published by the Australian Bureau of Statistics.

(2) In choosing to sort by postcode it was acknowledged that this would lead to some operating units being split because they had been registered at addresses in different postcode regions. However to ignore location and place absolute reliance on keyword to identify fleets would have presented difficulties where fleets would have been merged in error. The final sort sequence used sought a solution between these extremities: vehicles with the same keyword, but different postcodes were identified as separate fleets, but listed adjacent to each other to facilitate visual inspection and resolution of any problems.

ANNEX B

PROCESSING PROCEDURES

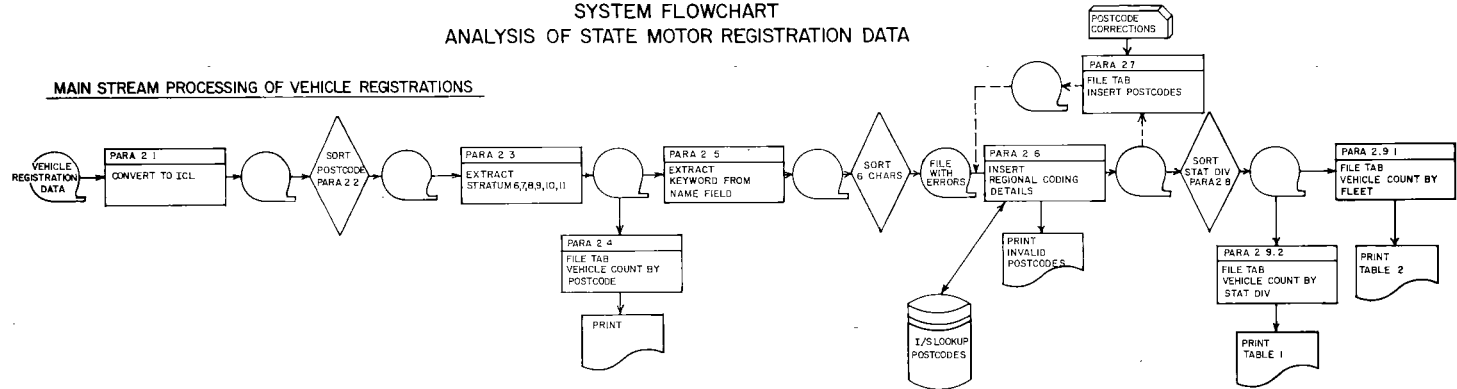
1. GENERAL

- 1.1 Annex A provided an overview of the philosophy and objectives of the processing of the State Motor Registry tapes. This annex looks more closely at the mechanics of the processing, providing listings of the more important programs. With the benefit of hindsight, there are several improvements which might be made to the processing procedures and these are noted.
- 1.2 The processing of this data required two suites of programs. A main stream of programs handling individual truck registration records obtained from each State, and a secondary stream to produce an Indexed Sequential Reference File, keyed on postcode, relating postcodes to a range of locational codes for eventual use in the main stream of processing (see para 2.6 below).
- 1.3 A report-writer package 'FILETAB' was used extensively throughout this exercise. FILETAB is a commercially developed parameter driven program for extracting, formatting and tabulating selected information into printed reports. Listings of the FILETAB parameters for runs in this study have not been included in the report because they are generally machine specific and will not be of general interest.
- 1.4 Sorts were done by the utility programs supplied by the computer manufacturer.
- 1.5 The conversion programs (see paras 2.1 and 3.1) were written in 'USERCODE', the assembler language of the ICL 4/70. These programs are specific to ICL installations and have not been included in this paper.

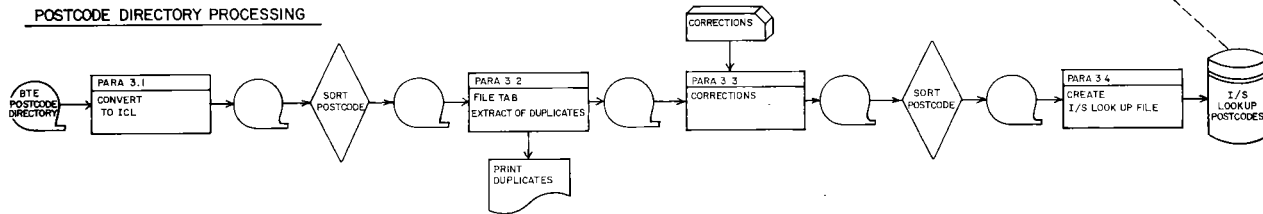
- 1.6 Other programs were written in COBOL.
- 1.7 To monitor progress of the processing FILETAB programs were written at regular intervals throughout the system to dump off portions of the files. These programs are not included in this report.
- 1.8 The sequence of processing is described below and illustrated in Figure B.1. Listings of the more important programs are attached to this Annex.
2. MAIN STREAM PROCESSING OF VEHICLE REGISTRATION INFORMATION
- 2.1 Convert Motor Registry Magnetic Tapes to ICL System 4/70 Code
Because of basic machine code differences between the computers used to produce the motor registry files and the Department of Transport ICL System 4/70, it was necessary to write an assembler code program to convert the Motor Registry files to ICL machine code.
- 2.2 Sort
The State files were then sorted to postcode order.
- 2.3 Select Vehicles in Scope for the Study (Stratum Extract)
The data tapes received from the State Registries contained all vehicles except cars and station wagons. As our study aimed to identify fleets of freight carrying vehicles it was necessary to exclude utilities, panel vans and other vehicles not normally used for freight cartage. A COBOL program (Attachment B.1) was written to extract strata 6, 7, 8, 9, 10, 11 (see Table A.3) the codes used to identify freight carrying vehicles.
- 2.4 FILETAB Extract
A FILETAB program was written to give a count of the number of vehicles by Stratum within each postcode, for each State.

SYSTEM FLOWCHART ANALYSIS OF STATE MOTOR REGISTRATION DATA

MAIN STREAM PROCESSING OF VEHICLE REGISTRATIONS



POSTCODE DIRECTORY PROCESSING



ATTACHMENT B.1 BTE - TRUCK - SELECT

IDENTIFICATION DIVISION.

PROGRAM-ID. PR001M00-BTE-TRUCK-SELECT.

AUTHOR. MCKINLEY.

DATE-WRITTEN. AUG 77.

DATE-COMPILED. 04/08/77

REMARKS

THIS PROGRAM TAKE A CONVERTED COPY OF THE STATE MOTOR *
REGISTRY MAG TAPE OF COMERCIAL VEHICLE REGISTRATIONS *
AUSTRALIA WIDE AND SELECTS FROM THIS FILE ANOTHER FILE OF *
ONLY THOSE RECORDS FOR THE REGISTRATION OF HEAVY TRUCKS. *
THE PROGRAM ISSUES THE FOLLOWING COUNTS ON SUCCESSFULL *
TERMINATION. *
INPUT-RECORD-COUNT, OUTPUT-RECORD-COUNT,RECORDS-DROPPED, *
RECORDS-HELD,DROPPED WITH-NO-POST-CODE,KEPT-WITH-NO-POST-CODE*
DROPPED-WITH-POST-CODE,KEPT-WITH-POST-CODE. *

ENVIRONMENT DIVISION.

CONFIGURATION SECTION.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT BTE-COMERCIAL-IN-FILE
 ASSIGN TO UT-MTP-S-SYS020
 RESERVE NO.
SELECT BTE-HEAVY-TRUCKS-OUT-FILE
 ASSIGN TO UT-MTP-S-SYS021
 RESERVE NO.

DATA DIVISION.

FILE SECTION.

FD BTE-COMERCIAL-IN-FILE
RECORDING F
BLOCK CONTAINS 7176 CHARACTERS
RECORD CONTAINS 184 CHARACTERS
LABEL RECORD STANDARD
DATA RECORD IS COMERCIAL-VEH-IN.
01 COMERCIAL-VEH-IN PIC X(184).
FD BTE-HEAVY-TRUCKS-OUT-FILE
RECORDING F
BLOCK CONTAINS 7176 CHARACTERS
RECORD CONTAINS 184 CHARACTERS
LABEL RECORD STANDARD
DATA RECORD IS HEAVY-TRUCKS-OUT.
01 HEAVY-TRUCKS-OUT PIC X(184).

WORKING-STORAGE SECTION.

01 COUNTERS.
03 INPUT-RECORD-COUNT COMP SYNC VALUE 0 PIC S9(9).
03 OUTPUT-RECORD-COUNT COMP SYNC VALUE 0 PIC S9(9).
03 INPUT-RECORDS-DROPPED COMP SYNC VALUE 0 PIC S9(9).
03 INPUT-RECORDS-SELECTED COMP SYNC VALUE 0 PIC S9(9).
03 DROPPED-NO-POST-CODE COMP SYNC VALUE 0 PIC S9(9).
03 SELECTED-NO-POST-CODE COMP SYNC VALUE 0 PIC S9(9).
03 DROPPED-POST-CODE COMP SYNC VALUE 0 PIC S9(9).
03 DROPPED-NO-ADDRESS COMP SYNC VALUE 0 PIC S9(9).
03 SELECTED-POST-CODE COMP SYNC VALUE 0 PIC S9(9).
03 SELECTED-NO-ADDRESS COMP SYNC VALUE 0 PIC S9(9).
01 FLAGS.
03 TERM-CODE COMP-3 VALUE 0 PIC S9(3).

ATTACHMENT B.1 (CONT) BTE - TRUCK - SELECT

01 COMERCIAL-VEH-REC-WS.
03 FILLER PIC X(09).
03 STRATUM-CODE PIC 9(03).
88 STRATUM-VALID VALUE 006 007 008 009 010 011.
03 FILLER PIC X(48).
03 POST-CODE PIC X(04).
88 POST-CODE-INVALID VALUE "0000" " "
03 NAME-ADDRESS PIC X(120).

PROCEDURE DIVISION.

100-MAINLINE SECTION.
101-CALL-STXIT.
ENTER USERCODE STXITCOB.
102-OPEN-FILES.
OPEN INPUT BTE-COMERCIAL-IN-FILE.
OPEN OUTPUT BTE-HEAVY-TRUCKS-OUT-FILE.
200-READ-INPUT SECTION.
201-READ-NEXT-REC.
READ BTE-COMERCIAL-IN-FILE INTO COMERCIAL-VEH-REC-WS
AT END GO TO 600-WIND-UP.
ADD 1 TO INPUT-RECORD-COUNT.
IF STRATUM-VALID
PERFORM 300-VALID-CHECKS
GO TO 500-WRITE-OUTPUT.
PERFORM 400-INVALID-CHECKS
GO TO 200-READ-INPUT.
300-VALID-CHECKS SECTION.
301-POST-CODE-CHECK.
ADD 1 TO INPUT-RECORDS-SELECTED.
IF POST-CODE-INVALID
ADD 1 TO SELECTED-NO-POST-CODE
ELSE ADD 1 TO SELECTED-POST-CODE.
302-ADDRESS-CHECK.
IF NAME-ADDRESS = SPACES
ADD 1 TO SELECTED-NO-ADDRESS.
303-EXIT.
EXIT.
400-INVALID-CHECKS SECTION.
401-POST-CODE-CHECK.
ADD 1 TO INPUT-RECORDS-DROPPED.
IF POST-CODE-INVALID
ADD 1 TO DROPPED-NO-POST-CODE
ELSE ADD 1 TO DROPPED-POST-CODE.
402-ADDRESS-CHECK.
IF NAME-ADDRESS = SPACES
ADD 1 TO DROPPED-NO-ADDRESS.
403-EXIT.
EXIT.
500-WRITE-OUTPUT SECTION.
501-ADD-IT.
ADD 1 TO OUTPUT-RECORD-COUNT.
502-WRITE-IT.
WRITE HEAVY-TRUCKS-OUT FROM COMERCIAL-VEH-REC-WS.
GO TO 200-READ-INPUT.
600-WIND-UP SECTION.
601-CLOSE-FILES.
CLOSE BTE-COMERCIAL-IN-FILE WITH LOCK.
CLOSE BTE-HEAVY-TRUCKS-OUT-FILE WITH LOCK.
602-DISPLAYS.
DISPLAY "NUMBER OF RECORDS READ" = " INPUT-RECORD-COUNT.

ATTACHMENT B.1 (CONT) BTE - TRUCK - SELECT

```
DISPLAY "NUMBER OF RECORDS WRITTEN"  ▣ " OUTPUT-RECORD-COUNT.
DISPLAY "NUMBER OF RECORSS SELECTED" ▣ " INPUT-RECORDS-SELECTED.
DISPLAY "NUMBER OF RECORDS DROPPED"  = " INPUT-RECORDS-DROPPED.
DISPLAY "NUMBER OF DROPPED RECORDS"
DISPLAY "WITH NO POST-CODE"           = " DROPPED-NO-POST-CODE.
DISPLAY "NUMBER OF SELECTED RECORDS"  = "
DISPLAY "WITH NO POST-CODE"           = "
                                           SELECTED-NO-POST-CODE .
DISPLAY "NUMBER OF DROPPED RECORDS"
DISPLAY "WITH POST-CODE"              = " DROPPED-POST-CODE.
DISPLAY "NUMBER OF SELECTED RECORDS"  = "
DISPLAY "WITH POST-CODE"              = " SELECTED-POST-CODE.
DISPLAY "NUMBER OF DROPPED RECORDS"
DISPLAY "WITH NO NAME AND ADDRESS"    = " DROPPED-NO-ADDRESS.
DISPLAY "NUMBER OF SELECTED RECORDS"  = "
DISPLAY "WITH NO NAME AND ADDRESS"    = " SELECTED-NO-ADDRESS.
603-SET-TERM-CODE.
MOVE 1 TO TERM-CODE.
ENTER USERCODE ENDCODE USING TERM-CODE.
STOP RUN.
```

2.5 Identification of Keyword (Character Extract)

The central objective of the exercise was to identify all vehicles belonging to each individual fleet. Because of inconsistencies in recording the name and/or address fields on registration records, the direct use of this information as recorded did not provide a satisfactory result. To overcome this problem, it was decided to construct a keyword from the name field, based on the first six contiguous characters, and if six were not available then five and so on to a limit of three. The listing of this program is given in Attachment B.2.

2.6 Insert Locational Codes

Each State file was then submitted to a COBOL program which accessed the postcode file and inserted into each vehicle record the code for the appropriate statistical division. This program also generated a list of invalid postcodes appearing on the Motor Registry file. A listing of this program is in Attachment B.3.

2.7 Correction of Invalid Postcodes

The invalid postcodes detected in the previous program were corrected and a FILETAB program was produced to re-insert the corrected records into the main file. The file was then re-submitted through the COBOL program described in Attachment B.3.

2.8 Sort

Each State file was then sorted by postcode within keyword within statistical division.

2.9 FILETAB Extracts

2.9.1 A FILETAB program was written to give vehicle counts by Stratum within statistical division.

2.9.2 FILETAB was again used to provide a listing of vehicles by Stratum within fleet owner within statistical division

ATTACHMENT B.2 BTE - TRUCK - FLEET - OWNER

IDENTIFICATION DIVISION.

PROGRAM-ID. PR002M00-BTE-TRUCK-FLEET-OWNER.

AUTHOR. MCKINLEY

DATE-WRITTEN. AUG 77.

DATE-COMPILED. 23/08/77

REMARKS

THIS PROGRAM TAKES A SORTED COPY OF THE HEAVY VEHICLE *
REGISTRATION MASTER FILE AND ISOLATES THE FIRST SIX *
CONTIGUOUS CHARACTERS OF THE NAME ADDRESS FIELD AND PLACES IT *
AT THE END OF EACH RECORD. IT IS TO BE USED FOR SORTING. *

ENVIRONMENT DIVISION.

CONFIGURATION SECTION.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT	BTE-HEAVY-TRUCKS-IN
	ASSIGN TO UT-MTP-S-SYS020
	RESERVE NO.
SELECT	BTE-HEAVY-TRUCKS-OUT
	ASSIGN TO UT-MTP-S-SYS021
	RESERVE NO.

DATA DIVISION.

FILE SECTION.

FD	BTE-HEAVY-TRUCKS-IN	
	RECORDING F	
	BLOCK CONTAINS 7176 CHARACTERS	
	RECORD CONTAINS 184 CHARACTERS	
	LABEL RECORD STANDARD	
	DATA RECORD IS TRUCKS-IN.	
01	TRUCKS-IN	PIC X(184).
FD	BTE-HEAVY-TRUCKS-OUT	
	RECORDING F	
	BLOCK CONTAINS 7176 CHARACTERS	
	RECORD CONTAINS 184 CHARACTERS	
	LABEL RECORD STANDARD	
	DATA RECORD IS TRUCKS-OUT.	
01	TRUCKS-OUT	PIC X(184).

WORKING-STORAGE SECTION.

01	COUNTERS.	
	03 INPUT-RECORD-COUNT	COMP SYNC VALUE 0 PIC S9(09).
	03 OUTPUT-RECORD-COUNT	COMP SYNC VALUE 0 PIC S9(09).
01	FLAGS.	
	03 THREE-FLAG	COMP SYNC VALUE 0 PIC S9(09).
	03 FOUR-FLAG	COMP SYNC VALUE 0 PIC S9(09).
	03 FIVE-FLAG	COMP SYNC VALUE 0 PIC S9(09).
	03 LENGTH-CHECK	COMP SYNC VALUE 0 PIC S9(04).
	03 TERM-CODE	COMP-3 VALUE 0 PIC S9(03).
01	HOLD-SIX.	
	03 HOLD-FIVE.	
	05 HOLD-FOUR.	
	07 HOLD-THREE	PIC X(03).
	07 FILLER	PIC X(01).
	05 FILLER	PIC X(01).
	03 FILLER	PIC X(01).
01	HOLD-IT REDEFINES HOLD-SIX	
	03 HOLD-AREA	OCCURS 6 PIC X(01).

ATTACHMENT B.2 (CONT) BTE - TRUCK - FLEET - OWNER

```

01 SORT-SLOT.
   03 LENGTH-THREE          PIC X(03).
   03 LENGTH-FOUR          PIC X(04).
   03 LENGTH-FIVE          PIC X(05).
   03 LENGTH-SIX           PIC X(06).
01 SUBSCRIPTS.
   03 IS-IT                  COMP SYNC VALUE 0 PIC S9(09).
   03 ENOUGH                 COMP SYNC VALUE 0 PIC S9(09).
01 TRUCKS-WS.
   03 FILLER                 PIC X(64).
   03 NAME-ADDRESS           OCCURS 114      PIC X(01).
   03 SORT-KEY               PIC X(06).
PROCEDURE DIVISION.

100-MAINLINE SECTION.
101-CALL-STXIT.
   ENTER USERCODE STXITCOB.
102-OPEN-FILES.
   OPEN INPUT BTE-HEAVY-TRUCKS-IN.
   OPEN OUTPUT BTE-HEAVY-TRUCKS-OUT.
200-READ-INPUT SECTION.
201-READ-NEXT-REC.
   READ BTE-HEAVY-TRUCKS-IN INTO TRUCKS-WS
   AT END GO TO 500-WIND-UP.
   ADD 1 TO INPUT-RECORD-COUNT.
202-PROCESS SECTION.
203-NAME-ADDRESS-PERFORM.
   PERFORM 400-NAME-CHECK.
204-GO-TO-DEPENDING.
   GO TO 204-LENGTH-THREE
   205-LENGTH-FOUR
   206-LENGTH-FIVE
   207-LENGTH-SIX
   DEPENDING ON LENGTH-CHECK.
204-EXTREME-VALUE.
   MOVE SPACES TO SORT-KEY.
   GO TO 300-WRITE-OUTPUT.
204-LENGTH-THREE.
   MOVE LENGTH-THREE TO SORT-KEY.
   GO TO 300-WRITE-OUTPUT.
205-LENGTH-FOUR.
   MOVE LENGTH-FOUR TO SORT-KEY.
   GO TO 300-WRITE-OUTPUT.
206-LENGTH-FIVE.
   MOVE LENGTH-FIVE TO SORT-KEY.
   GO TO 300-WRITE-OUTPUT.
207-LENGTH-SIX.
   MOVE LENGTH-SIX TO SORT-KEY.
300-WRITE-OUTPUT SECTION.
301-COUNT-IT.
   ADD 1 TO OUTPUT-RECORD-COUNT.
302-WRITE-IT.
   WRITE TRUCKS-OUT FROM TRUCKS-WS.
   GO TO 200-READ-INPUT.
400-NAME-CHECK SECTION.
401-INITIALIZE.
   MOVE 0 TO IS-IT ENOUGH THREE-FLAG FOUR-FLAG FIVE-FLAG.
   MOVE SPACES TO HOLD-SIX SORT-SLOT.
402-LOOP-1.
   ADD 1 TO IS-IT.

```

ATTACHMENT B.2 (CONT) BTE - TRUCK - FLEET - OWNER

```
IF IS-IT > 114
  MOVE 5 TO LENGTH-CHECK
  GO TO 403-EXIT.
IF NAME-ADDRESS (IS-IT) = "*"
  PERFORM 700-FOUND-SPACE
  PERFORM 600-FOUND-ASKERISK
  GO TO 403-EXIT.
IF NAME-ADDRESS (IS-IT) = SPACE
  PERFORM 700-FOUND-SPACE
  GO TO 402-LOOP-1.
ADD 1 TO ENOUGH.
MOVE NAME-ADDRESS (IS-IT) TO HOLD-AREA (ENOUGH).
IF ENOUGH > 5
  IF HOLD-SIX = "MESSRS"
    MOVE 0 TO ENOUGH
    GO TO 402-LOOP-1
  ELSE
    MOVE HOLD-SIX TO LENGTH-SIX
    MOVE 4 TO LENGTH-CHECK
    GO TO 403-EXIT.
GO TO 402-LOOP-1.
403-EXIT.
EXIT.
500-WIND-UP SECTION.
501-DISPLAYS.
  DISPLAY 'RECORDS INPUT = ' INPUT-RECORD-COUNT.
  DISPLAY 'RECORDS OUTPUT = ' OUTPUT-RECORD-COUNT.
502-CLOSE-FILES.
  CLOSE BTE-HEAVY-TRUCKS-IN WITH LOCK.
  CLOSE BTE-HEAVY-TRUCKS-OUT WITH LOCK.
503-TERM-CODE.
  MOVE 1 TO TERM-CODE.
  ENTER USERCODE ENDCODE USING TERM-CODE.
504-STOP-IT-ALL.
  STOP RUN.
600-FOUND-ASKERISK SECTION.
601-FLAG-TEST.
  IF FIVE-FLAG POSITIVE
    MOVE 3 TO LENGTH-CHECK
    GO TO 600-EXIT.
  IF FOUR-FLAG POSITIVE
    MOVE 2 TO LENGTH-CHECK
    GO TO 600-EXIT.
  IF THREE-FLAG POSITIVE
    MOVE 1 TO LENGTH-CHECK
    GO TO 600-EXIT.
  IF ENOUGH > 4
    MOVE HOLD-FIVE TO LENGTH-FIVE
    MOVE 3 TO LENGTH-CHECK
    GO TO 600-EXIT.
  IF ENOUGH > 3
    IF HOLD-FOUR = "BROS" OR "SONS"
      MOVE 5 TO LENGTH-CHECK
      GO TO 600-EXIT
    ELSE MOVE HOLD-FOUR TO LENGTH-FOUR
      MOVE 2 TO LENGTH-CHECK
      GO TO 600-EXIT.
  IF ENOUGH > 2
    IF HOLD-THREE = "AND" OR "MRS" OR "SON" OR "PTY"
      OR "LTD"
      MOVE 5 TO LENGTH-CHECK
      GO TO 600-EXIT
```

ATTACHMENT B.2 (CONT) BTE - TRUCK - FLEET - OWNER

```
        ELSE MOVE HOLD-THREE TO LENGTH-THREE
            MOVE 1 TO LENGTH-CHECK
            GO TO 600-EXIT.
    MOVE 5 TO LENGTH-CHECK.
600-EXIT.
    EXIT.
700-FOUND-SPACE SECTION.
701-ENOUGH-CHECK.
    IF ENOUGH > 4
        MOVE 0 TO ENOUGH
        MOVE HOLD-FIVE TO LENGTH-FIVE
        MOVE 1 TO FIVE-FLAG
        GO TO 700-EXIT.
    IF ENOUGH > 3
        MOVE 0 TO ENOUGH
        IF HOLD-FOUR = "BROS" OR "SONS"
            GO TO 700-EXIT
        ELSE MOVE HOLD-FOUR TO LENGTH-FOUR
            MOVE 1 TO FOUR-FLAG
            GO TO 700-EXIT.
    IF ENOUGH > 2
        MOVE 0 TO ENOUGH
        IF HOLD-THREE = "AND" OR "MRS" OR "SON" OR "PTY" OR
            "LTD"
            GO TO 700-EXIT
        ELSE MOVE HOLD-THREE TO LENGTH-THREE
            MOVE 1 TO THREE-FLAG
            GO TO 700-EXIT.
    MOVE 0 TO ENOUGH.
700-EXIT.
    EXIT.
```

ATTACHMENT B.3 POSTCODE - IS - CREATE

IDENTIFICATION DIVISION.

PROGRAM-ID. PR004M00-POSTCODE-IS-CREATE.

AUTHOR. MCKINLEY.

DATE-WRITTEN. OCT 77.

DATE-COMPILED. 11/10/77.

REMARKS.

THIS PROGRAM IS REQUIRED TO TAKE A SORTED COPY OF THE
B.T.E. POSTCODE TO STATISTICAL DIVISION FILE AND CREATE
AND INDEXED SEQUENTIAL LOOKUP FILE FROM IT. ALSO INCLUDE
AMENDMENT TRANSACTIONS FOR KNOWN ERRORS.

*
*
*
*

ENVIRONMENT DIVISION.

CONFIGURATION SECTION.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT

POSTCODE-FILE

ASSIGN TO UT-MTP-S-SYS020

ACCESS IS SEQUENTIAL

RESERVE NO.

SELECT

AMENDMENTS-FILE

ASSIGN TO UT-LNF-S-SYS005

ACCESS IS SEQUENTIAL

RESERVE NO.

SELECT

STAT-DIV-POST-CODE-FILE

ASSIGN TO DA-DSC-I-SYS050

ACCESS IS SEQUENTIAL

RECORD KEY IS POST-CODE-KEY

RESERVE NO.

I-O-CONTROL.

APPLY STORE-INDEX 512 ON STAT-DIV-POST-CODE-FILE

DATA DIVISION.

FILE SECTION.

FD POSTCODE-FILE

RECORDING F

BLOCK CONTAINS 4234 CHARACTERS

RECORD CONTAINS 73 CHARACTERS

LABEL RECORD STANDARD

DATA RECORD IS POSTCODE-IN-REC.

01 POSTCODE-IN-REC.

03 SEQUENCE-NO-IN

PIC X(04).

03 FILLER

PIC X(27).

03 POST-CODE

PIC X(04).

03 FILLER

PIC X(38).

FD AMENDMENTS-FILE

RECORDING F

RECORD CONTAINS 73 CHARACTERS

LABEL RECORDS STANDARD

DATA RECORD IS AMEND-IN-REC.

01 AMEND-IN-REC.

03 AMEND-SEQUENCE-NO

PIC X(04).

03 FILLER

PIC X(69).

FD STAT-DIV-POST-CODE-FILE

RECORDING F

BLOCK CONTAINS 3520 CHARACTERS

RECORD CONTAINS 22 CHARACTERS

LABEL RECORD IS STANDARD

ATTACHMENT B.3 (CONT) POSTCODE - IS - CREATE

```

DATA RECORD IS POST-CODE-STAT-DIV.
01 POST-CODE-STAT-DIV.
    03 DELETE-CHAR PIC X(01).
    03 POST-CODE-KEY PIC X(04).
    03 STATE PIC X(03).
    03 STATE-CODE PIC X(01).
    03 LGA-CODE PIC X(03).
    03 LGA-TYPE PIC X(01).
    03 STAT-DIV-CODE PIC X(03).
    03 NTS-CODE PIC X(03).
    03 AGR-CODE PIC X(03).
WORKING-STORAGE SECTION.
01 COUNTERS.
    03 INPUT-P-RECORD-COUNT COMP SYNC VALUE 0 PIC S9(09).
    03 INPUT-A-RECORD-COUNT COMP SYNC VALUE 0 PIC S9(09).
    03 OUTPUT-RECORD-COUNT COMP SYNC VALUE 0 PIC S9(09).
01 FLAGS.
    03 AMEND-FLAG COMP SYNC VALUE 0 PIC S9(04).
    03 TERM-CODE COMP-3 VALUE 0 PIC S9(03).
01 LAST-REC-HOLD-AREA.
    03 SEQUENCE-NO-WS PIC X(04).
    03 FILLER PIC X(24).
    03 STATE-WS PIC X(03).
    03 POST-CODE-H-WS PIC X(04).
    03 STATE-CODE-WS PIC X(01).
    03 LGA-WS PIC X(03).
    03 FILLER PIC X(24).
    03 LGA-TYPE-WS PIC X(01).
    03 STAT-DIV-CODE-WS PIC X(03).
    03 NTS-CODE-WS PIC X(03).
    03 AGR-CODE-WS PIC X(03).

```

PROCEDURE DIVISION.

```

100-MAINLINE SECTION.
101-CALL-STXIT.
    ENTER USERCODE STXITCOB.
102-OPEN-FILES.
    OPEN INPUT POSTCODE-FILE.
    OPEN INPUT AMENDMENTS-FILE.
    OPEN OUTPUT STAT-DIV-POST-CODE-FILE.
200-READ-INPUT SECTION.
201-READ-AMENDS.
    READ AMENDMENTS-FILE
        AT END MOVE HIGH-VALUES TO AMEND-SEQUENCE-NO.
    ADD 1 TO INPUT-A-RECORD-COUNT.
202-READ-POSTCODE.
    READ POSTCODE-FILE
        AT END GO TO 500-WIND-UP.
    ADD 1 TO INPUT-P-RECORD-COUNT.
300-PROCESS SECTION.
301-CHECK-AMENDS.
    IF SEQUENCE-NO-IN = AMEND-SEQUENCE-NO
        PERFORM 600-AMEND-MOVE
        GO TO 302-READ-AGAIN.
301-MOVE-REST.
    MOVE POSTCODE-IN-REC TO LAST-REC-HOLD-AREA.
302-READ-AGAIN.
    PERFORM 202-READ-POSTCODE.
    IF POST-CODE = POST-CODE-H-WS
        PERFORM 700-CHECK-AMENDS

```

ATTACHMENT B.3 (CONT) POSTCODE - IS - CREATE

```
GO TO 302-READ-AGAIN.
PERFORM 400-MOVE-OUTPUT.
IF AMEND-FLAG POSITIVE
    MOVE 0 TO AMEND-FLAG
    GO TO 200-READ-INPUT.
GO TO 302-READ-AGAIN.
400-MOVE-OUTPUT SECTION.
401-SET-UP-REC.
    MOVE POST-CODE-H-WS TO POST-CODE-KEY.
    MOVE SPACE TO DELETE-CHAR.
    MOVE STATE-WS TO STATE
    MOVE STATE-CODE-WS TO STATE-CODE.
    MOVE LGA-WS TO LGA-CODE.
    MOVE LGA-TYPE-WS TO LGA-TYPE.
    MOVE STAT-DIV-CODE-WS TO STAT-DIV-CODE.
    MOVE NTS-CODE-WS TO NTS-CODE.
    MOVE AGR-CODE-WS TO AGR-CODE.
    MOVE POSTCODE-IN-REC TO LAST-REC-HOLD-AREA.
402-WRITE-OUTPUT.
    WRITE POST-CODE-STAT-DIV INVALID KEY
    DISPLAY "INVALID KEY ON WRITE"
    DISPLAY "RECORD KEY IS " POST-CODE-KEY
    GO TO 400-EXIT.
    ADD 1 TO OUTPUT-RECORD-COUNT.
400-EXIT.
    EXIT.
500-WIND-UP SECTION.
501-LAST-REC.
    PERFORM 400-MOVE-OUTPUT.
502-CLOSE-FILES.
    CLOSE POSTCODE-FILE WITH LOCK.
    CLOSE AMENDMENTS-FILE WITH LOCK.
    CLOSE STAT-DIV-POST-CODE-FILE WITH LOCK.
503-DISPLAYS.
    DISPLAY "RECORDS READ POSTCODE FILE      = "
                                         INPUT-P-RECORD-COUNT.
    DISPLAY "RECORDS READ AMENDMENTS FILE = "
                                         INPUT-A-RECORD-COUNT.
    DISPLAY "RECORDS WRITTEN                = "
                                         OUTPUT-RECORD-COUNT.
504-STOP-IT-ALL.
    MOVE 1 TO TERM-CODE.
    ENTER USERCODE ENDCODE USING TERM-CODE.
    STOP RUN.
600-AMEND-MOVE SECTION.
601-MOVE-IT.
    MOVE AMEND-IN-REC TO LAST-REC-HOLD-AREA.
    MOVE 1 TO AMEND-FLAG.
600-EXIT.
    EXIT.
700-CHECK-AMENDS SECTION.
701-CHECK-IT.
    IF SEQUENCE-NO-IN = AMEND-SEQUENCE-NO
        PERFORM 600-AMEND-MOVE.
700-EXIT.
    EXIT.
```

3. PRODUCTION OF POSTCODE REFERENCE FILE

3.1 Convert BTE Placename Directory

An Assembler Code program was again required to convert the Postcode file to ICL 4/70 format.

3.2 FILETAB Extract

To allow the placename directory to be used to code vehicles to regions on the basis of the postcode contained in the address it was necessary to ensure that all placenames within the same postcode were shown as falling within the one statistical division. All records where the same postcode appeared in more than one statistical division were listed by this program.

3.3 Correction Insertion

This program amended the placename directory to show each postcode as falling wholly within the statistical division containing the greater proportion of the population. Errors generated in the validation section of this program were corrected and re-inserted. A listing of this program is in attachment B.4.

3.4 Create Indexed Sequential Postcode Reference File

To allow random access of the file by postcode, an Indexed Sequential Reference File was produced. The COBOL program written to produce this file is in attachment B.5.

4. AN ALTERNATIVE APPROACH

- 4.1 We had little expertise at using the then newly acquired FILETAB package and time was wasted developing COBOL programs to solve problems which were simple tasks for the FILETAB package, or any equivalent package.

ATTACHMENT B.4 AOO 600 - POST - AMEND

IDENTIFICATION DIVISION.

PROGRAM-ID. A00600.

AUTHOR. SHANE MORRIS.

DATE-WRITTEN. 12/5/78.

REMARKS.

```
*****
**      THIS PROGRAM INSERTS RECORDS FROM A LINE FILE **
**  HOLDING AMENDMENTS INTO A MASTERFILE HELD ON A    **
**  TAPE -- ALL RECORDS ARE ALREADY SORTED INTO ORDER **
**  OF ASCENDING POSTCODES -- BEFORE AN INSERTION CAN **
**  BE MADE, THE AMENDMENT RECORD IS CHECKED FOR      **
**  VALIDITY -- THE RESULTANT FILE IS THEN READY FOR  **
**  USE IN THE TRUCK SURVEY STASTICS PROGRAMS         **
*****
```

ENVIRONMENT DIVISION.

CONFIGURATION SECTION.

SOURCE-COMPUTER. SYSTEM 4-70.

OBJECT-COMPUTER. SYSTEM 4-70.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT MASTER-FILE ASSIGN TO UT-MTP-S-SYS010.

SELECT INSERT-FILE ASSIGN TO UT-LNF-S-SYS011.

SELECT OUTPUT-FILE ASSIGN TO UT-MTP-S-SYS012.

SELECT PRINTER-OUTPUT ASSIGN TO UT-LNF-S-SYS013.

DATA DIVISION.

FILE SECTION.

FD MASTER-FILE

RECORDING MODE IS F

BLOCK CONTAINS 4234 CHARACTERS

RECORD CONTAINS 73 CHARACTERS

LABEL RECORDS ARE STANDARD

DATA RECORD IS MASTER-REC.

01 MASTER-REC

PIC X(73).

FD INSERT-FILE

RECORDING MODE IS F

RECORD CONTAINS 80 CHARACTERS

LABEL RECORDS ARE STANDARD

DATA RECORD IS INSERT-REC.

01 INSERT-REC

PIC X(80).

FD OUTPUT-FILE

RECORDING MODE IS F

BLOCK CONTAINS 4234 CHARACTERS

RECORD CONTAINS 73 CHARACTERS

LABEL RECORDS ARE STANDARD

DATA RECORD IS OUTPUT-REC.

01 OUTPUT-REC

PIC X(73).

FD PRINTER-OUTPUT

LABEL RECORDS ARE STANDARD

DATA RECORD IS PRINT-LINE.

01 PRINT-LINE

PIC X(133).

WORKING-STORAGE SECTION.

01 HIGH-MASTER-RECORD.

03 FLR

PIC X(31).

03 POSTCODE-H-M

PIC 9(04).

03 FLR

PIC X(38).

ATTACHMENT B.4 (CONT) AOO 600 - POST - AMEND

```

01 LOW-MASTER-RECORD.
03 FLR PIC X(31).
03 POSTCODE-L-M VALUE IS ZERO PIC 9(04).
03 FLR PIC X(38).
01 RECORD-TO-BE-INSERTED.
03 INS-DATA.
05 FLR PIC X(31).
05 POSTCODE-I PIC X(04).
05 FLR PIC X(29).
05 STAT-DIV-I PIC X(03).
05 FLR PIC X(06).
03 FLR PIC X(07).
01 OUT-RECORD.
03 FLR PIC X(73).
01 PAGE-HEADER.
03 PAGE-CONTROL PIC X(01).
03 FLR VALUE IS SPACES PIC X(40).
03 FLR VALUE IS 'THE FOLLOWING RECORDS ' PIC X(22).
03 FLR VALUE IS 'HAVE BEEN FOUND TO BE ' PIC X(22).
03 FLR VALUE IS 'IN ERROR' PIC X(08).
03 FLR VALUE IS SPACES PIC X(40).
01 SUB-HEADING.
03 SUB-CONTROL PIC X(01).
03 FLR PIC X(60).
03 FLR VALUE IS 'CODE' PIC X(04).
03 FLR VALUE IS SPACES PIC X(29).
03 FLR VALUE IS 'DIV' PIC X(03).
03 FLR VALUE IS SPACES PIC X(36).
01 DETAIL-LINE.
03 DETAIL-CONTROL PIC X(01).
03 FLR VALUE IS SPACES PIC X(29).
03 PRINT-DETAILS PIC X(73).
03 FLR VALUE IS SPACES PIC X(30).
01 PRINT-CONTROL-CHARACTERS.
03 HEAD-OF-PAGE PIC X(01).
03 ONE-LINE PIC X(01).
03 TWO-LINES PIC X(01).
01 FLAGS-AND-INDICATORS.
03 TERMINATION-CODE VALUE IS ZERO COMP-3 SYNC PIC 9(03).
03 FLAG VALUE IS ZERO COMP SYNC PIC 9(01).
03 FIELD-LENGTH COMP SYNC PIC 9(05).
088 NUMERIC-FIELD VALUE IS ZERO.
03 NO-LINES VALUE IS 25 COMP SYNC PIC 9(02).

```

PROCEDURE DIVISION.

00-MAINLINE-ROUTINE SECTION.

```

01. NOTE THIS SECTION DRIVES THE PROGRAM BY OPENING AND CLOSING
FILES AND DETERMINING WHICH SECTION IS TO BE ACTIONED
NEXT, DEPENDING ON THE INPUT DATA.

```

10-PRIME-THE-PROGRAM.

```

ENTER SOFTWARE STXITCOB.
ENTER USERCODE ENDCODE USING TERMINATION-CODE.
OPEN INPUT MASTER-FILE.
OPEN INPUT INSERT-FILE.
OPEN OUTPUT OUTPUT-FILE.
OPEN OUTPUT PRINTER-OUTPUT.
PERFORM 100-INITIALISE-ROUTINE.

```

20-PROGRAM-DRIVER.

```

PERFORM 200-READ-MASTER-ROUTINE.

```

ATTACHMENT B.4 (CONT) AOO 600 - POST - AMEND

PERFORM 300-READ-INSERT-ROUTINE.
PERFORM 500-ACTION-TEST-ROUTINE UNTIL FLAG IS EQUAL TO 1.
90-END-PROGRAM.
CLOSE MASTER-FILE.
CLOSE INSERT-FILE.
CLOSE OUTPUT-FILE.
CLOSE PRINTER-OUTPUT.
MOVE 1 TO TERMINATION-CODE.
ENTER USERCODE ENCODE USING TERMINATION-CODE.
STOP RUN.
100-INITIALISE-ROUTINE SECTION.
101.
NOTE THIS SECTION INITIALISES THE APPROPRIATE VALUES IN THE
PRINTER CONTROL CHARACTERS.
110.
MOVE 1 TO HEAD-OF-PAGE, PAGE-CONTROL.
MOVE SPACES TO ONE-LINE, SUB-CONTROL.
MOVE ZERO TO TWO-LINES, DETAIL-CONTROL.
190-EXIT.
EXIT.
200-READ-MASTER-ROUTINE SECTION.
201.
NOTE THIS SECTION READS IN THE MASTER FILE -- AT THE END
OF THE FILE IT PASSES CONTROL TO 600-END-MASTER-SUMMARY
WHICH ENSURES THAT ANY REMAINING INSERTIONS ARE APPENDED
TO THE OUTPUT FILE -- IT ALSO LEAVES THE FLAG FIELD SET
TO 1, INDICATING THE END OF BOTH THE MASTER AND THE
INSERTION FILES.
210.
READ MASTER-FILE INTO HIGH-MASTER-RECORD
AT END PERFORM 800-END-MASTER-SUMMARY.
290-EXIT.
EXIT.
300-READ-INSERT-ROUTINE SECTION.
301.
NOTE THIS SECTION READS IN THE INSERT FILE -- AT THE END
OF THE FILE IT PASSES CONTROL TO 700-END-INSERT-SUMMARY
WHICH ENSURE THAT ANY REMAINING MASTER RECORDS ARE
APPENDED TO THE OUTPUT FILE -- IT ALSO LEAVES THE FLAG
FIELD SET TO 1, INDICATING THE END OF BOTH THE INSERTION
AND THE MASTER FILES.
310.
READ INSERT-FILE INTO RECORD-TO-BE-INSERTED
AT END PERFORM 900-END-INSERT-SUMMARY.
390-EXIT.
EXIT.
400-TEST-INSERT-ROUTINE SECTION.
401.
NOTE THIS SECTION CHECKS THE VALIDITY OF THE INSERTION
RECORDS PRIOR TO INCLUDING THEM ON THE MASTER FILE -- IF
THEY DO NOT CONTAIN A NUMERIC POSTCODE OF FOUR DIGITS
AND A NUMERIC STATISTICAL DIVISION OF THREE DIGITS IN
THE APPROPRIATE CHARACTER POSITIONS, AN ERROR LISTING IS
PRODUCED AND THE RECORD IS NOT INSERTED.
410-POSTCODE-CHECK.
MOVE 4 TO FIELD-LENGTH.
ENTER USERCODE NUMTST USING POSTCODE-I, FIELD-LENGTH.
IF NOT NUMERIC-FIELD GO TO 450-INSERT-ERROR.
420-STAT-DIV-CHECK.

ATTACHMENT B.4 (CONT) AOO 600 - POST - AMEND

MOVE 3 TO FIELD-LENGTH.
ENTER USERCODE NUMTST USING STAT-DIV-I, FIELD-LENGTH.
IF NUMERIC-FIELD GO TO 490-EXIT.
450-INSERT-ERROR.
MOVE INS-DATA TO PRINT-DETAILS.
IF NO-LINES IS GREATER THAN 24
THEN WRITE PRINT-LINE FROM PAGE-HEADER AFTER HEAD-OF-PAGE
WRITE PRINT-LINE FROM SUB-HEADING AFTER ONE-LINE
MOVE ZERO TO NO-LINES.
ADD 1 TO NO-LINES.
WRITE PRINT-LINE FROM DETAIL-LINE AFTER TWO-LINES.
PERFORM 300-READ-INSERT-ROUTINE.
GO TO 410-POSTCODE-CHECK.
490-EXIT.
EXIT.
500-ACTION-TEST-ROUTINE SECTION.
501.
NOTE THIS SECTION DETERMINES WHICH ACTION IS TO BE TAKEN
IN RELATION TO WHETHER THE INSERT RECORD IS TO BE
INSERTED INTO THE MASTER FILE AT THIS STAGE OR LATER --
THIS IS DONE BY COMPARING THE KEY (THE POSTCODE) OF THE
INSERT RECORD TO SEE IF IT FALLS BETWEEN THE HIGH MASTER
RECORD AND THE LOW MASTER RECORD KEYS.
510.
PERFORM 400-TEST-INSERT-ROUTINE.
IF POSTCODE-I IS LESS THAN POSTCODE-H-M
THEN PERFORM 600-INSERT
ELSE PERFORM 700-NO-INSERT.
590-EXIT.
EXIT.
600-INSERT SECTION.
601.
NOTE THIS SECTION CONTROLS THE SWAPPING OF RECORDS BETWEEN
THE LOCATION USED FOR COMPARING RECORD KEYS, WHERE AN
INSERTION IS NECESSARY -- IT THEN WRITES THE RECORD OF
THE LOWEST KEY OUT TO THE NEW MASTER FILE AND RETAINING
THE OTHER TWO FOR FUTURE USE.
610.
IF POSTCODE-L-M IS NOT EQUAL TO ZERO
THEN MOVE LOW-MASTER-RECORD TO OUT-RECORD
WRITE OUTPUT-REC FROM OUT-RECORD.
MOVE INS-DATA TO LOW-MASTER-RECORD.
PERFORM 300-READ-INSERT-ROUTINE.
690-EXIT.
EXIT.
700-NO-INSERT SECTION.
701.
NOTE THIS SECTION ARRANGES THE MOVEMENT OF COMPARED RECORDS
IF THERE IS NO INSERTION TO BE MADE (IE THE MASTER
RECORD OF LOWEST KEY IS WRITTEN DIRECTLY TO THE NEW
MASTER RECORD) -- THE RECORDS ARE THEN ARRANGED TO ALLOW
THE NEXT COMPARISON TO BE MADE.
710.
IF POSTCODE-L-M IS NOT EQUAL TO ZERO
THEN MOVE LOW-MASTER-RECORD TO OUT-RECORD
WRITE OUTPUT-REC FROM OUT-RECORD.
MOVE HIGH-MASTER-RECORD TO LOW-MASTER-RECORD.
PERFORM 200-READ-MASTER-ROUTINE.
790-EXIT.
EXIT.
800-END-MASTER-SUMMARY SECTION.
801.

ATTACHMENT B.4 (CONT) AOO 600 - POST - AMEND

NOTE THIS SECTION CONTROLS THE SITUATION WHERE THE END OF THE MASTER FILE IS REACHED BUT THERE ARE STILL SOME INSERT RECORDS REMAINING (IE TO BE APPENDED TO THE MASTER FILE).

810. MOVE LOW-MASTER-RECORD TO OUT-RECORD.
WRITE OUTPUT-REC FROM OUT-RECORD.
PERFORM 820-APPEND-RECORD UNTIL FLAG IS EQUAL TO 1.
GO TO 890-EXIT.

820-APPEND-RECORD.
PERFORM 400-TEST-INSERT-ROUTINE.
MOVE INS-DATA TO OUT-RECORD.
WRITE OUTPUT-REC FROM OUT-RECORD.
READ INSERT-FILE INTO RECORD-TO-BE-INSERTED
AT END MOVE 1 TO FLAG.

890-EXIT.
EXIT.

900-END-INSERT-SUMMARY SECTION.

901. NOTE THIS SECTION TAKES CARE OF THE SITUATION WHERE THERE ARE NO MORE INSERT RECORDS LEFT BUT THERE ARE STILL OLD MASTER FILE RECORDS TO BE COPIED TO THE NEW MASTER FILE.

910. MOVE LOW-MASTER-RECORD TO OUT-RECORD.
WRITE OUTPUT-REC FROM OUT-RECORD.
MOVE HIGH-MASTER-RECORD TO OUT-RECORD.
WRITE OUTPUT-REC FROM OUT-RECORD.
PERFORM 920-COPY-MASTERS UNTIL FLAG IS EQUAL TO 1.
GO TO 990-EXIT.

920-COPY-MASTERS.
READ MASTER-FILE INTO HIGH-MASTER-RECORD
AT END MOVE 1 TO FLAG.

990-EXIT.
EXIT.

ATTACHMENT B.5 BTE - IS - POST - SET - UP

IDENTIFICATION DIVISION.

PROGRAM-ID. PR005M00-BTE-IS-POST-SET-UP.

AUTHOR. MCKINLEY.

DATE-WRITTEN. NOV 77.

DATE-COMPILED. 18/11/77

REMARKS

THIS PROGRAM TAKES BTE CONVERTED POSTCODE FILE AS INDEXED*
FILE AND SLOTS ALL INFO INTO EACH MOTOR-REG RECORD. *

ENVIRONMENT DIVISION.

CONFIGURATION SECTION.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT	MOTOR-REG-IN-FILE
	ASSIGN TO UT-MTP-S-SYS020
	RESERVE NO.
SELECT	HEAVY-TRUCKS-OUT-FILE
	ASSIGN TO UT-MTP-S-SYS021
	RESERVE NO.
SELECT	POSTCODE-LOOK-UP
	ASSIGN TO DA-DSC-I-SYS050
	ACCESS IS RANDOM
	SYMBOLIC KEY IS POST-KEY-WS
	RECORD KEY IS POST-CODE-KEY.

I-O-CONTROL.

APPLY STORE-INDEX 512 ON POSTCODE-LOOK-UP.

DATA DIVISION.

FILE SECTION.

FD	MOTOR-REG-IN-FILE	
	BLOCK CONTAINS 7176 CHARACTERS	
	RECORD CONTAINS 184 CHARACTERS	
	LABEL RECORD STANDARD	
	DATA RECORD IS MOTOR-IN.	
01	MOTOR-IN	PIC X(184).
FD	HEAVY-TRUCKS-OUT-FILE	
	BLOCK CONTAINS 7176 CHARACTERS	
	RECORD CONTAINS 184 CHARACTERS	
	LABEL RECORDS STANDARD	
	DATA RECORD IS TRUCKS-OUT.	
01	TRUCKS-OUT	PIC X(184).
FD	POSTCODE-LOOK-UP	
	BLOCK CONTAINS 3520 CHARACTERS	
	RECORD CONTAINS 22 CHARACTERS	
	LABEL RECORD IS STANDARD	
	DATA RECORD IS POST-CODE.	
01	POST-CODE.	
	03 DELETE-CHAR	PIC X(001).
	03 POST-CODE-KEY	PIC X(004).
	03 STATE-ETC	PIC X(004).
	03 STAT-DIV-ETC	PIC X(013).

WORKING-STORAGE SECTION.

01	COUNTERS.		
	03 INPUT-COUNT	COMP SYNC VALUE 0	PIC S9(009).
	03 OUTPUT-COUNT	COMP SYNC VALUE 0	PIC S9(009).
	03 ACCESS-COUNT	COMP SYNC VALUE 0	PIC S9(009).
01	FLAGS.		

ATTACHMENT B.5 (CONT) BTE - IS - POST - SET - UP

```
03 TERM-CODE                      COMP-3    VALUE 0    PIC S9(003).
01 SYMBOLIC-KEY-WS.
03 POST-KEY-WS                     VALUE HIGH-VALUES  PIC X(004).
01 INPUT-REC-WS.
03 FILLER                          PIC X(060).
03 POST-CODE-BTE                   PIC X(004).
03 NAME-ADDRESS                   PIC X(101).
03 STAT-DIV-SLOT                   PIC X(013).
03 SORT-SLOT                      PIC X(006).
```

PROCEDURE DIVISION.

100-MAINLINE SECTION.

101-CALL-STXIT.

ENTER USERCODE STXITCOB.

102-OPEN-FILES.

OPEN INPUT MOTOR-REG-IN-FILE.

OPEN INPUT POSTCODE-LOOK-UP.

OPEN OUTPUT HEAVY-TRUCKS-OUT-FILE.

200-READ-SEQ-INPUT SECTION.

201-READ-TAPE.

READ MOTOR-REG-IN-FILE INTO INPUT-REC-WS

AT END GO TO 400-WIND-UP.

ADD 1 TO INPUT-COUNT.

202-POSSIBLE-READ-LOOK-UP.

IF POST-CODE-BTE = '0000' OR '

GO TO 302-WRITE-OUTPUT.

IF POST-CODE-BTE = POST-KEY-WS

GO TO 301-DATA-MOVE.

MOVE POST-CODE-BTE TO POST-KEY-WS.

READ POSTCODE-LOOK-UP INVALID KEY

DISPLAY "INVALID KEY : KEY IS " POST-KEY-WS

MOVE HIGH-VALUES TO POST-KEY-WS

GO TO 302-WRITE-OUTPUT.

ADD 1 TO ACCESS-COUNT.

300-PROCESS SECTION.

301-DATA-MOVE.

MOVE STAT-DIV-ETC TO STAT-DIV-SLOT.

302-WRITE-OUTPUT.

WRITE TRUCKS-OUT FROM INPUT-REC-WS.

ADD 1 TO OUTPUT-COUNT

GO TO 200-READ-SEQ-INPUT.

400-WIND-UP SECTION.

401-SET-TERM-CODE.

MOVE 1 TO TERM-CODE.

402-CLOSE-FILES.

CLOSE MOTOR-REG-IN-FILE WITH LOCK.

CLOSE HEAVY-TRUCKS-OUT-FILE WITH LOCK.

CLOSE POSTCODE-LOOK-UP WITH LOCK.

403-DISPLAYS.

DISPLAY "RECORDS READ = " INPUT-COUNT.

DISPLAY "RECORDS WRITTEN = " OUTPUT-COUNT.

DISPLAY "ACCESSES TO LOOK-UP = " ACCESS-COUNT.

404-STOP-IT-ALL.

ENTER USERCODE ENDCODE USING TERM-CODE.

STOP RUN.

EOP

SPACES

The greater use of commercially available packages could have simplified this task. As a processing task, the exercise is difficult more in its size than in its complexity, involving around half a million records. Some losses in processing efficiency could be anticipated by using these packages, but these should be minor and will probably be more than offset by savings in development time.

ANNEX C - INDUSTRY CODING KEY

The following table provides the correspondence between occupation and industry used in Chapter 4 to code the owners of vehicles to industry groups.

TABLE C.1 - CORRESPONDENCE BETWEEN INDUSTRY AND OCCUPATION

Industry Sub-Division	Occupations contained in the Industry Group
Agriculture, forestry, fishing and hunting:	Apiarist Beekeeper Cool stores Dairyman Farmer Farm labourer Fertiliser spreader Fisherman Gardener Grazier Market gardener Nurseryman Orchardist Oyster farmer Pastoralist Poultryman Shearer Tomato grower Trapper Woolclasser
Mining:	Miner Quarryman
Manufacturing: - Timber and other	Bushman Logging contractor Pulp contractor Sawmiller Timberworker Woolmerchant
Electricity, Water, Gas:	Rarely used

TABLE C.1 (CONT) - CORRESPONDENCE BETWEEN INDUSTRY AND
OCCUPATION

Industry Sub-Division	Occupations contained in the Industry Group
Construction:	Asphalt contractor Bricklayer Builder Builders labourer Bulldozer contractor Carpenter Concretor Drainer Electrician Fencer Freestone contractor Glazier Gravel contractor Landscape consultant Landscape contractor Monumental mason Painter Plant operator Plasterer Plumber Renovator Tiler
Wholesale and Retail Trade:	
- Petroleum	Oil agent
- Motor Vehicles	Garage proprietor Mechanic Panel beater Service station proprietor Towing operator Wrecker
- Other	Baker Butcher Merchant Milk vendor Pastrycook Proprietor Retailer Shopkeeper Distributor
Transport and Storage:	
- Road transport	Carrier Furniture removalist Roundsman
- Drivers	Driver

TABLE C.1 (CONT) - CORRESPONDENCE BETWEEN INDUSTRY AND
OCCUPATION

Industry Sub-Division	Occupations contained in the Industry Group
- Contractors	Carter Cartage contractor Contractor Haulage contractor
- Other than road transport	Rarely used
Business Services:	Cleaner
Public Administration:	Rarely used
Community Services:	Rarely used
Entertainment and Recreation:	Caterer Horse trainer Licensee Greenkeeper