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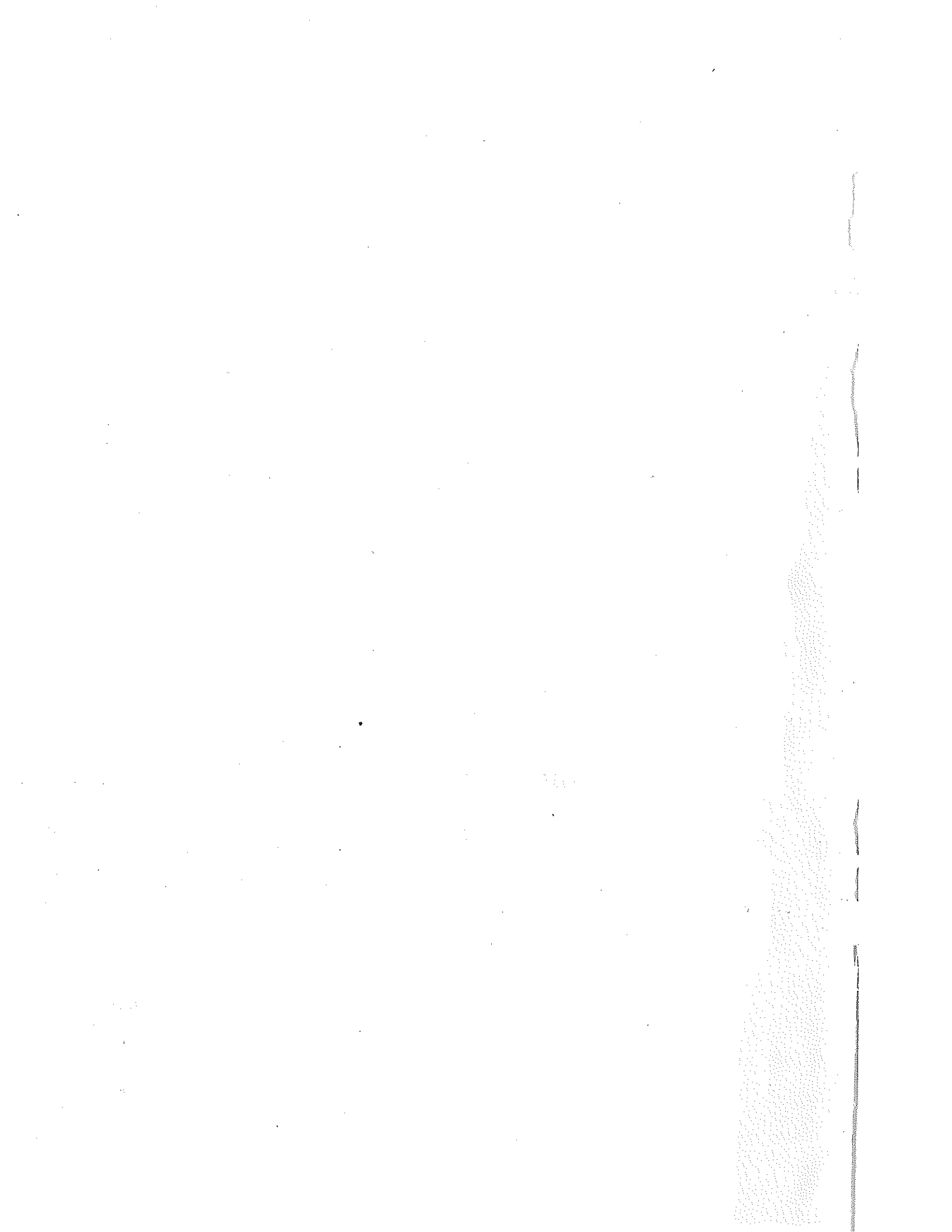
NATIONAL TRANSPORT RESEARCH CENTRE

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Pakistan Road Freight Industry:

An Overview

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The first part of the document
 discusses the importance of
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 and the role of the
 committee in this regard.
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PAKISTAN ROAD FREIGHT INDUSTRY: AN OVERVIEW

ABSTRACT

The Report describes the main operational characteristics of the private road freight industry of Pakistan. It is based chiefly on the results of a nation-wide survey carried out in 1986, in which 3500 truck drivers were interviewed at 39 sites located at inter-district boundaries. Information was collected on vehicle age, make, body type, value, ownership, fleet management, finance, tariffs, load, operating performance, costs, and accidents. Additional information is presented from surveys of freight consignors and freight agents and from drivers' own records of operating costs and revenues. Until the early 1980s the industry was totally dominated by Bedford trucks with a design capacity of 7 tons. This truck is now declining in importance as more profitable, larger capacity trucks are introduced. Overall the industry is very competitive and the vehicle fleet is run efficiently. However there appears to be considerable scope for the introduction of greater numbers of larger vehicles.

1 INTRODUCTION

Road freight transport is one of the most important components of the transport sector within developing countries. In Pakistan it accounts for three-quarters of the total inland freight tonne-kilometres and in expenditure terms it is equivalent to between three and four per cent of GDP.

To predict the effects of policy measures on freight transport it is necessary to gain a thorough understanding of the industry. The research reported here was designed to achieve this through a range of different surveys. Data were collected on the organisation and performance of the industry and on the costs, tariffs and utilisation of freight vehicles. The main data collection period of the study was during 1985 and 1986.

This report provides a general description and presents data on a wide range of subjects relating to the industry. Topics covered include vehicle age, vehicle value and fleet composition, freight consigning and the role of freight forwarding agents, costs, tariffs, productivity and profitability, and the ownership, finance and management of the industry. More detailed analyses of freight tariffs, operating costs and vehicle time utilisation will be presented in subsequent reports.

The overall study was carried out under a programme of co-operative research between the Overseas Unit of the Transport and Road Research Laboratory and the National Transport Research Centre, Islamabad. It is intended that the results of the research will be useful both in formulating general freight transport policy and in assisting with the more specific aspects of modelling vehicle operating costs used in road investment planning.

2 THE CONTEXT

Pakistan has an area of 796,000 sq. km and its population is about 100 million. The country is divided between the Provinces of Baluchistan, Punjab, North West Frontier, Sind and Azad Kashmir and the Northern Areas Region. Most of the country is desert. The rural population is concentrated in the irrigated areas of the Punjab and Sind. Irrigation water and hydro electricity are supplied from the River Indus and its tributaries (the Jhelum, Chenab, Ravi and Sutlej). These rivers run from the Himalayas and the Karakoram mountain ranges in India and north Pakistan. Karachi (7 million) is the largest town and the major port. Other large towns, (Lahore, Faisalabad and Rawalpindi-Islamabad) are situated in the north Punjab. A general map of Pakistan is shown in Fig. 1.

Agriculture is the most important sector of the economy accounting for about 31 per cent of GDP. Manufacturing industry accounts for a further 17 per cent. Although Karachi and the other large towns are important industrial centres, manufacturing is widely spread throughout Punjab, Sind and parts of the North West Frontier Province.

Pakistan produces a small amount of oil but is self sufficient in natural gas. About two million tons of coal are produced together with six million tons of other minerals.

In 1983 Pakistan had 8,800 km of railway and 104,000 km of roads of which 43,000 km were bitumen surfaced. In the same year it was estimated that there were 36,000 railway freight wagons and 45,000 privately registered trucks (Hundal 1985a). The National Transport Study (JICA 1983) estimated that in 1981 there were 26.1 bn ton km of inland freight transport of which road transport was estimated to take 70 per cent. As rail freight traffic has remained static the proportion of traffic taken by road has increased over recent years.

The locations of the main roads are shown in Fig. 2. There is a very high concentration of inter-district freight movements along the N5 route - the corridor from Karachi to Lahore and Peshawar. Some sections of this road (particularly between Lahore and Gujranwala and between Rawalpindi and Peshawar) are dual carriage-way. With the exception of some lightly trafficked roads in Baluchistan all main roads are surfaced, with typical roughness measurements of between 4000 and 5000 mm per km on the BI scale. Long hauls are very common for both road and rail. The main towns of Lahore, Faisalabad, Rawalpindi, Gujranwala and Peshawar are all more than 1000 km from the port of Karachi.

There is a major imbalance of imports over exports with a net movement of goods inland. In the year 1982-83 1.9 million tons of dry goods and 1.2 million tons of oil and petroleum products were exported. Cotton, textiles, rice

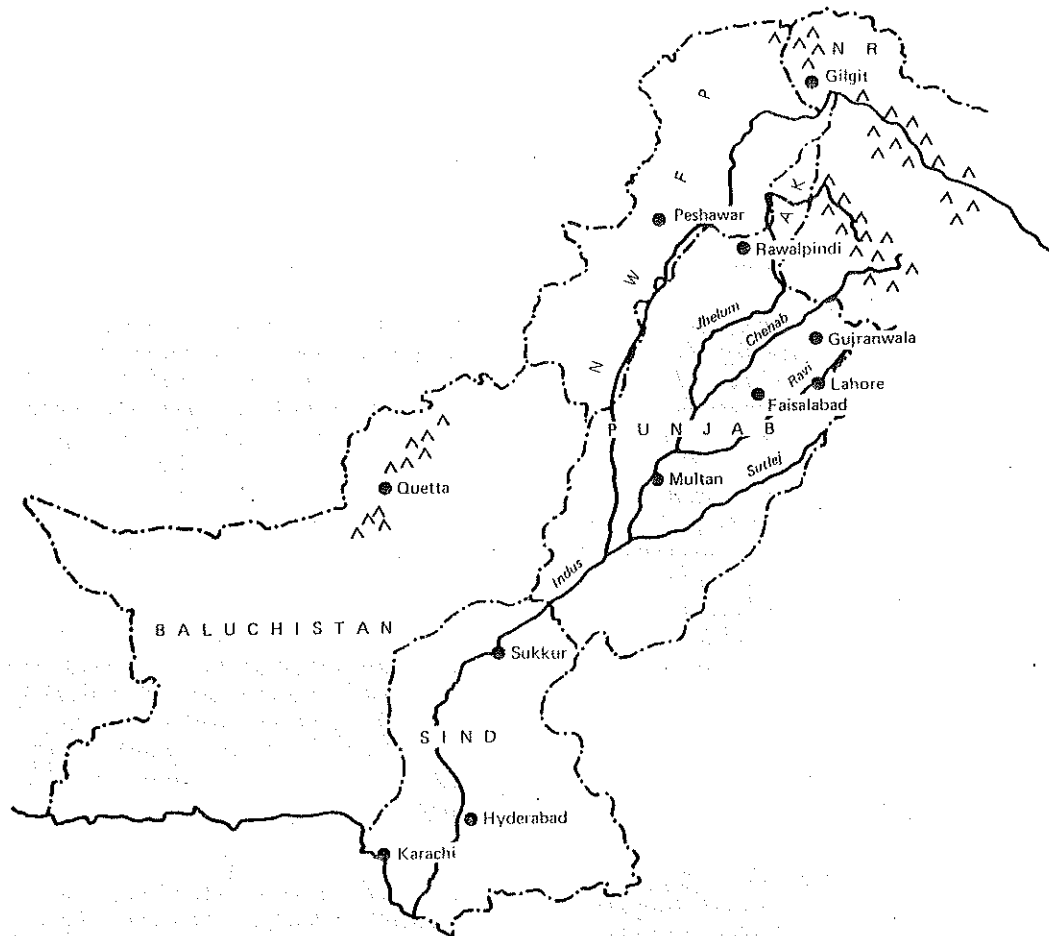


Fig.1 A general map of Pakistan

and fertilizer accounted for 70 per cent of dry export tonnage. In the same year 4.8 million tons of dry goods and 6.9 million tons of oil and petroleum products were imported; other major imports include cement, wheat, fertilizer and iron and steel. In 1982-83 these commodities accounted for 45 per cent of dry cargo imports.

In 1978 and 1979 a major harvest failure stimulated a large increase in the imports of grains and fertilizer. Because of the difficulty of moving these bulk commodities, the National Logistics Cell (NLC) was set up under the control of the armed forces. The NLC was made responsible for allocating the movement of bulk freight traffic from Karachi to the railways and to road transport. In addition 800 high capacity trucks were imported for the NLC to use for the transport of bulk cargoes. Since 1978 the NLC has continued to play an important role in Pakistan's freight transport.

Under an international relief effort additional imports were brought into Pakistan for the 3 million Afghan refugees. The NLC was made responsible for running an extra 600 vehicles brought in for the movement of relief goods. Afghans have also taken a more direct role in Pakistan's freight transport; 2500 trucks belonging to the refugees were brought into Pakistan. Although these vehicles

have, at times, been subject to various restrictions many Afghan trucks compete for business alongside Pakistani trucks.

3 SURVEYS AND DATA SOURCES

Prior to the main surveys being undertaken, background information was collected by a series of informal interviews with truck drivers and owners, freight forwarding agents, freight consignors, banks, insurance companies, vehicle manufacturers, spare parts importers, vehicle repairers, port and railway officials, and representatives from customs and other government departments.

The Roadside Interview Survey was the main data collection exercise of the whole study. In total 3500 truck drivers (equivalent to 7 per cent of the total fleet) were stopped and interviewed at 39 sites throughout Pakistan. The locations of the survey stations are shown in Fig. 2. The survey stations are listed and a breakdown of the makes and types of vehicles surveyed is presented in Tables A1 and A2 in the Appendix. The survey stations

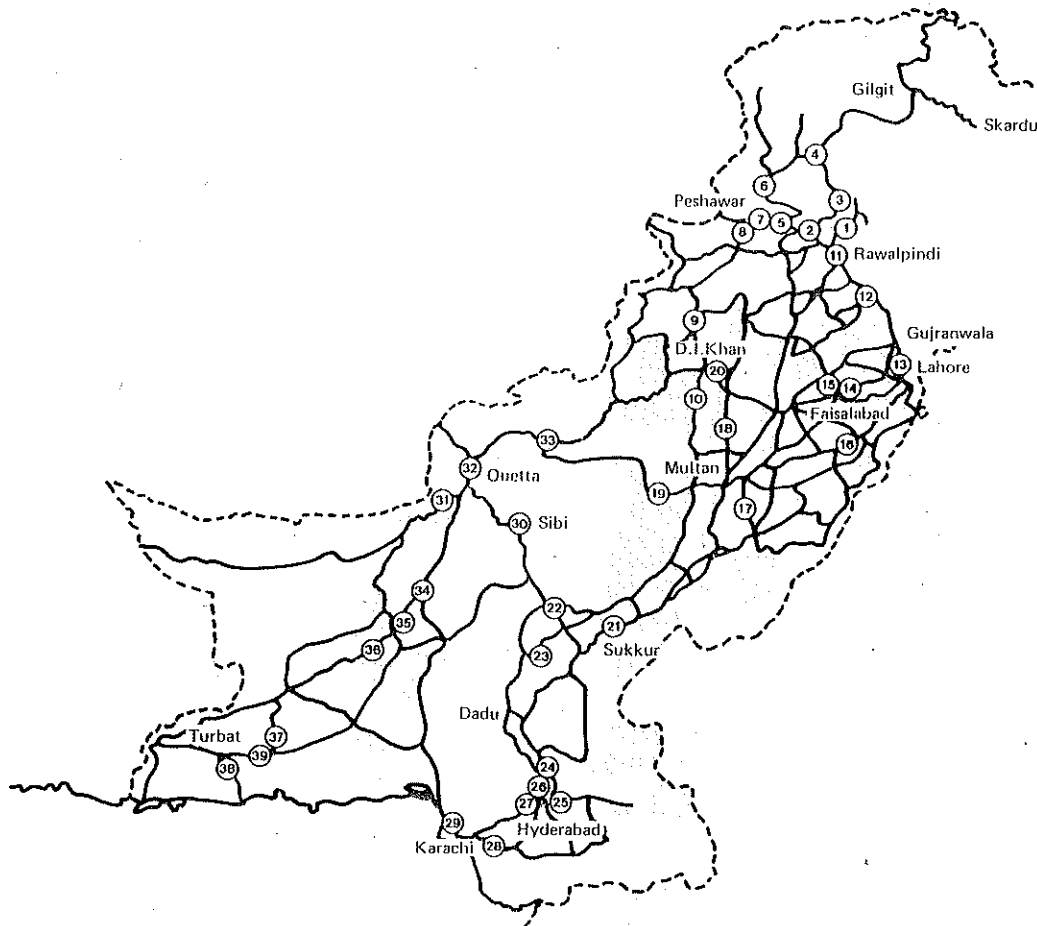


Fig.2 Roadside interview survey stations

Note: The locations of the survey stations are listed in Table A1 in the Appendix.

were principally located at district boundaries and so the data collected primarily represents long distance travel. As the main focus was on the private trucking industry, interviews were not carried out with trucks belonging to the military or the NLC. Information gathered included data on vehicle age, make, body type, value, ownership, fleet management, finance, tariffs, loads, operating performance, costs, accidents and insurance. The survey form was printed in Urdu and the interviews conducted in Urdu, Punjabi or Pushto.

Besides the Roadside Interview Survey five other surveys were undertaken as follows:-

i) Freight Consignors and Agents Survey

Structured interviews were held with 188 freight consignors and 237 freight agents. Information was gathered on the methods of consigning freight, freight modal choice and on the role of freight agents. In addition opinions were sought on a number of possible future developments in the industry.

ii) Vehicle Activity Survey

In this survey data were collected from a number of vehicles on the time spent moving, loading, unloading or

at rest. Data were gathered over periods lasting between one and four weeks and, in total, 47 periods of data were collected. Information on the distances travelled, costs incurred and revenue earned was also recorded.

iii) Truck Drivers' Cost And Revenue Diaries

Many drivers keep detailed records of their costs and revenues. In total the diaries of over 50 different trucks were collected for this survey covering about 600 vehicle months.

iv) Past Tariff Data

In order to identify trends and seasonality in tariffs, past tariff data were collected from records of freight agents relating to particular journeys with standard loads. In total 120 different series of data were collected. Most of the data covered the period from the beginning of 1982 to mid 1986.

v) Road Roughness Survey

In order to assist with the analysis of cost and tariff data, information on road roughness was required. To supplement data already collected for most of the main roads an additional survey of the rough unsurfaced roads of

Baluchistan and the more important interior roads of the Punjab was undertaken. In total data were collected on 70 road links covering a distance of over 5700 km.

4 THE FLEET

4.1 VEHICLE IMPORT AND ASSEMBLY

During the 1970s and 1980s Pakistan's freight vehicle fleet was dominated by one vehicle type: a two axle Bedford truck with 7 tons carrying capacity and a 98 hp engine. The design of this vehicle has changed little over the past 30 years. Bedford trucks were imported in "completely knocked down" (ckd) form and assembled locally. Over the years, the local content was progressively increased and by 1987 amounted to about 55 per cent of the vehicle value. During the 1970s the protection given to the Bedford helped to prevent other makes from becoming more established. However during the 1980s protection was relaxed and the import and assembly of many Japanese trucks became possible.

In 1979 Bedford sales accounted for over ninety per cent of total truck sales in Pakistan; since then the ratio has declined and by 1984 they accounted for only 58 per cent of total sales. Data on freight vehicle sales provided by

Pakistan Automobile Corporation (PACO) is shown in Fig. 3. Plates 1 to 4 are examples of typical trucks found in Pakistan.

Three principal makes of Japanese trucks (namely Isuzu, Hino and Nissan) are assembled in Pakistan. In 1986 the local content by value of these vehicles was well below 20 per cent. Details of the most common vehicle types used by the private market are shown in Table 1 with the ex-factory price for the chassis. Estimates of the full vehicle value, including the body, are shown in Tables A3 and A4 of Appendix A.

Under agreements with the Government each manufacturer is obliged to increase progressively the local content of the imported vehicles that it sells. The manufacturers have plans to widen the model ranges that are made and as a result it is likely to prove even more difficult to achieve the ambitious local content targets (up to 80 per cent within 7 years) that have been planned.

Other vehicle makes have been brought into Pakistan already assembled. The NLC imported Mercedes Benz, Saviem, Hino and Fiat trucks. A number of Mitsubishi tractor units have also been imported privately under a regulation which allows tractor units to be imported as "machinery". Many very old second hand vehicles (particularly Mercedes and Bedford trucks) were brought into Pakistan by the Afghan Refugees.

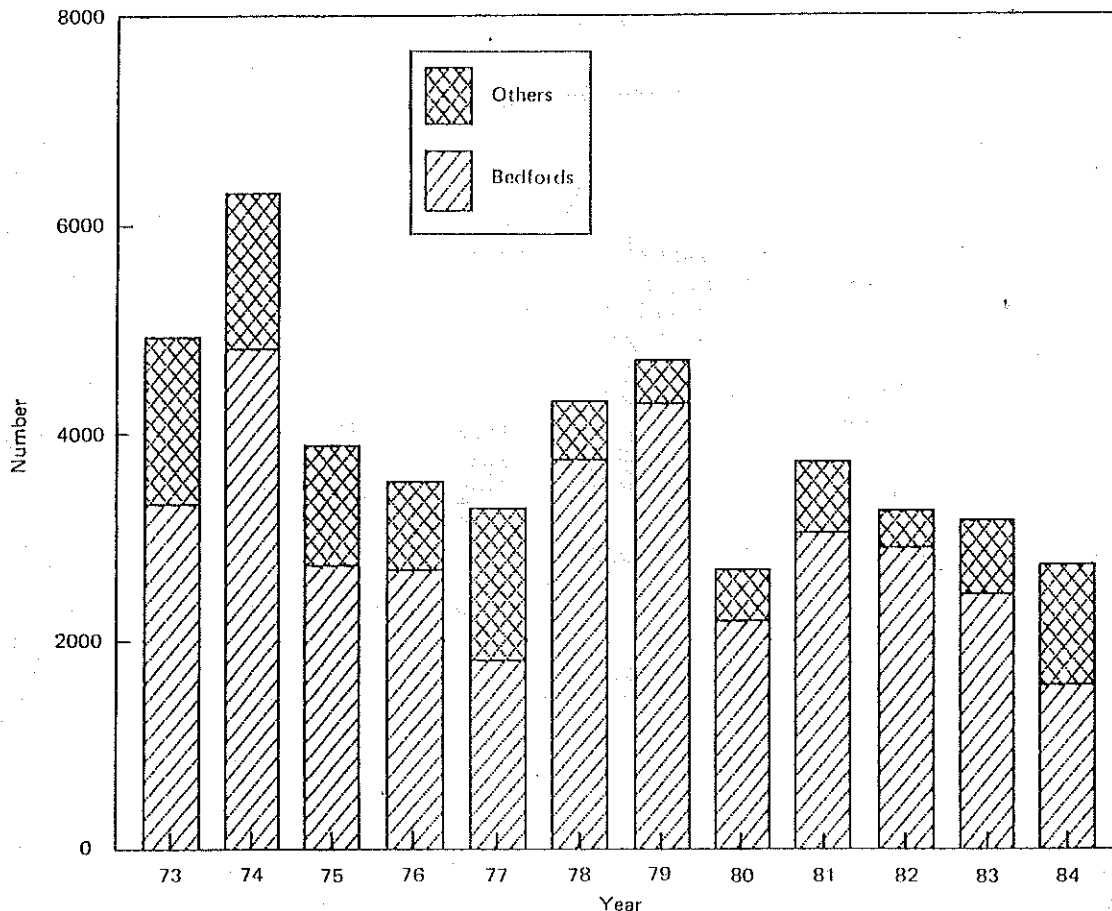


Fig.3 Vehicle sales

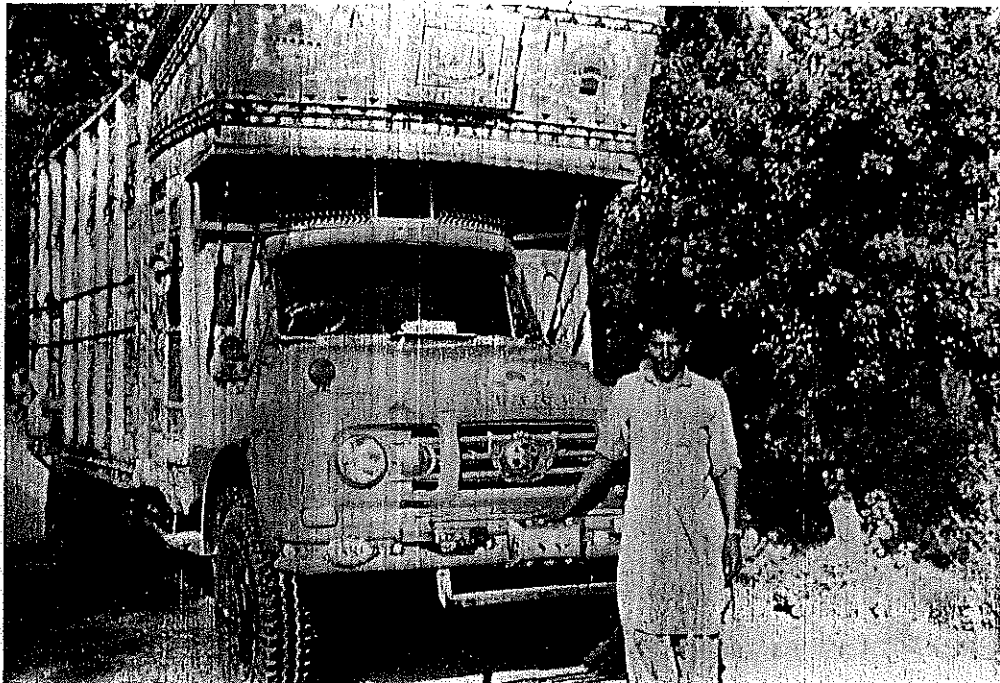


Plate 1 A typical Bedford truck

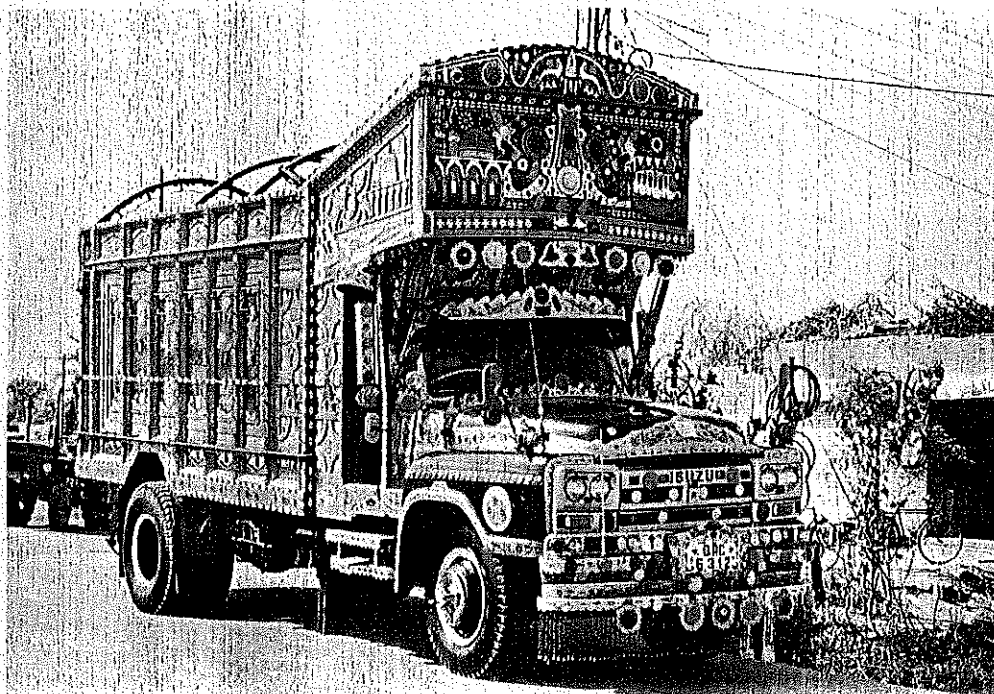


Plate 2 An Isuzu truck

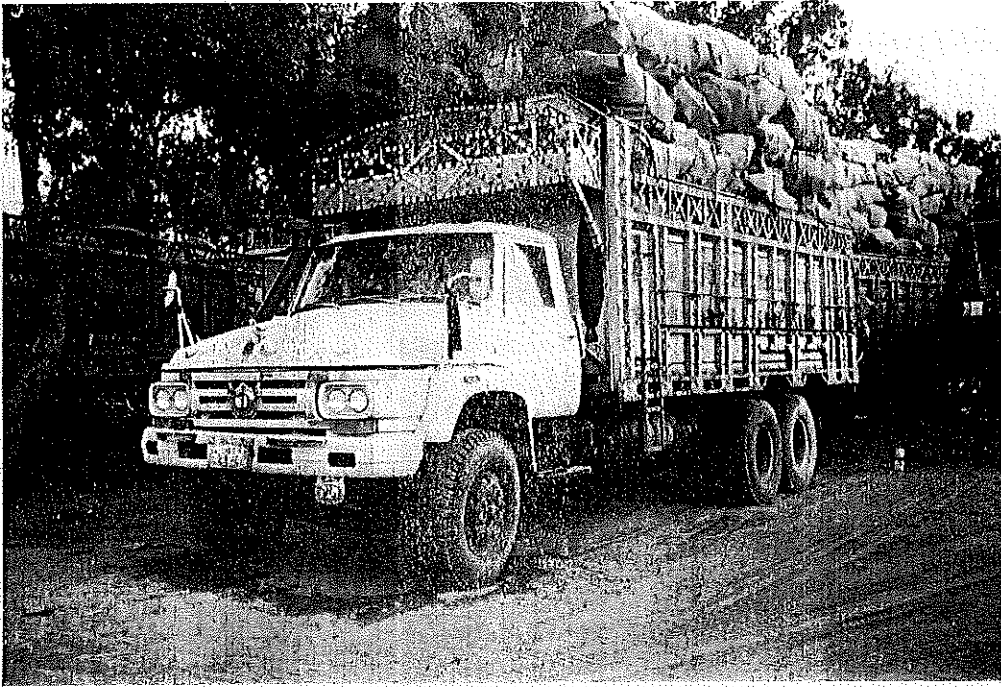


Plate 3 A three-axle Nissan truck



Plate 4 A Nissan tractor-trailer combination

TABLE 1

Common Trucks In Pakistan

Vehicle Make	Model	Type	Axles	GVW* kg	GCW** kg	HP	Price Rs. Sept 1986
Bedford	CJP	Rigid	2	10,920	n/a	98	275,000
Bedford	TM2500	Tractor Unit	2	n/a	25,000	171	n/a
Hino	FF 170	Rigid	2	n/a	n/a	200	412,000
Isuzu	JCR/FTR	Rigid	2	12,000	n/a	160	398,000
Isuzu	TDJ/DVR	Rigid	2	15,000	27,000	220	515,000
Mitsubishi	FP415ER	Tractor Unit	2	15,400	39,000	310	730,000
Nissan	TK20GT	Tractor Unit	2	14,175	26,000	190	570,000
Nissan	TK20	Rigid	2	16,500	26,000	190	475,000
Nissan	TD10	Rigid	3	23,000	n/a	160	480,000
Nissan	U780E	Rigid	2	12,000	n/a	140	342,000

* Gross Vehicle Weight

**Gross Combination Weight

Source: Manufacturers Specifications

4.2 FLEET COMPOSITION

The composition, by make and body type, of the trucks intercepted in the Roadside Interview Survey is shown in Figs. 4 and 5. A breakdown by vehicle type and Province is given in Table A2 in the Appendix. The data is only representative of vehicles engaged on inter-district truck movement and information relating to NLC and military vehicles is excluded. In the Survey it was not possible to

distinguish the exact model type of the vehicle although other characteristics such as the number of axles, and the vehicle configuration, make and body type were recorded. An additional complication is that vehicles are often modified so that they can take heavier loads. Sometimes an extra axle is added so that a two-axle truck becomes a three-axle truck, and rigid trucks are converted to tractor units. Vehicle strengthening and modification is discussed later in the report.

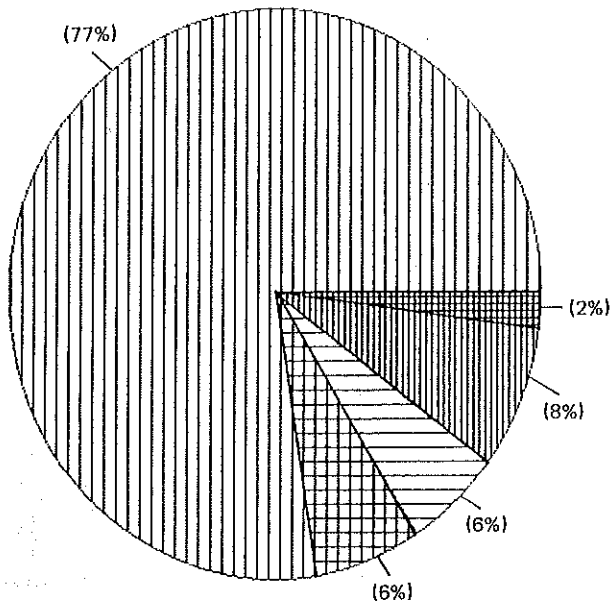
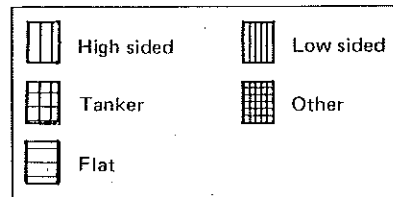
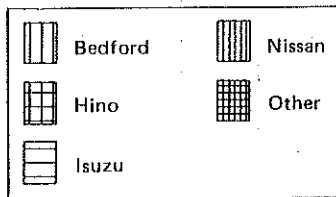


Fig.4 Vehicle makes

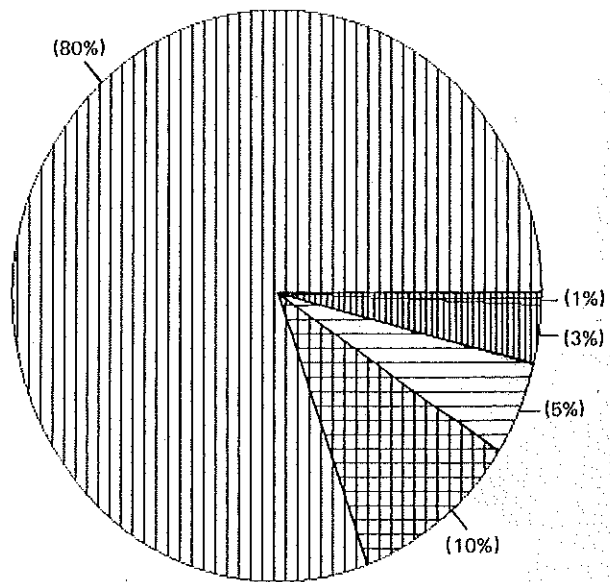


Fig.5 Body types

Figure 4 shows that the two-axle Bedford truck accounted for 77 per cent of the trucks surveyed. The newer Japanese trucks are growing in importance, particularly in Baluchistan where they accounted for over 40 per cent of the trucks surveyed. Overall, they formed 20 per cent of the total. Mercedes trucks imported from Afghanistan accounted for a further one per cent.

Three-axle vehicles made up four per cent and tractor-trailer combinations another three per cent of the total surveyed; in both categories Nissan was the dominant make. In Pakistan's commercial fleet semi-trailers are nearly always operated with the same tractor unit and for the purposes of this report they are regarded as one vehicle. Although the NLC does use draw-bar trailers these are very rare in the commercial fleet; the Roadside Interview Survey collected no information on their use.

Vehicle bodies are made locally in Pakistan and are added to the truck chassis after it has left the factory. Apart from tankers, vehicle bodies are made almost exclusively of wood and in most cases are highly decorated. There is usually a purpose built space on top of the cab where assistants and second driver can rest or sleep while the vehicle is in motion. In all categories, apart from tractor-trailers, high sided bodies are the most common, accounting for 80 per cent of the total. The flexibility

offered by high sided vehicles is most appropriate to Pakistan's conditions. They can easily carry loose building materials, general cargo, and animals; tarpaulins are carried for when it rains. Pakistan's high temperatures make box bodies less appropriate because of the difficulties of carrying out manual loading and unloading in hot unventilated conditions. Flat bodies are most common with tractor-trailers. These are most suitable for carrying bagged commodities, containers and large sized loads such as motor cars. Low sided Bedfords are mainly used for transporting sand and gravel.

After high sided bodies, tank bodies are the second most important body type accounting for about 8 per cent of Bedfords and about 23 per cent of the Japanese two and three-axle trucks.

4.3 VEHICLE MODIFICATIONS AND REPAIRS

Most trucks in Pakistan, including the newer Japanese vehicles, are strengthened after they leave the factory to take heavier loads. Table 2 gives data on some of the modifications which are frequently made, the most popular being the strengthening of the chassis, axle springs and engine compartment. Wheel rims, tyres, and

TABLE 2

Common Vehicle Modifications

Modification		Bedford	2 Axle Trucks			3 Axle Nissan	Nissan Tractor Trailers
			Hino	Isuzu	Nissan		
<i>Per Cent</i>							
Vehicle strengthened?	Yes	90	81	90	90	91	88
	No	6	13	7	5	1	11
	Don't Know	4	6	3	5	8	1
Chassis strengthened?	Yes	59	30	43	57	80	59
	No	32	53	47	34	11	29
	Don't Know	9	17	10	9	9	12
Engine compartment strengthened?	Yes	89	48	64	69	64	53
	No	4	34	26	22	27	34
	Don't Know	7	18	10	9	9	13
Springs Strengthened?	Yes	88	80	88	86	86	74
	No	3	2	2	5	4	11
	Don't Know	9	18	10	9	10	13
Extra axle added?	Yes	-	-	-	-	40	-
	No	-	-	-	-	51	-
	Don't Know	-	-	-	-	9	-
Truck into tractor unit?	Yes	-	-	-	-	-	2
	No	-	-	-	-	-	75
	Don't Know	-	-	-	-	-	23

Source: Roadside Interview Survey

axles are also often changed for heavier duty items. By contrast little evidence was found to suggest that brakes are improved to cope with the increased loads.

Bedford trucks designed to take 7 tons are commonly modified to carry 11 tons, while two-axle Hinos, Isuzus and Nissans designed to take 11 tons will carry 16 tons. The two-axle Japanese trucks that are converted to three-axle vehicles carry up to 30 tons.

The larger two-axle Nissan and Isuzu trucks have often been converted to tractor units with the addition of a "fifth wheel". In addition the chassis of the semi-trailers are strengthened (see Plate 5). Loads of 55 tons and more are not uncommon for tractor-trailer combinations.

No evidence was found to suggest that the performance of existing engines is improved nor that more powerful engines are put into existing vehicles. It appears that attempts to improve productivity by modifying vehicles is directed entirely towards carrying heavier loads rather than to running faster. Imported second hand vehicles are also strengthened. Afghan truck drivers take advantage of the flatter terrain in Pakistan by strengthening their vehicles to take heavier loads.

Although some authorities are reluctant to register the use and conversion of the heaviest trucks others are less hesitant. A high proportion of the heaviest trucks are registered in Las Bela, in Baluchistan, rather than in Karachi. Once a vehicle is registered by one authority there is little to stop it being used all over Pakistan. There is very little police enforcement of the official maximum gross vehicle weight regulations or the eight ton axle load limit.

Vehicle modifications and repairs are carried out by groups of small workshops. Each workshop has relatively little working space, employs no more than a handful of people and has only a limited access to machinery. They tend to specialise in providing a particular service, but in most towns a wide range of skills and machine tools are available and usually a full range of vehicle repairs can be carried out. A typical workshop is shown in Plate 6.

Spare parts for the Bedford truck are cheap and very widely available, many being made in Pakistan. In most cases if a part is not immediately available it will be made locally. In the larger towns original parts for the Japanese trucks are available, but these tend to be about three times the price of the equivalent part for the Bedford.

4.4 VEHICLE VALUE AND AGE STRUCTURE

Data collected by the Roadside Interview Survey suggested that the mean age of Pakistan's freight vehicle fleet was 9 years at the time of the survey. This is higher than might be normally expected but it can be explained by the decline in freight vehicle sales that occurred during the 1970s and early 1980s (See Fig. 3).

By comparing the age spectrum of the Bedfords observed in the Roadside Interview Survey with the number

of Bedfords known to have been assembled each year, it is possible to make an estimate of vehicle survival rates. (See Table A3 in Appendix.) Of the Bedfords assembled in 1984, nine per cent were seen in the Roadside Interview Survey, but this diminished to only three per cent for those assembled in 1973. The change in this percentage from year to year was not uniform partly because of sales to the military and the NLC (whose vehicles were not recorded in the Survey). Nevertheless there is a clear trend, and it was found that the data could be fitted to the following equation.

$$\ln (N/M) = -1.81 - 24.9 / \text{Year} \quad (1)$$

(se = 13.2)

Coefficient of determination (R^2): 0.26, Observations: 12

In the equation 'N', 'M' and 'Year' are defined as follows:-

$N(x)$ = Number of Bedfords observed in the Roadside Interview Survey assembled in year x .

$M(x)$ = Total number Bedfords assembled in year x .

Year = year(x) - 1956 (i.e. Year = 28 for 1984)

If this equation represents the true rate of survival then a mean expected life of 12.6 years is implied. However the result should be treated with caution because the Bedford sales data were limited and the survey was not completely representative of all traffic. Because the survey omitted trucks running on short distance urban and intra-district routes (these trucks are likely, on average, to be older than those travelling on inter-district routes) there are grounds to suppose that the calculated expected life underestimated the true value. A life expectancy of 15 years could well be a better estimate.

Hundal (1985b) found a mean expected life of 11.9 years in a study of the survival rates of 81 trucks first registered in 1961. Hundal's survey related to a wide variety of trucks and in view of the later standardisation on the Bedford model and the consequent improved availability of cheap spare parts it is reasonable to believe that the expected life of the later Bedford trucks would be higher.

The mean age of Bedford trucks found in the Survey was ten years. However since 1982 Bedford registrations have declined while Japanese truck registrations have increased. Over three quarters of the Hinos were less than two years old and the mean ages of the Nissans and Isuzus were between three and four years. The oldest trucks in use were found to be the Afghan-run Mercedes with a mean age of 15 years. Most of these trucks were brought second hand into Afghanistan.

The data collected from the Roadside Interview Survey demonstrated a strong relationship between the driver's estimate of current value and vehicle age. This is shown in Fig. 6 and in Tables A3 and A4 in the Appendix. During the period covered only relatively minor changes were made to the basic Bedford truck model. As a result the

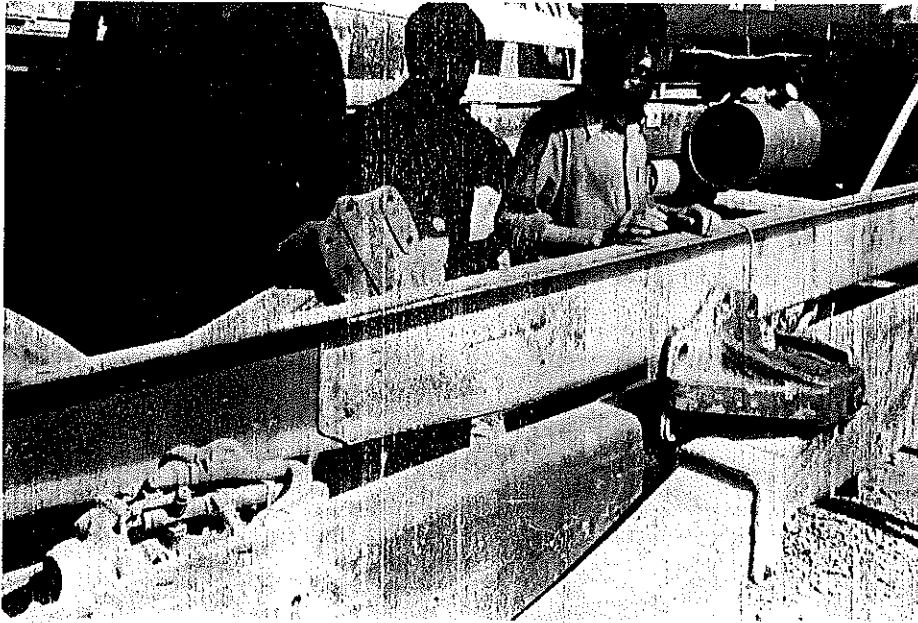


Plate 5 An example of chassis strengthening

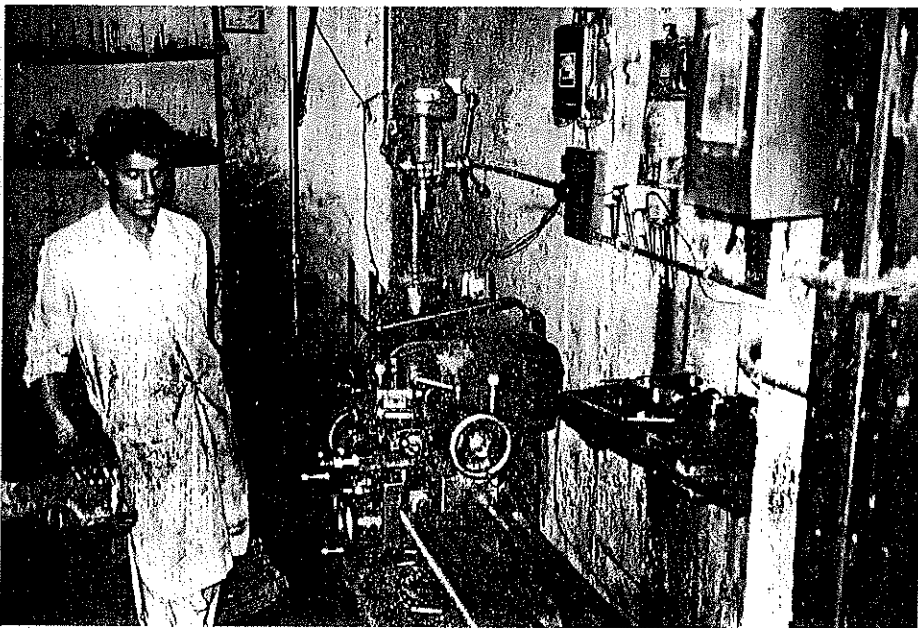


Plate 6 A typical workshop with a lathe

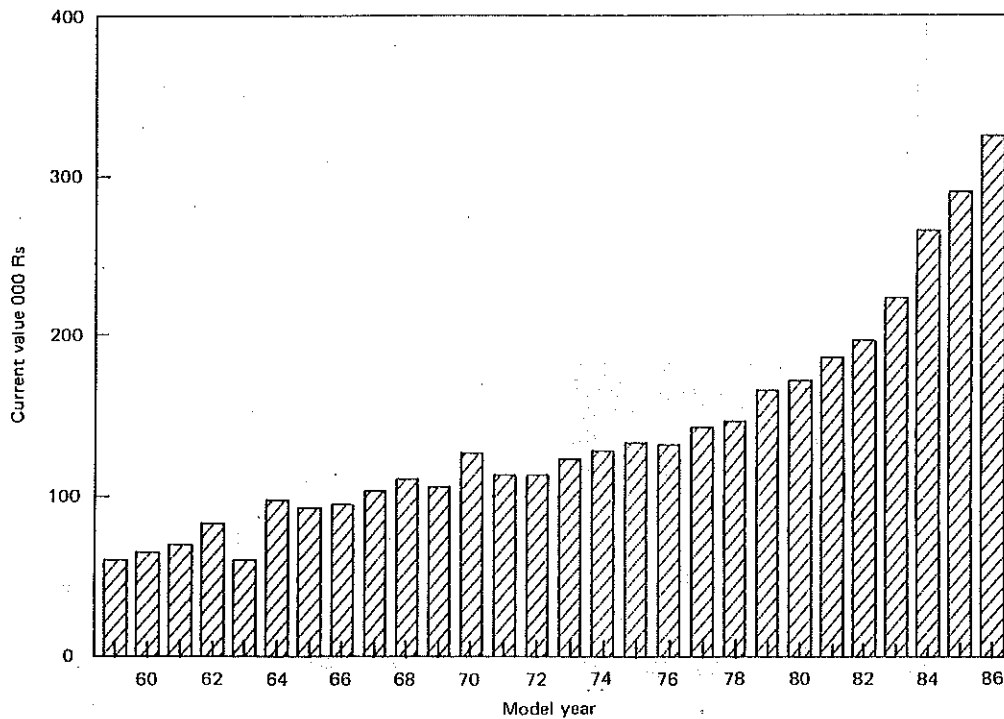


Fig.6 The value of Bedford trucks

data shows a more consistent relationship between value and model age for Bedfords in comparison with that for the Japanese trucks. Using the raw data from the Survey for Bedford trucks the following regression was found:-

$$\text{Vehicle Value (000s Rs)} = 297 - 156 \cdot \text{Log (Vehicle Age)} \quad (2)$$

(se = 3.36)

Coefficient of determination (R^2): 0.483,
Observations: 2139

5 THE ROLE OF CONSIGNORS AND FREIGHT AGENTS

5.1 FREIGHT CONSIGNORS

A survey of major freight consignors was carried out during 1986. The transport or marketing managers of 188 large industrial firms were interviewed in ten major towns of Pakistan (listed in Table A5 of the Appendix).

The interview of consignors focused on the type of freight consigned, the mode chosen, the degree to which freight agents were used, and views on future developments within the freight industry. A wide range of business types was represented. (See Table A6 in the Appendix.) Overall, the survey was representative of those concerned with the movement of freight by private road transport. However, because rail transport and NLC vehicles tend to be used by a relatively small number of

large consigning organisations such modes were under-represented in the survey sample.

5.1.1 Choice of transport mode

Of the three quarters of the consignors interviewed who were responsible for the decision as to which mode to use, one third stated that the time factor was the most important reason for their choice. Concern for damage to goods and convenience also ranked highly, but costs were only quoted as being of prime importance by 10 per cent.

Although most goods are moved by conventional rigid trucks 10 per cent of the consignors' raw materials and finished products were transported by trucks with trailers and a further 4 per cent were moved in containers. Of the two thirds of the consignors surveyed who could give a positive answer 91 per cent said that they could get a tractor-trailer combination onto their premises. The use of containers was found to be limited; only 23 per cent of consignors used them and two-thirds of these used them less than three times a month.

Rail transport was found to be a far less important mode, accounting for less than one per cent of all freight consignments, despite the fact that 15 per cent of consignors had a rail siding on site and seven per cent of consignors (largely cement manufacturers and petroleum companies) stated that they used a rail siding regularly.

An examination of the individual trips for which rail was chosen revealed clearly that it was the preferable mode only over long distances such as between Karachi and

Rawalpindi or Lahore. A similar result was found by Cundill (1986) in Kenya. The general attitude towards the railways was very negative. Sixty per cent felt the delays associated with rail transport and the extra loading and unloading charges incurred in transporting the freight from the railway depot to the factory prevented their use. Widespread concern was also expressed about the apparent lack of accountability for damage to goods transported by rail, despite the legal responsibility of the railways in such instances. These feelings are reflected by the fact that 30 per cent of the consignors in the survey who had a railway siding had relinquished its use and wished to be rid of it. Thus despite the apparent cost advantages that trains have over roads, it would appear that the flexibility, rapid delivery, convenience and greater accountability for damage associated with road transport, all of which were highly valued by the consignors interviewed, accounted for the insignificant role of the railways.

A small proportion of the consignors interviewed used NLC trucks to transport their raw materials; very mixed comments on the quality of service were given, ranging from the advantages associated with the large trucks used to the disadvantages of the extra documentation involved and the rigid regulations regarding drivers' hours.

5.1.2 Consignors ownership and use of vehicles

A key feature identified by both the Consignors Survey and the Roadside Interview Survey was the lack of vehicles run on an "own account" basis. For the majority of the consignors, traffic was contracted out to "hire and reward" operators. Approximately one third of the consignors had transport of their own but these vehicles were predominantly used for the movement of goods and raw materials in the local vicinity; only 12 consignors used their vehicles over long distances. The major advantages of vehicle ownership were felt to be a reduction in delays and the reduced probability of freight damage or theft; this is shown in Table 3.

TABLE 3

Advantages of Vehicle Ownership to Consignors.

Advantage of owning vehicles	Per cent of responses
Less delays	53
Less damage to goods	32
Fewer incidents of theft	8
Increased customer contact	7
Total	100

Source: Consignors Survey

Table 4 identifies the main disadvantages associated with vehicle ownership that were pointed out by consignors. It was felt that the difficulties of managing vehicles and staff

in situations of fluctuating demand were the most important problem, and the difficulties of trying to obtain return loads were also cited as major disadvantages of running "in-house" transport operations. Over half of the consignors simply stated that such operations would not be financially viable or appropriate to their business, and the comment was frequently made that they could not compete with the private "hire and reward" truck operators. Further evidence of this pattern was revealed from the Roadside Interview Survey where less than 1 per cent of the trucks intercepted were operated on an "own account" basis.

Sixty per cent of all vehicles operated by these consignors were Bedfords; other popular vehicles included the Mazda truck (a vehicle with up to three tons carrying capacity) and the Suzuki pick-ups; these vehicles accounted for, respectively, 15 and 10 per cent of the total owned by the consignors.

5.1.3 Contact with freight agents

Over half of the consignors maintained regular contacts with freight agents (freight forwarders); the large majority of these were in the form of a written yearly contract setting fixed freight rates for that period. About 20 per cent of consignors had established more informal relationships with one or more agents agreeing to direct work to an agent over a shorter time period. Details of the relationships between consignors and freight agents are given in Table 5.

It was not possible to draw any conclusions with regard to the difference in rates charged per ton kilometre between those consignors who had a formal contract with an agent and those who did not, due to the lack of directly comparable data of load types and routes.

5.2 FREIGHT AGENTS

A parallel survey of freight agents was also undertaken. In total 237 freight agents were interviewed in ten major towns (listed in Table A5 in the Appendix). The agents were asked the type of work undertaken, the type, size and mode of freight consignments dealt with and the importance of ancillary services such as telephones and warehouses. Opinions were also sought on possible future developments in the industry and on particular problems experienced.

5.2.1 Ownership and operations

Most freight agencies surveyed were either owned by individuals or operated as partnerships; just over half of the agencies operated from one office only, while a handful had as many as 20 other offices. The forwarding of freight was very clearly the major operation for the agents; 43 per cent also operated a small number of vehicles of their own and 65 per cent ran a warehouse of some sort. Less than 5 per cent were involved in the financing or trade of trucks or other freight related business such as importing, exporting, wholesaling or retailing.

TABLE 4

Disadvantages of Vehicle Ownership.

Disadvantage of owning vehicles	Most important problem (per cent of consignors)	Proportion of all problems mentioned
Managing staff/vehicles	43	34
Financial problems	32	49
Empty return journeys	5	9
Other	1	8
No reply	19	-
Total	100	100

Source: Consignors Survey

TABLE 5

Consignors Relationship with Freight Agents.

Relationship with Freight Agent	Consignors	
	Total	Per cent
No relationship with any agent	86	46
Informal relationship with one agent	15	8
Informal relationship with several agents	7	4
Written contract with fixed rates for one year	80	43
Total	188	100

Source: Consignors Survey

The freight agents who did not operate a warehouse tended to deal mainly with bulky raw materials such as stone, gravel, or iron and steel. Covered warehouses were utilised by 63 per cent of the agents, whilst a handful relied entirely on storage in the street. The capacity of the warehouses varied widely from those able to store the equivalent of one Bedford truck load (approximately 8 tons) to those able to cover 30 loads, although the majority were somewhere between 2 and 5 Bedford loads.

For the agents interviewed, private road transport accounted for over 99 per cent of all consigned freight, with a small amount consigned by the NLC and sea transport; no freight was consigned by rail or air at all.

5.2.2 Consignments and rates of commission

About one quarter of the agents interviewed dealt largely with general merchandise especially those based in the large urban centres of Karachi, Lahore and Rawalpindi. The remainder tended to specialise in commodities such as quarried building materials or iron and steel.

Almost one third of all the consignments were "smalls" (i.e. less than one ton). Only 16 per cent were between 7 and 12 tons, which is the size ideally suited to the Bedford truck, while a quarter of consignments were reported to be over 20 tons.

The results from the Roadside Interview Survey of truck drivers also indicated that freight agents were rarely approached for short journey distances (see Table 6). For all drivers with loaded trucks making journeys of less than 50 kilometres, only 20 per cent made use of a freight agent, whilst around 80 per cent of those making journeys over 500 kilometres used an agent.

It also became clear that freight agents were less likely to be used for particular cargo types. Agents were not used by 45 per cent of drivers consigning quarried material and the movement of petrol, diesel and oil rarely involved an agent; however, between 60 and 80 per cent of trucks transporting manufactures or agricultural produce had made use of an agent.

Table 6 shows that agents' charges were a significantly higher percentage of the total tariff for shorter journeys and smaller loads (as might be expected). Also, it was found that as a proportion of total tariffs agents' charges were slightly lower for freight moving away from Karachi than in the reverse direction. Little consistent pattern was found between freight agents' tariffs and vehicle types.

5.2.3 Freight agents' business channels

Ninety per cent of the freight agents interviewed were found to have a working telephone and 96 per cent claimed they had a satisfactory postal service. However

TABLE 6

Use of Freight Agents, Agents' Charges and Trip Distance.

Trip distance Kms	Number of loaded trucks surveyed	Per cent of drivers using an agent	Mean charge by agent as a per cent of total tariff
less than 50	149	20	11.3
50 - 100	225	28	8.8
101 - 200	371	49	7.1
201 - 500	608	66	5.6
501 - 1000	528	75	5.0
1001 - 1500	352	85	4.8
more than 1500	146	79	5.8
all journeys	2379	62	5.8

Source: Roadside Interview Survey

two thirds of all business was obtained by personal callers and one third by telephone. The post was a relatively unimportant way of obtaining business and telex or telegrams were not used at all.

The methods used to obtain business were dependent on the location of major customers for the agents. Most demand tended to come from the urban centre in which the agent was located and this was reflected in the high proportion (between 60 and 80 per cent) of business obtained through personal callers. However in Karachi (where the major customers were located in Lahore and Rawalpindi) the agents acquired, on average, 53 per cent of their business by telephone.

A quarter of all agents surveyed operated long term contracts with freight consignors and, on average, these accounted for just over half of their business. It was however common practice to offer regular services to particular destinations; these were usually major urban centres and the towns of Lahore, Karachi, Rawalpindi, Faisalabad and Peshawar were the destinations for over half of the regular services offered.

5.2.4 Time taken to find transport

A crucial feature revealed by the survey of agents was the speed with which vehicles were obtained to cope with demand. For 64 per cent of the agents there were usually no delays at all in finding a vehicle and on average, 89 per cent of the agents could obtain a truck within the hour and 94 per cent could procure one within 2 hours.

6 THE STRUCTURE AND FINANCE OF THE INDUSTRY

6.1 THE INSTITUTIONAL STRUCTURE

Road freight transport in Pakistan is largely organised on a free market basis; freight tariffs are competitively

determined by supply and demand, and apart from the operations of the NLC there is little direct government intervention in the industry. Entry is cheap and easy; there is a relatively lax licensing system and there is little enforcement of axle load limits or of vehicle construction and use regulations.

The pattern of numerous small scale entrepreneurs is a common feature of the industry with garage mechanics, truck owners and freight agents all exhibiting this characteristic.

Large industrial companies own very few vehicles and rely mainly on hiring transport. The few vehicles they do own tend to be used for local delivery work. The largest "own account" fleet is run by the Water And Power Development Authority (WAPDA) which likes to use its own vehicles to transport its expensive electrical equipment, although it will hire transport when necessary.

There are a few large transport organisations in Pakistan. The NLC is by far the biggest with about 2000 trucks. A small number of large privately run firms concentrate on running tractor-trailers and on moving containers, specialised equipment and oversized loads.

As is apparent from the previous section, freight agents play a pivotal role in the operations of the industry (see Section 5.2); they place consignments, run warehouses, and act as middle men in buying trucks and selling them on a hire-purchase basis. Banks and other large institutions play little role in providing finance for the industry.

6.2 VEHICLE OWNERSHIP AND MANAGEMENT

Data on the ownership and management of the industry was collected in the Roadside Interview Survey. In over 65 per cent of cases the registered owner of the truck was the provider of finance for the truck purchase and not the person who gained profits and losses from the truck operation. In Pakistan it is usual for trucks to be sold by a

hire-purchase arrangement; the vehicle seller or provider of finance safeguards his investment by registering the truck in his own name until the vehicle is fully purchased.

Over 90 per cent of the trucks were owned by a single private individual; partnerships accounted for just 7 per cent of the total. Non-transport companies owned less than one per cent of the total trucks surveyed but a much higher proportion of the tractor-trailers. A breakdown of ownership is given in Table 7.

In 20 per cent of interviews drivers were found to have either a full or part share in the ownership of the truck; in the remainder the principal driver was an employee.

Table 8 gives data on vehicle fleets under common management, fleets of two or more vehicles accounted for about 13 per cent of the total. The data suggests that the more expensive the vehicle then the greater the likelihood that the vehicle will be part of a fleet and the greater the probability that the fleet will be large. In the

Survey over 40 per cent of the Japanese tractor-trailers were found to be part of a fleet. For those tractor-trailers managed in fleets a mean fleet size of 28 vehicles was recorded.

6.3 VEHICLE PURCHASE AND FINANCE

In the Roadside Interview Survey drivers were asked a number of questions on the purchase and finance of their truck. Even though most drivers were employees it was found that they were well informed on the financial details of their operation. Most knew the details of how their trucks were financed and what repayments were required. Each driver was made responsible for all aspects of their vehicle's profitable operations; including collecting and paying out money and returning profits to the owner.

Table 9 gives data on the date of purchase of trucks by their current owner. It points to a high turnover in the

TABLE 7

Truck Ownership

	2 Axle Bedford	2 Axle Japanese	3 Axle Japanese	Japanese Tractor Trailer
Driver	458	103	14	2
Other Private Individual	1958	365	88	77
Family Partnership	146	15	6	12
Commercial Company	11	2	0	14
Federal Government	2	0	0	0
Provincial Government	0	0	0	1
Public Corporation	3	1	0	1
Others	2	0	0	0
Total	2632	492	109	108

Source: Roadside Interview Survey

TABLE 8

Truck Fleets

		2 Axle Bedford	2 Axle Japanese	3 Axle Japanese	Tractor-Trailer Japanese
Is truck managed in common with other trucks ?	Yes %	10	16	26	43
	No %	90	84	74	57
Total replies		2623	485	109	107
Mean Fleet Size (excluding single vehicle fleets)		4.62	4.0	9.6	28.3

Source : Roadside Interview Survey

TABLE 9

Date of Purchase by Current Owner

Year of purchase	2 Axle Bedford	2 Axle Hino	2 Axle Isuzu	2 Axle Nissan	3 Axle Nissan	Tractor-Trailer Nissan
	Per Cent					
Before 1976	4.3	-	-	-	-	-
1976	2.9	-	1	-	-	-
1977	1.2	2	-	-	-	-
1978	2.6	1	-	-	-	2
1979	2.3	1	1	1	1	3
1980	4.1	-	-	4	4	7
1981	5.6	2	-	4	1	8
1982	8.7	1	3	14	6	7
1983	14.8	4	10	17	10	11
1984	24.4	4	37	17	19	30
1985	26.2	57	42	35	45	30
1986	2.9	30	7	6	13	3
	100	100	100	100	100	100
Total Replies	2206	170	167	69	69	61

Source: Roadside Interview Survey

purchase and resale of second hand trucks. Over 50 per cent of the Bedford trucks had been purchased by their current owners during the previous two years, and 86 per cent were second hand.

Approximately three quarters of the privately owned fleet was purchased on a repayment, (or "hire-purchase") basis. Within each category of vehicle type, those trucks purchased through an outright payment tended to be older and less valuable, although a much greater proportion of the more expensive tractor-trailers were purchased by a single payment. The latter is probably a reflection of the larger firms involved in running them.

In Pakistan businessmen rarely think in terms of an interest rate as such although usually one can be inferred from the terms of a vehicle sale. If a vehicle is to be bought by hire-purchase then a higher overall price is quoted. Repayments are usually made on a monthly basis lasting between 40 and 60 months.

From the data provided on purchase time, value, initial deposit, and the monthly repayments an estimate was made of the effective rates of interest. The results are shown in Fig. 7. In 13 per cent of the cases the interest rate was estimated to be above 60 per cent; it is possible that the data provided for many of these cases was faulty. Overall the analysis shows a very wide spread of rates but the modal value lay between 16 and 20 per cent.

In many ways the range of interest rates paid is unsurprising. When the rate is not specified it is difficult to calculate the "best buy". Furthermore in many countries, including the UK, a wide range of interest rates are paid for credit and small loans when the full implications for repayments are not immediately obvious or understood.

In most countries the cheapest form of credit is from banks but in Pakistan truck owners complain that it is difficult, time consuming and expensive to use bank loans for truck purchase. The banks usually demand comprehensive insurance of the truck which is normally very expensive. In addition the banks may also demand legal entitlement to other assets (such as property) as security for the loan. This too can be expensive to arrange. The informal sources of credit that are used appear to be much more flexible and easier to arrange. Table 10 shows that most repayments were made to the vehicle seller or to an agent/money lender and repayments to banks account for only one per cent of the total.

For cases where the rate of interest was below 60 per cent the average rate paid was 25 per cent. However, the average rate weighted by the amount borrowed was 22 per cent. This is shown in Table 10, which also shows that owners of Bedford trucks paid the highest rates of interest and owners of tractor-trailers the lowest. There appears to be a consistent pattern that the larger the sum borrowed then the lower the average rate of interest paid.

Table 11 gives data on trucks purchased on a repayment basis by their current owner. Over 80 per cent had outstanding payments, reflecting the high turnover in truck ownership shown in Table 9. With the possible exception of two-axle Nissans, Bedford trucks appear to have a higher proportion of late repayments than other trucks. Nissan tractor-trailers have by far the lowest proportion of late repayments and their owners find making repayments the easiest. If the owner gets too far behind in his repayments then the deal is presumed to be broken and the truck reverts to the seller or money lender.

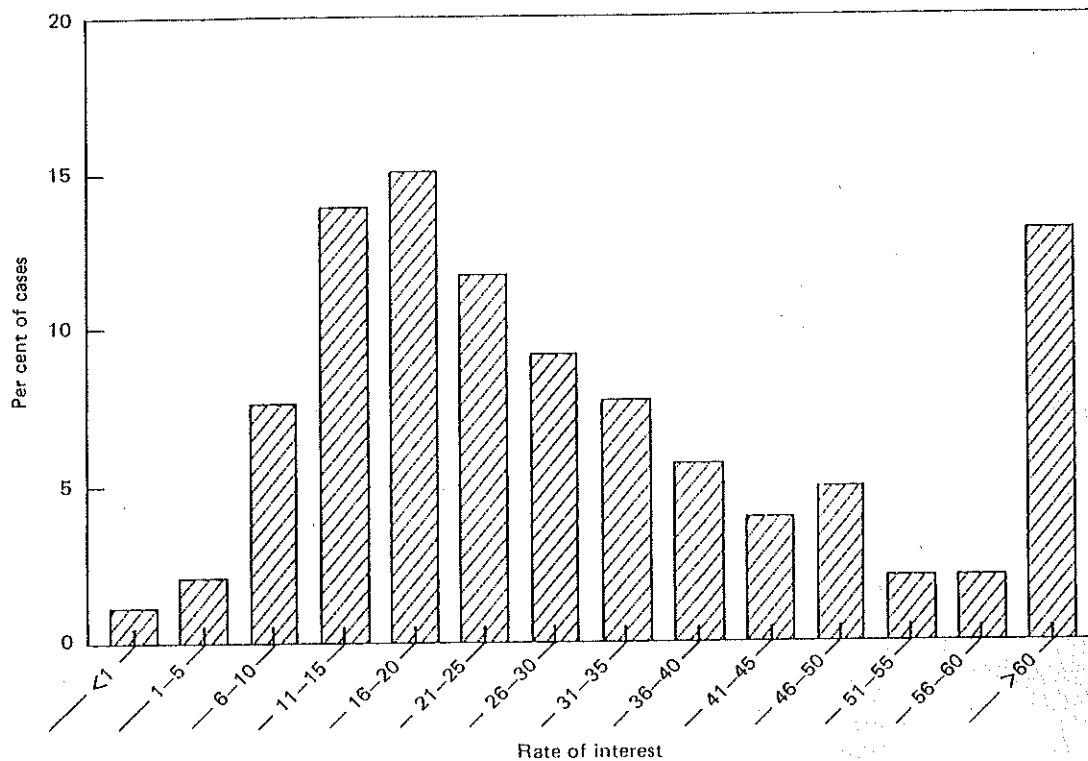


Fig.7 Effective rate of interest paid for truck purchase

TABLE 10

Repayments and Interest Paid for Truck Purchase

	Bedford	Hino	2 Axle Isuzu	Nissan	3 Axle Nissan	Tractor-Trailer Nissan
<i>For Cases with Effective Interest Rate Between 1% and 60%:</i>						
Average rate %	26	23	23	23	22	20
Average rate weighted by amount borrowed %	22	21	21	21	21	17
Average borrowed Rs. 000	137	267	245	249	391	467
Average monthly payment Rs	4230	9480	8670	8430	13,600	15,070
Average payment period months	52	40	41	44	44	45

Source: Roadside Interview Survey

TABLE 11

Trucks Purchased on a Repayment Basis

		Bedford	2 Axle		Nissan	3 Axle	Tractor-Trailer
			Hino	Isuzu		Nissan	Nissan
<i>For trucks with repayments: per cent of positive replies</i>							
Outstanding Loan?	No	17	3	6	20	3	11
	Yes	83	97	14	80	97	89
Late Repayments?	No	65	84	77	64	79	97
	Yes	35	16	23	36	21	3
Ease Of Meeting Repayments?							
	Easy	17	26	15	14	28	32
	Difficult	45	41	39	39	35	44
	Very Difficult	38	33	45	48	37	24
	Impossible	0	0	0	0	0	0
Repayments to:	Bank	1	1	4	7	6	6
	Relative	1	1	1	5	0	0
	Friend	1	4	3	0	0	0
	Vehicle Seller	81	77	77	79	81	83
	Agent/Money Lender	15	17	15	10	13	11
No. of trucks with multiple repayments		1709	165	136	53	61	37

Source: Roadside Interview Survey

7. OPERATIONAL PERFORMANCE, LOADS AND TARIFFS

7.1 VEHICLE TRIP LENGTH DISTRIBUTION

The Roadside Interview Survey provided a rich source of data on the operational performance of freight vehicles. However it was not designed to provide a precise picture of Pakistan's trip length distribution. For this it is useful to consider an analysis of the Origin - Destination (O-D) Survey carried out during 1979-80 when over 93,000 truck drivers were interviewed at 110 survey stations located at district boundaries throughout the country (Majeed 1983). The distribution of freight vehicle trip lengths from the Roadside Interview Survey is shown in Fig. 8 and data from the O-D Survey is shown in Fig. 9.

As expected the Roadside Interview Survey recorded a much greater proportion of long distance trips. Trips of over 1000 km accounted for 15 per cent of the cases and 45 per cent of the vehicle kms in the former survey but only 6 per cent of the cases and 29 per cent of the vehicle kms in the latter survey.

To assist with the analysis of the Roadside Interview Survey data the traffic direction at each survey site was classified as being either "to Karachi" or "from Karachi". The empty and loaded vehicle trip length distribution classified by direction is given in Table A7 in the Appendix.

Seventy-six per cent of trucks travelling in the "from Karachi" direction were loaded compared with 62 per cent in the opposite direction. This reflects the general imbalance in the movement of freight found throughout Pakistan. In overall terms 69 per cent of trips and 84 per cent of vehicle-kms were loaded. As expected, empty running declined as trip length increased. This is shown in Figure 10 where both UK and Pakistan data are given for comparative purposes. Although the data is not strictly comparable (the UK data omits tankers) a fairly close relationship exists between the two data sets for distances up to 500 km. The drop in the proportion of loaded vehicles recorded at 750 km in the Pakistan data relates to the particular difficulty of finding return loads from the remote Mekran area of Baluchistan. The UK data were drawn from a study by Cundill and Hull (1979) on empty running of goods vehicles.

Empty trucks travelling to Karachi had longer trip distances, on average, than those travelling in the opposite

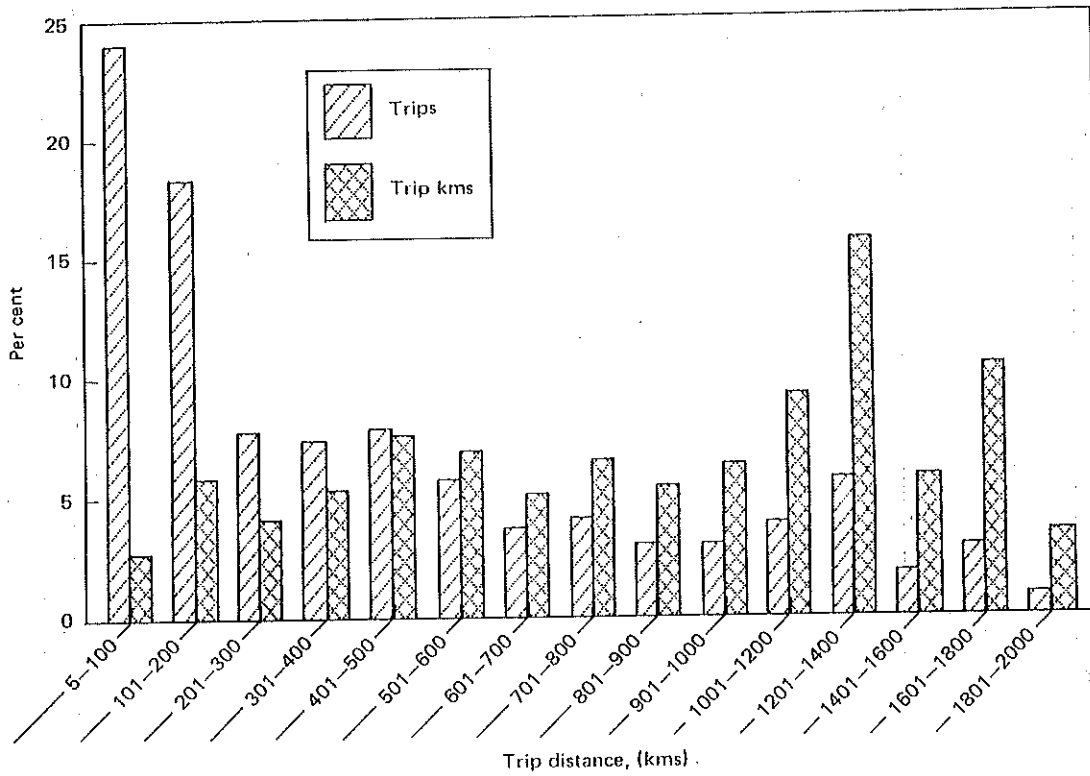


Fig.8 Freight survey trip length distribution

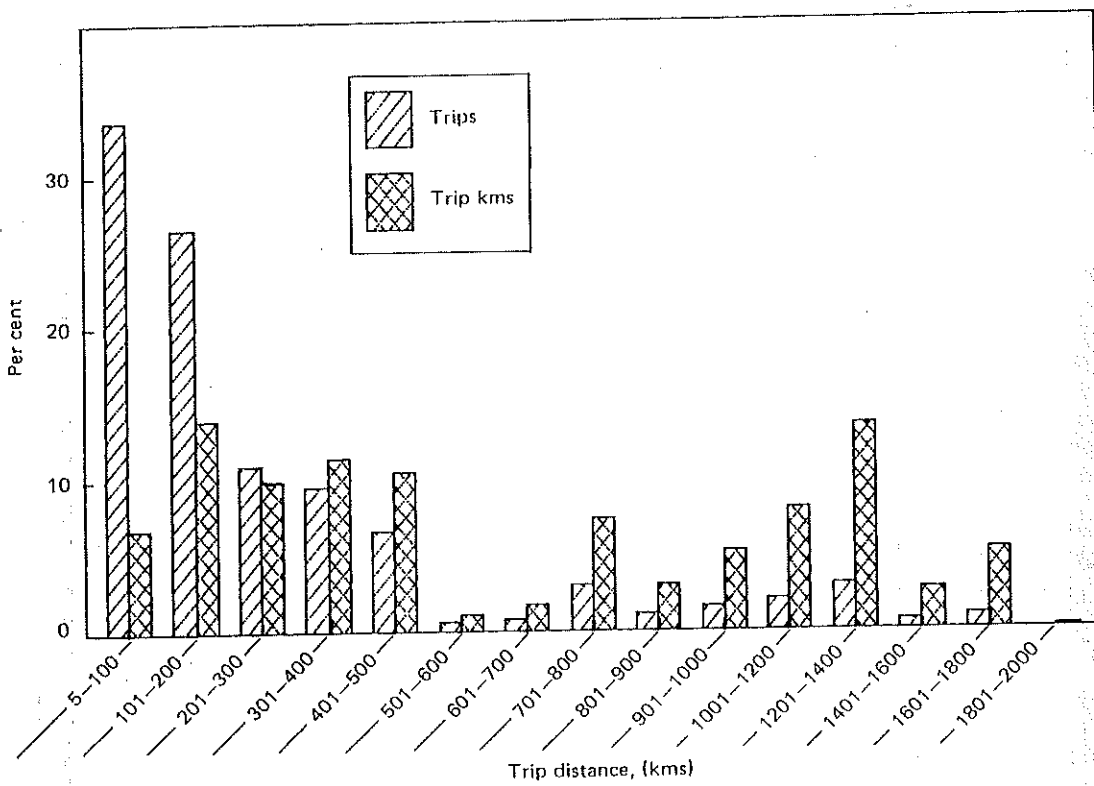


Fig.9 O-D survey trip length distribution

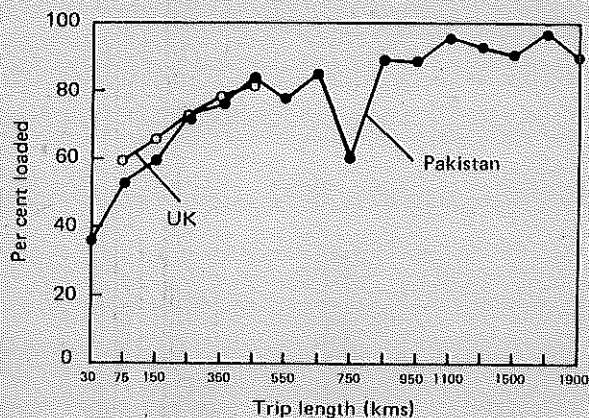


Fig. 10 Graph showing proportion of loaded vehicles against trip length

direction. For those travelling to Karachi 43 per cent travelled more than 200 kms compared with only 17 per cent in the opposite direction. The differences in loaded trip distances are not so marked.

7.2 OPERATING PERFORMANCE

In Pakistan freight vehicles are able to achieve a high degree of utilisation by working long hours, night and day. Most trucks have two drivers and when one is working the other is able to rest and sleep making use of the wooden compartment built above the cab. Apart from the tankers there are very few specialised trucks, so it is possible for vehicles to go looking for work from job to job with the minimum of difficulty. In practice vehicles are often away from base for periods of up to three weeks at a time seeking work throughout the country. The widespread dispersal of freight agents makes it relatively easy to find any work that is available.

Unlike the pattern common in other countries, it is the principal driver of each truck, rather than the firm's office, who is responsible for finding work, scheduling vehicles, collecting revenues, and organising repairs.

Although vehicles work long hours and are modified to take heavy loads, productivity is constrained by relatively low running speeds. A highway speed survey (Majeed 1980) estimated an average spot running speed of 52 kph (34 mph) for trucks. The Roadside Interview Survey found overall loaded journey speeds (i.e. with rest periods) of 23 kph for two-axle Bedfords, 20 kph for two-axle Japanese trucks, 21 kph for three-axle Japanese trucks, and 17 kph for tractor-trailer combinations.

Key operating statistics (broken down by vehicle type) derived from the Roadside Interview Survey are given in Table 12. Loaded trip distances range between 500 kms for Bedford trucks to 1000 kms for the larger three-axle vehicles. Empty trip distances were much less.

To estimate the degree of empty running and time spent empty drivers of loaded vehicles were asked about their current trip and about any empty period or empty running undertaken during the time between the last loaded trip

and the current one. This data is presented in Table 12 with data from interviews of drivers of empty vehicles.

The Roadside Interview Survey thus provided two sets of data on empty travel, one directly from empty vehicles and one from the previous activity of loaded vehicles - trip lengths for the former were somewhat larger (Table 12). The difference is because some trucks were able to pick up loads after only a very short empty journey within the town where they had dropped their previous load. These empty trips were recorded as past empty journeys but were not picked up as current empty trips at the inter-district survey sites.

The percentage of vehicle kilometres loaded given in Table 12 for Bedford trucks is little different from the other trucks. This is largely because of the higher proportion of tankers (which have much greater difficulty in finding return loads) amongst the heavier trucks. Excluding tankers, Bedfords do more empty running than other trucks because of their shorter trip distances.

Information on empty trips showed that for 83 per cent of cases the primary purpose was to look for a load, and in 14 per cent it was to return to base or to home. Journeys to make repairs amounted to just two per cent of empty trips.

On average Bedford trucks returned to base after 7 days and other trucks returned after 8 to 12 days. The drivers were away from their homes for much longer periods. The drivers of Bedfords and the other two-axle truck drivers were found to return to their families after 16 to 21 days but the drivers of three-axle Nissans and Nissan tractor-trailers returned after 27 and 38 days respectively.

Three different estimates of the annual distance travelled were calculated from the Roadside Interview Survey, these are given in Table 13. The estimates were based on:

- a) weekly distance travelled
- b) monthly revenues and current trip revenues and distances,
- and c) current trip times and distances.

Only one estimate of annual distance travelled shown in Table 13 is below 100,000 kms. Although there is some variability in the results it appears that the higher capacity trucks travel further than the Bedfords. Because the data were collected from inter-district truck movements the results are likely to overestimate the average distance travelled.

Although Bedford trucks accounted for 77 per cent of the trucks surveyed they provided just 50 per cent of the measured total ton-kilometres. The capacity that different vehicles provided is shown in Fig. 11, which demonstrates the importance of the tractor-trailers that accounted for 15 per cent of the capacity provided but only 3.5 per cent of the vehicles surveyed.

TABLE 12

Time and Distance Operating Statistics

	Bedford	2 Axle		Nissan	3 Axle	Tractor-Trailer
		Hino	Isuzu		Nissan	Nissan
Per cent trips loaded	68.5	75.7	66.8	67.1	75.0	74.1
Per cent vehicle kms loaded	85.4	87.5	73.7	76.6	86.1	87.6
Overall mean trip distance kms	403	726	607	598	887	809
For loaded trucks:						
mean trip length kms	502	839	665	666	1018	957
mean trip duration hrs	20	39	34	36	47	51
mean previous empty trip length kms	98	325	235	205	273	318
mean previous empty running & waiting duration hrs	26	40	31	32	46	35
For empty trucks:						
mean trip length kms	188	373	487	448	495	387
Mean period before:						
returning to base days	6.7	7.9	10.2	8.8	11.8	9.0
returning to family days	17.1	16.3	21.1	17.3	27.1	37.8
Number of times a day's rest is taken per month	2.5	2.1	2.4	2.1	1.7	1.6
Number of days rest taken each time	1.7	1.7	1.7	1.8	2.8	3.3
Days under repair per year	52	33	34	46	42	51

Source: Roadside Interview Survey

TABLE 13

Three Estimates of Annual Distance Travelled (1000 kms)

	Bedford	2 Axle		Nissan	3 Axle	Tractor-Trailer
		Hino	Isuzu		Nissan	Nissan
<i>based on:</i>						
a) weekly distance	117	159	147	132	143	136
b) trip revenues*	109	116	104	95	112	129
c) trip times	109	129	117	108	120	127
Mean of estimates	112	135	125	112	125	131

Source: Roadside Interview Survey

* Excludes data from Survey Stations 1 - 11.

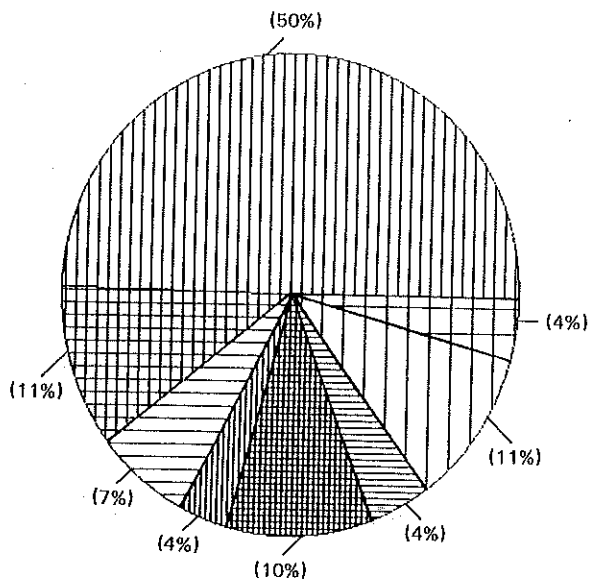
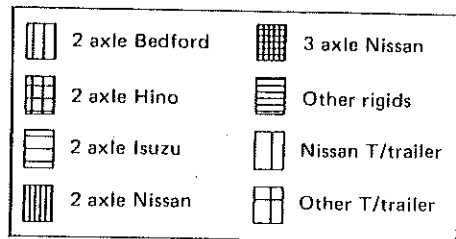


Fig.11 Breakdown of total ton-kms provided

7.3 LOADS AND TARIFFS

In this section the main differences in tariffs are identified for the different vehicle types. A more detailed analysis of the effects of time, distance, roughness and seasonality will be presented in subsequent reports.

Because of the responsibility given to drivers, it was relatively easy to gather information on the loads carried, tariffs charged and revenues earned. These data were collected from three different sources; the Roadside Interview Survey, the Vehicle Activity Survey and the Drivers' Cost and Revenue Diaries. Past trends in tariffs were also collected from freight agents. The data from the different surveys were found to be very consistent.

Figures 12 and 13 show how tariffs vary with journey distance, direction and vehicle type. The data relates only to trucks travelling outside the Mekran area and where the driver has given his load in weight terms. (The Mekran area of Baluchistan was excluded because of the very rough roads which increases tariff levels. Tanker trucks, and some vehicles taking animals or sand and gravel, were excluded because the drivers did not give their loads in weight terms.)

The average load carried by Bedfords was 8 tons whilst for other two-axle trucks the average was 12 tons. Average loads for three-axle trucks and tractor-trailer combinations were 21 tons and 27 tons respectively. For

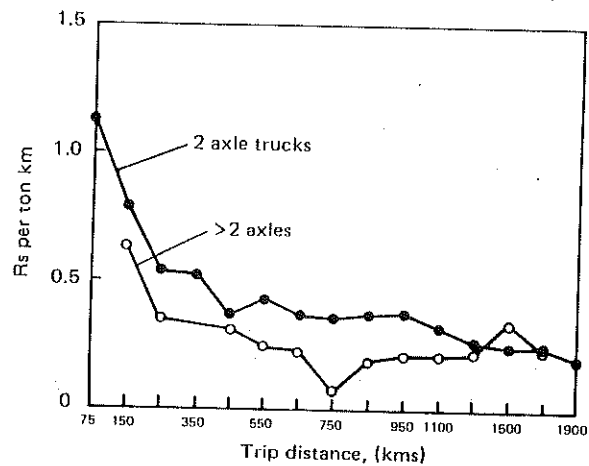


Fig.12 Freight rates to Karachi

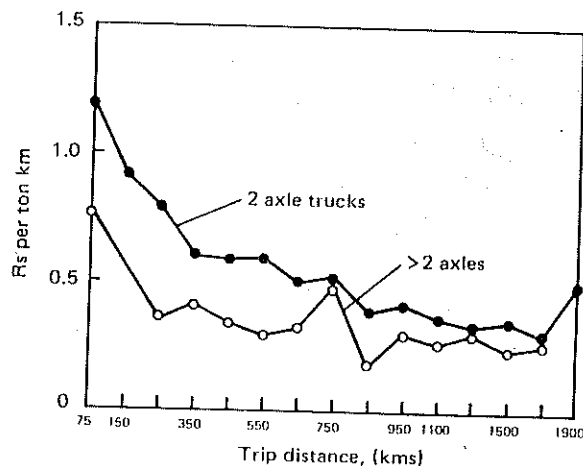


Fig.13 Freight rates from Karachi

the latter two categories average loads from Karachi were six tons more than average loads to Karachi. For Bedfords and other two-axle trucks, direction made no significant difference to the weight of load carried.

The figures demonstrate a clear decline in tariff per ton-kilometre as trip distance increases. They also show that rates from Karachi were much higher than rates to Karachi; for Bedford trucks an average of 38 per cent, for three-axle trucks 62 per cent and for tractor-trailers 110 per cent.

Comparing each distance and direction category there was little difference in tariff per ton-kilometre between Bedfords and other two-axle trucks, although the rates for three-axle trucks and tractor-trailers were substantially lower.

A further detailed comparison of tariffs between pairs of major towns found that the freight tariffs in directions from Karachi were persistently higher throughout the whole country than those in the opposite direction. (The only exception was the rate from Hyderabad to Karachi.)

Particularly high rates were found for Bedford trucks travelling from Karachi to Turbat (7.0 Rs per km) and

from Rawalpindi to Gilgit (7.8 Rs per km). These were more than double the average, reflecting the absence of return loads and the difficult operating conditions of driving in Mekran (for Turbat) and in the mountains (for Gilgit).

Table 14 provides a summary of tariffs, distances and load weight data for different vehicle types. Overall Bedford trucks earned Rs 2.7 per (empty and loaded) kilometre travelled. The two-axle Japanese trucks earned between 3.5 and 4.1 Rs per km travelled and the larger Nissan trucks earned between 5.2 and 5.4 Rs per km.

The overall tariff per ton-km for Bedfords was Rs 0.38. The overall rates for two-axle Japanese trucks were slightly lower with an average of Rs 0.35 per ton-km; the difference can be explained largely by the longer average trip distances for the Japanese trucks. Three-axle trucks and tractor-trailer units had overall tariff rates of about Rs 0.25 per ton-km (i.e. equivalent to about 65 per cent of the Bedford truck rate).

Table 15 provides a comparison between rail and road tariffs for a selection of key commodities. The rail data were compiled from statistics for freight carried during June 1985. The road tariff data (collected from the Roadside Interview Survey) relates to the period January to May 1986. All two-axle vehicle data is combined as is

data relating to three-axle trucks and tractor-trailers. The rates quoted for each category relate to the total revenue earned divided by the total ton-kilometres. The overall rates shown for rail relate just to the cargoes carried commercially. Cargoes with rates of below Rs 0.05 per ton-km are ignored; these are mostly used for the transport of the Railway's own materials.

The Table shows that while there is a substantial variation in the rates for the different commodities, in total, rail tariffs are about 70 per cent of the tariffs of the two-axle trucks. For most commodities the tariffs of the larger trucks are slightly above rail tariffs. However, in overall terms there is little difference in the rates. The analysis suggests that the larger trucks are able to compete on price with the Railways.

In the Roadside Interview Survey, tankers accounted for just 8 per cent of Bedfords but 23 per cent of the Japanese two and three-axle trucks; they earned the equivalent of 1.8 times those of other trucks per loaded kilometre travelled. This makes up for the very much higher rates of empty running encountered (i.e. 44 and 50 per cent of the total distance travelled for two-axle Bedford tankers and non-Bedford tankers respectively) and compares with 13 per cent empty running for the non-tanker Bedfords and 9 per cent for the other non-tanker trucks.

TABLE 14

Summary Of Tariffs, Distances And Load Weights *

	Bedford	2 Axle		Nissan	3 Axle Nissan	Tractor-Trailer Nissan
		Hino	Isuzu			
Mean Tariff Rs	1702	3918	2901	3850	5682	5940
Mean Loaded Distance Km	547	921	724	850	1051	957
Mean Empty Distance Km	158	242	359	236	198	387
Per Cent Kms Loaded	86.5	93.7	86.8	91.3	96.7	87.6
Mean Load Weight Tons	8.1	12.4	11.4	13.6	20.0	25.7
(Total Tariff/Total Loaded Distance)/Mean Load Weight Rs per Ton-Km	0.38	0.34	0.35	0.33	0.26	0.24
Total Tariff/(Total Loaded + Empty Distance) Rs per Km	2.7	4.0	3.5	4.1	5.2	5.4
Total Tariff/Total Loaded Distance Rs per Km	3.1	4.3	4.0	4.5	5.4	6.2

Source: Roadside Interview Survey

* Excluding Tankers and Trucks Travelling To And From Mekran

TABLE 15

A Comparison Of Road And Rail Tariffs

Commodity	Rail	Tariff		Rail	Mean Distance	
		2 Axle Trucks Rs per Ton-Km	3 Axle & T&T Trucks		2 Axle Trucks Kms	3 Axle & T&T Trucks
Kerosene Oil	0.59	0.95	-	488	432	-
Diesel Oil	0.54	0.70	0.74	409	411	596
Petrol	0.44	0.94	0.53	277	350	1521
Furnace Oil	0.27	0.42	0.32	844	603	1043
Firewood	0.51	0.59	-	359	292	-
Fertilizer	0.47	0.37	0.19	672	348	554
Wheat	0.27	0.39	0.31	1060	307	551
Sugar	0.26	0.38	-	1033	767	-
Coal & Coke	0.25	0.34	0.27	1237	1042	1555
Paddy & Rice	0.25	0.32	0.25	973	488	658
Iron & Steel	0.25	0.39	0.30	1159	635	1085
Cement	0.23	0.53	0.24	916	348	1065
Salt	0.22	0.44	-	848	243	-
Overall Rates:						
Petroleum Products	0.41	0.68	0.51	571	498	1014
Dry Cargo	0.26	0.37	0.25	872	638	1002

Sources: 1. Pakistan Railway Statistics For June 1985
2. Roadside Interview Survey

8 COSTS, REVENUES AND PROFITABILITY

Information on vehicle operating costs and revenues was collected from three different surveys. These were:-

- a) The Roadside Interview Survey
- b) Truck Drivers' Cost and Revenue Diaries
- c) Vehicle Activity Survey

The data from the Drivers' Cost and Revenue Diaries covered different periods going back to the mid 1970s. These data were aggregated into monthly periods and converted to 1986 prices to be comparable with the other two surveys.

In this Section a brief analysis of operating costs, revenues and profitability is presented. A more comprehensive analysis of this data will be presented in a subsequent report.

8.1 VEHICLE OPERATING COST COMPONENTS

Table 16 provides a summary of data collected on the main components of vehicle running costs by the different surveys. The data from the Roadside Interview Survey

relates only to vehicles travelling on paved roads in flat terrain (i.e. data relating to vehicles travelling in the mountainous north or on rough roads in the Mekran are omitted).

Some degree of variation in the results from the different data sources is to be expected. Differences in vehicle age help to explain some of the differences in maintenance and tyre costs.

There is a fairly close correspondence between the different surveys in crew costs, loading labour, gratuities paid to the police and oil and grease costs. Expenditure on tyres recorded by the Drivers' Diaries appears to be low in relation to the apparent tyre replacement rate; however a variety of repairs is made to extend tyre life and much use is made of remoulded tyres. Large differences were recorded in the payments made for the octroi (a local tax levied on loading and unloading freight) and for agents' commission. For these items different operators will face different costs according to the journey and type of load carried. It is possible that the surveys captured different patterns of vehicle operation.

Table 17 gives estimates of the capital costs per day of running different types of vehicle. They include both depreciation and interest charges covering the estimated vehicle life. A current real interest rate of three per cent is assumed. Different costs are given for trucks purchased by hire-purchase repayments from trucks purchased

TABLE 16

Vehicle Running Costs (Mean Values From Different Surveys, 1986 prices)

	Two-Axle Bedfords	Japanese	Three-Axle Japanese	Tractor-Trailers Japanese
Fuel consumption ltr/km (Diesel = 4.25 Rs/ltr)				
Diaries	0.299	-	-	-
Roadside Interview	0.285	0.306	0.397	0.486
Vehicle Activity	0.25	-	-	-
General repairs Rs/km				
Diaries	0.239	0.244	0.315	-
(mean vehicle age)	4yrs	1yr	1yr	-
Roadside Interview	0.358	0.259	0.367	0.568
(mean vehicle age)	10yrs	3yrs	3yrs	4yrs
Tyres (cost) Rs/km (New tyre = Rs 2275)				
Diaries	0.142	0.1	0.11	-
Tyres (no per 1000 km)				
Roadside Interview	0.149	0.143	0.207	0.246
Total crew costs Rs/day				
Diaries	127	104	-	-
Roadside Interview	131	159	199	173
Oil and grease costs Rs/km (Oil = 13.4 Rs/ltr)				
Diaries	0.141	0.19	0.193	-
Vehicle Activity	0.129	-	-	-
Loading Labour Rs/km				
Diaries	0.06	0.13	0.41	-
Vehicle Activity	0.065	-	-	-
Octroi and police Rs/km				
Diaries	0.148	0.17	0.16	-
Vehicle Activity	0.102	-	-	-
Agents' commission Rs/km				
Diaries	0.035	0.07	0.06	-
Vehicle Activity	0.142	-	-	-
Roadside Interview	0.12	0.16	0.16	0.158

outright. In the hire-purchase case the costs of meeting the repayment commitments are used, in place of the purchase price, and an adjustment for inflation is made for the repayment period.

8.2 VEHICLE REVENUE

Information on vehicle earnings is presented in Table 18. Earnings per day were estimated directly from the monthly earnings recorded in the Drivers' Diaries data and from the data collection periods (one to four weeks) of the Activity Survey. In the Roadside Interview Survey earnings per day were calculated from the tariffs charged

and the total time period to make the current loaded trip together with the time spent empty prior to making the loaded trip.

The estimates for Bedford trucks range from 967 to 1086 Rs per day; a difference of about 12 per cent. Because of the smaller sample sizes there is greater uncertainty for the larger trucks. For these an adjustment was made to the Roadside Interview Data to accommodate the directional flow imbalance of trucks travelling to and from Karachi. Tariffs for loads travelling from Karachi were found to be much higher than tariffs in the opposite direction; this difference was particularly marked for

TABLE 17

Vehicle Capital Costs Per Day (For trucks made in 85/86, 1986 prices)

	Two-Axle Bedford	Two-Axle Japanese	Three-Axle Japanese	Tractor-Trailer Japanese
Mean new purchase price Rs 000	305	377	519	625
Assumed vehicle life Years	15	13	12	12
Capital costs per day:				
i) for trucks purchased outright Rs	68	94	139	167
ii) for trucks purchased by repayments Rs	84	115	166	202
iii) mean estimate for all trucks Rs	80	111	160	185

tractor-trailers for which there was also a marked discrepancy in the number of vehicles travelling in the two directions.

8.3 TOTAL OPERATING COSTS AND PROFITABILITY

Estimates of mean lifetime operating costs, revenues and profitability are given in Table 19. Adjustments have been made to take account of the effects of vehicle age on operating costs, distance travelled and revenues. Lack of data prevents estimates for tractor-trailers.

Estimates of net profit are also given in Table 19, and estimates of internal rates of return (IRRs) are shown in Table 20. The data suggest that the three-axle Japanese trucks are the most profitable while Bedford trucks are only just profitable. Lack of data prevents estimates for tractor-trailers; these are believed to be intermediate in profitability between the two and three-axle Japanese

trucks. The results confirm impressions gained from informal interviews with various people connected with the industry.

The IRRs given are in real terms and they should be viewed in relation to the alternative returns on capital. In real terms money invested in Pakistan on deposit at the bank has, in recent years, given a return of between zero and three and a half per cent.

The profitability calculations are based on the assumption that for vehicles of different ages, revenues and costs will be maintained in real terms. However it is likely that the high levels of profitability found for the larger vehicles will decline as more of these vehicles are introduced into Pakistan and competition forces down tariffs. Furthermore since early 1986 the Yen has appreciated in value and as a result the price of new Japanese trucks has risen substantially. This will also affect the profitability of new operators entering the market.

TABLE 18

Vehicle Earnings (Mean estimates, 1986 prices)

	Two-Axle Bedford	Two-Axle Japanese	Three-Axle Japanese	Tractor-Trailer Japanese
<i>Total earnings per day (Rs)</i>				
Diary Data for 1985/86	1005	1554	-	-
Roadside Interview	967	1179	1804	1662
Roadside Interview - Adjusted for traffic direction flow imbalance	-	1171	1846	1917
Activity Survey	1086			

TABLE 19

Estimated Lifetime Operating Costs Per Kilometre (1986 prices)

	Two-Axle Bedford	Two-Axle Japanese	Three-Axle Japanese
Distance per day Kms	329	304	373
		<i>Rs per km</i>	
Running costs:			
Fuel	1.257	1.333	1.732
Crew	0.426	0.472	0.587
Maintenance and repairs	0.322	0.294	0.388
Tyres	0.142	0.142	0.213
Oil and grease	0.141	0.190	0.193
Loading labour	0.079	0.086	0.149
Octroi, police, taxes	0.171	0.193	0.183
Agents commission	0.078	0.115	0.110
Total running costs	2.616	2.825	3.555
Estimated capital costs:			
i) vehicle purchased outright	0.207	0.309	0.373
ii) vehicle purchased with repayments	0.255	0.378	0.445
iii) mean estimate for all trucks	0.243	0.365	0.429
Total Revenue per km	2.939	3.347	4.382
Net Profit:			
i) vehicle purchased outright	0.116	0.213	0.454
ii) vehicle purchased with repayments	0.068	0.144	0.372
iii) mean estimate for all trucks	0.080	0.157	0.398

TABLE 20

Estimated Internal Rate of Return (IRR) for Different Trucks

	Two-Axle Bedford	Two-Axle Japanese	Three-Axle Japanese
		<i>per cent</i>	
Estimated IRR based on outright purchase	9.3	18.1	50.6
Estimated IRR based on mean terms of repayments	6.3	15.1	70.3

Using the cost and revenue data collected from the Roadside Interview Survey an investigation was made of the changes in profitability of different vehicles with trip distance. Long distance trips appear to be unprofitable for Bedford trucks, while for two and three-axle Japanese trucks long distance trips appear to be much more profitable. This confirms the widely held view that trucks with small carrying capacity are more suited to short distance journeys where their flexibility is an advantage.

9 DRIVERS' PROBLEMS AND ROAD ACCIDENTS

9.1 DRIVERS' PROBLEMS

During the Roadside Interview Survey drivers were asked to identify up to three key problems that they encountered in the course of their work. The results are shown in Table 21. The most important problem identified was police harassment, which was mentioned by two thirds of all drivers. Police harassment is connected with the payment of gratuities to police on traffic duty; this practice is very widespread and is believed to apply also to public transport as well as to the freight transport industry. Data from the Drivers' Cost and Revenue Diaries Survey suggests that the police receive on average about Rs 450 per month from each vehicle, equivalent to just under half of the average industrial wage.

The second and third most important problems were poor roads and fear of robbers. For both of these a higher proportion of the drivers of the Japanese trucks identified these problems because a greater proportion of them operate in Baluchistan and in Sind. Baluchistan has a high mileage of unpaved main roads and both Sind and Baluchistan are noted for robbery attacks.

An interesting difference, relating to their economic performance, emerged between the Bedford and Japanese trucks. High operating costs were mentioned by 20 per cent of Bedford drivers but by only four per cent of Japanese truck drivers.

9.2 ROAD ACCIDENTS

Table 22 gives data relating to accidents suffered by the trucks during the previous year. In total 9 per cent of drivers reported one or more accidents during the year. On average, for each accident, vehicle damage amounted to about 13 per cent of vehicle value and load damage to less than one per cent of vehicle value. Of the accidents 77 per cent involved no injury, 14 per cent involved minor injuries, three per cent resulted in hospitalisation and six per cent resulted in fatalities.

'Roll-over' accidents were the most common involving about 39 per cent of the total. The high sided trucks used in Pakistan appear to be particularly susceptible to this type of accident. 'Roll-over' accidents caused the least personal injury. As expected 'head-on' and pedestrian accidents caused most of the fatal and serious injuries.

TABLE 21

Drivers' Main Problems

	<i>2 Axle Bedfords</i>		<i>Japanese Trucks</i>	
	No. of Answers	Per Cent of Drivers	No. of Answers	Per Cent of Drivers
Police Harassment	1716	66.3	436	67.6
Poor Roads	853	33.0	363	56.3
Fear of Robbers	614	23.7	251	38.9
High Running Costs	522	20.2	23	3.6
District Tax	222	8.6	37	5.7
Finding Loads	164	6.3	55	8.5
Low Salary	55	2.1	13	2.0
Low Tariffs	47	1.8	29	4.5
Competition	49	1.9	3	0.5
Spare Parts	21	0.8	1	0.2
Finding Finance	1	-	0	-
Driver's Unemployment	1	-	0	-
Unnecessary Delays	1	-	0	-
Loan Repayments	0	-	0	-
Vehicle Breakdown	0	-	0	-
Other Problems	287	11.1	51	7.9
Total Answers	4553		1262	
Number of Drivers Giving Positive Answers		2588		645

Source: Roadside Interview Survey

TABLE 22

Road Accidents

	Two-Axle Bedfords	Other Trucks	All Trucks
No. of vehicles involved in accidents during previous year	254	45	299
Total No. of accidents	288	50	338
No. of accidents as % of total trucks	11	7	10
Per cent of accidents with truck damage	95	80	92
Mean truck damage* Rs	25,500	36,000	27,100
Per cent with load damage	20	21	20
Mean load damage* Rs	7,000	11,600	7,900
		<i>Per Cent</i>	
Accident Type			
Roll-over	39	38	39
Head-on	22	26	22
Side	18	5	16
Nose-to-tail	12	12	12
Obstacle	6	5	2
Animal	0	0	0
Other	2	0	2
		<i>Per Cent</i>	
Personal Injury Type			
No injury	79	67	77
Minor injuries only	11	26	14
Hospitalised (no fatalities)	4	0	3
Fatal	6	7	6

Source: Roadside Interview Survey

* For those cases where damage occurred

10 SUMMARY OF MAIN RESULTS

The main findings of this study are as follows:

- i) Overall the road freight transport industry is very competitive and the existing vehicle fleet is run efficiently. However there appears to be scope for the introduction of greater numbers of larger vehicles.
- ii) Road freight transport has been growing in importance in Pakistan. In 1983 it accounted for 70 per cent of total inland freight movement.
- iii) During the 1970s and early 1980s the two-axle 7-ton Bedford truck dominated the industry. However during the last five years newer and larger two-axle Japanese trucks have taken an increasing proportion of the market.
- iv) Most trucks in Pakistan are strengthened to take heavier loads. It is common for the Bedfords which are designed to carry 7 tons to take 11 tons and for two-axle Japanese trucks designed to carry 11 tons to transport loads of 16 tons. Three-axle vehicles carry up to 30 tons and tractor-trailer units will carry over 50 tons.
- v) Two-axle Bedford trucks appeared to be only marginally profitable while the larger capacity trucks were

found to be much more profitable. The internal rate of return (IRR) for two-axle Japanese trucks was estimated to be about 15 per cent while for three-axle Japanese trucks the IRR was estimated to be over 50 per cent.

- vi) Small repair workshops are widely distributed throughout Pakistan. Spare parts are plentiful; many are factory made in Pakistan and some are made to order in the small workshops.
- vii) Commercial freight transport in Pakistan is organised on a free market basis; freight tariffs are determined by supply and demand. Entry into the industry is cheap and easy, and apart from the operations of the National Logistics Cell, there is little direct government intervention.
- viii) The predominant form of ownership is by individual entrepreneurs who provide a "hire and reward" service. There is a very high turnover in vehicle ownership. Over half of the Bedford trucks were purchased by their current owner during the previous two years.
- ix) "Own account" operations tend to be confined to urban collection and delivery work; they are virtually non-existent in long distance transport operations. The problems associated with managing staff and vehicles were identified by industrial freight consignors as the

main reasons against developing the use of their own vehicles. The "for hire" sector is readily able to provide transport cheaply and quickly and there is very little demand for purpose built specialised vehicles.

x) Vehicle finance is provided through an informal system of hire purchase arrangements between owners and middlemen, many of whom are freight agents. Bank finance is very rare. A wide range of effective interest rates is paid for truck purchase through these agreements. The modal rate of interest charged is about 20 per cent. On the whole, owners of the larger and newer trucks find it easiest to meet their financial commitments.

xi) Trip lengths in Pakistan are long; the average loaded trip length for Bedford trucks was 500 kms. For the larger capacity Japanese trucks it ranged from 650 to over 1000 kms. Empty running accounted for about 16 per cent of total vehicle kilometres. Annual travel appears to be in excess of 100,000 kms for those trucks regularly engaged on long haul transport.

xii) Overall journey speeds (including rest stops) are low at about 23 kph. The typical pattern of operations usually involves two drivers and one assistant. They will travel night and day going from job to job for up to two weeks at a time before returning to base. The principal driver is responsible for finding work, collecting revenue, keeping accounts and maintaining the vehicle in good repair.

xiii) Most industrial freight consignors were found to favour road transport in comparison with rail in view of the former's flexibility, speed, convenience and greater accountability in the case of damage.

xiv) The widespread network of freight agents was found to play a key role in the operations of the industry. Over 60 per cent of loads were placed through agents. Over 90 per cent of agents were found to have access to a working telephone and 90 per cent of agents claimed that on average they could find a vehicle to consign a load within one hour.

xv) The national imbalance in freight flows was found to be reflected in freight tariffs. On average, freight rates for goods travelling inland from Karachi were about 35 per cent higher than rates for the reverse direction.

xvi) Freight tariffs per kilometre were found to decline markedly with increasing journey distance. Tractor-trailers and three-axle trucks provided transport at tariff rates that were broadly competitive with Pakistan Railways; these rates were roughly equivalent to about 65 per cent of the tariffs charged by the two-axle Bedford trucks.

xvii) The most common complaint of drivers related to the widespread problem of police harassment. Frequent complaints were also made about road conditions and the fear of robbers, although by international standards the main roads in Pakistan are not bad and the actual incidence of highway robbery is very small.

xviii) About 9 per cent of vehicles were involved in an accident in the previous year. Of these accidents, 77 per cent involved no injury, 14 per cent involved minor injuries, in three per cent of the cases people were hospitalised and in six per cent of the cases fatal injuries were incurred. Vehicle 'roll-over' occurred in 39 per cent of the accidents.

11 ACKNOWLEDGEMENTS

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APPENDIX A: ADDITIONAL TABLES TO THE MAIN TEXT

TABLE A1

Roadside Interview Stations

Place Code	Road Section	Province	Date	Total Interviews
1	Rawalpindi - Murree	Punjab	10/01/86	69
2	Taxila - Hasan Abdal	Punjab	12/01/86	103
3	Abbottabad - Mansehra	N.W.F.P	14/01/86	98
4	Batgram - Besham	N.W.F.P	16/01/86	68
5	Attock Bridge	Punjab	18/01/86	139
6	Mardan - Malakand	N.W.F.P	20/01/86	109
7	Peshawar - Nowshera	N.W.F.P	22/01/86	96
8	Peshawar - Kohat	N.W.F.P	24/01/86	98
9	Bannu - DI Khan	N.W.F.P	26/01/86	98
10	DI Khan - DG Khan	N.W.F.P	28/01/86	55
11	Rawalpindi - Mandra	Punjab	10/02/86	43
12	Jhelum Bridge	Punjab	12/02/86	95
3	Gujranwala - Lahore	Punjab	14/02/86	94
14	Faisalabad - Sheikhpura	Punjab	16/02/86	134
15	Sargodha - Faisalabad	Punjab	18/02/86	103
16	Okara - Sahiwal	Punjab	20/02/86	100
17	Multan - Bahawalpur	Punjab	22/02/86	109
18	Muzaffargarh - Fatehpur	Punjab	24/02/86	110
19	DG Khan - Rakhni	Punjab	26/02/86	105
20	DI Khan - Darya Khan	Punjab	28/02/86	99
21	Pano Aqil - Mirpur Mathelo	Sind	18/03/86	79
22	Jacobabad - Dera Murad Jamali	Sind	20/03/86	102
23	Larkana - Ghari Yasin	Sind	22/03/86	50
24	Hyderabad - Sakrand	Sind	24/03/86	132
25	Hyderabad - Mirpur Khas	Sind	26/03/86	108
26	Kotri - Dadu	Sind	28/03/86	120
27	Hyderabad - Karachi	Sind	30/03/86	133
28	Karachi - Thatta	Sind	01/04/86	121
29	Karachi - Uthal	Baluchistan	03/04/86	99
30	Sibi - Dadhar	Baluchistan	10/04/86	112
31	Nushki - Quetta	Baluchistan	12/04/86	42
32	Quetta - Bostan	Baluchistan	14/04/86	99
33	Muslimbagh to Zhob & Loralai	Baluchistan	16/04/86	81
34	Khuzdar - Kalat	Baluchistan	19/04/86	115
35	Besima - Surab	Baluchistan	21/04/86	13
36	Besima - Panjgur	Baluchistan	23/04/86	18
37	Panjgur - Turbat	Baluchistan	25/04/86	10
38	Turbat - Gawadar	Baluchistan	27/04/86	29
39	Turbat - Awaran	Baluchistan	25/04/86	65
Total Interviews				3453

TABLE A2

Trucks Surveyed : By Interview Province, Make And Type

Make		Province				Total
		NWFP	Punjab	Sind	Baluchistan	
Bedford	2 axle	524	1111	613	386	2634
	3 axle	-	3	-	-	3
	Tractor Trailer	-	-	1	-	1
BMC/Leyland	2 axle	-	12	2	2	16
Ford	2 axle	-	2	1	1	4
Hino	2 axle	23	35	45	106	209
	3 axle	1	1	2	1	5
	Tractor Trailer	-	1	3	1	5
Isuzu	2 axle	13	28	32	117	190
	3 axle	-	6	1	-	7
	Tractor Trailer	-	5	6	-	11
International	2 axle	10	2	-	-	12
Man	2 axle	1	-	-	-	1
	Tractor Trailer	-	3	1	-	4
Mazda	2 axle	-	1	3	2	6
Mercedes	2 axle	7	2	-	1	10
	3 axle	6	19	2	2	29
	Tractor Trailer	-	4	3	-	7
Mitsubishi	2 axle	1	-	-	-	1
	Tractor Trailer	-	1	5	1	7
Nissan	2 axle	19	14	12	41	86
	3 axle	16	29	43	10	98
	Tractor Trailer	-	18	59	8	85
Saviem	2 axle	-	1	1	-	2
Toyota	2 axle	-	-	-	1	1
Others/Unspecified		1	5	10	3	19
	Total	622	1303	845	683	3453

Source: Roadside Interview Survey

TABLE A3

Age And Value Spectrum For Two-Axle Trucks

Model Year	Two-Axle Bedfords			Two-Axle Japanese Trucks			
	Number	Per cent in Survey	Per cent of all Bedford Sales	Current Value Rs 000	Number	Per cent in Survey	Current Value Rs 000
1957	2	-	-	48	-	-	-
1959	2	-	-	60	-	-	-
1960	3	-	-	65	-	-	-
1961	2	-	-	70	-	-	-
1962	8	0.3	-	83	-	-	-
1963	10	0.4	-	60	-	-	-
1964	72	2.7	-	98	-	-	-
1965	60	2.2	-	93	-	-	-
1966	81	3.0	-	95	-	-	-
1967	56	2.1	-	104	-	-	-
1968	51	1.9	-	111	-	-	-
1969	108	4.1	-	106	-	-	-
1970	57	2.2	-	127	-	-	-
1971	63	2.4	-	114	-	-	-
1972	100	3.8	-	114	4	0.8	113
1973	115	4.4	3.0	123	3	0.6	150
1974	211	8.0	4.4	128	1	0.2	70
1975	185	7.1	6.8	133	3	0.6	217
1976	168	6.4	6.3	131	4	0.8	293
1977	86	3.3	4.8	143	9	1.9	101
1978	120	4.6	3.2	146	7	1.4	102
1979	232	8.8	5.4	166	10	2.1	182
1980	167	6.4	7.6	172	12	2.5	238
1981	102	3.9	3.4	186	21	4.3	257
1982	191	7.3	6.6	197	26	5.4	285
1983	178	6.8	7.3	223	65	13.4	317
1984	139	5.3	8.8	266	92	19.0	341
1985	54	2.1	-	290	186	38.4	383
1986	2	-	-	325	42	8.7	406
Total	2625	100	-	-	485	100	-
Mean				155			337

Source: Roadside Interview Survey

TABLE A4

Age And Value Spectrum Of Nissan Three-Axle & Tractor-Trailers

Model Year	Nissan 3 Axle Trucks			Nissan Tractor Trailers		
	Number	Per cent	Current Value Rs 000	Number	Per cent	Current Value Rs 000
1974	1	1.0	-	-	-	-
1976	-	-	-	3	3.6	438
1977	-	-	-	2	2.4	425
1978	1	1.0	350	7	8.3	360
1979	7	7.1	301	6	7.1	484
1980	6	6.1	360	5	5.9	413
1982	7	7.1	310	7	8.3	360
1983	11	11.2	503	13	15.5	580
1984	17	17.3	498	19	22.6	573
1985	40	40.8	527	15	17.9	634
1986	6	6.1	508	1	1.2	700
Total	98	100	-	84	100	-
Mean			483			534

Source: Roadside Survey

TABLE A5

Location of Interviews for Consignors and Freight Agents

Location	Number of interviews	
	Consignors	Freight Agents
Karachi	56	49
Lahore	36	37
Rawalpindi	23	29
Faisalabad	1	9
Gujranwala	18	28
Sarghoda	14	24
Sukkur	13	19
Abbottabad	11	9
Attock	10	9
Sheikhupura	4	-
Others	2	4
Total	188	237

Source: Freight Consignors and Agents Survey

TABLE A6

Types of Business Undertaken by Consignors

Type	Total	Per cent
Textiles	35	18.6
Industrial mechanics	19	10.1
Iron and steel	18	9.6
Agricultural produce	17	9.0
General raw materials	15	7.8
Food/animal feed	9	4.8
Cement	7	3.7
Agricultural mechanics	6	3.2
Vegetable oil/ghee	5	2.7
Minerals	5	2.7
Petroleum products	4	2.1
Fertilizer	1	0.6
Others	25	13.3
Total	188	100.0

Source: Freight Consignors and Agents Survey

TABLE A7

Empty and Loaded Trip Length Distribution by Direction

Trip Length Kms	From Karachi Loaded	Empty	To Karachi Loaded	Empty	Total Trucks	Per Cent Loaded
5 - 50	66	149	76	106	397	35.8
51 - 100	97	118	127	81	423	53.0
101 - 200	193	67	178	188	626	59.3
201 - 300	102	27	91	45	265	72.8
301 - 400	135	15	55	45	250	76.0
401 - 500	129	9	96	34	268	84.0
501 - 600	100	8	51	35	194	77.8
601 - 700	64	4	45	15	128	85.2
701 - 800	60	2	24	54	140	60.0
801 - 900	50	1	42	10	103	89.3
901 - 1000	57	2	35	10	104	88.5
1001 - 1200	70	0	59	6	135	95.6
1201 - 1400	94	1	88	13	196	92.9
1401 - 1600	33	0	24	6	63	90.5
1601 - 1800	45	0	51	3	99	97.0
1801 - 2000	12	1	14	2	29	89.9
Total Trucks	1307	404	1056	653	3420	
Average Per Cent Of Loaded Trucks:						
By Trips	76.4		61.8		69.1	
By Vehicle Kms	93.3		74.3		83.9	

Source: Roadside Interview Survey

