GOVERNMENT OF PAKISTAN
MINISTRY OF COMMUNICATIONS
NATIONAL TRANSPORT RESEARCH CENTRE (NTRC)
ISLAMABAD
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TRAVEL TIME SURVEY ON N-5

January, 2006

(MUMTAZ HUSSAIN MALIK)
Assistant Chief

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Executive Summary

The travel time survey of commercial vehicles i.e. trucks and buses playing on N-5 between Peshawar and Karachi was conducted earlier in June, 2003 by NTRC on the recommendation of World Bank Mission report for appraisal of the highway rehabilitation project. One of the impact indicators considered important in the mission's report for the improvement of road network was improved flow of commerce measured in terms of improvement of travel times of commercial vehicles on N-5 by 10%. National Highway Authority therefore undertook the travel time survey of commercial vehicles on N-5 between Peshawar and Karachi in June 2003 and conducted the survey again in January 2006 on the following sub-stations: -

1. Peshawar – Rawalpindi
2. Rawalpindi Bypass
3. Rawalpindi – Lahore
4. Lahore Bypass
5. Lahore – Multan
6. Multan – Sadiqabad
7. Sadiqabad – Sukkur
8. Sukkur – Hyderabad
9. Hyderabad – Karachi

The travel time survey of commercial vehicles i.e. buses and trucks was conducted in January 2006 separately on each sub-section in each direction using double cabin pickup. The travel time and travel speed of both categories of vehicles on the north and south bound carriageways have been computed as a section by section basis. The total distance of 1714 kilometers was recorded from Karachi to Peshawar during the survey. The total travel time of buses between Karachi and Peshawar on the north bound was recorded as 24 hours and 25 minutes while on the south bound it was 24 hours and 35 minutes giving on average travel time of 24 hours and 30 minutes. The total travel time of trucks on the north bound was computed as 43 hours and 28 minutes while on the south bound it was recorded as 41 hours and 55 minutes giving on average travel time of 42 hours and 47 minutes. The

overall average speed of the buses was found to be 70 kilometers per hour and that of trucks it was computed as 40 kilometers per hour. The travel time and travel speed of both categories varied considerably at various sections. The highest average speed of buses was noted as 80 kilometers per hour at Lahore Bypass whereas lowest was recorded as 54 kilometers per hour at Rawalpindi Bypass. Similarly the highest average speed of trucks was computed as 48 kilometers per hour between Karachi and Hyderabad, whereas between Multan & Sadiqabad it was lowest and was recorded as 35 kilometers per hour. The survey has shown that as a result of Highway improvement the overall travel time saving has been 7% for buses and 8% for trucks in 2006 as compared to 2003.

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Section Wise Travel Time/Travel Speed Survey (Filled In) Proformas

- Rawalpindi – Peshawar (Buses)
- Rawalpind – Peshawar (Trucks)
- Rawalpindi Bypass (Trucks)
- Rawalpindi Bypass (Buses)
- Rawalpindi – Lahore (Trucks)
- Rawalpindi – Lahore (Buses)
- Lahore Bypass (Trucks)
- Lahore Bypass (Buses)
- Lahore – Multan (Buses)
- Lahore – Multan (Trucks)
- Multan – Sadiqabad (Trucks)
- Multan – Sadiqabad (Buses)
- Sadiqabad – Sukkur (Trucks)
- Sadiqabad – Sukkur (Buses)
- Sukkur – Hyderabad (Trucks)
- Sukkur – Hyderabad (Buses)
- Hyderabad – Karachi (Trucks)
- Hyderabad – Karachi (Buses)

Importance of Travel Time Data

Travel time is the amount of time a vehicle takes to traverse a specified section of roadway. Travel time varies inversely with travel speed. It provides direct information about average speed and is a good indicator of level of service that is being provided and can be used as a relative measure of efficiency of flow. Assignment of traffic to networks and to new or improved facilities in addition to other factors, is based upon relative travel time. This has a marked bearing on the physical plan and design of new facilities and on the nature of improvements to existing facilities. Economic studies, such as benefit – cost analysis use travel time data to evaluate the benefits of time saving. Travel time data is used in the Trend Studies to evaluate the level of service as it changes with the passage of time. Congestion can be properly evaluated when information is provided on the amount, location and cause of delays. Such information is required for selecting the remedial measures. Traffic flows and speeds are dependent upon prevailing conditions such as physical characteristics of roads, width, number and types of intersections, road alignment, surface condition, Composition of traffic and vehicle capabilities, proportion of different types of vehicles and their performance capabilities, gradient, loading, environmental condition & driver skill etc.

Methods for Conducting Travel Time Surveys

There are various methods available for measuring travel time. The most commonly used methods are:-

- **Registration plate method**

  This method is useful only when travel time data is sufficient. Observers are posted at the entrance, the exit, and if necessary at other strategic points of the test section for which travel time is desired. Each observer records the registration number of each vehicle along with the time at which the vehicle passes the observation point. A sample size of 50 registration number matches usually provides good accuracy. This method is expensive because of large manpower requirements in obtaining and analysizing data.

- **Photographic method.**

  The photographic technique is primarily a research tool and is most useful in studies of the interrelationships of several factors such as speeds, spacings, lane usage, acceleration rates, merging and crossing maneuvers, and delays at intersections. This method is usually applicable for short test sections. Equipment requirement and data analysis raise costs and the method is limited to day light hours and favourable atmospheric conditions.

- **Interview method**

  This method involves interviewing selected individuals as to their travel time and delays experienced by them. As an example, the employees of strategically located firms are asked to record their travel time to and from work on one particular day. With good cooperation the results obtained may be quite satisfactory. This method is useful where a large amount of data is required in a minimum of time and at little expense for field observation.

- **Elevated Observation Method.**

  Observers are stationed at elevated vantage points. They select typical vehicles at random and record pertinent data regarding their progress through a section of roadway. This method is not practical for long run observations and is dependent on the availability of suitable observation posts.

- **Moving Vehicle Observer Method**

  This method was developed by Transport Research Laboratory (TRL) in England. It utilizes a test vehicle which makes a series of test runs in each direction over the route under study. The standard method requires, a minimum of six test runs in each direction under comparable conditions for reliable results. It has been found to be economical and to produce satisfactory, unbiased estimates of travel time. The test route is divided into sections which are as uniform as possible with respect to physical conditions (width, number of lanes, parking, etc.) and traffic conditions (volume, speed, type of traffic, etc.). The data required, which are recorded for each section along the route, include:-

1. **Travel time**, obtained by a stopwatch or other device.
2. **Overtaking traffic,** a count of vehicles, moving in the same direction, that over take the test vehicle.
3. **Passed traffic**, a count of vehicles, moving in the same direction, that are overtaken by the test vehicle.

This method can also record traffic volume along with travel time by a manual count of number of vehicles moving in the opposite direction that are met by the test vehicle.

The first four methods are generally useful for short test sections particularly those sections where diverging and merging links do not exist and traffic reaches the ultimate end of the section. The last method is used for long sections which have diverging and merging links and a certain portion of traffic will disperse before the ultimate end of the section.

Travel Time Survey on N-5

- **Background of Travel Time Survey of N-5**

  The World Bank Mission in April – May 2003 highlighted the improvement programmes undertaken by NHA during Phase-I of the Project. The mission's findings and recommendations based on discussion with concerned officials of NHA & GOP highlighted the needs and importance of base line data for determination of existing status and basis for the future impacts assessment. One of the performance indicators considered important in the mission's report for the judgment of project implementation and development impact was improved flow of commerce on the network measured by improvement in (growth adjusted) travel time on the N-5 corridor. The mission report expected to improve the commercial vehicle travel times of N-5 by 10%. National Highway Authority therefore undertook the travel time study for commercial vehicles on N-5 between Peshawar and Karachi in 2003 and repeated the same survey in 2006.

➢ **Scope of Survey**

The scope of travel time survey was limited to computation of travel times of commercial vehicles. For these purpose two main categories of commercial vehicles i.e. buses and trucks were taken into account at each sub-section in each direction.

Methodology

The available literature provides for the following:-

Moving Vehicle Method of Estimating Volume and Travel Time

A test vehicle makes a series of test runs in each direction over the route under study. For reliable results, a minimum of six test runs should be made in each direction under comparable conditions. The method is applicable to two-way routes only. It has been found to be economical and to produce satisfactory, unbiased estimates of volume and travel time. The test route is divided into sections which are as uniform as possible with respect to physical conditions (width, number of lanes, parking etc) and traffic conditions (volume, speed, type of traffic etc). The data required, which are recorded for each section along the route, include:-

1. Travel time, obtained by a stop watch or other device
2. Opposing traffic, a manual count of the number of vehicles moving in the opposite direction that are met by the test vehicle.
3. Overtaking traffic, a count of vehicles, moving in the same direction, that overtake the test vehicle.
4. Passed traffic, a count of vehicles, moving in the same direction, that are passed by the test car.

Computations for a typical set of data are shown below. The formulas for volume and average travel time each include the number of vehicles that overtake the test car and the number of vehicles passed by the test car. These values are necessary to compensate for irregular movement of the test car, for if the test car were traveling at the actual mean speed for the entire run, it would pass as many vehicles as pass it, and these values would cancel each other. In addition, the formula for volume contains the sum of the times to travel each direction. This is necessary because the volume for one time interval would be about one-half of that met by the test vehicle, since the time required for the test vehicle to travel to the midpoint of each direction is required for the vehicle met at that point to travel to the starting position of the test vehicle.

Formulas: In the following computations, the test section is assumed to be a north-south road. The subscripts n and s refer to the direction the test vehicle was traveling when the time was measured.

Hourly Volume

Hourly volume for one directional flow on the section, under existing conditions, is determined by the following formula:

$$V_n = \frac{60\,(M_s + O_n - P_n)}{T_n + T_s}$$

Where

V_n = Volume per hour, northbound (for southbound volume all subscripts are reserved)

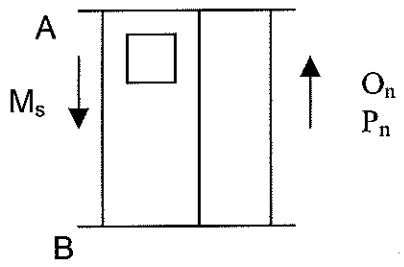
M_s = Opposing traffic count of vehicles met when the test vehicle was traveling south.

O_n = Number of vehicles overtaking the test vehicle While traveling north.

P_n = Number of vehicles passed by the test vehicle while traveling north

T_n = travel time when traveling north, in minutes.

T_s = travel time when traveling south, in minutes



The test vehicle makes a round trip, essentially measuring the number of vehicles that will pass the starting point in the time it takes the vehicle to make a round trip from A to B and back to A again.. The vehicle begins at A and proceeds in a southerly direction, counting all vehicles which pass it in the opposite direction (Ms). Certainly, all of these vehicles will pass point A in the time it takes the test vehicle to return to that spot. The test vehicle then turns around at point B. Any vehicle that passes the test vehicle (On) will also arrive at A before the test vehicle returns. Any vehicle overtaken by the test vehicle has already been counted as part of Ms. However, these vehicles (P_n) will not arrive at A before the test

vehicle. Therefore, the volume past point A, in a northerly direction, in the time it takes the test vehicle to make a round trip, is $M_s + O_n - P_n$, and the formula follows.

If the test vehicle turned instantaneously at B, the count would be exact. However, there is a time loss while the vehicle turns, which may allow some error to occur. Also, one run may not be statistically representative of average conditions. For these reasons, the method is considered an estimate, and several runs are made and the results averaged.

Average travel time

The average travel time for one directional flow is determined by the following formula:

$$\bar{T}_n = T_n - \frac{60\,(O_n - P_n)}{V_n}$$

Where $\bar{T}_n$ = average travel time of all traffic northbound (for southbound travel time subscripts are reversed)

The value $(O_n - P_n)$ represents a correction accounting for the fact that the test vehicle may not have been traveling at the average speed.

Space mean speed

The space mean speed for one directional flow is determined by the following formula:

$$S_n = \frac{60_d}{\bar{T}_n}$$

Where S_n = space mean speed northbound, in miles per hour

d = length of test section, in miles

Illustrative Example

Date for test section length of 0.75 miles is given below:

NORTHBOUND TRIPS	T_n (min)	M_n	O_n	P_n
1N	2.65	85	1	0
2N	2.70	83	3	2
3N	2.35	77	0	2
4N	3.00	85	2	0
5N	2.42	90	1	1
6N	2.54	84	2	1
Total	15.66	504	9	6
Average	2.61	84.0	1.5	1.0

SOUTHBOUND TRIPS	T_s (min)	M_s	O_s	P_s
1S	2.33	112	2	0
2S	2.30	113	0	2
3S	2.71	119	0	0
4S	2.16	120	1	1
5S	2.54	105	0	2
6S	2.48	100	0	1
Total	14.52	669	3	6
Average	2.42	111.5	0.5	1.0

$$V_n = \frac{60(M_s + O_n - P_n)}{T_n + T_s} = \frac{60(111.5 + 1.5 - 1.0)}{2.61 + 2.42}$$

$$= 1{,}336 \text{ vehicles per hour}$$

$$V_s = \frac{60(M_n + O_s - P_s)}{T_s + T_n} = \frac{60(84.0 + 0.5 - 1.0)}{2.42 + 2.61}$$

$$= 996 \text{ vehicles per hour}$$

$$\bar{T}_n = T_n - \frac{60(O_n - P_n)}{V_n} = 2.61 - \frac{60(1.5 - 1.0)}{1336}$$

$$= 2.59 \text{ minutes}$$

$$\bar{T}_s = T_s - \frac{60(O_s - P_s)}{V_s} = 2.42 - \frac{60(0.5 - 1.0)}{996}$$

$$= 2.45 \text{ minutes}$$

$$S_n = \frac{60d}{T_n} = \frac{60 \times 0.75}{2.59} = 17.4 \text{ miles per hour}$$

$$S_s = \frac{60d}{T_s} = \frac{60 \times 0.75}{2.45} = 18.4 \text{ miles per hour}$$

However, in our case certain adjustments had to be made in view of the following:-

(1) The survey was restricted to estimation of travel times only

(2) On a dual carriageway the opposing traffic on the other carriageway seems to have little relevance and therefore can be ignored.

(3) Effort was made to equate the number of overtaking and overtaken vehicles while living within the regulatory framework pertaining to speed restriction etc.

(4) Even on section where there is a single carriageway, the effect get minimized because of the little difference between O & P as mentioned at sub-para (3) above. The contribution of this factor may at the most be 1.3% and can be ignored as found from the literature.

The travel time survey of commercial vehicles i.e. Buses & Trucks has been conducted for N-5 between Peshawar & Karachi using Moving Vehicle Observer Method. This method is based on following the travel speed of the stream. The observer using a separate vehicle follows the vehicles on the road and does not over take them, unless he is over taken by the other vehicles. In this method, the total number of vehicles overtaking the vehicle of the observer should be equal to the total number of vehicles overtaken by the observer. During the present survey the travel time of trucks and buses has been worked out separately in each direction by using a double cabin pickup through the Moving Vehicle Method. The maximum permissible speed and the restricted speed limits were followed by the observer during the survey. In many cases the commercial vehicles mainly buses were found exceeding the speed limits. In some cases the observer was not able to overtake the same number of vehicles as the overtaking vehicles because of speed limit violations by commercial vehicles. One such example is operating speed of all overtaking buses noted beyond permissible limits on the Hyderabed – Karachi section. In order to make the survey precise and feasible and taking into account the appropriate length of the sections, the entire route was divided into nine sections. In this way two runs were made for each category - one in the north bound and second in the south bound direction of each section. The observations thus taken do not include those vehicles which were found stationery at the time of observation. The survey proformae used for determination of travel time of each category at each section are Annexed. Direction wise detail of travel time and average speed of Buses and Trucks may be seen in Table-1.

❖ **Travel Time Survey of Buses**

The travel time survey of buses includes travel data of all Air-conditioned and non Air-conditioned buses (20 – 30 seats coaches & more than 50 seats buses) plying on intercity and long routes. The local buses were not included in the survey. The survey also included Hiace (Wagons), but this category is plying on a few sub-sections i.e. Rawalpindi – Peshawar and Rawalpindi - Lahore.

❖ **Travel Time Survey of Trucks**

The travel time survey of trucks includes travel data of all 2 axles and multi axles trucks (3 axles to 6 axles). All oil tankers and dumpers have been included in the survey. The mini trucks have not been included in the survey because of their light weights and relatively high and variable operating speeds.

Direction wise Travel Time Surveys

The travel time survey of commercial vehicles (buses & trucks) has been conducted in both directions i.e. north bound carriageway and south bound carriageway separately. This gives travel times and average speed of buses and trucks at each sub-section in each direction.

Section Wise Travel Time and Average Speed of Commercial Vehicles (Buses & Trucks) At N-5 (2006) (Table-1)

Section	Distance Kms	Travel Time		Avg Spd. Kph.		Start Point	End Point
		Bus	Truck	Bus	Truck		
	2006	2006 Hrs - Min	2006 Hrs - Min	2006	2006		
Peshawar – Rawalpindi	150	2 - 15	3 - 17	67	45	Islamabad Interchange	FC Fort Peshawar
Rawalpindi Bypass	18	0 - 20	0 - 30	54	36	Islamabad Interchange	Faizabad Interchange
Rawalpindi – Lahore	277	3 - 55	7 - 35	71	37	Faizabad Intechange	Ravi Toll Plaza
Lahore Bypass	20	0 - 14	0 - 30	80	40	Ravi Toll Plaza	Thokar Niaz Baig
Lahore – Multan	325	4 - 10	7 - 30	78	43	Tokhar Niaz Baig	Chowk Kumharan Multan
Multan - Sadiqabad	300	5 - 12	8 - 30	57	35	Chowk Kumharan Multan	Sadiqabad Bypass
Saidqabad – Sukkur	155	2 - 00	3 - 35	78	43	Sadiqabad Bypass	Rohri Bypass
Sukkur Hyderabad	325	4 - 25	8 - 20	74	39	Rohri Bypass	Rajputana Hospital Inter Change Hyd
Hyderabad – Karachi	144	1 - 55	3 - 00	75	48	Rajputana Hospital Inter Change Hyd	Sohrab Goth Karachi
Total	1714	24 – 30	42 - 47	70	40	Peshawar	Karachi

Section Wise Travel Time and Average Speed of Commercial Vehicles (Buses & Trucks) At N-5 (2003) (Table-2)

Section	Distance Kms	Travel Time		Avg. Spd. Kph		Start Point	End Point
		Bus	Truck	Bus	Truck		
	2003	2003 Hrs - Min	2003 Hrs - Min	2003	2003		
Peshawar - Rawalpindi	155	2 - 50	3 - 40	55	42	Islamabad Interchange	FC Fort Peshawar
Rawalpindi Bypass	18	0 - 20	0 - 35	54	31	Islamabad Interchange	Faizabad Interchange
Rawalpindi – Lahore	286	4 - 30	8 - 00	63	36	Faizabad Interchange	Ravi Toll Plaza
Lahore Bypass	20	0 - 15	0 - 30	80	40	Ravi Toll Plaza	Thokar Niaz Baig
Lahore – Multan	320	4 - 30	9 - 10	71	35	Tokhar Niaz Baig	Chowk Kumharan Multan
Multan - Sadiqabad	300	5 - 15	8 - 15	57	36	Chowk Kumharan Multan	Sadiqabad Bypass
Saidqabad – Sukkur	150	2 - 10	3 - 30	69	43	Sadiqabad Bypass	Rohri Bypass
Sukkur Hyderabad	350	4 - 50	9 - 30	72	37	Rohri Bypass	Rajputana Hospital Inter Change Hyd
Hyderabad – Karachi	147	1 - 40	3 - 10	88	46	Rajputana Hospital Inter Change Hyd	Sohrab Goth Karachi
Total	1746	26 - 20	46 – 20	66	38	Peshawar	Karachi

Direction Wise Travel Time and Average Speed of Commercial Vehicles (Buses & Trucks) At N-5 (2006) (Table-3)

Section	Distance Kms	North Bound Carriageway				South Bound Carriageway			
		Travel Time		Avg. Spd. Kph		Travel Time		Avg. Spd. Kph	
		Bus	Truck	Bus	Truck	Bus	Truck	Bus	Truck
	2006	2006 Hrs - Min	2006 Hrs - Min	2006	2006	2006 Hrs - Min	2006 Hrs - Min	2006	2006
Peshawar - Rawalpindi	150	2 - 15	3 - 15	67	46	2 - 20	3 - 20	64	45
Rawalpindi Bypass	18	0 - 20	0 - 27	54	40	0 - 20	0 - 35	54	31
Rawalpindi – Lahore	277	3 - 50	7 - 40	71	36	4 - 00	7 - 30	69	37
Lahore Bypass	20	0 - 15	0 - 30	80	40	0 - 15	0 - 30	80	40
Lahore – Multan	325	4 - 10	7 - 30	78	43	4 - 10	7 - 30	78	43
Multan – Sadiqabad	300	5 - 10	8 - 40	58	35	5 - 15	8 - 20	57	36
Saidqabad – Sukkur	155	2 - 00	3 - 40	77	42	2 - 00	3 - 30	77	44
Sukkur Hyderabad	325	4 - 30	9 - 00	72	36	4 - 20	7 - 40	75	42
Hyderabad – Karachi	144	1 - 55	3 - 00	75	48	1 - 55	3 - 00	75	48
Total	1714	24 - 25	43 - 28	70	39	24 - 35	41 - 55	70	41

Direction Wise Travel Time and Average Speed of Commercial Vehicles (Buses & Trucks) At N-5 (2003) (Table-4)

Section	Distance Kms.	North Bound Carriageway				South Bound Carriageway			
		Travel Time		Avg. Spd. Kph		Travel Time		Avg.Spd. Kph	
		Bus	Truck	Bus	Truck	Bus	Truck	Bus	Truck
	2003	2003 Hrs - Min	2003 Hrs - Min	2003	2003	2003 Hrs - Min	2003 Hrs - Min	2003	2003
Peshawar - Rawalpindi	155	2 - 45	3 - 50	56	40	2 - 50	3 - 30	55	44
Rawalpindi Bypass	18	0 - 20	0 - 35	54	31	0 - 18	0 - 32	60	34
Rawalpindi - Lahore	286	4 - 25	8 - 20	65	34	4 - 35	7 - 40	62	37
Lahore Bypass	20	0 - 15	0 - 30	80	40	0 - 13	0 - 30	93	40
Lahore - Multan	320	4 - 30	9 - 00	71	36	4 - 25	9 - 25	72	34
Multan – Sadiqabad	300	5 - 10	8 - 00	58	38	5 - 20	8 - 30	56	35
Saidqabad – Sukkur	150	2 - 10	3 - 20	69	45	2 - 10	3 - 40	69	41
Sukkur Hyderabad	350	4 - 45	9 - 15	74	38	4 - 55	9 - 45	71	36
Hyderabad - Karachi	147	1 - 40	3 - 00	88	49	1 - 40	3 - 25	88	43
Total	1746	26 - 00	45 - 50	67	38	26 - 26	46 - 57	66	37

Section Wise Travel Time and Average Speed of Commercial Vehicles (Buses & Trucks) At N-5 (2003 and 2006) (Table-5)

Section	Distance		Travel Time				Avg. Spd. Kph				Start Point	End Point
			Bus		Truck		Bus		Truck			
	Kms. 2003	Kms. 2006	2003 Hrs - Min	2006 Hrs - Min	2003 Hrs - Min	2006 Hrs - Min	2003	2006	2003	2006		
Peshawar - Rawalpindi	155	150	2 - 50	2 - 15	3 - 40	3 - 17	55	67	42	45	Islamabad Interchange	FC Fort Peshawar
Rawalpindi Bypass	18	18	0 - 20	0 - 20	0 - 35	0 - 30	54	54	31	36	Islamabad Interchange	Faizabad Interchange
Rawalpindi – Lahore	286	277	4 - 30	3 - 55	8 - 00	7 - 35	63	71	36	37	Faizabad Interchange	Ravi Toll Plaza
Lahore Bypass	20	20	0 - 15	0 - 14	0 - 30	0 - 30	80	80	40	40	Ravi Toll Plaza	Thokar Niaz Baig
Lahore – Multan	320	325	4 - 30	4 - 10	9 - 10	7 - 30	71	78	35	43	Tokhar Niaz Baig	Chowk Kumharan Multan
Multan - Sadiqabad	300	300	5 - 15	5 - 12	8 - 15	8 - 30	57	57	36	35	Chowk Kumharan Multan	Sadiqabad Bypass
Saidqabad - Sukkur	150	155	2 - 10	2 - 00	3 - 30	3 - 35	69	78	43	43	Sadiqabad Bypass	Rohri Bypass
Sukkur Hyderabad	350	325	4 - 50	4 - 25	9 - 30	8 - 20	72	74	37	39	Rohri Bypass	Rajputana Hospital Inter Change Hyd
Hyderabad – Karachi	147	144	1 - 40	1 - 55	3 - 10	3 - 00	88	75	46	48	Rajputana Hospital Inter Change Hyd	Sohrab Goth Karachi
Total	1746	1714	26 - 20	24 – 30	46 – 20	42 - 47	66	70	38	40	Peshawar	Karachi

Comparison of Travel Time and Average Speed between 2003 and 2006 (Table-6)

Peshawar to Karachi	2003	2006	Saving	%age Saving
Travel Time of Buses	26 Hours 20 Minutes	24 Hours 30 Minutes	1 Hours 50 Minutes	7
Travel Time of Trucks	46 Hours 20 Minutes	42 Hours 47 Minutes	3 Hours 44 Minutes	8
Average Speed of Buses	66 kph	70 kph	4 kph	6
Average Speed of Trucks	38 kph	40 kph	2 kph	5

Direction Wise Travel Time and Average Speed of Commercial Vehicles (Buses & Trucks) At N-5 (2003 and 2006) (Table-7)

Section	Distance Kms.		North Bound Carriageway								South Bound Carriageway							
			Travel Time				Avg. Spd. Kph				Travel Time				Avg.Spd. Kph			
			Bus		Truck		Bus		Truck		Bus		Truck		Bus		Truck	
	2003	2006	2003 Hrs - Min	2006 Hrs - Min	2003 Hrs - Min	2006 Hrs - Min	2003	2006	2003	2006	2003 Hrs-Min	2006 Hrs-Min	2003 Hrs-Min	2006 Hrs-Min	2003	2006	2003	2006
Peshawar – Rawalpindi	155	150	2 - 45	2 - 15	3 - 50	3 - 15	56	67	40	46	2 - 50	2 - 20	3 - 30	3 - 20	55	64	44	45
Rawalpindi Bypass	18	18	0 - 20	0 - 20	0 - 35	0 - 27	54	54	31	40	0 - 18	0 - 20	0 - 32	0 - 35	60	54	34	31
Rawalpindi – Lahore	286	277	4 - 25	3 - 50	8 - 20	7 - 40	65	71	34	36	4 - 35	4 - 00	7 - 40	7 - 30	62	69	37	37
Lahore Bypass	20	20	0 - 15	0 - 15	0 - 30	0 - 30	80	80	40	40	0 - 13	0 - 15	0 - 30	0 - 30	93	80	40	40
Lahore – Multan	320	325	4 - 30	4 - 10	9 - 00	7 - 30	71	78	36	43	4 - 25	4 - 10	9 - 25	7 - 30	72	78	34	43
Multan – Sadiqabad	300	300	5 - 10	5 - 10	8 - 00	8 - 40	58	58	38	35	5 - 20	5 - 15	8 - 30	8 - 20	56	57	35	36
Saidqabad – Sukkur	150	155	2 - 10	2 - 00	3 - 20	3 - 40	69	77	45	42	2 - 10	2 - 00	3 - 40	3 - 30	69	77	41	44
Sukkur Hyderabad	350	325	4 - 45	4 - 30	9 - 15	9 - 00	74	72	38	36	4 - 55	4 - 20	9 - 45	7 - 40	71	75	36	42
Hyderabad – Karachi	147	144	1 - 40	1 - 55	3 - 00	3 - 00	88	75	49	48	1 - 40	1 - 55	3 - 25	3 - 00	88	75	43	48
Total	1746	1714	26 - 00	24 - 25	45 - 50	43 - 28	67	70	38	39	26 - 26	24 - 35	46 - 57	41 - 55	66	70	37	41

Findings & Observations

The total distance recorded from Peshawar to Karachi during the survey has been 1714 kilometers. The out come of the travel time survey shows that from Peshawar to Karachi the average travel time of the buses is 24 hours 28 minutes giving an average speed of 70 kilometers per hour. The average travel time of the trucks has been found to be 42 hours 47 minutes giving an average speed of 40 kilometers per hour. The loaded trucks were generally found traveling at a creeping speed of around 30 kilometers per hour. The speed of the overloaded trucks has been found dropping below 20 kilometers per hour at ascending gradients. The empty trucks were generally found traveling over 50 kilometers per hour. The buses have been found traveling at the maximum permissible speed limits and on many sections buses were found operating beyond the permissible speed limit. The highest speed of buses has been found on Lahore Bypass section where average speed noted as 88 kilometers per hour. The highest speed of trucks was noted 48 kph on Hyderabad – Karachi Section. The minimum average speed of buses was recorded on the Rawalpindi – By Pass section and the speed has been 54 kilometers per hour. The lowest speed of trucks was noted as 35 kph on Multan – Sadiqabad Section. The section wise detail about the travel time is as follows:-

Section Wise Travel Time and Average Speed

1. Peshawar – Rawalpindi

The travel time survey on Rawalpindi – Peshawar section was conducted on 17 and 18th January 2006. The length of the section starting from Islamabad Interchange (Coca Cola Factory) and terminating at FC Fort (Peshawar) is 150 kilometers. The average time taken by the buses is 2 hours & 17 minutes giving an average speed of 67 kilometers per hour. The average time taken by the trucks on this section is 3 hours 17 minutes and the average speed of the trucks comes out to be 45 kilometers per hour. The average speed of the trucks has been found reasonably good mainly because of friendly gradients of the road at this section.

2. Rawalpindi – Islamabad

The travel time survey at Rawalpindi - Islamabad section was conducted on 17th & 18th January, 2006. The length of the section (Rawalpindi by pass) starting from Islamabad interchange (Coca Cola Factory) and terminating at Faizabad interchange is 18 kilometers. The average time taken by the buses is 20 minutes giving an average speed of 54 kilometers per hour. The average time taken by the trucks on this section is 30 minutes and the average speed of the trucks comes out to be 36 kilometers per hour. The average speed of the buses and trucks is on the lower side mainly because of traffic congestion from Faizabad to Peshawar More.

3. Rawalpindi – Lahore

The travel time survey on Rawalpindi – Lahore section was conducted on 29th December, 2005, 9th January 2006 and 14th and 16th January, 2006. The length of the section starting from Faizabad interchange and terminating at Ravi Toll Plaza is 277 kilometers. The average time taken by the buses is 3 hours & 55 minutes giving an average speed of 71 kilometers per hour. The average time taken by the trucks on Rawalpindi – Lahore Section is 7 hours and 35 minutes and the average speed of the trucks has been found 37 kilometers per hour. The average speed of the buses is reasonably good mainly because of improvements at the build up areas on this sub-section. The average speed of the trucks have been found on the lower side and the reason being some of the steep gradients between Rawalpindi and Kharian section.

4. Lahore Bypass

The travel time survey on Lahore By Pass was conducted on 29th December 2005 and 14th January, 2006. The length of the sub-section starting from Ravi Toll Plaza and terminating at Thokar Niaz Baig Interchange via Bund Road is

20 kilometers. The average time taken by the buses is 14 minutes giving an average speed of 80 kilometers per hour. The average time taken by the trucks on this section is 30 minutes and the average speed of the trucks comes out to be 40 kilometers per hour. The average speed of both category of commercial vehicles has been found good due to improvement of bund road and provision of Lahore By Pass as art of the Motorway between Babu – Sabu and Thokar Niaz Baig.

5. Lahore – Multan

The travel time survey on Lahore – Multan sub-section was conducted on 30th December 2005, 8th January 2006 and 15th January, 2006. The length of this section starting from Tokhar Niaz Baig and ending at Multan By Pass is 325 kilometers. The average time taken by the buses is 4 hours & 10 minutes giving an average speed of 78 kilometers per hour. The average time taken by the trucks on this section is 7 hours 30 minutes and the average speed of the trucks has been found as 43 kilometers per hour. The average speed is reasonably high mainly because of geometric improvements and provision of by passes at the build up centers on this section.

6. Multan – Sadiqabad

The travel time survey on Multan – Sadiqabad section was conducted on 31st December 2005, 1st January, 2006 and 8th January 2006. The length of this sub-section starting from Multan by Pass and terminating at Sadiqabad By Pass is 300 kilometers. The average time taken by the buses is 5 hours & 12 minutes giving an average speed of 57 kilometers per hour. The average time taken by the trucks on this section is 8 hours 30 minutes and the average speed of the trucks has been found 35 kilometers per hour. The average speed of both the categories (buses & trucks) has been found on the lower side mainly because of road deterioration and construction activities.

7. Sadiqabad – Sukkur

The travel time survey on Sadiqabad – Sukkur section was conducted on 1st January 2006, 2nd January 2006 and 8th January, 2006. The length of the section starting from Sadiqabad by Pass and terminating at Rohri Toll Plaza is 155 kilometers. The average time taken by the buses is 2 hours giving an average peed of 78 kilometers per hour. The average time taken by the trucks on this section is 3 hours 35 minutes and the average speed of the trucks has been found 43 kilometers per hour. The average speed of both the categories (buses & trucks) has been found reasonably high and the reason being the improvement of riding quality.

8. Sukkar – Hyderabad

The travel time survey on Sukkur – Hyderabad section was conducted on 3rd, 4th,5th and 7th January 2006. The length of the section starting from Rohri by Pass and terminating at Rajputana Hospital Interchange (Hyderabad) is 325 kilometers. The average time taken by the buses is 4 hours & 25 minutes giving an average speed of 74 kilometers per hour. The average time taken by the trucks on this section is 8 hours 20 minutes and the average speed of the trucks has been found 39 kilometers per hour.

9. Hyderabad – Karachi

The travel time survey on Hyderabad – Karachi section was conducted on 5th, 6th and 7th January, 2006. The length of the section starting from Rajputana Hospital Interchange (Hyderabad) and terminating at Sohrab Goth is 144 kilometers. The average time taken by the buses is 1 hour & 55 minutes giving an average speed of 75 kilometers per hour. The average time taken by the trucks on this section is 3 hours giving an average speed of 48 kilometers per hour. The average speed of both the categories of commercial vehicles (buses & trucks) has been found reasonably good on this section.

ANNEXEURES

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Rawalpindi — Peshawar

Start Point Islamabad Interchange End Point F.C fort Peshawar

Date: 18-1-2006 Day Wednesday

Distance: 150 Kms VehicleType: Buses

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Rawalpindi	Peshawar	0950	1205	2-15	7	7
2	Peshawar	Rawalpindi	1230	1450	2-20	10	10

Average Time	2 hrs 15 minutes
Total Distance	150 Kms
Speed KPH	67

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Rawalpindi – Peshawar

Start Point Islamabad Interchange End Point F.C Fort Peshawar

Date: 17-01-2006 Day Tuesday

Distance: 150 Kms VehicleType: Trucks

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Rawalpindi	Peshawar	0930	1245	3-15	13	13
2	Peshawar	Rawalpindi	1445	1805	3-20	10	10

Average Time	3 hrs 20 minutes
Total Distance	150
Speed KPH	45

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Rawal Pindi By Pass

Start Point Islamabad Interchange End Point Faizabad Interchange

Date: 18-01-2006 Day Wednessday

Distance: 18 Kms VehicleType: Buses

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Islamabad Interchange	Faizabad Interchange	0930	0950	0-20	3	3
2	Faizabad Interchange	Islamabad Interchange	1500	1520	0-20	2	2

Average Time	20 minutes
Total Distance	18 Kms
Speed KPH	54

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TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Rawalpindi By Pass

Start Point Islamabad Interchange End Point Faizabad Interchange

Date: 17-01-2006 Day Tuesday

Distance: 18 Kms VehicleType: Trucks

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Islamabad Interchange	Faizabad Interchange	1835	1910	0-35	7	7
2	Faizabad Interchange	Islamabad Interchange	0903	0930	0-27	10	10

Average Time	30 minutes
Total Distance	18 Kms
Speed KPH	36

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Rawalpindi – Lahore

Start Point Faizabad Interchange End Point Ravi Toll Plaza

Date: 09/01/06 and 14-01-06 Day Monday and Saturday

Distance: 277 Kms VehicleType: Buses

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Faizabad interchange	Ravi Toll Plaza	1030	1430	4-00	17	17
2	Ravi Toll Plaza	Faizabad interchange	0900	1250	3-50	15	15

Average Time	3 hrs 55 minutes
Total Distance	277
Speed KPH	71

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Rawalpindi - Lahore

Start Point Faizabad interchange End Point Rani Toll Plaza

Date: 29-12-2005/16/01/06 Day Thursday & monday

Distance: 277 Kms VehicleType: TRUCKS

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Faizabad interchange	Rani toll Plaza	0900	1630	7-30	62	62
2	Rani Toll Plaza	Faizabad interchange	1030	1800	7-30	51	51

Average Time	7 Hrs 30 minutes
Total Distance	277 Kms
Speed KPH	37

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Lahore Bypass

Start Point Ravi Toll Plaza End Point Thokar Niaz Baig

Date: 14-01-2006 Day Saturday

Distance: 20 Kms VehicleType: Buses

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Ravi Toll Plaza	Thokar Niaz Baig	1430	1445	0-15	3	3
2	Thokar Niaz Baig	Ravi Toll Plaza	1500	1515	0-15	7	7

Average Time	15 minutes
Total Distance	20 Kms
Speed KPH	80

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Lahore By Pass

Start Point Ravi Toll Plaza End Point Thokar Niaz Baig

Date: 29-12-05 ~~07~~ Day Thursday

Distance: 20 kms VehicleType: Trucks

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Ravi Toll Plaza	Thokar Niaz Baig	1630	1700	0-30	3	3
2	Thokar Niaz Baig	Ravi Toll Plaza	1700	1730	0-30	8	8

Average Time	30 minutes
Total Distance	20
Speed KPH	40

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Lahore – multan

Start Point Thokar Niaz Baig End Point Chowk Kumhgaran multan

Date: 8-01-06 and 15-01-06 Day Sunday

Distance: VehicleType: Buses

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Chowk Kumharan multan	Thokar Niaz Baig	1650	2100	4-10	8	8
2	Thokar Niaz Baig	Chowk Kumharan multan	0820	1230	4-10	5	5

Average Time	4 hours 10 minutes
Total Distance	325 Kms
Speed KPH	78

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Lahore - multan

Start Point Thokar Niaz Baig End Point Chowk Kumharan multan

Date: 30-12-05 & 15-01-06 Day Friday and Sunday

Distance: 325 Kms VehicleType: Trucks

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Thokar Niaz Baig	Chowk Kumharan multan	0900	1630	7-30	40	40
2	Chowk Kumharan multan	Thokar Niaz Baig	1300	2030	7-30	33	33

Average Time	7 hrs 30 minutes
Total Distance	325 Kms
Speed KPH	43

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Multan – Sadiqabad

Start Point Chowk Kumharan multan End Point Sadiqabad By pass

Date: 01-01-06 and 8-01-06 Day Sunday

Distance: 300 Kms VehicleType: Buses

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Chowk Kumharan multan	Sadiqabad By pass	0930	1445	5–15	8	8
2	Sadiqabad Bypass	Chowk Kumharan multan	1030	1540	5–10	11	11

Average Time	5 hrs 12 min
Total Distance	300 Kms
Speed KPH	57

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Multan – Sadiqabad

Start Point Chowk Kumharan multan End Point Sadiq abad By Pass

Date: 31-12-05 Day Saturday

Distance: 300 Kms VehicleType: Trucks

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Chowk Kumharan multan	Sadiq abad By Pass	0630	1450	8-20	52	52
2	Sadiq abad By Pass	Chowk Kumharan multan	1515	2355	8-40	40	40

Average Time	8 hrs 30 minutes
Total Distance	300 Kms
Speed KPH	35

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Sadiqabad – Sukkur

Start Point Sadiqabad Bypass End Point Sukkur Toll Plaza

Date: 2-01-06 and 8-01-06 Day Monday and Sunday

Distance: 155 Kms VehicleType: Buses

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Sadiqabad Bypass	Sukkur Toll Plaza	1330	1530	2-00	4	4
2	Sukkur Toll Plaza	Sadiqabad Bypass	0830	1030	2-00	3	3

Average Time	2 hrs
Total Distance	155 Kms
Speed KPH	78

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TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Sadiqabad – Sukkur

Start Point Sadiqabad Bypass End Point Sukkur Toll Plaza

Date: 01-01-06 and 02-01-06 Day Sunday and Monday

Distance: 155 kms VehicleType: Trucks

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Sadiqabad bypass	Sukkur Toll Plaza	1500	1830	3-30	39	39
2	Sukkur Toll Plaza	Sadiqabad Bypass	0900	1240	3-40	54	54

Average Time	3 hrs 35 minutes
Total Distance	155 Kms
Speed KPH	43

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section SUKKUR – Hyderabad

Start Point Sukkur Toll Plaza End Point Rajputana hospital Hyderabad.

Date: 5-01-06 and 7-01-06 Day Thursday and Saturday

Distance: 325 Kms VehicleType: Buses

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Sukkur Toll Plaza	Rajputana hospital interchange	0900	1320	4-20	12	12
2	Rajputana hospital interchange	Sukkur Toll Plaza	~~0915~~ 1200	1630	4-30	7	7

Average Time	4 hrs 25 minits
Total Distance	325 kms
Speed KPH	74

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TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Sukkur – Hyderabad

Start Point Sukkur Toll Plaza End Point Rajputana hospital interchange

Date: 3-01-06 and 4-01-06 Day Tuesday and Wednesday

Distance: 325 Kms VehicleType: Trucks

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Sukkur Toll Plaza	Rajputana hospital interchange	0800	1540	7-40	46	46
2	Rajputana hospital interchange	Sukkur Toll plaza	0830	1730	9-00	103	103

Average Time	8 hrs 20 minutes
Total Distance	325 kms
Speed KPH	39

TRAVEL TIME SURVEY

Karachi - Peshawar (N-5)

Section Hyderabad – Karachi

Start Point Rajputa hospital interchange End Point Sohrab Goth

Date: 6-01-06 and 7-01-06 Day friday and saturday

Distance: 144 Kms VehicleType: Buses

RUN	DIRECTION		JOURNEY			VEHICLES	
	From	To	Start Time	Finished Time	Duration	Overtaking	Overtaken
1	Rajputana hospital interchange	Sohrab Goth	1230	1425	1-55	5	5
2	Sohrab Goth	Rajputana hospital interchange	0905	1100	1-55	8	8

Average Time	1 hr 55 minutes
Total Distance	144 Kms
Speed KPH	75