CHAPTER - II

PHYSICAL PERFORMANCE OF GSRTC

INTRODUCTION :

Public enterprises in India constitute a major national capability in terms of their scale of operation, coverage of national economy, technological capabilities and stock of human capital. Public enterprises in India operate at the three levels of administration: central, state and municipal. State level enterprises are an important segment of public enterprise in India, being vital instruments of public policy for the states. There has been a spectacular growth in the number of these enterprises and investment in them since fifties.[1] There are over a thousand public enterprises, about 700 of which are owned by the states. Among the state owned enterprises, the State Road Transport Undertakings are important in their contribution towards growth of the states. Different categories of public enterprises function in a different way and therefore they should be treated separately. State Road Transport Undertakings constitute an important part of Indian public sector.

SURVEY OF LITERATURE :

The philosophy of public sector has largely been to accelerate the rate of social and economic development. It is

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1. T.L. Sankar and Others : "State Level Public Enterprises in India; An overview", Economic and Political Weekly, 25th February 1989, Pp. M 33-M 40.

generally believed that the public enterprises are not run for financial profit but for creating industrial instrument for economic development of the country. The Government of India has established large number of enterprises in public utility areas. There has been a tendency on the part of experts, researchers and public to ignore the aspects of social profitability of public sector undertakings. A major thrust by and large has been to condemn an enterprise which has incurred financial losses, even though some economic and social benefits might have occurred in the process. It may be mentioned that Indian Economy seems to have reached a stage where public enterprises are expected to earn financial profits without substantially sacrificing their own commitments.[2]

The Arjun Sengupta Committee Report [1986] to review policy for public enterprises stated that public enterprises pursue a number of objectives simultaneously and a single measure of performance is difficult to specify. However there are certain objectives which are common and these should form the basis for general performance criteria. These general criteria may fall into four groups.

[1] Financial performance

[2] Productivity and cost reduction

[3] Technical dynamism

[4] Effectiveness of project implementation[3]

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2. Inder Jit Singh : Transport Economy, Comparative Study of Punjab and Haryana Roadways, Anmol Publication Pvt. Ltd., New Delhi, 1995, P.54.
3. Standing Conference of Public Enterprise : Reports/ Recommendations of various Committees on Public Enterprises, New Delhi, 1990, Pp.53-54.

Over and above this, various economists have opined on the measurement of performance of public enterprise. P. Sargent Florence and Gilbert Walker suggested alternative tests of appraising efficiency of Nationalised Industries as follows.[4]

[1] The growth of productivity

[2] Growth in staff employed

[3] Industrial morale and goodwill

[4] Keeping out of trouble.

P.H. Appleby[5] argued that the efficiency of public enterprises should be measured according to the criterion of citizen satisfaction.

Dr. Om Prakash[6] suggested following approaches to measure the performance of public sector enterprise.

[1] Profit and Loss Account Approach : A Conventional approach which takes into consideration profits and dividends.

[2] Balance Sheet Approach : It contemplates a comparative study of a corporation at two dates to determine the progress of that corporation during the intervening period.

[3] Fiscal Approach : It includes aggregation of contribution made by each unit to the state exchequer in the form of dividend on shares, interest on loans, taxes.

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4. P. Sargent F. and Gilbert Walker : Efficiency Under Nationalization and Its Measurement, 1952, Pp.19-33.

5. Paul H. Appleby : "Efficiency in the Public Sector" quoted by V.V. Ramanadhan, [ed.] Pricing, Labour and Efficiency in Public Sector, 1962, P.57.

6. Om Prakash : The Theory and Working of State Cooperation, George Allen & Unwin, London, 1962, Pp.183-184.

[4] Employment Approach : It studies employment provision by an enterprise enforcing reasonable standard of wages providing better working and living conditions and arranging for a higher standard of welfare facilities.

[5] Productivity Approach : It signifies increase in output which are not accountable by increase in the quantity of inputs.

[6] Cost Accounting Approach : It indicates cost per unit in various departments of a unit.

[7] Development and Stability Approach : It implies fulfillment of various requisite statutory obligations of developing a particular industry or service to the best advantage of society.

In this respect B.H. Dholakia[7] has rightly pointed out that the controversy regarding alternative criteria for evaluating the efficiency of public enterprises stems from the fact that the performance of public enterprises can be viewed from several angles.

In the light of this, the present study attempts to examine Physical and Financial Performance of GSRTC during 1960-61 to 1994-95.

This chapter deals with Physical performance of GSRTC.

The performance of State Road Transport Undertaking is generally viewed in terms of various criteria. These mainly form two groups: Physical Performance and Financial Performance. The

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7. B.H. Dholakia : The Changing Efficiency of Public Enterprises in India, Somaya Publication Pvt. Ltd., Bombay, 1980, P.3.

physical performance of various state road transport undertakings have been examined in a few studies and majority of them concentrates on the following parameters[8].

[a] Bus Staff Ratio

[b] Kms. per bus per day

[c] Vehicle utilisation

[d] Passenger carried per bus per day

[e] Kms. Per litre of oil

[f] Number of Breakdowns

[g] Number of accidents

[h] Kms. per employee.

Among various studies, the detailed studies are available on Punjab and Haryana Roadways, Pepsu Road Transport Corporation, Andhra Pradesh State Road Transport Corporation, Rajasthan State Road Transport Corporation, North Bengal State Road Transport Corporation, Kerala State Road Transport Corporation, Madhya Pradesh State Road Transport Corporation, Tamil Nadu State Road Transport Corporation etc.

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8. Dalvi M.O. & Shrinivasan R.C. : "Productivity in Road Transport", Journal of Transport Management, January 1983, P.15.

- Jain N.C. :"Performance Appraisal System in SRTC", Journal of Transport, May-April 1986, P.73.

- Mahesh Chand :"Performance Analysis of Kerala State Road Transport",Indian Journal of Transport Management, April, 1986. P.415.

- S.K. Arora : Economics of Management in Road Transport Industry, Deep & Deep Publication, New Delhi, 1987.

- Gundam Rajeshwari : "Public Sector Performance, The Case of APSRTC", Abstracted Doctoral Dissertation Finance India, Vol.IX, No.2, June 1995, Pp. 431-438.

Separately, summarizing few studies it can be stated that some of the State Road Transport Undertakings have shown improvement in terms of physical performance over a period of time e.g. a study by Bidhi Chand & S.C. Vaidya[9] shows that not only number of buses held, scheduled kms. Effective kms. covered, number of routes operated, strength of the staff have improved with the passage of time but they also find improvement in kms. per vehicle on road per day, kms per employee per day, kms. per litre of oil and fall in rate of breakdowns and accidents during 1978-79 to 1989-90 in case of Punjab Road Transport and Pepsu Road Transport. A study on Delhi Transport Corporation by Taranjeet Singh Chopra[10] also shows improvement in percentage of fleet utilization, kms. per bus per day, kms. per employee per day during 1971-72 to 1988-89 and studies relating to Haryana, APRSTC, North Bengal, Kerala, Meghalaya SRTCS observed improvement over a period of time in above mentioned parameters.

A Study by Inder Jit Singh[11] shows the vehicle utilization has increased from 180 km. in 1973-74 to 235 Km. in 1988-89 and during the same period staff employed per 100 kms

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9. Bidhi Chand and S.C. Veidya : "Performance of State Road Transport Undertakings in Punjab", in Indian Transport System,, ed. by P. Jegadish Gandhi & G. John Gunaseelan, Mittal Publications, New Delhi 1994, Pp.130-147.

10. Taran Jeet Singh : "Delhi Transport Corporation - Performance and Prospects" in Indian Transport System ed. by P. Jagadis Gandhi & G. John Gunaseelan, Mittal Publications, New Delhi, 1994, Pp.243 - 251.

11. Inderjeet Singh : Transport Economy : Comparative Study of Punjab and Haryana Road Ways, Anmol Publication Pvt. Ltd. New Delhi, 1995.

operation has declined from 2.82 in 1973-74 to 2.26 in 1988-89 in case of Punjab Road ways. It is also found improvement in average kms. per litre of oil from 3.60 to 3.99 during the same period and fall in the breakdowns per 10,000 kms. from 0.967943 to 0.563775 and number of accidents per lakh kms. from 619 to 323.

The Table - II.1 summaries results of various studies on SRTCS in India. This table shows the approach of researchers to explain the performance of SRTC and trend in it.

It is to be noted that all these studies have examined almost similar variables and the trend in each variable separately explains performance of SRTCs in terms of that indicator.

The above table makes it clear that there are six to seven indicators which are selected by various researchers to examine physical performance of different state road transport corporations. It is observed from the table that the period of study is not identical for all SRTCs and trend in the indicator of the physical performance is not same for all SRTCs. The increase in Bus Staff Ratio indicates improvement in performance. This ratio has increased in case of Punjab S.T., PRTC, APSRTC, GSRTC, RSRTC & Punjab Roadways whereas decline is observed in case of Haryana roadways, Nagaland SRTC, Manipur SRTC, North Bengal Road Transport corporation etc. However, the improvement

TABLE - II.1

PERFORMANCE OF SRTCS IN INDIA

Sr. No.	SRTC and Work by	Indicators	Period of Study	
			1973-74	1988-89
01.	Punjab Roadways By Inderjit Singh[12]	[1] Staff Bus Ratio	5.08171	5.31706
		[2] Kms.obtain Per Lit. of Oil	3.60	3.99
		[3] Breakdowns Per 10,000 Kms.	0.96794	0.56377
		[4] Accidents Per lakh Kms.	0.66632	0.16211
		[5] Vehicle Utilisation Per Bus Per Day in Kms.	180	235
		[6] Passenger Carried Per Bus Per Day	247.82	343.80
			1973-74	1988-89
02.	Haryana Roadways By Inderjit Singh[13]	[1] Staff Bus Ratio	5.15	5.34
		[2] Kms.obtain Per Lit. of Oil	3.80	4.15
		[3] Breakdowns Per 10,000 Kms.	0.10167	0.13359
		[4] Accidents Per 1 lakh Kms.	0.23998	0.19022
		[5] Vehicle Utilisation Per Bus Per Day in Kms.	234	304
		[6] Passenger Carried Per Bus Per Day	212.12	425.15
			1974-75	1981-82
03.	Punjab S.T. By S.K. Arora[14]	[1] Staff Bus Ratio	5.37	4.93
		[2] Comparative Capacity Utilisation	85%	90%
		[3] Kms. Per litre of Oil	3.60	3.86
		[4] Breakdowns Per 10000 Kms.	1.00	0.66
		[5] Accidents Per 1 lakh Kms.	0.50	0.25
		[6] Vehicle Utilisation Per Bus Per Day	177	224
		[7] Passenger Carried Per Bus Per Day	257.08	361.35

12. Inderjit Singh : Transport Economy : Comparative Study of Harayana Road Ways, Pp. 47 - 114, Anmol Publication Pvt. Ltd. New Delhi, 1995.

13. Inderjit Singh : Ibid, Pp. 115 - 199.

14. S.K. Arora : Economics of Management in Road Transport Industry, Deep and Deep Publication, New Delhi, 1987, Pp. 59 - 103.

Table - II.1 Cont.

Sr. No.	SRTC and Work by	Indicators	Period of Study 1974-75	1981-82
04.	PRTC By S.K. Arora[15]	[1] Bus Staff Ratio	4.90	6.00
		[2] Comparative Capacity Utilisation	83.50	93.00
		[3] Kms. Per Litre of Oil	3.62	3.85
		[4] Breakdowns Per 10000 Kms.	0.70	0.98
		[5] Accidents Per 1 lakh Kms.	0.33	0.33
		[6] Vehicle Utilisation Per Bus Per Day	197.00	228.00
		[7] Passenger Carried Per Bus Per Day	277.72	359.70
			1974-75	1981-82
05.	Haryana S.T. By S.K. Arora[16]	[1] Bus Staff Ratio	5.50	5.30
		[2] Comparative Capacity Utilisation	95.00	95.00
		[3] Kms. Per Litre of Oil	3.90	4.15
		[4] Breakdowns Per 10000 Kms.	0.45	0.17
		[5] Accidents Per 1 lakh Kms.	0.21	0.18
		[6] Passenger Carried Per Bus Per Day	265.00	377.00
			1974-75	1981-82
06.	Manipur S.T. By S.K. Arora[17]	[1] Bus Staff Ratio	13.10	12.19[198
		[2] Comparative Capacity Utilisation	40.00	47.00[198
		[3] Kms. Per Litre of Oil	3.10	3.30
		[4] Breakdowns Per 10000 Kms.	4.73	3.05
		[5] Accidents Per 1 lakh Kms.	0.50	0.30
		[6] Passenger Carried Per Bus Per Day	156.00	85.00[1980

15. S.K. Arora : Ibid, Pp. 104 - 141.
16. S.K. Arora : Ibid, Pp. 142 - 168.
17. S.K. Arora : Ibid, Pp. 142 - 168.

Table - II.1 Cont.

Sr. No.	SRTC and Work by	Indicators	Period of Study	
			1974-75	1981-82
07.	Nagaland SRTC By S.K. Arora[18]	[1] Bus Staff Ratio	10.27	8.59 [1980-81]
		[2] Comparative Capacity Utilisation	58.89	56.33 [1980]
		[3] Kms. Per Litre of Oil	3.50	3.60 [1979]
		[4] Breakdowns Per 10000 Kms.	0.9 [1978-79]	1.20
		[5] Accidents Per 1 lakh Kms.	0.80 [1979-80]	0.90
		[7] Passenger Carried Per Bus Per Day	77 [1975-76]	37 [1980-81]
			1974-75	1981-82
08.	APSRTC By S.K. Arora[19]	[1] Bus Staff Ratio	10.317	11.003
		[2] Comparative Capacity Utilisation	86.98	88.00
		[3] Kms. Per Litre of Oil	4.00	4.11
		[4] Breakdowns Per 10000 Kms.	0.94	0.98
		[5] Accidents Per 1 lakh Kms.	0.31	0.19
		[6] Vehicle Utilisation Per Bus Per Day in Kms.	306.72	294.40
		[7] Passenger Carried Per Bus Per Day	506.00	609.00
			1974-75	1981-82
09.	Gujarat By S.K. Arora[20]	[1] Bus Staff Ratio	9.56	11.50
		[2] Comparative Capacity Utilisation	77.32	80.30
		[3] Kms. Per Litre of Oil	4.22	4.74
		[4] Breakdowns Per 10000 Kms.	0.95	0.60
		[5] Accidents Per 1 lakh Kms.	0.31	0.38
		[6] Vehicle Utilisation Per Bus Per Day in Kms.	269.90	303.90
		[7] Passenger Carried Per Bus Per Day	564	659

18. S.K. Arora : Ibid, Pp. 142 - 168.
19. S.K. Arora : Ibid, Pp. 104 - 141.
20. S.K. Arora : Ibid, Pp. 142 - 168.

Table II.1 Cont.

Sr. No.	SRTC and Work by	Indicators	Period of Study 1974-75	1981-82
10.	Rajasthan SRTC By S.K. Arora[21]	[1] Bus Staff Ratio	6.77	8.060
		[2] Comparative Capacity Utilisation	76.00	73.00
		[3] Kms. Per Litre of Oil	4.51	4.50
		[4] Breakdowns Per 10000 Kms.	0.50	0.70
		[5] Accidents Per 1 lakh Kms.	0.24	0.27
		[6] Vehicle Utilisation Per Bus Per Day in Kms.	279.00	277.00
		[7] Passenger Carried Per Bus Per Day	254	249
11.	North Bangal SRTC By S.K. Arora[22]	[1] Bus Staff Ratio	22.60	15.00
		[2] Comparative Capacity Utilisation	46.70	63.00
		[3] Kms. Per Litre of Oil	4.00	3.60
		[4] Breakdowns Per 10000 Kms.	1.20	1.50
		[5] Accidents Per 1 lakh Kms.	0.42	0.20
		[6] Vehicle Utiisation Per Bus Per Day in Kms.	231.40	210.00
		[7] Passenger Carried Per Bus Per Day	425	611
12.	Kerala SRTC By S.K. Arora[23]	[1] Bus Staff Ratio	11.10	9.37
		[2] Comparative Capacity Utilisation	78.70	76.60
		[3] Kms. Per Litre of Oil	4.00	3.70
		[4] Breakdowns Per 10000 Kms.	2.30	2.60
		[5] Accidents Per 1 lakh Kms.	2.30	2.20
		[7] Passenger Carried Per Bus Per Day	709	870

21. S.K. Arora : Ibid, Pp. 142 - 168.
22. S.K. Arora : Ibid, Pp. 104 - 141.
23. S.K. Arora : Ibid, Pp. 142 - 168.

Table - II.1 Cont.

Sr. No.	SRTC and Work by	Indicators	Period of Study	
			1978-79	1988-89
13.	Punjab Roadways By Bidhi Chand[24] and C. Vaidya	[1] Kms. Per litre of oil	3.70	4.00
		[2] Rate of Breakdowns Per 10.000 Effective Kms.	1.00	0.56
		[3] Incidence of Accidents Per 1 lakh Kms.	0.30	0.16
		[4] Kms. Per Vehicle on Road per day	229	245
			1978-79	1988-89
14.	Pepsu [PRTC] By Bidhi Chand[25] and C. Vaidya	[1] Kms. Per litre of oil	3.80 [1980-81]	3.88
		[2] Rate of Breakdowns Per 10.000 Effective Kms.	2.18	1.84
		[3] Incidence of Accidents Per 1 lakh Kms.	0.33	0.36
		[4] Kms. Per Vehicle on Road per day	226	270
			1960-61	1988-89
15.	G.S.R.T.C. By B.V. Acharya[26] and P.K. Bhatt	[1] Bus Staff Ratio	8.61	7.65
		[2] Percentage of Fleet Utilisation	68.09	85.09
		[3] Kms. Per Litre of Oil	4.28 [1970-71]	4.95
		[4] Breakdowns Per 10000 Kms.	1.37	0.43
		[5] Accidents Per 1 lakh Kms.	0.98	0.30
		[6] Vehicle Utilisation Per Bus Per Day	171.00	313.08

24. Bidhichand & Subhash C. Vaidya : "Transport Undertakings in Punjab" in Indian Transport System, Ed. by P. Jegadish Gandhi & G. John Gunaseelan, Meetal Publication, New Delhi, 1994, Pp. 130 - 147.

25. Bidhichand & Subhash C. Vaidya : Ibid, Pp. 130 - 147.

26. B.V. Acharya & P.K. Bhatt : "Gujarat Road Transport - Some Operational Aspects" in Indian Transport System Ed. by P. Jegadish Gandhi & G. John Gunaseelan, Meetal Publication, New Delhi, 1994, Pp. 175 - 183.

Table - II.1 Cont.

Sr. No.	SRTC and Work by	Indicators	Period of Study 1985-86	1990-91
16.	Meghalaya SRTC By Rakhee[27] Bhattacharjee	[1] Bus Staff Ratio	1.7	1.8
		[2] Comparative Capacity Utilisation	60%	73%
		[3] Kms. Per Litre of Oil	3.15	3.32
		[4] Accidents Per 1 lakh Kms.	0.9	0.7
		[5] Breakdowns Per 10000 Kms.	9.0	8.1

is observed with respect to kms. per litre of oil for all SRTCs mentioned in Table - II.1 except North Bengal Road Transport Corporation and Kerala State Road Transport Corporation. The improvement in vehicle utilization is observed in case of Punjab Road ways, Haryana Road ways, PRTC, GSRTC and Pepsu. Moreover the rates of breakdowns and accidents have declined for a majority of SRTCs. This shows that the physical performance has improved with the passage of time in terms of majority of indicators under consideration of SRTCs.

Moreover, a brief review of literature is also published in Transport Economy: Comparative Study of Punjab and Haryana Roadways by Inderjit Singh.

27. Rakhee Bhattacharjee : "Performance Evaluation of Meghalaya State Transport Corporation" in Indian Transport System Ed. by P. Jegadish Gandhi & G. John Gunaseelan, Meetal Publication, New Delhi, 1994, Pp. 184 - 190.

Kishore Rahi[28] has evaluated the trend of profit in terms of rate of return on capital invested, managerial efficiency in terms of route receipts, total effective kilometers covered, total cost and capital investment of Punjab Roadways and Ambala Bus syndicate Pvt. Ltd.

Patnkar's[29] study of passenger road transport reveals both administrative and economic inadequacies of the transport system. This study has recommended a rather realistic formulation of national transport policy and its execution by the various road transport undertakings.

The problem of evolving some guidelines on financing providing and maintaining passenger amenities is also examined by P. Sudarsanam[30].

Satyanarayana has observed that the cost of service of road transport depends upon the size of the fleet, vehicle condition, length and road condition.[31]

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28. Kishore Rahi : Performance of Public and Private Transport Undertakings - A Case Study of Punjab Roadways and Amabla Bus Syndicate Pvt. Ltd., M.Phil Dissertation, Punjab University, Chandigarh 1977.

29. P.G. Patnakar : Road Passenger Transport on India Central Institute of Road Transport, Pune, Year 1986.

30. P. Sudarsanam [ed] : Passenger Amenities in State Transport Undertakings, Central Institute of Road Transport, Pune, 1980.

31. J. Satyanarayana : "Cost Structure of Road Transport Industry", Transport Journal, March 1971, Pp. 19-20.

All these studies which evaluate physical performance of SRTC, treat each parameter separately. However in order to evaluate the overall physical performance it is necessary to examine trend in all parameters simultaneously which requires construction of one single index which takes care of all these parameters connected with physical performance. The present chapter attempts to construct the single index to explain the physical performance of GSRTC since its inception. Before we go into it, it is essential to throw light on some important parameters.

When GSRTC came into existence in 1960-61, there were 7 divisions and 76 depots. The number of divisions has almost doubled to 15 in 1994-95 and the number of depots have increased to 134. Not only that but the number of routes operated have tremendously increased from 1774 in 1960-61 to 18018 in 1994-95. It shows that the services provided in terms of routes have improved significantly over a period of time. The number of routes have increased at the rate of 23% per year. The performance of GSRTC can be examined in terms of number of villages directly served by GSRTC and this has also increased from 8682 [46.26%] in 1965-66 to 17395 [94.82%] in 1994-95. This shows that almost 95% of villages are directly benefiting from GSRTC. Over and above this the percentage of population enjoying the services of GSRTC has also increased from 74.85% in 1965-66. [154.43 lakhs] to 99.04% in 1993-94 [337.57 lakhs]. It is to be noted that almost all taluka headquarters are directly

TABLE - II.2

QUINQUENNIUM AVERAGE OF SELECTED INDICATORS

Year	No.of Fleet	Total Staff Empl-oyed	No. of Routes Opera-ted	No.of Break downs per 10000 kms.	No.of Accid-ents per lakh kms.	Opera-tional Kms. [Effe-ctiv Kms.]	No. of Passenger Travelled [Lakh]	No.of Divi-sions	No.of Depots
1	2	3	4	5	6	7	8	9	10
1960-61 to 1964-65	2152.4	14220.0	2237.6	1.128	0.824	951.602	1853.476	7.50	77.40
1965-66 to 1969-70	3182.0	21705.0	3886.8	0.488	0.558	1790.830	3559.470	9.60	82.40
1970-71 to 1974-75	4514.6	33279.8	6431.6	0.762	0.432	3041.236	6386.454	10.80	91.40
1975-76 to 1979-80	5712.8	42549.4	8724.6	0.654	0.352	4417.756	9649.78	13.80	107.80
1980-81 to 1984-85	7109.2	50087.2	12251.4	0.470	0.342	6060.076	12816.70	14.00	116.00
1985-86 to 1989-90	7861.0	49456.2	14941.2	0.398	0.296	7198.570	13173.03	14.40	123.00
1990-91 to 1994-95	8720.6	57273.8	13556.8	0.504	0.294	8552.480	13633.38	15.00	131.60

Source : Estimated on the basis of data published in Administration Reports of GSRTC and Statistics of GSRTC Corporation.

connected with capital city Gandhinagar and GSRTC also provides interstate services. This shows that the GSRTC is successful in providing its services to almost entire population of State of Gujarat. The Table - II.2 gives quinquennium averages of the following parameters.

The Table-II.2 gives some broad ideas about the working of GSRTC since 1960-61. It gives quinquennium averages of some of the parameters which give idea about the size of GSRTC and the extent of services rendered by GSRTC. The number of fleet has increased almost four times during 1960-61 - 1964-65 to 1990-91 - 1994-95. The average number of fleet during 1960-61 to 1964-65 was 2152.4 which has increased to 8720.6 in the last quinquennium covering the period of 1990-91 to 1994-95. Similarly the number of staff has increased by more than four times from 14220 to 57274. As against this the number of passenger travelled has increased by more than seven times during the period under considerations. It is also clear from Table-II.2 that the number of accidents per lakh kms. and number of breakdowns per 10,000 kms. have significantly declined with the passage of time.

INDICATORS OF PHYSICAL PERFORMANCE :

In order to examine the physical performance of GSRTC and trend in it the following parameters are considered.

[01] Bus Staff Ratio

[02] Percentage of Fleet Utilization

[03] Kms. Per litre of Oil

[04] Inverse of Breakdown Per 10,000 Kms.

[05] Inverse of Accident Per lakh Kms.

[06] Vehicle Utilization Per Bus Per Day.

[07] Passenger Carried Per Bus Per Day

[08] Effective Kms. Per Staff.

[01] BUS STAFF RATIO : Bus staff ratio is an important indicator of the performance of SRTC. With the increase in the Bus staff ratio the number of persons employed per bus goes on falling which indirectly implies that an organization is operating with less number of persons per bus, and to that extent it is more efficient. Though it is not the only indicator of the efficiency of SRTC it is an important one.

[02] PERCENTAGE OF FLEET UTILIZATION : This refers to the use of vehicles on road to the number of vehicles held by the divisions [excluding reclaimed buses kept in non use] multiplied by 100. The capacity of the road transport service is generally measured by strength of fleet or number of vehicles. However total number of buses are not utilized for scheduled services. Part of buses are kept in reserve. If the number of fleet increases without proportionate increase in scheduled services, it reduces the capacity of the SRTC to produce transport services. It is, therefore, the efficiency or productivity of SRTC increases with increase in the percentage of buses on scheduled services and therefore lower percentage of buses on

scheduled services would demonstrate a lower degree of efficiency or productivity.

[03] KILOMETRES PER LITRE OF OIL : This refers to the gross kms. covered by the vehicles during a given period divided by the consumption of fuel during the same period. The workshop consumption of fuel is not included in fuel consumption for calculating kilometres per litre of oil. It is required to evaluate the performance of road transport undertaking in terms of effective use of inputs e.g. diesel, lubricants and others oils. A higher number of kilometres mean a lower cost of production and therefore it should be regarded as higher level of efficiency.

[04] INVERSE OF BREAK DOWN PER 10,000 KMS. : The performance of SRTC can be examined in terms of breakdowns the transport corporation has. With the increase in the number of breakdowns the efficiency of transport undertaking deteriorates. The relative comparison over a period of time is not possible in terms of absolute number of breakdowns because total kms. of the undertaking has increased over a period of time. It is therefore breakdowns per ten thousand kms. is required to be estimated to have a comparative study over a period of time. With the fall in the breakdowns per 10,000 kms. there seems to be an improvement in the efficiency of SRTC. In otherwords with the increase in the inverse of breakdowns, the efficiency of GSRTC improves.

[05] INVERSE OF ACCIDENTS PER LAKH KMS. : Similarly the efficiency of SRTC is reflected in number of accidents suffered by it during the period under consideration. With the fall in the number of accident, the performance of SRTC improves. In order to have a comparative study, one has to estimate accidents per lakh kms.rather than in the absolute term. It implies that with the increase in the inverse of accidents per lakh km. the efficiency of GSRTC improves.

[06] VEHICLE UTILIZATION PER BUS PER DAY : This indicates gross kms. operated per vehicle on road per day. It is worked out by dividing the gross kms. done in a day by the number of vehicles on road during that day. The improvement in the performance is indicated through increase in the vehicle utilization per bus per day.

[07] PASSENGER CARRIED PER BUS PER DAY : The increase in the number of passengers carried represents services provided to the society. But this increase in the passenger is also accompanied by increase in the number of buses. But the passengers carried per bus per day is the better criterion of judging the efficiency of the undertaking.

08. EFFECTIVE KMS. PER STAFF : The total remunerative kms. operated is known as effective kms. In order to examine efficiency of staff in terms of kms., it is the total effective kms. divided by staff gives us effective kms. per staff and with increase in this, we observe improvement in efficiency of the organization.

TABLE - II.3

INDICATORS OF PHYSICAL PERFORMANCE OF GSRTC

Year	Bus Staff Ratio	Percentage of Fleet Utilisation	Kms. Per Litre of Oil	Inverse of Breakdowns Per 10,000 Kms.	Inverse of Accidents Per 1 Lakh Kms.	Vehicle Utilisation Per Bus Per Day	Passenger Carried Per Bus Per Day [Lakhs]	Kms. Per Staff
1	2	3	4	5	6	7	8	9
1960-61	0.156	68.90	4.19	0.73	1.02	171.40	0.0022	0.0632
1961-62	0.156	68.70	4.07	0.76	1.15	181.40	0.0022	0.0621
1962-63	0.147	72.10	4.06	0.89	1.32	190.70	0.0024	0.0646
1963-64	0.150	72.10	4.09	1.05	1.28	196.60	0.0024	0.0685
1964-65	0.150	70.60	4.16	1.12	1.37	201.80	0.0025	0.0736
1965-66	0.148	75.60	4.25	1.32	1.61	207.50	0.0027	0.0774
1966-67	0.142	77.30	4.19	1.85	1.61	212.70	0.0030	0.0792
1967-68	0.142	77.10	4.34	2.44	1.69	216.90	0.0032	0.0815
1968-69	0.151	77.80	4.43	2.44	1.87	221.30	0.0031	0.0871
1969-70	0.150	74.60	4.48	3.13	2.33	222.90	0.0033	0.0856
1970-71	0.139	78.50	4.28	1.69	2.33	233.90	0.0036	0.0879
1971-72	0.139	79.90	4.20	1.30	2.04	244.40	0.0038	0.0895
1972-73	0.134	80.10	4.29	1.49	2.38	257.00	0.0039	0.0934
1973-74	0.134	75.20	4.22	1.20	2.27	252.20	0.0038	0.0869
1974-75	0.134	79.60	4.22	1.05	2.63	268.40	0.0042	0.0978
1975-76	0.135	78.30	4.35	1.08	2.86	268.30	0.0042	0.0979
1976-77	0.133	79.00	4.44	2.63	2.86	271.60	0.0044	0.0992
1977-78	0.134	80.50	4.47	1.16	2.94	282.90	0.0046	0.1019
1978-79	0.134	81.90	4.52	1.64	2.78	289.30	0.0049	0.1076
1979-80	0.135	82.40	4.54	2.04	2.78	294.20	0.0049	0.1108
1980-81	0.133	81.40	4.66	1.85	2.63	205.80	0.0054	0.1098
1981-82	0.147	82.80	4.74	1.64	2.63	306.80	0.0051	0.1182
1982-83	0.138	80.50	4.73	2.38	3.23	305.10	0.0049	0.1195
1983-84	0.147	81.80	4.83	2.78	3.23	304.20	0.0048	0.1240
1984-85	0.155	82.40	4.86	2.38	3.03	308.40	0.0045	0.1340
1985-86	0.159	80.60	4.85	3.03	3.45	307.60	0.0044	0.1364
1986-87	0.164	82.60	4.90	2.63	3.57	310.80	0.0048	0.1437
1987-88	0.163	85.00	4.99	3.03	3.57	312.00	0.0044	0.1509
1988-89	0.157	85.80	4.95	2.33	3.33	313.80	0.0046	0.1480
1989-90	0.154	85.80	4.95	1.92	3.03	318.30	0.0047	0.1482
1990-91	0.151	87.00	4.98	1.85	3.03	316.60	0.0044	0.1416
1991-92	0.152	83.30	5.02	2.17	3.33	322.60	0.0044	0.1467
1992-93	0.155	86.30	4.99	2.17	3.57	325.80	0.0046	0.1444
1993-94	0.150	85.00	5.01	2.33	3.70	335.70	0.0040	0.1553
1994-95	0.153	85.80	4.84	1.59	3.45	331.00	0.0041	0.1578
C.V.	6.434	6.17	7.12	39.33	30.59	18.64	22.76	27.39

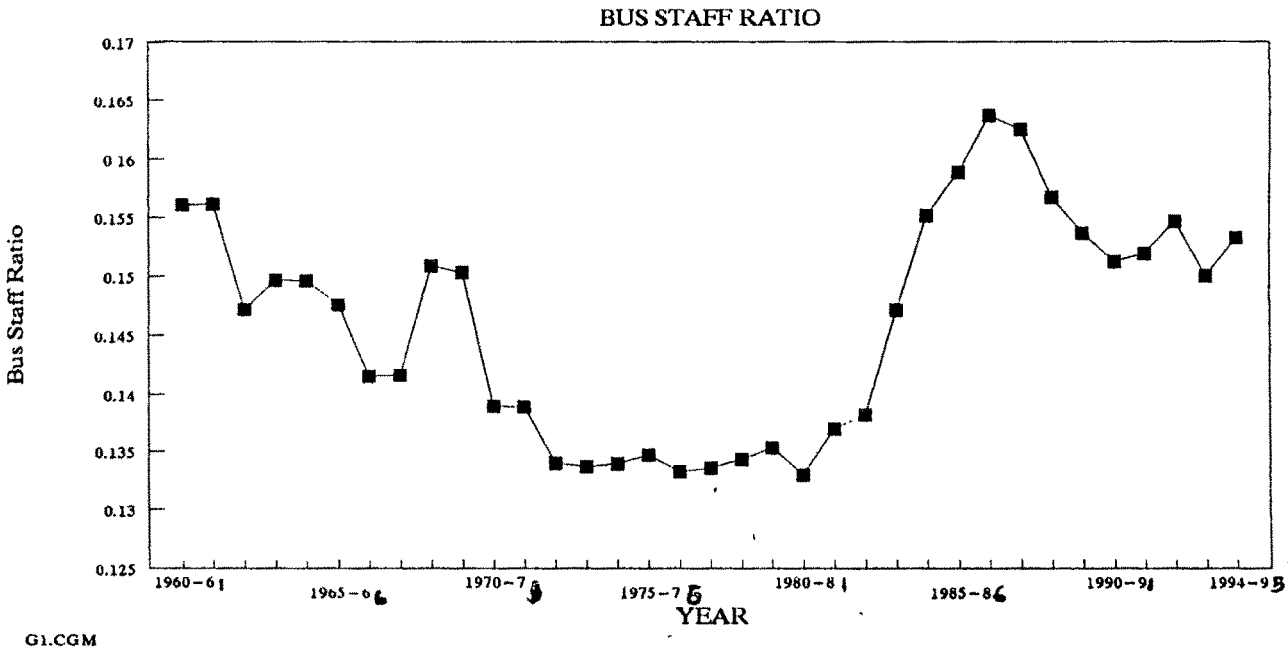
EMPIRICAL RESULTS :

The information regarding these indicators is provided in Table-II.3 from 1960-61 to 1994-95 and it is observed that each indicator of physical performance namely Bus-Staff Ratio, Percentage fleet utilization, Kms. per litre of oil, Vehicle Utilization per bus per day, Passenger carried per bus per day and effective kms. per staff have increased during the period under consideration where as number of breakdowns per 10,000 kms. and number of accidents per lakh kms. have declined.

The Graph numbers I to VIII reflect trends in these indicators. It is obvious from Graph-I that the bus staff ratio has fluctuated between 0.132 approximately to 0.163. It was lowest in 1980-81 and highest in 1986-87 i.e. 0.163666 and after 1986-87 it has declined. However we do not observe more fluctuations in it. The coefficient of variations comes to 6.561259.

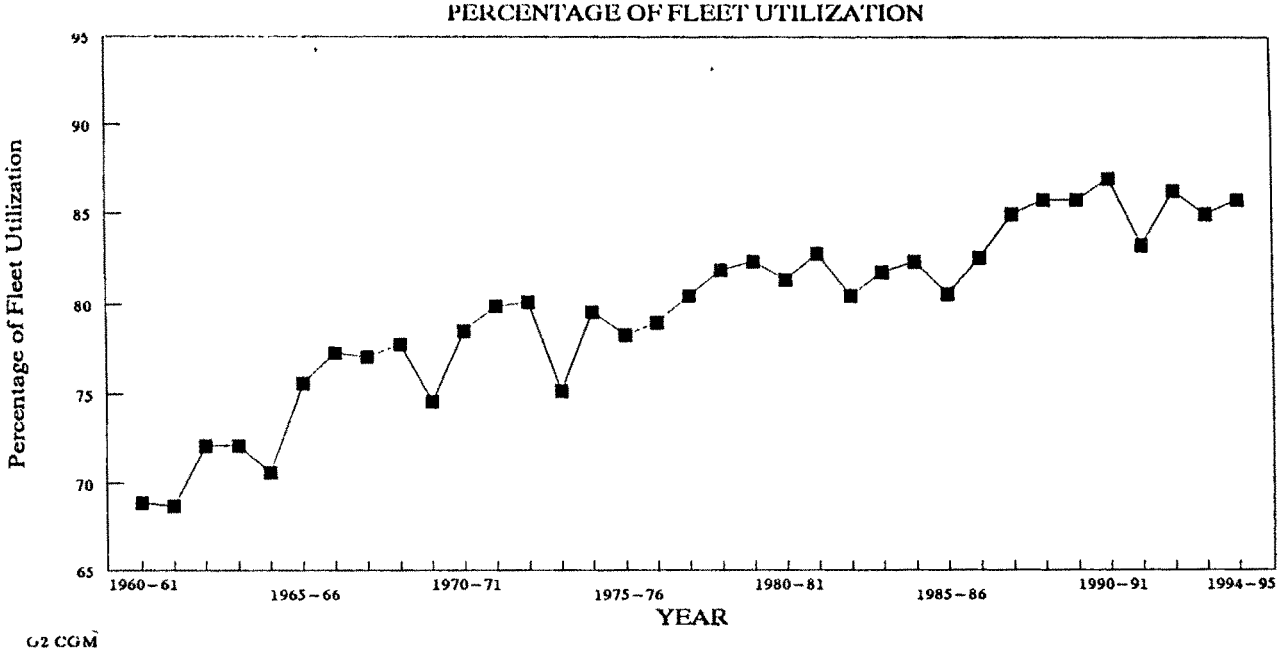
The another indicator i.e. percentage of fleet utilization has increased steadily from 68% in 1960-61 to 86.3% in 1992-93 and it has marginally declined to 85.8% in 1993-94. The coefficient of variation 6.102388. The Graph-II shows minor fluctuation in this indicator during the given time interval.

Graph – II.1



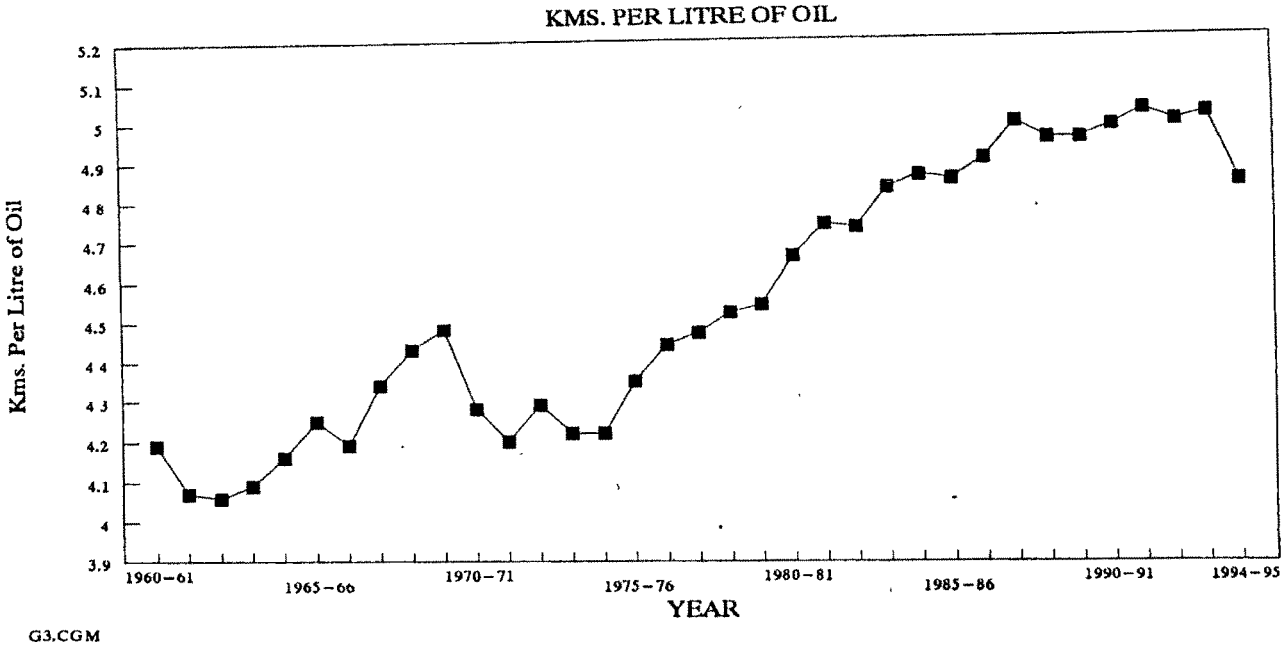
G1.CGM

Graph – II.2



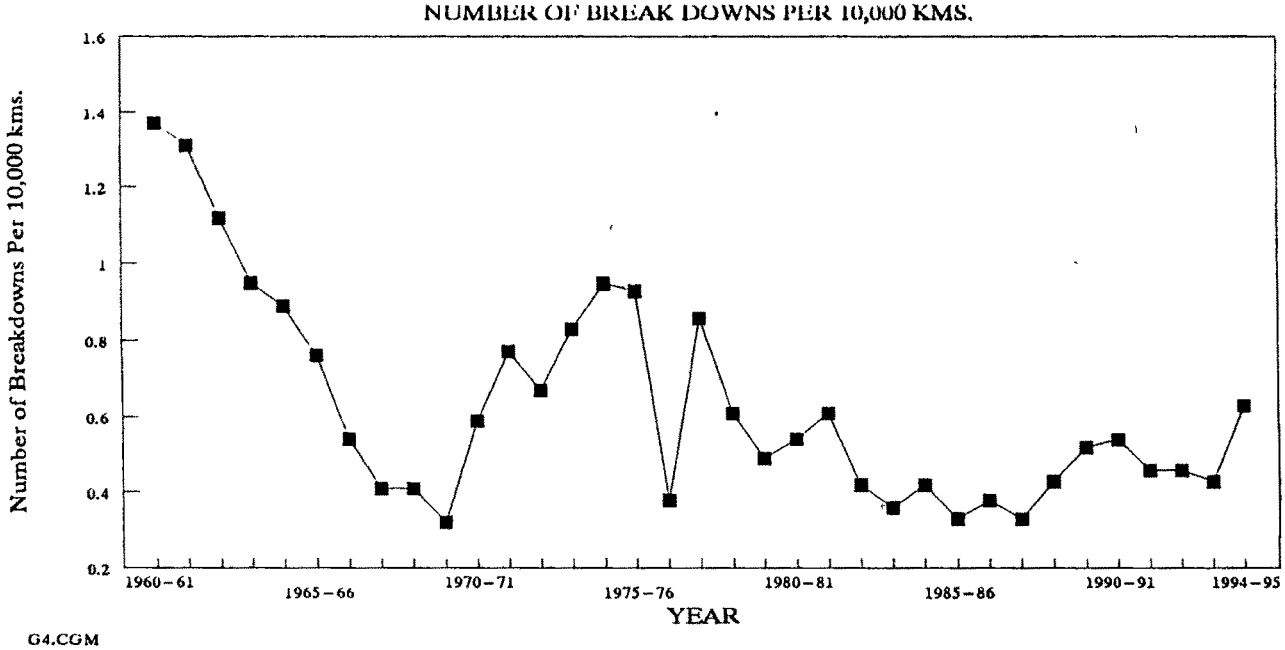
G2 CGM

Graph – II.3



G3.CGM

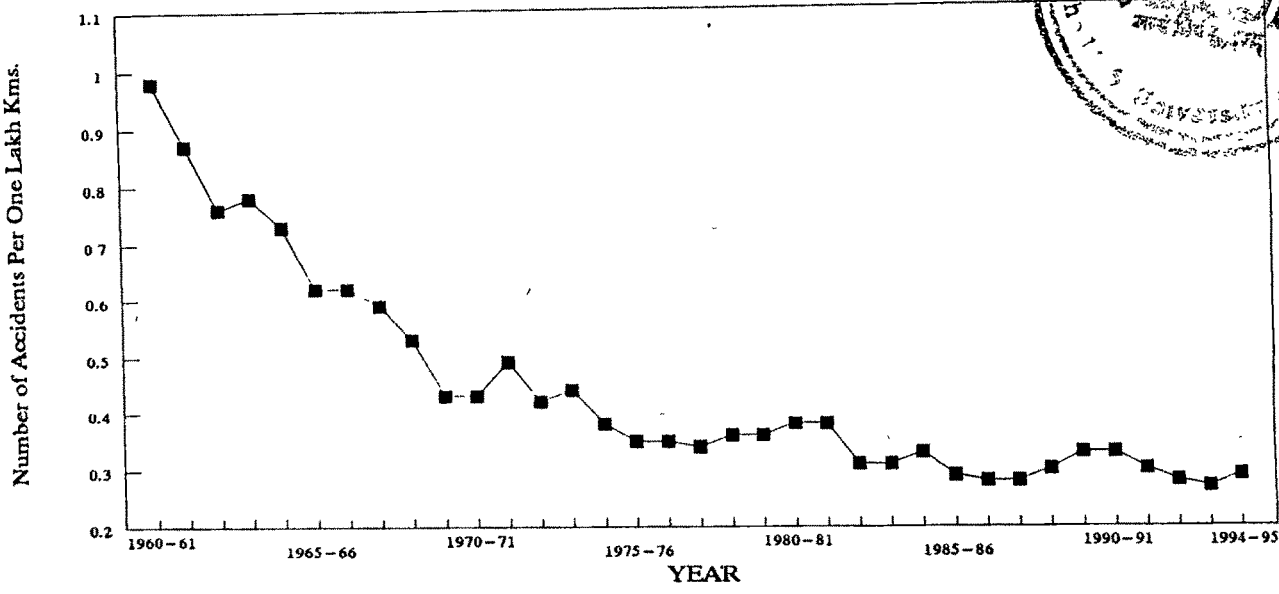
Graph – II.4



G4.CGM

Graph – II.5

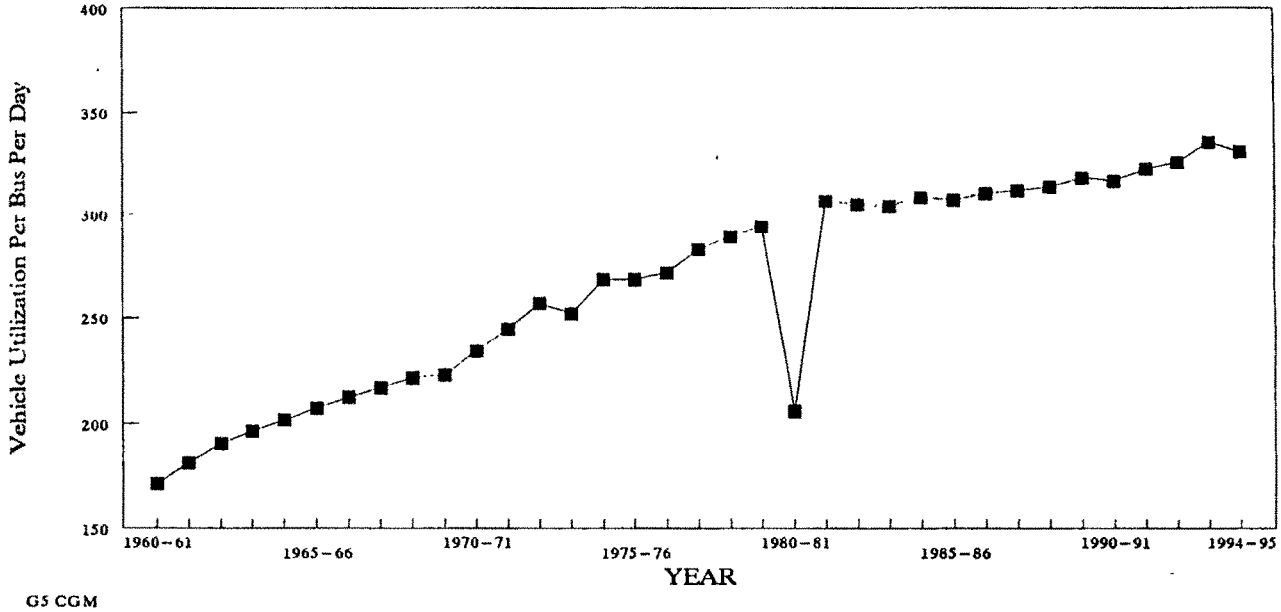
NUMBER OF ACCIDENTS PER ONE LAKH KMS.



G5.CGM

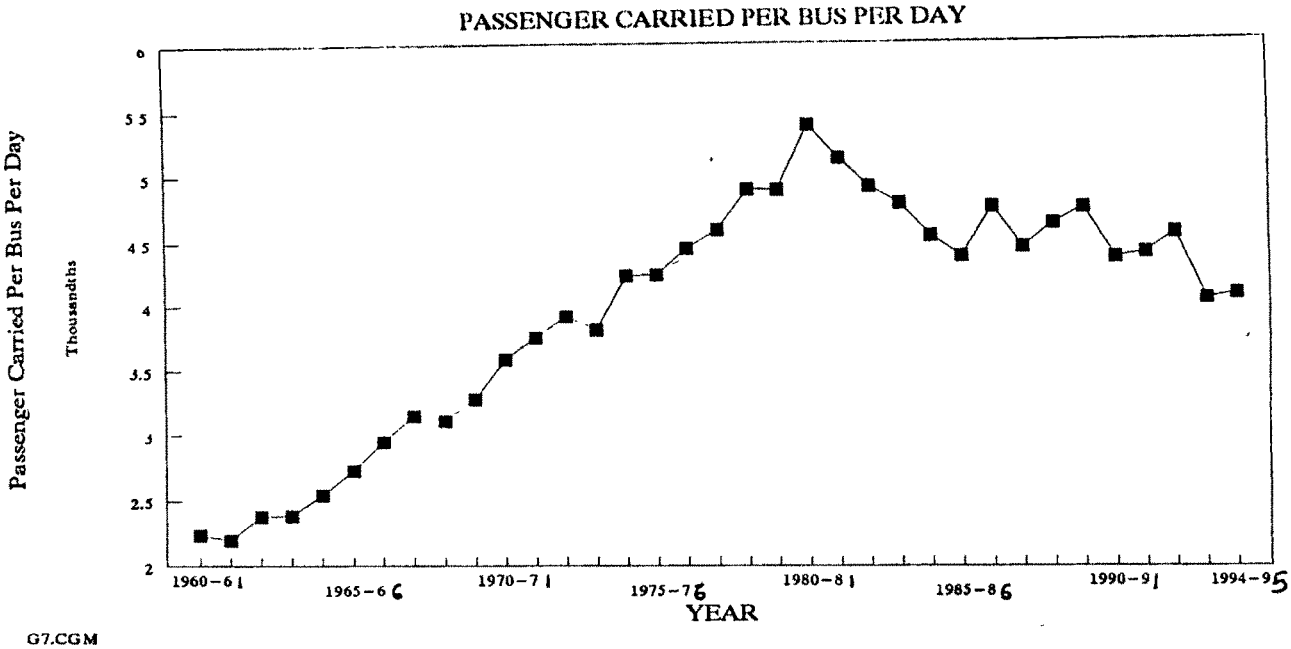
Graph – II.6

VEHICLE UTILIZATION PER BUS PER DAY



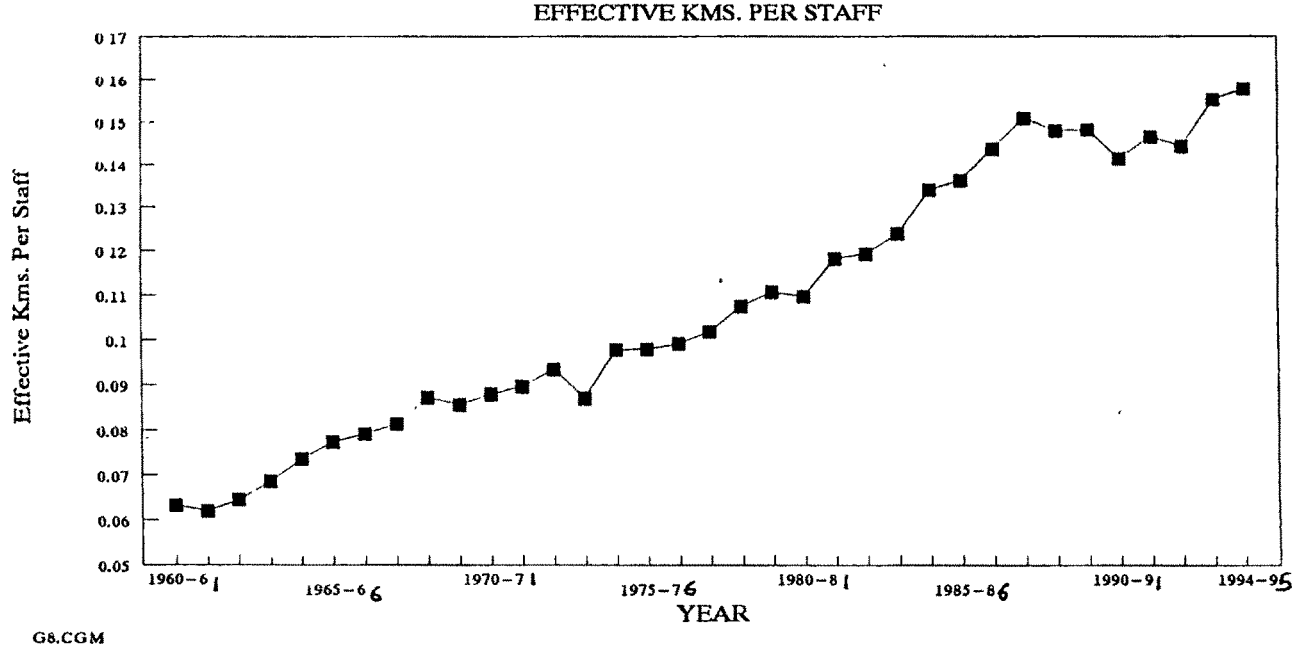
G5 CGM

Graph – II.7



G7.CGM

Graph – II.8



G8.CGM

The Graph-III shows kms. per litre of oil and it has fluctuated between 4.06 and 5.02. The Graphs - IV, V and VI represent Vehicle Utilization per bus per day, Passenger carried per bus per day and effective kms. per employee respectively and it is observed that these have improved over a period of time. Not only that but the number of accidents per one lakh km. and number of breakdowns per 10,000 kms. have declined as reflected in Graphs - VII & VIII. The fluctuations are more as compared to other indicators.

Looking at the coefficient of variations for these indicators, we find that it is least in case of percentage of fleet utilization and highest in case of inverse of breakdowns per 10,000 kms. indicating there by that least fluctuations are observed in percentage fleet utilization.

GROWTH RATES OF INDICATORS OF PHYSICAL PERFORMANCE :

In order to examine trend in the physical performance of GSRTC over a period of time in terms of above mentioned indicators, growth rate of each indictor is estimated for the period 1960-61 to 1994-95 using the following model.

$$\log Y = a + bt + u$$

Where Y is the indicator of physical performance, t is the time and b is estimated growth rate in percent per year.

The Table II.4 makes it clear that the growth rate is positive for all indictors. Not only that but the positive

growth is statistically significant for all the indicators except Bus Staff Ratio. The fall in breakdowns per 10,000 kms. and accidents per lakh kms over a period of time is a good sign of the performance of GSRTC. Instead of regressing these two indicators directly on time, the inverse of breakdowns per 10,000 kms. and the inverse of accidents per lakh of kms are regressed on time. The positive growth rate is required for these indicators to show improvement in efficiency of GSRTC. It is found that the inverse of breakdown has increased at the rate of 2.34% per year and the inverse of accidents per lakh kms. has

TABLE - II.4

GROWTH RATES OF INDICATORS OF PHYSICAL PERFORMANCE

Sr. No.	Indicator	Growth Rate	R^2
01.	Bus Staff Ratio	0.001586 [1.4744]	0.061
02.	Percentage of Fleet Utilization	0.005732 [13.2877]	0.843
03.	Kms. Per Litre of Oil	0.0067 [16.588]	0.893
04.	Inverse of Breakdown	0.0234 [4.2409]	0.3526
05.	Inverse of Accident	0.0327 [13.3802]	0.844
06.	Vehicle Utilization Per Bus Per Day	0.0182 [14.6889]	0.867
07.	Passenger Carried Per Bus Per Day	0.0205 [7.8568]	0.652
08.	Effective Kms. Per Staff	0.0276 [35.9717]	0.975

Note : Figures in the brackets are estimated 't' values.

increased at the rate of 3.27% per year. The vehicle utilization per bus per day shows the growth rate of 1.82% per year where as passenger carried per bus per day has increased at the rate of 2.05% per year. Similarly effective kms. per staff has increased at the rate of 2.76% per year. Not only that but the value of R^2 is very high in case of all indicators. This tends to suggest that there is an improvement in all the indicators of physical performance during the period under study.

SINGLE INDEX OF PHYSICAL PERFORMANCE :

The reliance on one indicator to examine the change in the physical performance of GSRTC is not adequate as it is a multifacet problem and to examine overall physical performance of GSRTC, one is required to take into account all the indicators simultaneously and to construct one single index. The single index representing physical performance of GSRTC can be examined on the basis of several alternative techniques such as method of ranking, method of indexing, method of principal component method etc.

The ranking method which comprises the assigning of rank scores to individual indicators and aggregating them is the simplest one. This method has been criticised in view of its arbitrary nature as the unit difference in ranks does not reflect a proportionate difference in variable value.

The index method wherein the indicator for each year is expressed as the proportion of the average over a period of time. This is considered to be an improvement over the ranking method. The drawback of this method is that the index is sensitive to the extreme values in the series.

The ranking as well as index methods do not have any mechanism for assigning weight to the indicators. In effect all the indicators those are included in the analysis get equal weights. The principal component procedure on the other hand provides convenient way of aggregating the indicators with the weights assigned to the indicators being determined in a relatively objective manner on the basis of the correlation matrix. The procedure mainly comprises of redefining a set of original variables into a set of newly constructed orthogonal variables. The newly constructed variables are used to calculate the component scores. In this method, the first principal component which explains the maximum variance is normally considered for calculation of component scores.

THE METHOD OF PRINCIPAL COMPONENT :

The joint performance of the above indicators is examined through the construction of single index popularly known as Principal Component Index. The method of estimating the principal component is as follows.[32]

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32. Koutsoyiannis A. : Theory of Econometrics, The Macmillian Press Ltd., London, Second Edition 1978, P.424-436.

$$P_1 = a_{11}X_1 + a_{12}X_2 + a_{13}X_3 + \ldots\ldots\ldots + a_kX_k$$

The method of principal component can be applied by using the original values of X's, their deviations from their means or the standardised variable [measured as the deviations of the Xj's from the mean and subsequently divided by standard deviations]. When variables are measured in different units the standardise variables are used. It is because of this reason that the present study estimates the index using standardised variables.

P_1 is the composite index of K indicators X_1 to X_k

a_{11}, a_{12}, a_{13}, ...a_{1K}, are known as principal loading which are estimated as follows.

[1] We start by the simple correlation coefficients between K variables. These correlation coefficients are arranged in a tabular form as given below which is known as the correlation table.

[2] We then sum each column or row of the correlation table obtaining K sums of simple correlation coefficient.

CORRELATION TABLE

	X_1	X_2		X_k	$\sum_i^k r_{x_i x_j}$
X_1	$r_{x_1 x_1}$	$r_{x_1 x_2}$	.....	$r_{x_1 x_k}$	$\sum_i^k r_{x_1 x_i}$
X_2	$r_{x_1 x_2}$	$r_{x_2 x_2}$	.....	$r_{x_2 x_k}$	.
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.....	.	.
X_k	$r_{x_1 x_k}$	$r_{x_2 x_k}$	.....	$r_{x_k x_k}$	.
$\sum_j^k r_{x_i x_j}$	$\sum_j^k r_{x_1 x_j}$	$\sum_j^k x_2 x_j$	.....	$\sum x_k x_j$	$\sum_i^k \sum_j^k r_{x_i x_j}$

[3] We compute sum total of the column or row sums

$$\sum_i^k \sum_j^k r_{xixj}$$

Finally we obtain the loading for the first principal component P_1 by dividing each column [row] sum by the square root of the grand total.

[4] The sum of the square of the loadings of each principal component is the latent root of the first principal components. 1/K x 100 give the percent of total variations in all X'5.

The Table - II.5 shows the single index of physical performance of GSRTC estimated through method of ranking, method of indexing and principal component method. Looking at the Table - II.5 one observe that the overall physical performance of GSRTC has improved during 1960-61 to 1987-88 with some

fluctuations irrespective of the method applied, where as deterioration in performance is observed after 1987-88.

It is to be noted that the best performance of GSRTC was observed during 1987-88 as its rank is 35 for all the three methods under consideration.

In order to find out the extent to which the overall performance of GSRTC represented by three different methods differs from each other the rank correlation coefficients are estimated between ranking on the basis of [i] method of ranking and method of indexing [ii] method of ranking and method of principal component and [iii] method of indexing and method of principal component. These coefficients come to 0.82199, 0.990764 and 0.785064 respectively. These are very high and statistically significant implying there be that the relative overall physical performance of GSRTC during different years do not differ significantly with the change in the method of estimating the index. This tends to suggest that the overall physical performance has improved irrespective of the estimation of single index.

On the basis of it, one may conclude that the physical performance of GSRTC have significantly improved over a period of time. It should be mentioned here that the first principal component explains 71.77% of the variations in set of variations of all explanatory variables.

TABLE - II.5

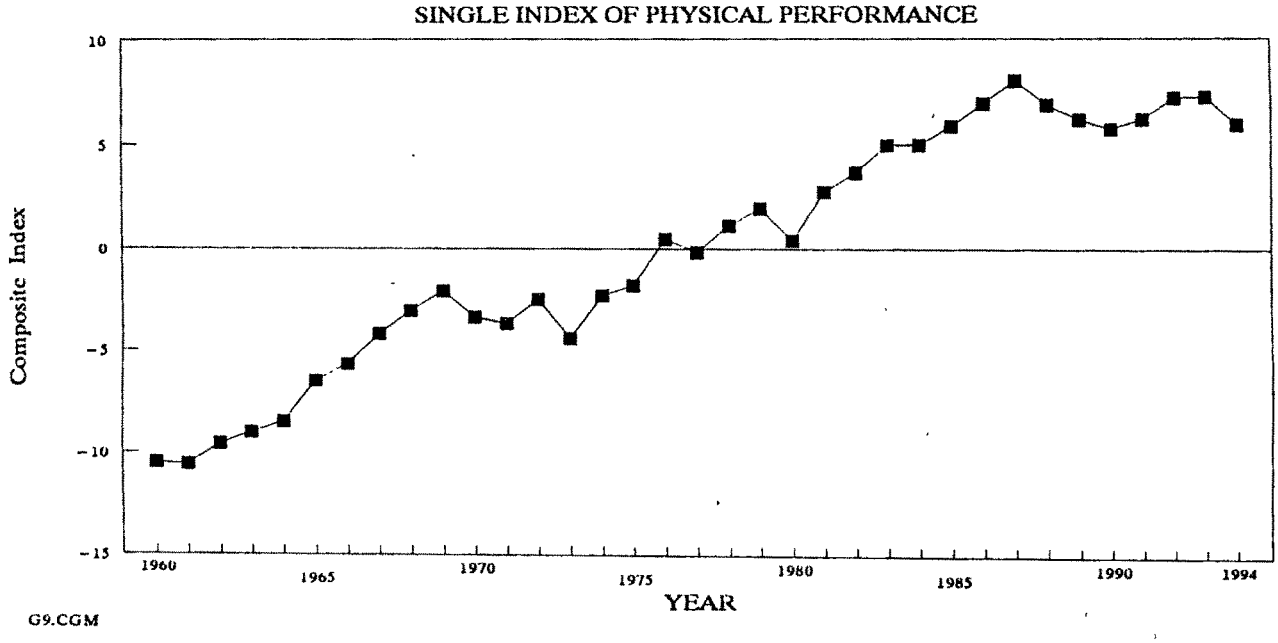
SINGLE INDEX OF PHYSICAL PERFORMANCE OF GSRTC

Year	Method of Ranking	Rank	Method of Indexing	Rank	Principal Composite Index	Rank
1	2	3	4	5	6	7
1960-61	45	3	384.16	1	-10.50	2
1961-62	42	2	390.88	2	-10.59	1
1962-63	39	1	409.01	3	- 9.57	3
1963-64	47	4	439.13	4	- 9.01	4
1964-65	53	5	454.07	5	- 8.50	5
1965-66	73	6	487.91	9	- 6.48	6
1966-67	76	7	570.10	15	- 5.66	7
1967-68	100	11	668.98	22	- 4.20	9
1968-69	115	15	679.28	23	- 3.01	12
1969-70	124	16	790.80	33	- 2.07	15
1970-71	100	12	554.29	13	- 3.33	11
1971-72	93	9	492.81	11	- 3.68	10
1972-73	104	13	527.70	12	- 2.44	13
1973-74	77	8	477.95	8	- 4.39	8
1974-75	98	10	460.50	6	- 2.26	14
1975-76	111	14	467.76	7	- 1.78	16
1976-77	141	19	718.70	29	0.49	19
1977-78	132	17	489.35	10	- 0.15	17
1978-79	154	20	569.35	14	1.16	20
1979-80	166	21	636.50	20	1.97	21

Table - II.5 Cont.

Year	Method of Ranking	Rank	Method of Indexing	Rank	Principal Composite Index	Rank
1	2	3	4	5	6	7
1980-81	138	18	573.39	16	0.43	18
1981-82	169	22	582.50	17	2.80	22
1982-83	184	23	701.76	26	3.71	23
1983-84	196	24	773.19	32	5.02	24
1984-85	206	26	717.30	28	5.05	25
1985-86	215	28	823.62	34	5.94	27
1986-87	237	34	765.72	31	7.01	32
1987-88	246	35	831.12	35	8.08	35
1988-89	236	33	714.05	27	6.96	31
1989-90	223	30	648.97	21	6.26	29
1990-91	206	25	635.98	19	5.82	26
1991-92	222	29	691.39	24	6.29	30
1992-93	235	32	694.22	25	7.27	33
1993-94	227	31	719.64	30	7.33	34
1994-95	210	27	598.00	18	6.03	28

Graph – II.9


SINGLE INDEX OF PHYSICAL PERFORMANCE
Composite Index
10
5
0
-5
-10
-15
1960
1965
1970
1975
1980
1985
1990
1994
YEAR
G9.CGM

Graph - IX shows trend in composite index of physical performance of GSRTC and it is observed that with minor fluctuations, it has increased with the passage of time. In order to examine trend in composite index of physical performance two different models are selected.

[1] $Y = a + bt + u$ where Y is the composite index of physical performance and t is time.

[2] $Y = a + bt + CD + Dbt + u$

The graph of composite index suggests that the index was maximum during 1987-88 and later on it has declined. In order to take care of this phenomenon, the dummy variable is introduced in the model where D = 0 upto 1987-88 and it is equal to the one after 1987-88 and the following results are obtained.

$$Y = -9.412 + \underset{[22.96634]}{0.5537\ t} \qquad R^2 = 0.9411$$

The coefficient associated with t [time] is positive which indicates the upward trend in the physical performance and it is also statistically significant as the value of 't' is high indicated in the bracket. Not only that but the value of R^2 is also very high. This tends to suggest that the overall physical performance of GSRTC has improved during the period under consideration.

Estimating the second equation the following results are obtained.

$$Y = \underset{}{-10.297} + \underset{[25.97423]}{0.6415\ t} + \underset{[2.57569]}{15.98543\ D} - \underset{[-3.04989]}{0.61276\ Dt}$$

$$R^2 = 0.970327$$

It can be said from the above equation that the composite index of physical performance has increased at the rate of 0.64115 upto 1987-88. After 1987-88, the deterioration in composite index is observed as the coefficient associated with Dt is not only negative but statistically significant. Moreover the value of R^2 is very high in this case.

TABLE - II.6

PRINCIPAL LOADING

1	2
X1	0.518578
X2	0.846257
X3	0.927332
X4	-0.386820
X5	-0.785752
X6	0.855664
X7	0.672750
X8	0.916127

It is to be noted here that the estimation of composite index is justified provided variables are highly correlated. In order to examine this, it is necessary to estimate principal loading. Table II.6 shows principal loading of the first Principal component.

A glance at the values of principal loading makes it clear that all factor loadings are statistically significant as each factor loading is greater than 0.338.[34] This indicates that variables are highly correlated and the construction of composite index will indicate change in the performance of all indicators taken together.

OTHER INDICATORS OF PHYSICAL PERFORMANCE :

Over and above the indicators of physical performance, mentioned on the earlier pages, in some of the studies, following indicators are also taken into account while explaining physical performance of SRTC.

[i] Load factor

[ii] Average duty performed per crew per day in kms.

[iii] Life of new tyre till scraped

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34. D. Child : Essentials of Factor Analysis, 1970, Reported in Theory of Econometrics by A. Kontsoyiannis, The Macmillian Press, London, 1978, p.95.

The load factor is defined as the percentage ratio of passenger kilometres to capacity kilometres. The capacity kilometres is defined as the average carrying capacity multiplied by the effective kilometres operated where as average carrying capacity is defined as total seating capacity for all buses plus total standees for all buses divided number of buses in use. This indicates that by that the load factor is affected by effective kms. operated and percentage of fleet utilization. It is, therefore not included in the estimation of composite index.

The Table - II.7 reveals percentage of load factor for GSRTC during 1960-61 to 1994-95. It is observed from the table that the it has fluctuated between 65.16% in 1992-93 and 77.67% in 1973-74. One can see that after 1986-87, there is significant fall in the percentage of load factor.

The crew utilization represents kms. per crew per day and it has increased steadily over a period of time. The estimation of composite index takes into account kms. per employee which includes crew also and therefore it is not possible on technical grounds in estimation of single index of physical performance.

The average life of tyre till scrap indicates material productivity and it is observed that it has increased significantly from 52700 kms. in 1960-61 to 99100 kms. in 1992-93.

TABLE - II.7

LOAD FACTOR, CREW UTILIZATION AND AVERAGE LIFE OF TYRE

Year	Percentage of Load Factor	Crew Utilization in Kms.	Average Life of Tyre till Scrapped [in Kms]
1	2	3	4
1960-61	72.90	116.0	52700
1961-62	70.19	123.4	57100
1962-63	69.53	118.8	55600
1963-64	67.60	118.4	57500
1964-65	69.60	122.2	59600
1965-66	70.34	130.5	56500
1966-67	71.97	131.5	55000
1967-68	72.10	136.9	52200
1968-69	70.85	136.8	54200
1969-70	73.10	136.0	53500
1970-71	73.14	140.8	50200
1971-72	75.90	139.3	46800
1972-73	72.69	139.9	52600
1973-74	77.67	134.3	54300
1974-75	77.50	143.7	51800
1975-76	76.24	142.8	61900
1976-77	75.97	146.5	63300
1977-78	76.21	151.7	65000
1978-79	77.20	156.3	65900
1979-80	74.16	158.4	65200

Table - II.7 Cont.

Year	Percentage of Load Factor	Crew Utilization in Kms.	Average Life of Tyre till Scrapped [in Kms]
1	2	3	4
1980-81	76.67	156.1	64500
1981-82	75.16	161.8	63100
1982-83	74.84	161.1	70100
1983-84	76.80	166.0	74800
1984-85	74.06	176.3	80400
1985-86	71.51	173.4	82400
1986-87	75.12	177.1	85300
1987-88	66.03	172.1	87600
1988-89	67.94	174.2	88000
1989-90	70.23	179.6	83200
1990-91	68.21	173.0	79600
1991-92	65.16	178.4	90500
1992-93	67.86	183.9	99100
1993-94	54.26	187.1	102700
1994-95	58.93	185.1	104600

Source : [1] Annual Reports of GSRTC and Statistics of GSRTC.

The above discussion tends to suggest that the physical performance of GSRTC in terms of crew utilization km. and average life of tyre has improved over a period of time. The percentage of load factor has remained more or loss stable upto 1986-87, it has declined since 1987-88.

QUALITY OF SERVICE :

The performance of GSRTC can also be evaluated in terms of qualities of services. Under this two things can be examined.

[i] Categories of accidents

[ii] Departure and arrivals of various services.

The Table II.8 represents various categories of accidents. It is mainly divided into four categories, fatal, major, minor and insignificant. It is to be noted that the number of accidents under each category has increased in the absolute term but the number of accidents per lakh population has declined from 0.98 in 1960-61 to 0.29 in 1994-95. However the number of major accidents per lakh kms. has increased from 0.08 to 0.15 during the period under consideration. Not only that but the share of major accidents in total accidents has increased from 13.32% in 1965-66 to 53.77% in 1994-95 over a period of time.

Though number of breakdowns in the absolute term has increased, it has declined per 10,000 kms. from 1.37 to 0.63.

Thus it may be concluded that the quality of services provided by GSRTC has improved especially in terms of fall in rate of accidents and breakdowns.

TABLE - II.8

CATEGORIES OF ACCIDENTS

Year	Number of Accidents and Accident Per lakh Kms.*						Number of Breakdowns and Breakdowns Per 10,000 Kms.**
	Fatal	Major	Minor	Insignificant	Total	No.of Death	
1	2	3	4	5	6	7	8
1960-61	27 [0.041]	---	696 [0.94]	---	723 [0.98]	38	9138 [1.37]
1965-66	44 [0.031]	118 [0.08]	547 [0.38]	177 [0.13]	886 [0.62]	55	10840 [0.76]
1970-71	85 [0.035]	199 [0.08]	822 [1.33]	143 [0.06]	1249 [0.50]	90	4519 [0.59]
1975-76	142 [0.037]	388 [0.10]	801 [0.21]	18 [0.01]	1349 [0.35]	175	35816 [0.93]
1976-77	136 [0.034]	409 [0.10]	869 [0.22]	7 [--]	1421 [0.35]	143	34511 [0.38]
1977-78	182 [0.042]	515 [0.12]	747 [0.17]	34 [0.01]	1478 [0.34]	204	37738 [0.86]
1978-79	199 [0.041]	836 [0.17]	632 [0.13]	79 [0.02]	1746 [0.36]	222	29534 [0.61]
1979-80	196 [0.037]	1028 [0.19]	659 [0.12]	43 [0.01]	1926 [0.36]	216	25768 [0.49]
1980-81	222 [0.040]	1197 [0.21]	682 [0.12]	36 [0.01]	2137 [0.38]	261	30154 [0.54]
1981-82	275 [0.044]	1359 [0.22]	597 [0.11]	19 [0.01]	2351 [0.30]	322	37971 [0.61]
1982-83	238 [0.039]	1147 [0.19]	509 [0.08]	11 [--]	1905 [0.31]	267	25621 [0.42]
1983-84	244 [0.040]	1283 [0.21]	520 [0.08]	8 [--]	2055 [0.33]	306	22114 [0.36]
1984-85	251 [0.038]	1396 [0.21]	508 [0.08]	2 [--]	2157 [0.33]	307	27159 [0.42]
1985-86	266 [0.040]	835 [0.12]	730 [0.11]	117 [0.02]	198 [0.29]	383	22041 [0.33]

Table - II.8 Cont.

Year	Number of Accidents and Accident Per lakh Kms.*						Number of Breakdowns and Breakdowns Per 10,000 Kms.**
	Fatal	Major	Minor	Insignificant	Total	No.of Death	
1	2	3	4	5	6	7	8
1986-87	262 [0.038]	824 [0.12]	733 [0.11]	102 [0.02]	1921 [0.29]	331	26660 [0.38]
1987-88	283 [0.039]	877 [0.12]	761 [0.11]	91 [0.01]	2012 [0.28]	333	24615 [0.33]
1988-89	292 [0.039	1046 [0.14]	810 [0.11]	78 [0.01]	2226 [0.30]	364	32590 [0.43]
1989-90	302 [0.038]	1300 [0.17]	922 [0.12]	35 [--]	2559 [0.33]	356	41035 [0.52]
1990-91	338 [0.044]	1327 [0.17]	840 [0.11]	21 [--]	2526 [0.33]	403	42096 [0.54]
1991-92	296 [0.036]	1353 [0.16]	824 [0.10]	10 [--]	2483 [0.30]	369	37767 [0.46]
1992-93	366 [0.043]	1256 [0.15]	764 [0.09]	8 [--]	2394 [0.28]	449	39825 [0.46]
1993-94	311 [0.034]	1337 [0.14]	877 [0.09]	2 [--]	2527 [0.27]	393	40054 [0.43]
1994-95	344 [0.037]	1433 [0.15]	880 [0.10]	8 [--]	2665 [0.29]	418	59015 [0.63]

* Figures in brackets represent accidents per one lakh Kms.
** Figures in brackets represent breakdowns per 10,000 Kms.

Source :

01. Administrative Reports of GSRTC and Statistics of GSRTC.

TABLE - II.9

QUALITY OF SERVICE
[Percentage of Regularity]

Year	Departure	Arrivals
1	2	3
1960-61	84.91	89.13
1965-66	93.35	92.80
1970-71	91.97	90.18
1975-76	92.21	92.31
1976-77	92.61	92.49
1977-78	92.77	92.82
1978-79	93.88	94.01
1979-80	94.20	94.29
1980-81	94.54	94.50
1981-82	94.19	94.40
1982-83	95.90	96.00
1983-84	95.62	95.62
1984-85	94.80	95.20
1985-86	95.54	96.02
1986-87	94.91	95.50
1987-88	96.38	96.77
1988-89	95.70	96.05
1989-90	94.73	95.24
1990-91	94.78	95.11
1991-92	95.37	95.91
1992-93	95.33	96.01
1993-94	95.65	96.46
1994-95	94.24	95.08

Source :
01. Administrative Reports of GSRTC and Statistics of GSRTC.

Table - II.9 indicates regularity in departure and arrival of scheduled services. It is seen that the percentage of regularity with respect to departure and arrival was very high right from its inception and it has marginally increased with the passage of time. The regularity in arrival and departure has serious impact on demand for passenger transport there by on earning of GSRTC. Its performance is said to be satisfactory in terms of arrival and departure.

STRUCTURE OF THE STAFF EMPLOYED :

Over and above this it is also necessary to examine the trend in the structure of staff employed. The total staff is broadly classified into three categories. Traffic staff, workshop staff and administrative staff. It is obvious from the Table - II.10 that the staff in the absolute term under each category has increased significantly over a period of time i.e. the traffic staff has increased from 6513 in 1960-61 to 42592 in 1994-95, the workshop staff has increased from 3458 to 12233 where as administrative staff has registered an increased from 1541 in 1960-61 to 3811 in 1994-95. It is interesting to note that the share of traffic staff has increased from 56.58% to 72.64%, where as share of workshop staff and administrative staff have declined from 30.04% to 20.86% and 13.39% to 6.49% respectively during the period under consideration.

TABLE - II.10

BREAK-UP OF STAFF - FUNCTIONWISE

Year	Traffic Staff	Workshop Staff	Administrative Staff	Total Staff
1	2	3	4	5
1960-61	6513 [56.58]	3458 [30.04]	1541 [13.39]	11512
1965-66	11199 [61.47]	5073 [27.84]	1947 [10.69]	18219
1970-71	17799 [63.80]	7390 [26.49]	2708 [9.71]	27897
1975-76	24803 [64.17]	10196 [26.38]	3653 [9.45]	38652
1976-77	25530 [63.72]	10738 [26.80]	3800 [9.48]	40068
1977-78	27229 [64.15]	11338 [26.71]	3881 [9.14]	42448
1978-79	28662 [64.77]	11717 [26.48]	3874 [8.75]	44253
1979-80	31109 [65.73]	12274 [25.94]	3943 [8.33]	47326
1980-81	32922 [65.56]	13180 [26.25]	4116 [9.20]	50218
1981-82	34633 [66.55]	13301 [25.56]	4106 [7.89]	52040
1982-83	33294 [66.13]	13061 [25.94]	3993 [7.93]	50348
1983-84	32362 [65.13]	12951 [26.31]	3920 [7.96]	49233
1984-85	31878 [65.60]	12851 [26.44]	3868 [7.96]	48597
1985-86	31332 [65.39]	12780 [26.67]	3807 [7.95]	47919

Table - II.10 Cont.

Year	Traffic Staff	Workshop Staff	Administrative Staff	Total Staff
1	2	3	4	5
1986-87	31060 [65.33]	12691 [26.69]	3791 [7.97]	47542
1987-88	31878 [65.94]	12706 [26.28]	3736 [7.78]	48347
1988-89	34054 [67.39]	12699 [25.13]	3776 [7.47]	50529
1989-90	36356 [68.67]	12769 [24.12]	3819 [7.21]	52944
1990-91	37931 [69.62]	12700 [23.31]	3850 [7.07]	54481
1991-92	39373 [70.50]	12606 [22.57]	3867 [6.92]	55846
1992-93	41312 [71.48]	12604 [21.81]	3879 [6.71]	57795
1993-94	43212 [72.49]	12485 [20.94]	3914 [6.57]	59611
1994-95	42592 [72.64]	12233 [20.86]	3811 [6.49]	58636

Source :

01. Administrative Reports of GSRTC and Statistics of GSRTC.

CONCLUSION :

Thus the present chapter has examined the physical performance of GSRTC in terms of various indicators and trends in them over a period of time. It may be concluded that the over all physical performance as well as physical performance in terms of each indicator of physical performance of GSRTC has improved over a period of time. However it is to be noted that after 1987-88, the deterioration in physical performance trend is observed. This tends to suggest that positive efforts on the part of GSRTC are required to bring about improvement in the physical performance of GSRTC. The study also reveals structural change in employment, indicating increase in the share of traffic staff in total employment over a period of time. The quality of service measured in terms of punctuality in arrival and departure of schedule services is found to be satisfactory during the period under consideration and also shows some improvement in it over a period of time.