

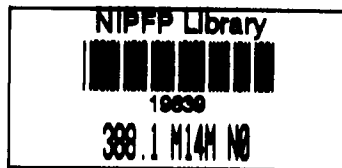
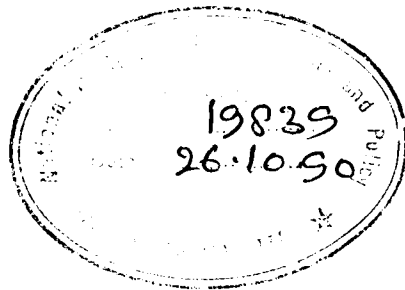


MAINTENANCE OF HIGHWAYS - AN EVALUATION

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## ABSTRACT

Nearly one third of our National Highways have acceptable riding surface quality. The reason for poor maintenance of National Highways has been attributed to inadequate funds provided for maintenance. This paper attempts to examine the extent to which the actual expenditure on maintenance of Highways deviated from the desirable levels during the last decade. Annual normative requirement for maintaining each kilometre of Highway was computed after making appropriate adjustment for relevant factors like lane-width, traffic intensity and nature of terrain, and this was compared with the actual expenditure on maintenance in every State/Union Territory during the decade.

The findings reveal that although adequate funds relative to normative requirements were available for maintenance of National Highways in most States/UTs, a considerable proportion of the funds was absorbed by contingent repairs arising out of damages due to floods and landslides, resulting in the negligence of routine maintenance. The study highlights inter-state differences in the level of maintenance of National Highways. It does not rule out the possibility of diversion of funds intended for maintenance, in those States/UTs where National Highways remain undermaintained, despite availability of adequate funds for routine maintenance. The expenditure on maintenance of State Highways seems to be lower than normative requirements, with a few exceptions, although nothing conclusive can be said about State Highways, owing to incomplete and inconsistent data. The paper underlines the need for strict supervision and control of maintenance expenditure, as well as periodic evaluation of riding surface quality, to render maintenance activity more responsive to requirements.

## MAINTENANCE OF HIGHWAYS - AN EVALUATION

Capital assets like roads, buildings and irrigation projects have been created over a period of time, and as such, these warrant regular, adequate and timely maintenance, if they are not to deteriorate and fall into disuse. Maintenance to replacement cost-ratios being as high as 1 : 30<sup>1</sup> in the case of roads, maintenance is a cost-effective option in a resource-scarce country like ours.

The issue of maintenance of roads in the country has assumed urgency in the context of two factors. First, according to the Planning Commission,<sup>1</sup> there was already a backlog of maintenance arrears at the beginning of the First Five Year Plan. Second, even roads that were newly constructed during the Plans require regular annual maintenance, and surface renewals every three to twelve years, depending upon the type of surface. In the absence of adequate maintenance, the cumulative impact of these two factors is likely to be considerable.

The Planning Commission conducted a critical study on the problem of road maintenance and reported its findings in February 1987.<sup>2</sup> This study takes a rather alarming view of the state of roads in India. It points out that the cumulative impact of neglect over the years has led to a rapid deterioration in riding surface quality. It even warns of an impending breakdown of the road network beyond redemption unless maintenance receives the priority it deserves.

An expert group was constituted by the Ministry of Surface Transport (MOST) to conduct a technical study to assess the riding surface quality of National Highways in various States. This study found that in 1983-84, only 29 per cent of our National Highways had acceptable riding surface quality. Table 1 gives the percentages of National Highways in Good, Fair and Poor condition in various States obtaining in 1983-84. We find that there are wide inter-State variations with some States having longer stretches of good roads than others.

In view of these disheartening observations on the conditions of our road networks, it is necessary to identify the factors contributing for the deterioration of riding surface quality. It is in this context that maintenance assumes relevance. For, adequate and timely maintenance is a significant factor determining riding surface quality.

However, it may be pointed out here that maintenance is by no means, the sole determinant of road conditions. In fact, despite adequate maintenance efforts, structural inadequacies and inherent crust deficiencies in construction could seriously hamper pavement quality. Heavier axle loads and increased traffic intensities more than what the roads were originally designed to bear, are other factors contributing to deterioration of road surface. To capture the cumulative impact of all these factors on riding surface quality would be outside the scope of this paper, as it would involve technical evaluation of data which are not available. Therefore, this paper is rather limited in scope. It proposes to examine the adequacy or otherwise of maintenance efforts. Technical committees appointed from time to time by the Ministry of Surface Transport (MOST) have prescribed separate per unit norms for maintenance of each class of road

## II

The road network in the country comprises National Highways, State Highways, roads of inter-state importance, District roads, Rural and Village roads, and Urban roads, in addition to roads administered by agencies like Electricity Board, Border Roads Organisation and others. Each of these networks is administered by different authorities - the Central government in respect of National Highways, the State governments in respect of State Highways and Local Bodies in respect of Urban roads and Village roads.

The Planning era witnessed considerable expansion of the road network from four lakh kilometres in 1950-51 to 18 lakh kilometres in 1989. Approximately half of this is surfaced. In India, the road density works out to 0.46 kms/square kilometre, which compares favourably with other developing countries.

National Highways constitute an arterial network connecting state capitals, major cities and towns of economic importance. It has grown from 22255 kms. in 1950-51 to 33925 kms in 1988-89. National Highways are constructed and maintained by the MOST, Government of India. While the MOST is responsible for the overall planning, sanctioning of projects, and provisioning of funds from the Central Budget for expenditure on National Highways, the actual work of construction and maintenance has been entrusted to the state governments on agency basis under Article 258 of the Constitution.

Maintenance of roads consists of routine maintenance on the one hand, and contingent maintenance on the other. Routine maintenance refers to ordinary repairs like patch and berm

repairs, strengthening of pavements and shoulders, arboriculture, drainage etc. It also includes periodic surface renewals through pre-mix carpeting, semi-dense carpeting. Liquid Sand Seal Coat, etc. Contingent maintenance is undertaken to set right damages caused by natural calamities like floods, cyclones, earthquakes, etc. as well as certain special repairs. The latter category varies from year to year and from state to state depending upon need.

In 1968, an expert committee was appointed by the MOST to prescribe norms for routine maintenance as well as flood damage repairs and special repairs.<sup>6</sup> This Committee divided the National Highways in the country into three categories based on width of carriageway into Single Lane, Double Lane and Multilane Expressways. Each of these was further subdivided into sub-categories based on the volume of traffic passing over them viz. Low Traffic (Less than 450 commercial vehicles daily) Medium Traffic (450-1500 cvd) and Heavy Traffic (Over 1500 cvd). The country was divided into four zones based on the price of metal chips. This was necessitated as the metal chips used in road maintenance constituted a significant proportion of maintenance cost, and that price of metal chips varied considerably from region to region. Norms on a per mile basis were prescribed for each of these categories and sub-categories. There was, thus, a separate set of per mile norms for maintenance of National Highways in each zone. Besides, certain fixed premia were also allowed for National Highways in difficult terrain, viz. high rainfall areas, hilly areas and desert areas. In this paper we have computed the average per kilometre norm for maintenance of National Highways, in each state, based on these prescriptions.

We obtained from the MOST, the distribution of National Highways according to lane width, traffic density and terrain characteristics, in each state for the year 1988. We also computed the percentage of National Highways in each zone within every state, from the data provided by the MOST. Applying the per kilometre norms for each category/sub-category/Zone, to the respective lengths of National Highways in each category/sub-category/Zone, in every state, we obtained the total requirement for maintenance as per norms, for each state, at 1968 prices.<sup>ii</sup>

From the 'Typical Rate Analysis' provided by the Ministry (MOST) we computed the percentages of labour, bitumen, and metal chips going into maintenance cost in each zone. Using weighted averages of lengths of National Highways in each zone, within every state, we computed the average shares of labour, bitumen and metal chips used in maintenance in every state. We inflated the labour component of the norms at 1968 prices by the Industrial Workers' Consumer Price Index,<sup>iii</sup> (Labour Bureau) the bitumen component by the bitumen index calculated from the data provided by the Ministry of Petroleum & Chemicals, and the metal chip component by the implicit Mining and Quarrying price index in the National Accounts Statistics to arrive at the per kilometre norms for maintenance at current prices for the decade 1979-1988, statewise.

We also obtained the actual maintenance expenditure on National Highways, statewise, for the year 1979-1988, from the MOST. Dividing this by the length of National Highways in the respective states in the respective years, we arrived at the actual per kilometre expenditure on maintenance, statewise, for the decade 1979-1988, also at current prices.<sup>iv</sup>



Both the norms as well as actual expenditures vary widely from state to state. While Delhi spent as much as Rs. 2.2 lakhs per km on maintenance of National Highways in the year 1988, Nagaland spent as little as Rs. 4124 in the same year. However, it may be pointed out that in Nagaland as well as in other north-eastern states, a considerable proportion of National Highways are constructed and maintained by the Border Roads Development Board, which is outside the purview of our analysis. As such figures of expenditure prevailing in these states may not reflect correctly the situation prevailing in these states. Nevertheless, it would be fair to say that there are wide interstate variations.

However, considering the fact that norms also vary widely across states, it is the deviation of expenditures in each state from their respective state-specific norms that interests us. Table 3 captures this aspect. The following formula has been used to compute the deviation index:

$$\frac{\text{Actuals}}{\text{Norms}} \times 100$$

Figures less than 100 indicate spending below normative requirements and vice versa.

The Table shows that in 1979, all states except three (Andhra Pradesh, Assam and Gujarat) spent less than Normative requirements, Delhi however, spent over twice the norms. Upto 1982, besides Delhi, only two states (Gujarat and Kerala) spent in excess of normative requirements. However, from 1983 onwards, an increasing number of states/UTs began to exceed the norms. In 1988, 14 states and three UTs spent over and above what they were

required to, on the maintenance of National Highways. Even the magnitude of deviations from the norms is considerable in some cases - Delhi 341.6 per cent, Goa 250 per cent, West Bengal 191 per cent, Gujarat 185 per cent. The all-India average index which was 81 per cent in 1979, dropped to 68.8 per cent in 1982, edged closer to 100 in 1985 and 1986 and in the last two years, 1987 and 1988 exceeded 100. In 1988, the MOST spent 23.71 per cent more than required on the maintenance of National Highways in the country. The states where maintenance expenditure was inadequate were, Bihar, J&K, Madhya Pradesh, Manipur, Nagaland, Rajasthan, Tamil Nadu and Arunachal Pradesh.

Table 4 gives the normative requirement of funds computed by us, for all-India, after making appropriate adjustments for lane-width, traffic density, geographical characteristics and zonal location. To make it comparable with the figures given in Col. 2 of Table 2 the length of National Highways in Mizoram, Sikkim, Tripura, and those maintained by Border Roads Development Board, Cochin Port Trust, and Ferry Vessels at Pandu have also been included in computing the total requirement of funds reported in Col. 2 of Table 4. Col. 3 gives the requirement figures projected by MOST. It is pointed out that for the years 1979-83, our estimates are higher than those of the MOST, while thereafter, the trend reverseas. This may be explained partially, by the inevitable in-built bias in our estimates, to which we have already referred, in footnote(ii). Besides, it is not clear what price index the MOST uses to update the norms from year to year.<sup>(v)</sup> We have used a composite price index of labour aggregate and bitumen, in the proportion in which they are used in maintenance activity. The index used by the MOST seems to have risen much faster than our index. Col.4 of Table lists the average per kilometre norm adopted by the MOST, and Col.5 gives

the average per kilometre norm computed by us. From 1984-85, the MOST figures are considerably higher than our figures, which explains the shortfall listed in Col.5 of Table 2.

Besides, the percentage shortfall listed by the MOST in Col. 5 of Table 2 has been obtained by comparing requirement figures with allotment figures, which in our opinion, would be misleading, because, the states spend more than the allotted amount, most of which is subsequently reimbursed by the Centre. Therefore, in Col. 8 Table 4 we have compared the difference between requirement (computed by us) and actual reimbursement. Here again, we find that there was shortfall upto 1985, thereafter there was no shortfall.

The following conclusions emerge from these findings: First that the problem of inadequate funds for maintenance is essentially a pre 1985 phenomenon, thereafter, there is evidence of spending over and above the normative requirements in the country as a whole. Therefore, in the case of National Highways, citing paucity of funds as the reason for undermaintenance is untenable in the years after 1985. Besides, the gap between requirement and actual expenditure is not as large as it has been made out to be, if we go strictly by the norms. Second, that the situation is not uniform all over the country. There are some States/Union Territories which are constantly overspending relative to norms. Delhi, particularly, is a big spender, consistently spending over twice the normative requirements during the decade. Even after compensating for input price increases and heavier traffic intensities, a majority of the States/Union Territories are over spending in recent years.

How does one reconcile the fact that less than a third of National Highways have acceptable riding surface quality (Table 1) with the findings of this study that indeed adequate funds were available for maintenance of National Highways, particularly after 1985?

Firstly, riding surface quality measurements relate to 1983-84, while overspending on maintenance relative to normative requirements is a post-1985 phenomenon. It is possible that there is improvement in riding surface quality after 1985. This calls for a periodic evaluation of riding surface quality.

Secondly, it is also possible that the norms prescribed for maintenance were themselves on the lower side, and therefore, inadequate to the actual needs that exist. Since we are not technically competent to comment on the adequacy of the norms themselves, we have taken them as given, after adjusting for increased traffic intensities and wider lane-widths. Thirdly, it is possible that a considerable proportion of the maintenance expenditure is taken up by Flood Damage Repairs and Special Repairs, to the detriment of routine maintenance. Indeed that this is so, is evident from Table 5 which gives the share of contingent maintenance in total. The expert committee allocated 20 per cent of routine maintenance as the norm for Flood Damage and Special Repairs. This should work out to 16.66 per cent of the total. However, we find, that in a majority of the states, the actual expenditure exceeds 16.66 per cent. Considering that states have little control over contingent expenditure, we decided to check the extent of deviation of routine maintenance expenditures, with reference to norms for routine maintenance only.

The allotment figures for routine maintenance as well as contingent repairs were available statewise, for the years 1979-88 from the MOST. Applying these proportions to the actual expenditures for the respective states for the respective years, we computed the likely actual expenditure on routine maintenance only, during the decade and compared this with the norms prescribed for routine maintenance by the 1968 expert committee all at current prices. Table 6 captures the deviation of actual expenditure on routine maintenance from the normative requirements. The Table shows that routine maintenance has suffered because of the high proportion of flood damage repairs and special repairs. The country as a whole spent only 57 per cent of normative requirement on routine maintenance in 1979, while this proportion has risen to 84 per cent in 1988. Perhaps, the 20 per cent earmarked for contingent repairs by the expert committee, is insufficient to meet the needs. The nature of contingent repairs being such that they will have to be attended to at the cost of routine maintenance, whenever the need arises. However, here it must be pointed out that a few states and Union Territories have an index of over 100, even in the case of routine maintenance.

These findings corroborate the observations made by a special committee appointed by the MOST to review the agency system in September 1983.<sup>7</sup> The Planning Commission has also expressed the view that the norms specified for Flood and Special Repairs are inadequate, and will have to be revised upwards.<sup>8</sup> In this context, the recommendations of the Trivedi Committee are timely.

National Highways constitute 1.8 per cent of the total road network in the country in 1984-85, while they appropriate approximately 10 per cent share in the total expenditure on all roads. 7 per cent of the total maintenance expenditure on all roads is spent on maintenance of National Highways. On an average, maintenance accounts for 30 per cent of all expenditure on National Highways during the decade 1979-88.

### III

State Highways are the next most important network in the country. Once again, we attempted to compare the actual expenditure on maintenance of State Highways with the norms prescribed for the purpose. However, detailed distribution of State Highways in terms of lane width traffic density and type of terrain was not available. Therefore we could not apply the methodology used in the case of National Highways, for computation of average per kilometre maintenance norm for State Highways.

However, the Eighth Finance Commission had worked out the average per kilometre maintenance norms for single lane and double lane roads in different states at 1983-84 prices.<sup>9</sup> We obtained the length of single and double lane State Highways in different States during the years 1979-1983 from the Statistical Abstract of India, and computed the total normative requirement of funds for maintenance of State Highways during the years 1979-1983, using the same composite price index as deflators. From the Combined Finance and Revenue Account of the CAG, we obtained the actual expenditure on maintenance of State Highways

during the years 1979-1983 at current prices. Table 7 gives the index of deviation of actual maintenance expenditure from normative requirements in the case of State Highways.

Table 7 presents no consistent picture. In all the five years examined, the all India average expenditure on maintenance of State Highways is below normative requirements, although there are a few states (Assam and Bihar) where the Index is over 100. We ascertained from the Finance Commission that in some years, a lot of stores and spares are accumulated, which are used in subsequent years which may explain the excessively high index recorded in some states. Also, it is possible that some expenditures of a capital nature are registered in the Revenue Account of the CAG, in which case, our index may be an overestimation.

Besides, States like Gujarat, Uttar Pradesh and Kerala which have considerable lengths of State Highways record no Revenue expenditure at all in some years and negligible sums of expenditure in other years, indicating that in these States, maintenance expenditure on State Highways is classified under Minor Heads other than State Highways' or that the expenditure does not figure in the Revenue Account at all. In the absence of a clear or consistent picture no concrete conclusions can be drawn as to the state of maintenance of State Highways except to point out that the average maintenance expenditure on State Highways is below normative requirements during the years 1979-1983.

#### IV

The findings of this study point out to the following conclusions: First, that although the expenditure on maintenance of National Highways relative to normative requirements has been adequate in recent years, nearly 40 per cent of this is absorbed by Flood Damage Repairs and Special Repairs, seriously affecting routine maintenance. Second, that there are wide inter-State variations in the extent and magnitude of deviation of maintenance expenditures from normative requirements with an increasing number of States spending in excess of normative requirements. There are certain States/Union Territories which spend in excess of normative requirements even for routine maintenance, and in these States/Union Territories, paucity of adequate funds for maintenance cannot be cited as a cause for undermaintenance of National Highways. If National Highways in these States still do not have acceptable riding surface quality, it points to the possibility of leakage of funds provided for maintenance. This calls for strict supervision and control of maintenance activities. Third, that the average expenditure on maintenance of State Highways falls short of normative requirements during the years 1979-1983.

In this context, it would be appropriate to draw attention to the findings of a study conducted by the Central Road Research Institute. Examining the impact of maintenance on riding surface quality, the study concluded "Riding quality of a road section, though getting influenced by the promptness and adequacy of maintenance operations, cannot be directly taken as a measure of adequacy or otherwise of maintenance efforts". As we have already pointed out, other factors like riding quality obtained at the time of construction or last surface course renewal, and



the adequacy of pavement thickness for the prevailing traffic conditions, would affect riding quality significantly. A discussion with the officials in the Ministry of Surface Transport as well as in the Central Road Research Institute revealed that newly built roads seldom achieved acceptable riding surface quality. Perhaps, here lies the problem of ill-maintained Highways, even though there is no paucity of funds for maintenance.

## NOTES

- (i) Cost per kilometre of new construction obtained from Road Development Plan for India (1981-2001), Ministry of Shipping & Transport, Roads Wing, 1984. Maintenance norms per kilometre obtained from our own computation.
- (ii) Although the norms were at 1968 prices, the distribution of National Highways by Categories of lane width and traffic density pertained to 1988, so that the standardised per kilometre norm computed by us would take into account the distribution prevailing in 1988. While it would have been more accurate to take into account, the actual distribution prevailing in the year 1979-1988, this data was available for the year 1988 only. To the extent that there were fewer stretches of double lane roads and less traffic density in the years prior to 1988 our estimates of maintenance norms for these years will be in overestimation, and consequently our indices of deviation, an under-estimation. This may explain the seemingly in-built bias in the indices.
- (iii) We tried inflating the labour component of maintenance norms, using both Agricultural labourers' CPI and Industrial Workers' CPI. The results were not very sensitive to the index used.
- (iv) Both the norms and the actual expenditure exclude cost of spares/tools, etc. and depreciation of machinery and equipment.
- (v) The officials at the Ministry of Surface Transport, Roads Wing could not give any satisfactory indication of the exact index used for updating the norms.

### References

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8. Ibid (pp.15-16).
9. Report of the Eighth Finance Commission - 1984  
(Annexure III - 22).

Table :1

Condition of Pavement of National Highways 1984-85  
Percentages

S.No.	State	Good	Fair	Poor
1	Andhra Pradesh	31.97	55.09	12.94
2	Assam	0.81	78.73	20.46
3	Bihar	33.49	59.96	6.55
4	Chandigarh	100.00	0.00	0.00
5	Delhi	100.00	0.00	0.00
6	Goa	11.06	70.59	18.35
7	Gujarat	78.93	21.07	0.00
8	Haryana	33.84	66.16	0.00
9	Himachal Pradesh	10.84	47.89	41.26
10	J & K	65.92	23.53	10.55
11	Karnataka	24.81	55.43	19.76
12	Kerala	6.06	93.94	0.00
13	M.P	20.63	61.58	19.69
14	Maharashtra	27.87	52.22	18.18
15	Manipur	0.00	0.00	100.00
16	Meghalaya	0.00	76.48	23.52
17	Nalaland	0.00	0.00	100.00
18	Orissa	0.00	36.49	63.51
19	Punjab	28.03	61.37	10.60
20	Rajasthan	37.52	23.23	39.26
21	Tamil Nadu	61.57	38.43	0.00
22	U.P	22.22	66.91	10.00
23	West Bengal	52.29	45.85	1.87
24	Arunachal	0.00	100.00	0.00
25	Pondicherry	0.00	100.00	0.00
26	Mizoram	0.00	71.42	28.58
27	Sikkim	0.00	0.00	100.00
28	Tripura	0.00	61.13	38.87
	All India	28.74	52.46	18.81

SOURCE : MOST (Roads Wing)

Table: 2

Funds Demanded And Funds Finally agreed to by the  
Ministry Of Finance For Maintenance And Repairs  
of National Highways in the Country

Year	Requirement Projected To Finance	Amount Provided	Shortfall	Percentage Shortfall
(Rs. in crores)				
1970-71	13.50	12.83	0.67	4.96 %
1971-72	16.00	14.03	1.97	12.31 %
1972-73	16.62	15.79	0.83	4.99 %
1973-74	15.49	14.73	0.76	4.90 %
1974-75	19.59	17.50	2.89	10.67 %
1975-76	20.49	18.57	1.92	9.37 %
1976-77	24.29	21.00	3.29	13.54 %
1977-78	27.20	25.30	1.90	7.26 %
1978-79	34.50	28.85	5.65	16.30 %
1979-80	41.25	38.20	11.05	26.79 %
1980-81	55.55	37.00	10.55	33.39 %
1981-82	55.55	47.00	8.55	15.39 %
1982-83	60.08	51.00	9.00	15.00 %
1983-84	71.90	61.00	18.90	15.16 %
1984-85	188.30	75.00	33.30	30.75 %
1985-86	116.82	90.00	26.82	22.96 %
1986-87	176.78	94.25	82.53	16.69 %
1987-88	178.24	99.03	79.21	44.44 %
1988-89	176.36	117.50	58.86	33.37 %

Source : MOST (Roads Wing)

Table-3

## Index of Deviation of Actual Per KM Maintenance Expenditure From 1968 Norms

S.No	States	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
1	Andhra Pradesh	101.80	78.76	69.78	71.12	101.28	109.34	89.21	101.90	126.37	138.88
2	Assam	121.18	83.93	93.71	67.54	57.46	73.85	104.25	97.62	109.75	111.51
3	Bihar	74.00	71.48	66.57	65.43	62.64	74.44	108.63	110.69	90.40	72.62
4	Chandigarh	70.89	58.51	65.99	62.32	90.74	156.22	302.27	233.10	138.32	185.56
5	Delhi	214.73	200.75	157.12	231.55	225.24	220.78	231.38	199.72	275.22	341.68
6	Goa	63.16	45.67	48.04	57.84	138.43	87.92	153.67	353.30	207.76	250.14
7	Gujarat	170.66	172.33	146.90	118.73	117.43	169.52	195.86	124.14	143.94	184.89
8	Haryana	63.01	66.48	59.71	61.83	75.18	74.80	72.67	66.59	62.53	120.76
9	Himachal Pradesh	90.22	73.78	53.21	59.72	54.90	62.44	68.30	95.51	114.35	151.22
10	J & K	43.02	27.42	28.30	16.86	19.11	23.16	38.39	29.26	51.46	76.08
11	Karnataka	60.47	79.41	73.04	83.47	90.37	82.39	90.01	100.30	113.65	142.11
12	Kerala	90.96	118.07	140.04	119.01	97.90	107.70	114.33	155.35	148.16	129.76
13	M.P.	59.29	45.24	51.07	56.71	53.87	61.23	77.90	74.69	75.75	92.97
14	Maharashtra	78.06	79.37	71.34	80.27	102.86	89.91	104.78	107.74	110.68	131.26
15	Manipur	71.19	31.47	46.08	30.30	39.43	39.72	50.58	59.60	51.54	47.47
16	Meghalaya	47.01	36.47	50.59	66.38	109.35	121.83	130.79	100.26	75.16	114.98
17	Mizoram	14.44	3.61	6.55	6.64	15.63	3.22	6.19	8.73	3.28	11.94
18	Orissa	61.60	54.79	54.98	70.19	80.04	78.69	94.97	109.93	94.74	136.12
19	Punjab	94.96	68.23	72.58	72.47	81.54	89.75	88.02	117.43	141.32	181.88
20	Rajasthan	73.13	53.57	64.87	57.48	70.08	71.93	81.77	99.57	111.93	87.44
21	Tamil Nadu	43.25	33.88	34.03	34.22	38.87	52.23	63.58	66.49	72.66	83.25
22	U.P.	84.65	87.86	81.34	93.49	99.24	95.25	107.86	103.18	85.96	129.94
23	West Bengal	98.31	85.08	83.06	52.71	65.75	92.48	116.02	120.27	131.31	191.01
24	Arunachal			3.70	4.70	6.21	13.16	13.55	21.26	37.05	52.73
25	Pondicherry						77.61	83.16	163.79	185.74	108.31
	All India	81.00	71.80	70.12	68.84	76.34	82.94	96.66	99.63	102.71	123.71

Table : 4

All India - Difference between Requirement and Actual Expenditure  
on Maintenance of National Highways

1	2	3	4	5	6	7	8
Year	Total Requirement As per Norms Rs. Crore Computed by us	Requirement Projected to Finance by MOST	Per KM Norm for Maintenance as per MOST Projection(0s)	Per KM Norm for Maintenance as per our computations	Actual Expenditure Reported by States	Amount Reimbur- sed by Finance To MOST	EXCESS/SHORTFALL OF REIMBURSEMENT OVER NORM(7-2)
1979	42.48	41.25	14214	14629	34.50	n.a	-
1980	86.52	55.55	17704	19289	43.19	40.84	-19.60
1981	79.50	55.55	17667	25283	55.55	47.74	-31.76
1982	84.05	60.00	19082	26986	59.07	56.47	-28.36
1983	91.07	71.90	22821	29095	70.22	68.77	-22.90
1984	97.35	108.30	34037	30597	81.51	80.26	-17.09
1985	98.92	116.82	36727	31089	96.19	87.57	-11.35
1986	105.30	176.78	54447	32432	104.25	106.97	1.67
1987	107.38	178.24	54858	33048	109.16	107.56	0.10
1988	114.65	176.36	51965	33796	131.01	140.30	25.65

Source: Col 3, 4 &amp; 6; MOST

Col 7: Controller of Accounts (MOST)

Note: Maintenance of NH in Mizoram, Sikkim, Tripura, BRDB, ferry vessels at Paudu,  
Cochin Port Trust etc included in the computations.

Table: 5

Percentage share of Flood & Special Repairs in total  
Maintenance Expenditure (Actuals)

S.No.	States	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
1	Andhra Pradesh	41.84	26.88	28.84	17.24	43.39	49.02	24.90	29.64	46.44	37.74
2	Assam	53.31	52.91	45.01	36.14	33.05	45.87	44.82	32.89	38.87	44.19
3	Bihar	48.64	49.99	45.08	44.14	45.83	52.67	52.69	48.39	43.84	50.70
4	Chandigarh	0.00	0.00	0.00	0.00	0.00	44.44	60.05	32.48	0.00	0.00
5	Delhi	32.67	39.91	26.43	15.22	9.19	15.25	0.00	0.59	0.00	16.35
6	Goa	27.36	14.82	39.17	18.90	19.19	51.52	54.07	75.68	29.06	50.70
7	Gujarat	69.78	74.55	61.84	53.34	52.72	70.25	63.57	47.79	47.32	52.21
8	Haryana	22.34	12.05	13.84	11.94	35.28	31.71	12.47	11.81	11.71	33.10
9	Himachal Pradesh	74.90	62.31	59.10	60.64	48.75	46.16	41.02	47.50	55.83	69.28
10	J & K	79.05	64.86	65.06	52.27	52.48	57.90	62.74	29.86	65.15	73.71
11	Karnataka	21.42	40.27	38.43	36.45	48.56	41.59	31.14	27.56	18.33	22.12
12	Kerala	54.11	58.88	54.99	46.99	20.01	42.05	34.32	28.34	37.00	52.89
13	M.P.	23.28	13.09	16.39	16.39	25.82	39.98	32.53	32.14	27.39	27.63
14	Maharashtra	32.01	27.22	30.32	29.60	49.37	42.84	36.44	29.57	39.35	40.82
15	Manipur	32.55	38.34	37.11	32.79	38.90	25.85	43.70	29.41	40.74	49.71
16	Meghalaya	26.29	7.57	19.10	40.34	65.63	65.39	61.25	46.34	25.73	45.94
17	Nalaland	77.78	24.69	62.92	53.37	0.00	0.00	0.00	0.00	0.00	0.00
18	Orissa	31.48	27.26	30.73	45.12	51.68	46.93	42.01	46.32	37.67	40.91
19	Punjab	34.69	11.22	13.95	14.09	14.01	19.92	27.40	27.53	30.29	53.53
20	Rajasthan	40.15	44.77	41.31	35.91	42.59	36.99	30.58	34.83	30.07	32.23
21	Tamil Nadu	17.24	5.43	2.14	6.38	23.81	31.63	22.94	18.20	21.72	18.22
22	U.P.	39.84	61.07	62.57	57.01	60.00	62.25	49.93	50.23	39.33	49.75
23	West Bengal	42.20	39.83	34.78	31.37	24.87	39.33	47.08	36.62	52.63	53.89
24	Arunachal							24.04	0.00	68.45	87.78
25	Pondicherry							37.99	32.96	45.00	17.84
	All India	41.79	42.35	39.25	35.70	42.82	47.33	40.89	36.94	38.09	43.29

Source: The MOST (Roads Wing)



Table :6

Index of Deviation of per KM actual Maintenance Expenditure From 1968 Norms  
Routine Maintenance only

S.No.	States	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
1	Andhra Pradesh	71.05	69.11	59.59	70.63	68.80	66.90	80.40	86.03	81.23	103.76
2	Assam	67.90	47.43	61.83	51.75	46.17	47.97	69.03	78.61	80.51	74.69
3	Bihar	45.61	42.90	43.87	43.86	40.87	42.28	61.67	68.56	60.92	42.96
4	Chandigarh	85.07	70.21	79.19	74.79	108.89	104.15	144.93	188.86	165.99	222.68
5	Delhi	173.49	144.75	138.70	235.58	245.46	224.52	277.65	238.25	330.27	342.92
6	Goa	55.05	46.68	35.07	56.29	134.24	51.15	84.69	103.10	176.85	147.97
7	Gujarat	61.88	52.64	67.27	66.48	66.63	60.53	85.63	77.78	91.00	106.08
8	Haryana	58.72	70.16	61.74	65.33	58.39	61.30	76.34	70.47	66.25	96.95
9	Himachal Pradesh	27.17	33.37	26.12	28.21	33.76	40.34	48.34	60.17	60.61	55.74
10	J & K	10.82	11.56	11.87	9.65	10.90	11.70	17.16	24.63	21.52	24.00
11	Karnataka	57.02	56.92	53.96	63.66	55.78	57.75	74.39	87.18	111.37	132.80
12	Kerala	50.10	58.27	75.64	75.71	93.97	74.89	90.11	133.60	112.02	73.36
13	M.P	54.59	47.18	51.23	56.90	47.96	44.10	63.07	60.83	66.01	80.74
14	Maharashtra	63.69	69.31	59.66	67.81	62.49	61.67	79.91	91.05	80.55	93.21
15	Manipur	57.62	23.28	34.78	24.44	28.91	35.35	34.17	50.48	36.37	28.65
16	Meghalaya	41.58	40.45	49.11	47.52	45.11	50.60	60.82	64.55	66.96	74.59
17	Nalaland	3.85	3.27	2.92	3.71	18.75	3.87	7.43	10.48	3.93	14.33
18	Orissa	50.65	47.83	45.71	46.23	46.42	50.11	66.09	70.81	70.89	96.52
19	Punjab	74.41	72.68	74.94	74.71	84.13	86.25	76.68	102.12	118.22	101.43
20	Rajasthan	52.52	35.51	45.69	44.20	48.27	54.39	68.11	77.87	93.93	71.11
21	Tamil Nadu	42.95	38.45	39.97	38.44	35.54	42.85	58.79	65.27	68.25	81.69
22	U.P	61.11	41.04	36.53	48.23	47.63	43.14	64.81	61.59	62.58	78.36
23	West Bengal	68.20	61.42	65.01	43.41	59.28	67.33	73.68	91.47	74.69	105.69
24	Arunachal			4.44	5.64	7.45	15.80	12.35	25.51	14.03	7.73
25	Pondicherry						93.13	61.88	131.70	122.58	106.78
	All India	56.58	49.67	51.12	53.12	52.38	52.42	68.57	75.40	76.30	84.19

Table :7

## State Highways - Index of Deviation of Actual per KM Expenditure from Norms

S.No.	States	1979	1980	1981	1982	1983
1	Andhra Pradesh	93.11	81.47	100.16	89.23	74.35
2	Assam	553.18	442.73	545.44	441.96	498.45
3	Bihar	235.17	311.50	281.90	161.35	172.78
4	Goa	34.87	16.60	17.63	33.46	59.94
5	Gujarat	-	-	-	-	-
6	Haryana	84.25	62.85	48.55	51.76	41.87
7	Himachal Pradesh	109.17	94.95	79.89	76.31	63.99
8	J & K	-	-	-	-	-
9	Karnataka	47.20	45.98	36.42	43.76	41.55
10	Kerala	1.56	1.57	0.29	0.00	0.00
11	M.P	97.40	93.36	93.15	99.63	94.24
12	Maharashtra	89.95	92.38	91.39	97.97	108.52
13	Manipur	64.59	30.73	27.36	34.35	43.13
14	Meghalaya	-	-	-	-	-
15	Nalaland	21.20	68.29	63.52	84.76	114.21
16	Orissa	56.75	68.62	60.72	59.77	58.34
17	Punjab	115.46	84.39	60.86	69.26	50.78
18	Rajasthan	80.21	62.19	68.01	54.07	79.28
19	Tamil Nadu	110.45	67.63	222.33	64.12	109.90
20	U.P	-	-	-	-	-
21	West Bengal	98.96	83.04	111.59	113.50	95.72
22	Pondicherry	186.29	-	137.87		53.46
	All India	83.28	79.67	79.99	73.64	75.06

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