

THE REPORT OF THE WORKING GROUP ON

ROADS

(2007-2012)

For 11TH FIVE YEAR PLAN



सत्यमेव जयते

GOVERNMENT OF INDIA

**MINISTRY OF SHIPPING, ROAD TRANSPORT
AND HIGHWAYS**

DEPARTMENT OF ROAD TRANSPORT AND HIGHWAYS

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EXECUTIVE SUMMARY

Chapter-1: Introduction

The Working Group on Roads for the 11th Five Year Plan (2007-2012) was constituted by Planning Commission in April, 2006 under the Chairmanship of the Secretary, Department of Road Transport & Highways, Ministry of Shipping, Road Transport & Highways, Government of India. The Working Group decided to appoint four different Sub-Groups on National Highways, State Roads, Research & Development and Highway Safety, and Public-Private-Partnership respectively.

The main task of the Working Group is to critically review the financial and the physical progress of the development of the entire road net work both in the Centre and State sectors during the 10th Five Year Plan, highlighting the constraints faced and the remedial actions required to be taken in the context of the preparation of the 11th Five Year Plan and recommend a policy framework for the development of roads in the 11th Five year Plan and a perspective for the next decade beyond 11th Plan – Vision 2021.

Chapter-2: National Highways

The Chapter gives elaborate coverage on the physical and financial achievements during the 10th Five Year Plan, identifies the priorities for improvement of the stretches of National Highways entrusted with the PWDs of the States / Union Territories, progress achieved so far under various phases of the National Highways Development Project (NHDP), the programmes for future phases of NHDP including the fund requirements for the 11th Five Year Plan (2007-2012), the projected fund requirement for the 11th Five Year Plan (2007-2012) for improvement of the remaining National Highways stretches entrusted with PWDs of States / UTs and with Border Roads Organisation (BRO), including improvement of about 7,000 km of new National Highways which are likely to be declared during 11th Five Year Plan and provisions for road safety, training etc.

Chapter-3: State Roads

This Chapter focuses on the deficiencies in funding for development of the secondary system of road transportation in the country (which comprises of about 1,30,000 km of State Highways (SH) and about 3,00,000 km of Major District Roads (MDRs)), losses due to poor condition of these roads, their total replacement cost, the constraints faced (in terms of lack of finances, spreading resources thinly, control on pre-construction activities, weak management by the contractors). Suggestions have been made for coordinated development of State Highways and Major District Roads keeping in view the development of National Highways and Rural Roads. In doing so, attention is to be given for development of State Roads connecting places of tourist importance, mining areas, power plants, industrial belt, steel plants, important railway stations, other areas which can further the economic development in vulnerable states & backward regions / communities, roads connecting neighbouring states and bridges in the border etc. The proposed programme for development of State Roads during the 11th Five Year Plan entails a fund requirement of Rs 100,000 crore, inclusive of Rs 32,000 crore as possible element of private finance.

Emphasis have been made for establishing a dedicated Road Data Centre in the Indian Roads Congress with financial supports by the States regarding Basic Road Statistics, for improving the implementation capacities of the PWDs of the States / UTs through institutional strengthening and training etc., the necessity for the contracting industry and the consultancy sectors to grow on healthy lines.

Chapter-4: Research & Development in the Road Sector

Suggestions have been made under this chapter to give emphasis towards the research on conservation of materials used in the construction of roads, innovations in construction technology, environmental impact and road safety measures, updation of

all obsolete technologies being used in design / construction / maintenance of roads and bridges along with road safety measures, cost optimization etc. With this in view, thrust areas for possible R&D initiatives have been suggested. The necessity to have reliable database for enabling scientific analysis of road accidents and for improvement in the method of accident data collection with involvement of Technical Specialists have been emphasized including suggestions regarding the future thrust areas. It has been suggested to earmark Rs 100 crore towards R&D activities in the National Highways sector in the 11th Plan and for making an annual provision of about Rs 5 crore by each States / UTs for SHs and MDRs.

Chapter-5: Role of Private Sector

The chapter gives a broad overview on the initiatives taken by the Government for attracting private sector participation in road sector, review of the existing policy framework on PPP and its demerits in timely implementation of the projects, requirement to enhance the capacity of the implementation agencies / the private sector for implementation of PPP projects, suggestions regarding study of the concept of telescopic user fee for possible adoption, involvement of direct beneficiaries in capital structure of project through sale of long term passes for unlimited number of trips in a specified time period, review of exemption category to bring them in line with international practice, adoption of Electronic Toll Collection (ETC) technology, putting up effective mechanism for elimination of overloading on highways by planning weigh-in-motion bridges along with static weigh bridges with space for off-loading and storage, suggested measures for encouraging PPP, measures for encouraging R&D in roads by private agencies, suggestions for States / UTs to take up capacity of augmentation of such roads with financial support of the private sector which are justified on the basis of traffic volume and which are not envisaged to be upgraded as National Highways, suggestions regarding possibility of leveraging funds from CRF to meet the viability gap and necessity to constantly review and amend acts including setting up of permanent legal cell for PPP.

Chapter-6: Highway Maintenance

Under this chapter a comparison of the year-wise fund provided for maintenance and repair of NHs from 2002-03 to 2006-07 have been given which clearly brings out the inadequacy of the available fund. Various levels of maintenance have been discussed and it has been emphasized for modernization of maintenance management through introduction of Pavement Management System, introduction of mechanization in maintenance, maintenance by contract, corridor management and taking up of necessary steps for enforcement of the Control of National Highways (Land & Traffic) Act, 2002.

The annual fund requirement for maintenance and repair of National Highway network has been estimated as about Rs. 2,280 crore per year as against the available fund of about Rs. 800 crore per year. Accordingly, the fund requirement towards M&R of NHs has been assessed as Rs. 11,400 crore for the 11th Plan. The estimated fund requirement for maintenance of State Roads is about Rs. 6,000 crore per year.

Cognizance have been taken of the recommendations made by the 12th Finance Commission, inter-alia deciding to provide an annual central grant of Rs. 3,750 crore over the period 2006-10 for the country as a whole in addition to the normal expenditure which the States are expected to incur on maintenance of Roads and Bridges.

The suggestions also called for Institutional Reforms including the need to establish a Road Management Unit at the Headquarters of the PWDs of States / UTs for prioritization of maintenance interventions.

Chapter-7: Environmental & Social Aspects

A brief overview has been given under this chapter regarding the extant policies for Environment Impact Assessment (EIA), Coastal Regulation, Forest Conservation and Wildlife Protection. Social concerns such as Rehabilitation & Resettlement (R&R) initiatives being addressed during preparation of DPRs and during actual execution of road projects have also been discussed.

Several actions have been suggested for effectively tackling of environmental and social impacts resulting from upgradation of roads, which include creation of special

cells in the Ministry of Shipping, Road Transport & Highways / NHAI/ PWDs of States / UTs. Other suggested actions pertain to R&R, removal of encroachments, corridor management, control of road side advertisements, recycling of existing pavements, promotion of use of waste materials, use of bio-engineering techniques for protection of slopes, implementation of the Control of National Highways (Land & Traffic) Act, 2002, upgradation of vehicle technology to meet future emission standards, effective inspection and maintenance programme for in-use vehicles.

The urgent necessity to undertake research on conservation of energy with special reference to its impact on environment has been stressed. Further, efforts for containment of air and noise pollution needed to take up during the next 5 years have been suggested.

The necessity to suitably supplement the powers given to the Highway Administrations under the Control of National Highways (Land & Traffic) Act, 2002 by proper institutional arrangements, supporting structure including providing actual support of local administration at the field level has been emphasized. Measures have been suggested for effective land management through various initiatives.

Chapter-8: Capacity Building of Implementing Organization and Human Resource Development

The suggestions contained in this chapter are intended towards the improvement in the delivery mechanism of the various organizations such as the Department of Road Transport & Highways, NHAI, BRO, PWDs of States / UTs etc. The present scenario in Training and the policy initiatives required to be taken for developing sufficient numbers of highway engineers and other professionals have been discussed along with the role that the National Institute of Training for Highway Engineers (NITHE) is required to take up.

An outlay of Rs. 50 crore has been suggested for training during the 11th Five Year Plan.

Suggestions have been made for strengthening of existing training centres such as CRRI, NITHE and State level training institutes and creation of a dedicated fund by earmarking some percentage in the budget for training activities for skilled / unskilled manpower in the field of road construction and maintenance to meet the requirements of the industry.

Chapter-9: Domestic Construction Industry and Consultancy Organization

An overview has been given regarding the status of the domestic construction industry before 1985, the impetus received in 1985 after the Government of India adopted the International Competitive Bidding (ICB) procedures and FIDIC conditions of Contract for Highway Projects while seeking loan assistance from the World Bank, the growth of the industry during implementation of NHDP-Phase-I & II. A quantum jump in the capacity of the Contractors in the highway sector is required keeping in view the future programmes of development. It is suggested that the States / UTs should devise packages of different sizes so as to provide space for different categories of contractors. It has been suggested to continue with the current policy of providing mobilization advance and equipment advance free of interest, and to strengthen the system of dispute avoidance and resolution.

It has been stressed that the Consultancy sector is required to play a vital role with the decision to take up the future phases of NHDP mainly through PPP route. Accordingly, it has been suggested to introduce a system of quality assurance and quality audit for the consultants work including instituting a system of grading the firms and keeping a track record of their past performance.

It has been suggested that emphasis will be required to boost the local industry for manufacturing of highway equipments. It is further suggested that the concept of "Equipment Bank" in the private sector regarding leasing of equipments needs to be encouraged. The necessity for developing low cost indigenous equipments and machinery for projects on lower category of roads such as Rural Roads etc. has been

stressed so that the projects could be implemented within reasonable costs and through smaller contractors. Progress usage of indigenous materials including waste materials / by products has been stressed with adequate R&D to be taken up for their usage with the initiatives from the concerned waste producing industry / concerned Ministry in consultation with the M/o S, RT&H.

Chapter-10: Mobilization of Resources

Whereas the sources of financing of National Highways are Government budget, fee / toll on bridges, Central Road Fund, etc., for State Roads, an amount of about Rs. 10,000 crore is likely to be available for SHs and MDRs out of Central Road Fund (CRF) during the 11th Five Year Plan. Besides this, for commercially projects, it should be possible to attract reasonable finances from the market based on experience of some of the recent initiatives by the States. It has been suggested that present generation road fund dedicated to roads may be set up by the States. The recommendations have been made that the budgetary allocations for road sector should be a certain minimum percentage of the annual plan of the State / UT excluding provisions under CRF, E&I, PMGSY etc. It has been emphasized that the strategy of implementation of projects with external assistance should be continued for some more time for the State Roads. Tapping of some fund from project beneficiaries could also be done. The current norms for Calamity Relief Fund need reviewing for its modification, as this do not provide for permanent restoration of damaged infrastructure.

The highway users would need to be involved directly or indirectly in mobilization of resources. Re-orientation of institutional arrangements by improving planning process to identify commercially viable projects, cutting down on initial project costs through value engineering principles of phased development, enhancing transparency of financing arrangements through PPP approaches, obtaining supports of road users and trucking associations are also suggested.

Chapter-11: Development of Roads in the North-Eastern Region

It is recognized that the North-Eastern region has the potential to emerge as a strategic base for domestic and foreign investors to tap the potential of the contiguous markets of China, Myanmar, Bangladesh, Lao PDR, Thailand, Vietnam, Cambodia, Malaysia, Indonesia and beyond. Roads serve as the principal mode of transport for movement of goods and services, with a share well over 90% of the total movement by surface transport in the North-Eastern Region.

The State-wise distribution of the primary and secondary road network including their condition given under this chapter demonstrates that the length of State Highways in the region is much less as compared to that of the National Highways. Therefore, it has been suggested that there is necessity for the Government of India to assist the North-Eastern States in upgrading certain District Roads as State Highways.

Other major areas of concern are structural adequacy of only about 10% of the SHs in the region to carry permissible legal single axle loads of 10.2 tonnes, financial constraints, presence of a large number of semi-permanent timber (SPT) bridges, etc. It has been suggested that till the time these SPT bridges are replaced, their proper maintenance is crucial.

It has been suggested that the "Road Development Plan Vision : 2021" of the M/o S,RT&H can serve as a guiding reference for formulating a comprehensive master plan for the region as a whole. Further, it is necessary to work out a fund requirement for filling up the existing road infrastructure gap.

In view of the current low level of development, private sector financing would take some more time and therefore basic financing has to be from the Government.

Suggestions have been made for setting up of dedicated State level road fund for maintenance, for examining the possibility of applying in NE region performance based maintenance contract being executed by NHAI and some other State Governments such as Andhra Pradesh, Karnataka etc., and for gradually taking up a few pilot projects.

An overview of the role and functions of the Deptt. of Road Transport & Highways has been given including the major projects under NHDP and SARDP-NE being taken up.

Emphasis has been made for institutional strengthening and human resource development of the PWDs of States / UTs and BRO keeping in view the use of modern

technology, new specifications, mechanized construction, etc., and also for undertaking a review of strength and weaknesses of the existing procedures, rules and regulations, delegation of power, present method of implementation, opportunities forthcoming and threat from external environment.

It has been suggested for setting up of regional level training centre supported with State level inputs and network with academic and engineering institutions in the NE region.

Chapter-12: Investment Needs

National Highways:-

It has been assessed that Rs. 1,21,758 crore outlay would be require for the Department of Road Transport & Highways during the 11th Five Year Plan (2007-2012). Further, it has been assessed that Rs. 3,108 crore would be available for implementation of NHDP from the surplus of the users fee collected by NHAI during 11th Plan. The share of private sector investment during the 11th Five Year Plan is estimated to be Rs. 87, 735 crore.

State Roads:-

The proposed programme envisages a financial outlay of Rs. 1,00,000 crore for the 11th Five Year Plan with possible element of private finance as Rs. 32,000 crore.

CHAPTER 1

INTRODUCTION

1.1 : Appointment of Working-Group

Working Group on Roads for the 11th Plan (2007-2012) has been constituted under the **Chairmanship** of the **Secretary**, Department of Road Transport & Highways vide Planning Commission's Order No.18/2/2005-Tpt. dated 10/4/2006 (**Annexure-I**)

The Working Group in its first meeting on 8th June, 2006 in Transport Bhawan, New Delhi-110001 decided to appoint the four different Sub-Groups as indicated below:

- (a) Sub-Group on National Highways
- (b) Sub-Group on State Roads
- (c) Sub-Group on Research & Development and Highway Safety
- (d) Sub-Group on Public, Private Partnership (PPP)

1.2 Terms of reference for the Working Group

1. To critically review the financial and the physical progress of the development of the entire road net work both in the Centre and State sectors during the 10th Five Year Plan, highlighting the constraints faced and the remedial actions required to be taken in the context of the preparation of the 11th Five Year Plan.
2. Keeping in view the experience acquired from NHDP and launch of the expanded programme for highway development, recommend a policy framework for the development of roads in the 11th Five year Plan and a perspective for the next decade beyond 11th Plan – Vision 2021 – taking cognizance of various issues, including inter-alia the following :
 - i) need for providing world class infrastructure with a view to improving mobility with safety;
 - ii) need for enhancing the capacities of various implementing agencies in order to achieve time targets;
 - iii) need for balanced development of the entire grid of road network comprising of NHs, SHs, MDR, ODRs etc.;
 - iv) prioritization of development work in view of a large number of deficiencies in the existing network with a view to consolidating the network;
 - v) need for maintenance and preservation of existing assets;
 - vi) need for creating an environment conducive to public private partnerships, in view of the increasing role of private sector;
 - vii) need for upgradation of technology in order to improve quality of construction of roads and reduce construction time;
 - viii) energy conservation and environment protection;
 - ix) road safety and traffic management in view of increasing emphasis on speed and mobility;
 - x) need for integrated road-port linkage development programme to ensure faster transportation of traded cargo, especially container cargo.
3. To formulate a programme for development of roads for the Eleventh Five Year Plan indicating monitorable physical targets, financial outlays and their yearwise phasing during this Plan period. While formulating the Plan, various aspects should be examined including inter-alia the increasing role of the private sector, the emerging traffic demands on high traffic density road corridors and the development needs to meet these demands at economic costs, the need for improving mobility and speed of goods and passenger by

higher category roads, the existing deficiencies of the road system and remedial measures and safety considerations for road transport operations.

4. To review the existing arrangements including the increasing role of the private sector for funding the development of various categories of roads and suggest innovative measures for augmentation of resources both for construction and maintenance of roads. To evolve a toll policy keeping in view the overall objective of reducing the cost of transportation.
5. To review the existing norms and criteria for maintenance and repairs for all categories of roads, assess actual requirement of funds for each year of the Eleventh Plan and recommend measures to meet such requirements. To create a conducive environment for public private partnership for maintenance operations especially, in respect of high density corridors.
6. To review the type of machinery and material presently being used in road construction and maintenance and suggest improvements, including steps needed for growth of road equipment industry in the country in order to deliver quality output in a time bound manner.
7. To review the existing manpower training arrangements at the central and State level and suggest improvements, keeping in view the need for construction of higher category roads including expressways.
8. To review the status of various implementing agencies involved in the development and maintenance of roads in terms of their capability to deliver timely outputs and to recommend measures, including outsourcing and institutional for augmenting their implementation capacities.
9. To suggest measures for effectively monitoring the progress of construction and maintenance of roads. Also to evolve a mechanism to ensure that funds allocated for maintenance of roads in the 12th Finance Commission are optimally utilised.
10. To evolve a strategy for ensuring optimal utilization of the increasing Central Road Fund accruals going as Additional Central Assistance for the development of State road network.
11. To review the status of domestic construction industry in terms of its capability to absorb, utilize and augment the technology being presently used for road and bridge construction.
12. To review the existing status of research and development in roads and to suggest future directions and thrust areas in R&D programmes, including those for road safety.
13. With increased emphasis on speed and mobility, recommend road safety measures including setting up of a dedicated organization for the same detailing the funding, implementation and monitoring aspects to reduce the rate of accidents. To establish synergies with the Ministry of Health in managing accidents by setting up trauma centers on GQ and NS, E-W Corridor in the first phase.
14. To assess environmental impact and suggest measures to reduce the adverse environmental impact of construction of road, particularly in the hilly areas.
15. To suggest measures for effective land management, including provision of wayside amenities, control on ribbon development and prevention of encroachments alongside roads in the interest of optimum utilization of the road capacity.

16. To study the best practices adopted worldwide and to draw lessons for the Indian road industry focusing on public private partnerships; and
17. To examine any other matter considered important by the Working Group.

1.3 The composition of the Working Group was as follows:

S. No.	Designation	Nomination
1	Secretary, D/o RT&H	Chairman
2	Chairman, NHAI	Member
3	DG (RD), D/o RT&H	Member
4	AS & FA, D/o RT&H	Member
5	Adviser (Tpt.), Planning Commission	Member
6	Adviser to Deputy Chairman	Member
7	DG, Border Roads Organisation	Member
8	Director, CRRI	Member
9	Additional Member (Works), Railway Board	Member
10	Executive Director (Traffic – Commercial), Railway Board	Member
11	Representative from Ministry of Tourism	Member
12	Representative from Department of Expenditure, Ministry of Finance (Shri V.K. Lakhanpal, Director)	Member
13	Representative from DONER	Member
14	Representative from Ministry of Environment & Forests	Member
15	Adviser (Tpt.), North Eastern Council	Member
16	Principal Secretary, PWD, Government of Gujarat	Member
17	E-in-C, PWD, Government of Haryana	Member
18	E-in-C, PWD, Government of West Bengal	Member
19	E-in-C & Secretary, PWD, Government of Mizoram	Member
20	E-in-C, PWD, Government of Karnataka	Member
21	CE (NH), Government of Rajasthan	Member
22	Representative from CIDC	Member
23	Representative from Confederation of Indian Industry	Member
24	Representative from Consulting Engineering Services	Member
25	Representative from L&T	Member
26	Representative from Punj Lloyd Ltd.	Member
27	Representative from M/s RITES	Member
28	Representative from C&C Construction Pvt. Ltd.	Member
29	Representative from Hindustan Construction Co. Ltd	Member
30	Representative from IDFC	Member
31	Chief Engineer (Planning), D/o RT&H	Convener

CHAPTER 2

NATIONAL HIGHWAYS

2.1. Introduction :

Roads are the key to the development of our economy. A good road network constitutes the basic infrastructure that propels the development process through connectivity and opening up the backward regions to trade and investment. However, despite their importance to the national economy, the road network in India is grossly inadequate. The existing network is unable to cope up with high traffic density. Roads are now recognized as an infrastructure critical to economic and industrial growth.

India has one of the largest road networks in the world, aggregating to about 33 lakh km length of roads at present. The country's road network consists of National Highways, State Highways, Major District Roads and Village and Other District Roads. The National Highways comprises only 2% of the total length of roads, but carries over 40% of the total traffic across the length and breadth of the country. The development and maintenance of National Highways are the responsibility of the Central Government, whereas the State Government concerned is responsible for road other than National Highways.

The length of National Highways has grown over the year since independence. The Plan-wise addition to the NH network is given in the table below.

Period	Length added in Kms	Total length in Kms.
As on 01.04.1947		21440
Pre First Plan (1947-1951)	815	22255
First Plan (1951-1956)		22255
Second Plan (1956-1961)	1514	23769
Third Plan (1961-1966)	179	23948
Interregnum Period (1966-1969)	52	24000
Fourth Plan (1969-1974)	4819	28819
Fifth Plan (1974-1978)	158	28977
Interregnum Period (1978-1980)	46	29023
Sixth Plan (1980-1985)	2687	31710
Seventh Plan (1985-1990)	1902	33612
Interregnum Period (1990-1992)	77	33689
Eight Plan (1992-1997)	609	34298
Ninth Plan (1997-2002)	23814	58112
Tenth Plan (2002-2006)	9008	66590*

* 530 km length of National Highways of Madhya Pradesh has been de-notified.

2.2. Agencies taking up development work:

The development and maintenance of National Highways are implemented on agency basis. The Government of States / Union Territories (PWDs of State / UTs), the National Highways Authority of India (NHAI) and Border Roads Organisation (BRO) are the agencies for such implementation.

Presently, 43,705 km of National Highways are entrusted to the State Government / Union Territories for the stretches of National Highways passing through the respective states. The NHAI has been entrusted with 16,117 km of National Highways included in various phases of National Highways Development Project (NHDP) and other important National Highways. 5,512 km of National Highways in difficult

border areas are with the Border Roads Organisation. 1256 km length of National Highways is yet to be entrusted to the implementing agencies.

Presently works on NHDP Phase-I, II, IIIA and V are in progress. The length of National Highways entrusted to NHA will increase further with the progress and start of the work on various phases of NHDP and the length entrusted to the Governments of States / Union Territories and BRO will decrease accordingly.

2.3 Review of 10th Plan

2.3.1. Financial Achievement:

During 10th Plan period the total outlay for the central sector roads was Rs. 59,490 crore including Rs. 24,700 crore for the Internal and Extra Budgetary Resources (IEBR). The total amount provided during the 10th Plan at the BE stage was Rs. 62,124.94 crore including Rs. 20,892 crore in IEBR. The total expenditure for the period 2002-03 to 2005-06 was Rs. 30,109.50 including Rs. 5,592.90 crore in IEBR. The targeted expenditure during 2006-07 is Rs. 11262.07 Crs., which includes Rs. 3500 Crs. under IEBR. Thus, the total expenditure during tenth plan will be Rs. 41371.57 Crs. including an amount of Rs. 9092.90 Crs. under IEBR. Year wise details of outlay and expenditure are given in **Annexure -II**.

2.3.2. Physical Achievement:

The Tenth Plan envisaged the top priority of completion of NHDP (GQ and the NS & EW Corridor). A number of physical targets were also set up for stretches which were with the PWD. The physical targets and achievements during the first four years and the target of the final year i.e. 2006-07 and the total of the physical targets to be achieved during the 10th Plan period are given in **Annexure -III**.

2.4. Removing deficiencies on National Highways (At 2005 Prices)

There are a large number of deficiencies in the National Highways network in terms of inadequate capacity, insufficient pavement thickness, weak, narrow and distressed bridges and the culverts. The removal of deficiencies is a continuous process.

An assessment had been made of the deficiencies and the cost of their removal on the NHs at present entrusted to PWDs and BRO excluding the works of the improvement already planned under NHDP Phase-I, Phase-II and Phase III. The cost of removal of such deficiencies in the existing National Highways network which are with the PWDs of States / UTs and the BRO has been assessed about Rs. 67,400 crore at the current price level. The BRO has made an assessment about the quantum of balance works at the beginning of the 11th Five Year Plan which is about Rs. 5,600 crore. Thus the total deficiencies on the National Highways excluding the schemes included under NHDP Phase I, II and III is about **Rs. 73,000 crore**.

Under NHDP Phase IV, 20,000 km. of NHs will be improved to 2-lanes with paved shoulders. Making a proportionate reduction in amount required for improvement of 20,000 km of non NHDP section the cost of removal of deficiencies in non NHDP section (excluding NHDP Phase I, II, III & IV) by State PWDs and BRO work out to about Rs. 45,000 crore. Assuming the deficiencies are removed in next two five year plans an average fund of Rs. 4,500 crore per year is required. The average fund allocation under NH(O) Head is about Rs. 2,000 crore per year to this Ministry for Non-NHDP sections. In order to meet this requirement there is a requirement of additional fund under NH(O) head allocation every year by an amount of Rs.2,500 crore per year on the National Highways under NH(O).

The funding under M&R need in 10th Plan has been only to the extent of 40% of requirement. Funding under M&R needs to be increased to take up work of maintenance on the National Highways to keep them in the traffic-worthy condition with a good riding quality. Funding for the M&R may also be included in the Plan Schemes.

2.5. Priorities for Improvement

Improvement of National Highways under various phases of NHDP have already been decided and implementations Programme have been furnished as per the present programme, a length of 21,090 Km of National Highways will still remain with State PWDs and BRO.

During 10th five year plan, one of the priority items was given to improvement of riding quality (IRQP) of existing network as against widening of NHs to two lanes. Now, all the National Highways should be having a minimum of 2-lane standards and it is felt that under the 11th Five Year Plan the priority may be given for the construction of Missing Links to two lane roads and constructions of missing Bridges, widening of NHs to two lane standards wherever there are single or intermediate lane widths. Similarly rehabilitation/repair/reconstruction of existing weak bridges, culverts and construction of new bridges /culverts at these location, need to be taken up on priority. Because of limitation of funds, other types of improvement may be taken up on selective basis. Keeping in view of the funds requirement, the proposed Physical Targets and the Financial Requirements for the 11th Five Year Plan for the National Highways with the State PWDs are as given below:

S. No.	Category	Length kms/Nos	in	Cost (Rs. in Crore)
1.	Missing Link (km)	270		650
2.	Widening from Single lane to 2-lanes (km) and 2-laning with paved shoulder	8000		7550
3.	Strengthening	4000		2700
4.	Improvement of Riding Quality (km.)	5000		2500
5.	Widening to 4-lanes/6-lanes (km)	300		1000
6.	Bypasses (Nos)	25		600
7.	Missing Bridge (Nos)	12		300
8.	Bridges /ROBs(Nos)	550		2400
9.	Misc. works (Drainage measures and other miscellaneous works (Lump sum)	LS		250
10.	Training	LS		50
11.	Road Safety	LS		100
12.	Improvement of newly declared National Highways	LS		1400
	TOTAL			Rs. 20,000 Crore

2.6 National Highways Development Project (NHDP)

NHDP is being implemented by NHAI. NHDP Phase I and II has following components involving widening of NH to four lane in general and to 6 or more lanes in exception.

- (a) Golden Quadrilateral (GQ) connecting 4 major metropolitan cities viz. Delhi-Mumbai-Chennai-Kolkata-Delhi
- (b) North South & East West Corridors (NS-EW) connecting Srinagar to Kanniakumari and Silchar to Porbandar with a spur from Salem to Cochin.
- (c) Connectivity to major ports.
- (d) Other National Highway stretches

2.6.1 NHDP Phase I which was approved by CCEA in December 2000 at an estimated cost of Rs. 30,300 crore (1999 prices) comprises 5,846 km of Golden Quadrilateral, 981 km of NS-EW corridors, 356 km of Port Connectivity and 315 km of other National Highways, a total of 7,498 km.

2.6.2 NHDP Phase II which was approved by CCEA in December 2003 at an estimated cost of Rs. 34,339 crore (2002 prices) comprises mostly NS-EW Corridor (6,240 km) and other National Highways of 496 km length, the total length being 6,736 km.

2.6.3 NHDP Phase-III: NHDP Phase III consists of stretches aggregating to 11113 km of National Highways. Out of this, implementation of 4,035 km (6,139 km identified by the Ministry) on BOT basis has been approved under NHDP Phase IIIA and preparation Detailed Project Report in the remaining stretches is approved under NHDP phase IIIB. The stretches have been identified as per the following criteria:

(i) High density traffic corridors not included in Phases-I & II; (ii) Providing connectivity of state capitals with NHDP (Phases-I&II); and (iii) Connectivity of centers of tourism and places of economic importance.

2.6.4. NHDP Phase-V: The Govt. has approved the proposal for 6-laning of 6,500 km of selected stretches of existing 4-lane NHs on Design Build Finance & Operate (DBFO) basis. This includes 5,700 km of GQ and other selected stretches. The total estimated cost is Rs. 41,210 crore, which includes budgetary support of Rs. 5,518 crore; balance Rs. 35,692 crore is to be mobilized through private sector participation.

2.6.5. NHDP Phase-VI: The Govt. has approved proposal for development of 1000 km of access controlled four / six lane divided carriageway expressways under NHDP Phase-VI on BOT basis at the cost of Rs 16,680 crore (Rs 7,680 crore as contribution of Govt. / NHAI for utility shifting, land acquisition etc.; remaining Rs. 9,000 crore to be mobilized from private sector.

2.7 Progress of the National Highways Development Project

4/6 laning of about 18000 km of National Highways have been taken up under National Highways Development Project Phase I, II & III A. The overall progress of NHDP as on February, 2007 is as under:

NHDP Component	Total Length	Completed Four Lane	Under implementation		Balance for award of civil works
			Length (km)	No. of contracts	
GQ	5846	5540	306	35	-
NS-EW	7300	1080	5150	146	908
Port connectivity	380	145	214	7	21
Other NHs	945	287	638	16	20
NHDP -IIIA	4035	30	1404	22	2566
NHDP-V	6500		148	2	6352
Total	25006	7082	7860	228	9867

The targets for completion of the various components of NHDP are as under:-

NHDP Component	Target for Completion
Completion of GQ	March, 2007 *
Completion of NS-EW Corridors, Port Connectivity & other projects under NHDP-Phase-I&II	December, 2009
Completion of NHDP-Phase-IIIA	December, 2009
Completion of NHDP-Phase-V	December, 2012
Completion of NHDP-Phase-VI	December, 2015

***-Substantial completion except for stretches where contracts have been terminated.**

2.8 Future Development

2.8.1. The Committee on Infrastructure headed by the Hon'ble Prime Minister has proposed a massive National Highways Development Programme for the next seven years (2007-2012) which envisages the following:

Sl. No.	Name of Project	Likely Cost (in Rs. Crore)
1.	Completion of GQ and EW-NS corridors	52434
2.	4-laning of 11,113 km under NHDP Phase-III	72454
3.	2-laning with paved shoulders of 20,000 km of National Highways under NHDP Phase-IV	27800
4.	6-laning of selected stretches of National Highways under NHDP Phase-V	41210
5.	Development of 1000 km of expressways under NHDP Phase-VI	16680
6.	Construction of ring roads, flyovers and bypasses on selected stretches under NHDP Phase-VII.	16680
	Total	227,258

2.8.2. NHDP Phase-IV: Under this, selected stretches of about 20,000 km of NHs are envisaged to be improved to 2-lane standards with paved shoulders. The programme is yet to be approved by the Govt.

2.8.3. NHDP Phase-VII: This proposed programme envisages construction of ring roads, flyovers and by-passes on selected stretches on National Highways for an estimated cost of about Rs 16,680 crore. The programme is yet to be approved by the Govt.

All the above mentioned projects will be financed through various sources of funds like cess, loan assistance from the World Bank and ADB, borrowings by NHAI, estimated surplus amount available from the users fee as well as the share of private sector. Various sources of funding to finance these projects have been finalised and the financing plan implementation by the year 2015 by has been approved. The requirement of funds during the 11th Plan (2007-2012) for implementation of NHDP has been worked out. The total amount required during this period is about Rs. 1,73,501 crore. The projected availability of fund from various sources during eleventh Plan period (2007-1012) are as below:

S. No.	Funding Source	Amount (Rs. Crore)
1	Cess	36,589
2	External Assistance	4,454
3	Borrowings by NHAI	41,615
4	Surplus from the user fee	3,108
5	Share of private sector	87,735
	TOTAL	1,73,501

2.9. Development of the National Highways with the Border Roads Organizations (BRO)

The total length of National Highways entrusted with the Border Roads Organization (BRO) at present is about 5,512 km passing thorough the States / UTs of Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Himachal Pradesh, Jammu

& Kashmir, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand, West Bengal and Andaman & Nicobar Islands.

The assessed requirement of funds for improvement of National Highways with BRO is Rs. 2,500 crore for the 11th Five Year Plan.

2.10. New National Highways

A road vision 2021 was prepared in the Ministry, which proposes a total National Highway network of about 80,000 km by the end of the year 2021. At present, National Highway network stands about 66590 km which requires additional declaration of about 13410 km of state roads as National Highways to achieve this target of 80,000 km. Because of emphasis on infrastructure sector given in recent years than it was when the Vision document was prepared it may be desirable to achieve the target in next 2 Plan years (by 2017) instead of next 3 five year plan (by 2022). The target for new addition of length in NH network in 11th Five Year Plan would be about 7000km. For expansion of the NH network the following factors need to be kept in view.

- Connecting industrial complexes, important growth nodes, pilgrimage and tourist centers and places of economic importance.
- Filling up the grid in pockets of various regions without a National Highway.
- Providing linkages with adjoining countries.

CHAPTER 3

STATE ROADS

3.1 Introduction

State Highways (SHs) and Major District Roads (MDRs) constitute the secondary system of road transportation in the country. The SHs provide linkages with the National Highways, district headquarters of the state and important towns, tourist centres and minor ports. Their total length stands at about 130,000 km at present. Major District Roads run within the district connecting areas of production with markets, connecting the rural areas to the district headquarters and to State Highways and National Highways. Their length is estimated at around 300,000 km. These roads also carry medium to heavy traffic. It is assessed that the secondary system carries about 40 percent of the total road traffic, although they constitute only about 13 percent of the total road length. They are major carriers of road traffic within the state and a reasonable level of interstate traffic. By acting as linkages between the rural and urban areas, the State Highways and Major District Roads contribute significantly to the rural economy as also to the industrial development of the country by enabling movement of industrial raw materials and products from and to the interior of the country.

3.2 Deficiencies in the Present System

Though the size of the network comprising SHs and MDRs is reasonable, the quality is not as per the standards set for these categories of roads. Their present condition and stage of development varies widely from state to state. The status of MDRs is particularly worrisome. The main reason for this state of affairs is that the funds for the development of this secondary system are very inadequate. A total amount of Rs. 8,000 to 10,000 crore per annum is being made available against the requirement of at least Rs.16,000 crore per annum. While reasonable funds have been made available for the National Highways and the Rural Roads, somehow the secondary system of roads is not receiving the desired attention in the matter of financial allocations in relation to requirements. The result is, there are several deficiencies in the existing SHs and MDRs as (i) inadequate width of carriageway in relation to traffic demand (ii) Weak pavement and bridges (iii) Congested stretches of SHs and MDRs passing through cities/towns (iv) Poor safety features and road geometric and inadequate formation width in hilly and mountainous region (v) Missing links and bridges and (vi) Several railway level crossings crying for replacement with ROB/RUB.

The existing road network is under severe strain due to traffic growth, overloading of vehicles and the Government's past negligence to provide the needed funds for road maintenance. A broad assessment shows that over 50 percent of SHs and MDRs network has poor riding quality. Losses due to poor condition of these roads would be around Rs. 6000 crore per annum besides their premature failure resulting in huge rehabilitation and reconstruction costs implying infusion of avoidable plan funds at accelerated intervals. The total replacement cost of the existing SH and MDR network is broadly assessed to be as under:

<i>(Rs in crore)</i>	
State Highways	1,50,000
Major District Roads	1,00,000
Total	2,50,000

Source: Road Development Plan Vision: 2021, of the Ministry of Shipping, Road Transport & Highways, published by the IRC. Cost based on 2000-01 Prices)

3.3 Constraints Faced

Some of the major constraints faced by different states in the execution of the programmes for state roads during the Tenth Plan are given here under:

- (i) *Lack of finances:* Budgetary funds have been inadequate. Efforts have been made by several states to encourage and attract private sector financing in

augmenting capacity of roads and provision of bridges, railway over-bridges and bypasses but results have been mixed.

(ii) *Spreading resources thinly*: In some cases, there is pressure to sanction more projects leading to spreading of available funds thinly. This results in time overruns and even cost over runs. Amount of sanctions need to be commensurate with the available funds.

(iii) *Control on pre-construction activities*: There have been cases where works were awarded without acquiring full land for the project and obtaining environmental clearance and shifting/removal of utilities affected due to road projects.

(iv) *Weak management by contractors*: While the quality of road construction has considerably improved during recent years and several measures have been taken by the contracting industry to acquire state of art equipment and procure good technical and managerial staff, still there is considerable room for improvement in achieving project management excellence, proper scheduling of manpower and equipment resources.

3.4 Consolidating the Existing Network

The Road Development Plan: Vision 2021 formulated by the Department of Road Transport & Highways has stressed that more effort should go in the direction of augmenting the capacity and quality of these categories of roads rather than any large scale expansion. In fact, now there is need to identify a CORE NETWORK of major arterial routes covering national highways and those state highways/major district roads which are either already experiencing high volumes of traffic or have such potential in the light of industrial and other growth strategies by both the public and the private sector. It is, therefore, recommended that each state may identify a core network considering the actual/expected flows of goods and passengers encompassing national highways, state highways and selected major district roads which carry bulk of the road traffic and a Core Investment Programme undertaken for development of the identified core network.

The Core network should have a corridor concept and it should be possible to reach from one end of the State to the other at an average speed of 70-80 km per hour. The objective should be that a commercial vehicle can cover 500 to 600 km on such a network in one day. The goal has to be high mobility with safety. The core network would include the Expressways, four laned roads, strengthened pavements and pavements with good riding quality, bypasses, bridges etc. for a length of about 71500 km length with a financial outlay of about Rs. 80,000 crore covering the States.

3.5 Development Approach

The approach of balanced development of State Highways and Major District roads did not receive the required attention. The required developments of these categories' need to be taken up in a coordinated manner keeping in view of the development of National Highways and Rural Roads. The development of National Highways and Rural Roads are now receiving much attention and huge investments are being made on these facilities. The State Highways and Major District Roads are to be developed as links to have properly developed network for efficient transportation of passengers and goods. The good roads boost tourism and accelerate the pace of development in other infrastructure sectors and industries. Therefore, attention is also needed for development of State roads connecting places of tourist importance, mining areas, power plants, industrial belts, steel plants, important railways stations and other areas which can increase the economic development in vulnerable states and beneficiating socially / economically backward communities and other backward people. The roads connecting the neighbouring states and bridges in the border may also be given priority. The state roads leading to border posts at the international boundaries need upgradation for the international trade and travel. The identified list of such State roads for the tourist important place is at Annexure-IV.

3.6 Need for the Database

There is need to strengthen the database system for all roads including State Highways and Major District Roads. An institutionalized system, to collect data of road length, road and bridge inventory, traffic flows and road condition of various categories and to publish it, should be established. Formats for data on different aspects may be standardized. Each state should bring out a printed booklet of Basic Road Statistics by end of September for the period ending previous March. These figures should be compiled at national level. A booklet should be brought out by following December. Such data on Road Information System should also be put on website of each state and at the national level.

It is recommended that a dedicated Road Data Centre is established in the Indian Roads Congress – a body of professional highway engineers – under the aegis of the Ministry of Shipping, Road Transport & Highways. Such a Centre can be financially supported suitably by the states. For improving viability of the development programmes in the road sector, assessment of performance may be judged from measurement of certain transport indicators such as road density, level of service, safety (accidents), average journey speeds, trade flows and passengers moved, etc. Such information should serve as databank, analysis of which can help in taking policy decisions and strategic planning at different levels of sectoral management.

3.7 Implementation Capacity

For efficient delivery of programmes, attention is also being paid to modernisation of road agencies in the states. Several states have taken up institutional strengthening studies with a view to enhancing the capacity for planning, designing and execution of works and meet the transport demand of road users. The Public Works Departments in the states / UTs are basically a strong institution and need to be preserved and reoriented for the current needs of modern technology and commercial management principles. Core processes of planning and design besides execution are being strengthened by several states and specialists in traffic engineering, bridge designs, financial structuring of private financing projects are either being created in-house or outsourced. Training arrangements of engineering personnel would need to be enhanced so that they are abreast with the latest know-how and good practices within the country and outside. Side by side, contracting industry and consultancy sector also need to grow on healthy lines so that they are real partners in progress in delivery of the world class road infrastructure.

3.8 Programme for Development

3.8.1 There is a need to carry on the momentum generated during the Tenth Five Year Plan and commitment of the government to provide the much needed road infrastructure so as to improve competitiveness of our products in the world market and transport efficiency. As earlier brought out, a core network would need to be identified by each state and programmes for their development chalked out largely through the PPP route in due consultation with the Industry Associations like FICCI, CII, ASSOCHAM, PHD Chamber of Commerce and other regional industrial and trade organizations. Window of opportunities has also been opened by the Central Government in providing viability gap funds upto 20 percent of project costs for such financing for state sector schemes as well. The objective should be that a commercial vehicle is able to cover 500 to 600 km in one day so as to bring in the required transport efficiency to world class standards.

3.8.2 It is difficult for a precise estimation of physical and financial requirements for upgrading of SHs and MDRs without a detailed study of traffic forecasts and existing condition of these roads by the individual states, a broad indication of the requirements keeping in view the recommendations of the Road Development Plan Vision: 2021, progress likely to be achieved during the Tenth Plan and major thrust areas identified by the state governments for capacity upgradation of the road network and removal of deficiencies on the network has been proposed.

3.8.3 The programmes for the development of State roads is amounting to Rs. 100,000 crore including the construction of 300km of Expressways, 5000 km of Four laning, 40,000km of widening to two lane for the Core Network have been proposed. For the Non-core network in the North-Eastern region 2500km length is to be upgraded for the 2-laning. For the other states 10,000 km length is to be upgraded to two laning. The details are elaborated in the Chapter 12.

CHAPTER-4

RESEARCH AND DEVELOPMENT IN THE ROAD SECTOR

4.1 The Research and Development (R&D) activities need to be aimed as user oriented and for this purpose direct linkage of R&D institutions with user Ministry, Departments and construction industry are to be established. However, it is generally conceived that there is a lack of application of the out comes of R&D activities in practice/industries and also proper coordination between user need and R&D activities does not exists. Therefore R&D without user need should not be encouraged. Sustainable R&D efforts to match the requirements in the field in present scenario are required. In order to reap the benefit of the R&D undertaken in the country the same is needed to be disseminated to the users, viz. the planners, policy makers and implementing agencies. Future R&D programme should pay increasing attention towards the research on conservation of materials used in the construction of roads, innovations in construction technology, environmental impact and road safety measures, similarly thrust in this direction should be on updating of all obsolete technologies being used in the designing, construction, maintenance of roads and bridges along with road safety measures with special emphasis on cost optimization. Various suggestions for future direction and thrust areas in R&D program and technology upgradation are summarized below:

1. Need for networking of all institutions involved in R&D for transport and highway sector to ensure need based R&D in tune with the ongoing infrastructural developmental programs. This will ensure and prevent duplication of efforts and will result in optimal utilisation of resources available for R&D.
2. Need for adoption and promotion of new technologies and construction material such as Self Compacting Concrete, Fiber Reinforced Concrete, Ultra High Performance Fiber Reinforced Concrete etc.
3. Need for R&D on scenario simulation, deep water foundations, performance based designs and development of guidelines for retro fitting of bridges.
4. Periodic Revision of various codes/standards and more effective dissemination of codal provisions.
5. Need for Asset Management including development of Maintenance Management System (MMS) and pavement presentation strategy for Indian road network.
6. High Density High Speed Corridors are being developed in the country and R&D efforts are needed to be tuned to meet the requirements.
7. Preparation of Highways Capacity Manual for Indian highways, development of intercity travel demand models, forecasting techniques and bringing the concept of environmental capacity along with the establishment of norms for highway capacity.
8. Need for research on urban traffic especially on the highways passing through urban area, road signages, toll plazas and effective integration of other road furniture's etc.
9. Development of methodology for widening of reinforced earth structures in view of conversion of 4-lane in 6-lane highways.
10. Use of smart materials and sensors (e.g. paints that change color when damage occurs to the structure painted, piezo sensors that report a change in voltage on deforming, shape memory alloys that retain a memory of geometry and induce forces when they are deformed) need to be studied carefully and used in applications ranging from structural health measurement/ monitoring/ timely maintenance, and in other related uses such as weigh stations / toll plazas, environmental indicators of road conditions, potential hazard indicators etc.
11. Development of the bridge information system using sensors.
12. Development of new techniques for non-destructive pavement evaluation.
13. New methods and strategies for repair and rehabilitation of cement concrete pavements.

14. Development of methodology for investigation of bridges through Artificial Intelligence Techniques and Fuzzy logic.
15. Performance based Road Management System.

4.2 The Road Safety

There has been tremendous growth of both road network and road traffic in India. While it is good for the economic and social development of the country, it has brought in its wake the problem of road accidents resulting in injury and fatalities to road users and its own social negative externalities apart from human suffering. The situation is worsening as can be seen from Table given below:.

Road Fatality Scenario

Year	Vehicles (million)	Population (million)	Fatalities (thousand)	Fatalities per thousand vehicles	Fatalities per million population
1971	1.86	548	15.0	8.04	27.36
1981	5.39	683	28.4	5.27	41.56
1991	21.37	844	56.4	2.65	67.07
2001	54.99	1027	80.9	1.47	78.70
2004	70.00	1065	92.5	1.32	86.80

Source: Ministry of Road Transport and Highways (MORTH); Motor Vehicle Statistics & Statistics of Road Accidents in India (Vehicle population for 2004 is quick estimates).

The total number of fatalities and injuries in the year 2004 is reported as 92,500 and 464,600 persons respectively. The fatality rate per thousand vehicles is coming down (apparently vehicle population is rising more than the fatalities); whereas the rate per million population has continued to increase from 27 in 1971 to 87 in 2004. An analysis of available accident statistics also shows that about one-third of fatalities occur on National Highways and another one-third on State Highways. Thus, National Highways, which constitute about 2 per cent, and State Highways about 4 per cent of the total road network together account for over 65 per cent of the total fatalities. It is also reported that 50 to 60 per cent of fatalities happen due to heavy commercial vehicles (trucks and buses). These commercial vehicles are involved in a higher proportion of fatalities with pedestrians and bicyclists than that of injuries. Cars and two wheelers have a higher involvement in non-fatal crashes. According to some reports, the economic loss due to road accidents may be a staggering amount of Rs.55,000 crore a year. With the NHDP and other road upgradation programmes being undertaken in the States and production of modern automobiles by vehicle manufacturers, speeds of vehicles are increasing and accident scenario is likely to become still grim. These facts underscore the severity of the problem and the necessity of formulating a strategy to contain the situation.

The road accidents taking place in the country are ever increasing despite the number of safety measures initiated during the earlier plans, we need to have reliable data base which should enable a scientific analysis of road accidents. The source of accident data at present is mainly Police records which lacks in Technical details and thus making their scientific analysis impossible. The method of accident data collection needs to be vastly improved with involvement of Technical Specialists (such as Traffic Engineers etc.) and a system needs to be set up for collection, retrieval and analysis of accident database so that effective remedial measures could be conceptualized. Therefore, future thrust in this direction should be on:

1. Systematic data collection involving specialists; undertaking scientific analysis on the causes of accidents and post accidents measures required to be undertaken. Setting up of a dedicated organization for road safety & traffic management.

2. Pre-accidental measures such as highway surveillance through electronic devices and patrolling, enforcement of traffic safety laws and regulations, awareness campaign, provision of under passes/over passes, pedestrian & cycle path, service roads etc.
3. Post accident management measures such as setting up of trauma centers and provision of IT devices to manage the post accident scenario etc.
4. Action on various aspects of road safety analysis including organizational setup, need for prediction of accidents, collection of base data and setting up of data base system to collect accidents data for reporting purpose and to evolve funding mechanism for road safety.
5. Need for involving safety aspects in road design for entire road network and to create public awareness for the safety on roads
6. Development of Standards on safety features for all types of roads including necessity of service roads.
7. Need to involve vehicle manufacturers in road development program so that development in road sector are matched with developments in automobile industry.
8. To establish norms for assessment of an accident cost to the society.

4.2.1 Engineering Measures for Road Safety

- (i) Awareness is required to be created among officers of road agencies at all levels about the importance of road safety measures which must receive priority similar to that accorded to structural safety of bridges.
- (ii) Sequel to the emphasis on development of roads in India as a result of NHDP, PMGSY and State Road Projects funded by the World Bank and the Asian Development Bank, a number of projects are being taken up throughout the country leading to creation of several construction zones. The IRC has formulated safety guidelines in construction zones. However, except at a few sites, the prescribed guidelines are not being followed resulting in both inconvenience to traffic and avoidable accidents. This aspect requires increasing attention of the contractors and the supervising staff of road departments.
- (iii) An important principle to be observed is that a driver traveling on a road should not be confronted with a surprise while driving. He should receive sufficient prior warning of the danger lurking ahead. He must also be made aware of the approaching road junctions so that he is not faced with abrupt decision making for crossing or turning at such intersections.
- (iv) The road signage on many of our roads is inadequate. Sometimes it may depend on the individual officer in charge. So one may have a section with excellent road signage followed by another section with near absence of road signs. There is need to provide adequate road signs and pavement markings on all Highways and Major District Roads. Priority may be given to roads carrying traffic more than 5000 PCUs per day.
- (v) Maintenance of shoulders in good condition, trimming of roadside trees for ensuring clear vision around the curves and at the junctions, provision of proper superelevation at curves, provision of guard stones or delineators on curves are some of the inexpensive but very effective measures that would go a long way in reducing the road accidents. Removal of trees close to the road surface is also required as a number of accidents are reported to be taking place due to vehicles hitting such trees or vehicles being restricted from going off the road in emergencies to save accidents.
- (vi) It is necessary to ensure incorporation of safety elements in design and engineering phase for preparation of Detailed Project Report (DPR). Special attention needs to be given to incorporation of measures to improve safety

at night time and inclusion of traffic calming measures needed on highways passing through towns and villages.

- (vii) There is need to identify engineering measures for the vulnerable road users (such as pedestrians, cyclists, and slow moving vehicles) and cattle/animals with due regard for the elderly and the handicapped persons.
- (viii) Safety features on bridges, causeways and roads along canals should receive priority attention.
- (ix) It is suggested that each state should appoint a Standing Committee (on the model adopted by the Maharashtra PWD) to inspect the roads and suggest road improvement measures to eliminate black spots on the road and to make the roads more safe for the traveling public. Inclusion of representatives of stakeholders in such a Committee alongwith inclusion of some performing NGOs working in that field makes the suggestions of the Committee more acceptable to the people and the government.
- (x) It is necessary to carry out the Road Safety Audit at the various stages of development of highways at pre-construction stage, during construction stage and post construction stage.

4.2.2 Strengthening Enforcement

- (i) Another noteworthy development on the legal front has been the enactment of “The Control of National Highways (Land and Traffic) Act 2002” which is intended to enhance the road safety, access management, control on ribbon development and prevention of encroachments on national highways. Some states have already enacted such Acts for the state roads. Similar Acts need to be enacted by other states as well.
- (ii) The Traffic Police has made considerable improvement in enforcement of traffic regulations in major cities. However, inter-city highways (National Highways and State Highways) where there is considerable overloading of vehicles, over-speeding and cases of driving under the influence of alcohol have not received any serious attention. The Transport Departments of State Govts./UTs need to improve the system of enforcement to ensure compliance with the Motor Vehicles Act.
- (iii) The parameter of judging effectiveness of enforcement should not be the quantity of fines collected but how these fines have reduced violations and improved ABC (attitude, behavior, culture) of road safety. It is pertinent to mention that as per the judgment given by the Hon’ ble Supreme Court imposition of penalty does not legally authorize plying of overloaded vehicles and excess loads of such vehicles are required to be offloaded.

4.2.3 Accident Analysis

- (i) A computer based road accident database management system should be set up as part of the Road Data Centre. Computer-based data collection, including accidents registration procedure, and database management system need to be developed. Therefore, it is required to conduct a study of the (a) assessment of the needs and expected results (b) identify software and hardware requirements (c) design of an institutional mechanism with clearly defined roles and responsibilities. Data collection at the field level needs to be improved in cooperation with the state police and hospitals. Road Safety Experts/ Traffic Engineers etc. may be involved in the process of data collection, wherever feasible.
- (ii) The government may consider nominating dedicated specialized agencies to analyze accident data for lessons learnt and to identify countermeasures and prepare quarterly reports at the state level. All these can be combined in a pilot initiative for ‘Accident Free Corridor’.

4.3 Funds

It is suggested that a special amount should be earmarked for road improvement measures to improve traffic safety out of both plan and non-plan grants to be spent on improvement of accident prone spots on the roads. An amount of Rs. 100.0 crore is to be earmarked in the 11th Plan for the R& D activities in the National Highways sector. An annual provision of about Rs.5 crore by each states /UTs for SHs and MDRs is suggested. Some of the road safety measures would also get covered while undertaking capacity augmentation of state roads.

CHAPTER-5

ROLE OF PRIVATE SECTOR

5.1 Existing Status

The investment in highway sector in the country in the last decade has increased manifold. The Governments both at the centre and at the state level have evolved modes of financing which were not followed earlier. The main modes have been the creation of dedicated funds for the development of roads and the adoption of Public Private Partnership (PPP) approach for projects implementation for development of highways. There has been progress over the last 10 years in attracting private investment in infrastructure. However, there is a need to recognize that PPP projects are not a panacea for all problems of infrastructure improvement.

The Government of India at the central level decided to encourage private sector participation in road sector in early 90s and the National Highway Act, 1956 was amended in 1997 to provide for a 'private person' to be given responsibility on constructing and operating section of national highways and to collect and retain the fee to be levied on improved facilities. The Government notified the rates of fee that could be charged for the use of national highway sections, which were improved from existing 2-lanes to 4-lanes. The government also notified the fee rules. Some incentives to facilitate the participation of private sector in roads were announced by the Government, which included mainly grant upto 40% of project cost, equity participation upto 30%, exemption on income tax, waiver of custom duty on import of high performing equipment and the Government taking responsibility of acquiring the land and shifting of utilities.

The High Powered Committee (HPC) was constituted by the Government of India in 1997 to evolve the standard documents for PPP projects which also included the Model Concession Agreement (MCA) which was finalized during the year 1999 and the first major project on BOT basis taken up by the Government of India through National Highways Authority of India (NHAI). The Model Concession Agreement (MCA) has now been revised to rationalize the traffic risk sharing.

Some of the State Governments such as Gujarat, Rajasthan, Madhaya Pradesh, Maharashtra, Andhra Pradesh, Punjab, Kerala, Chattishgarh and Tamil Nadu have also adopted in Public Private Partnership approach for development of roads in their state.

5.2 Review of existing policy frame work on PPP

The existing policy frame work in the central sector is mainly governed by the revised Model Concession Agreement, the concessions and facilities allowed by the Government to encourage Public Private Partnership and the decision by Central Government that the future projects for National Highways would be mainly thorough PPP.

The policy to offer all projects first under BOT (Toll) route based on only feasibility studies may need review so that the bidders are serious. Also offering the project first on the BOT (Toll) then on BOT (Annuity) and then on civil contracts after seeking approval of the government at each states is likely to introduce avoidable delays in the process. The Design, Build Finance and Operate (DBFO) format would require longer time for engineering by prospective bidders and therefore projects for stretches having high traffic potential only may attract good response. It also needs to be recognized that internationally, the share of Highways network which could be improved through PPP is limited to 15% to 20%

Other important aspect requiring attention is the capacity of the implementing agencies to execute PPP Projects involving transparent evaluation of the proposals, successful completion of the projects as per requirement of Concession Agreement and safe and efficient operation of the facility. The capacity of the private sector would also

need to be substantially enhanced to meet new challenges of building the facilities comparable to international standards and to operate and maintain them in an efficient and safe manner.

5.3 Toll Policy

The user fee should not be looked at as a stand alone basis and should be based on a comprehensive study of road and vehicle operating cost. The concept of weight / distance charge should be studied for possible introduction as used else where. The concept of telescopic user fee requires to be studied for possible adoption.

Another concept worth examining would be involvement of direct beneficiaries as suggested by World Bank, whereby road users may be included in the capital structure of the projects through sale (during project construction period) of long term passes entitling the user to an unlimited number of trips on the projects road for a limited period of time. The effected cost this instrument could be the total value of toll unpaid during the operation period by the frequent user holding such passes.

As per the international practices, no exemption is given to the user of toll roads. Therefore the exemption categories need to be reviewed to bring them in line with international practice and to provide comfort to investors, particularly those from abroad.

The technology for user fee collection needs to be substantially enhanced at the earliest possible so that the service time at toll plazas is minimized. Implementing agencies need to take immediate action for adopting Electronic Toll Collection (ETC).

There is also need for putting up effective mechanism to eliminate overloading on highways which is an area of concern for highway operations particularly on PPP projects. For this, Weigh in Motion bridges along with static weigh bridges with space for off loading and storage need to be planned, particularly at toll plazas.

5.4 Suggested measures for encouraging PPP

Following actions are recommended to expand the role of PPPs as the main basic delivery mode at both the national, state and municipal levels.

- a) Most countries engaged in broad based PPP programe recognized the need to develop a cross sectoral pool of expertise in a dedicated PPP unit. Creation of national level PPP unit may be considered, that would perform the functions of information dissemination and guidance so as to provide advisory to PPP programe. It is recognized that such a unit has been created in Ministry of Finance and is in the process of being created in NHAI. Such PPP unit should also be established at state levels for guidance for developing roads in states and municipal level for PPP projects.
- b) The existing ambiguities for tax treatment, licensing, imports, banking, audits require critical re-look and substantial modifications so as to facilitate commercial matter to provide encouragement for foreign investors.
- c) There would be need to have a regulatory mechanism so as to standardize the processes, thereby providing greater predictability and confidence to investors and for protecting the interest of users.
- d) For highways projects implemented through PPP, traffic is a critical and sensitive issue. Therefore traffic studies and projection has to be studied and established as accurately as possible so that investors are aware of the risk involved.
- e) The project cost estimation should be as realistic as possible and should be based on actual market forces.

- f) The core technical requirements, standards and specifications, safety requirements, etc., should be clearly spelt out in the concession agreements so as to leave no scope for different interpretation.
- g) Land acquisition and utility removal is another important area which can adversely impact the implementation process of PPPs. Therefore, the projects on PPP are to be identified and land acquisition process started quite early so that most of the land is available at appointed Date.
- h) BOT (Annuity) and shadow tolling could be better options for medium / low traffic density corridors and should preferably be adopted.
- i) While formulating the PPP proposals for highway projects, the scope for innovations and using latest technologies and materials may be suitably incorporated.
- j) Possibility of involving insurance companies for providing suitable insurance cover to concessionaires to mitigate risks (traffic risks etc.) may be explored.

5.5 Appropriate mix of BOT (Toll) and BOT (Annuity) methods

On a network basis, the corridors having medium /low traffic density may not be viable on BOT (Toll) basis and therefore for such corridors, BOT (Annuity) mode would be more appropriate for PPP. If a proper due diligence indicates any project to be unviable on BOT (Toll), then it should be offered on BOT (Annuity) basis in the first instance itself. Therefore, there is need to revisit the policy of first offering the project on BOT, and then BOT annuity, and then to civil works contracts, with an approval at each stage, since this process would not only take more time, but may also lead to lack of seriousness among the bidders

5.6 Private participation in R&D in roads

Encouragement to private players by way of tax or other benefits such as cost subsidies and incentives, might encourage some private player in doing R&D. There are some areas such as modified bitumen, construction machineries, soil stabilization, bridge rehabilitation where private players can undertake some meaningful R&D.

5.7 Public-Private Partnership Initiatives by States

5.7.1 Background and Legal Framework

To increase the private sector participation in providing transport infrastructure including roads, several tax exemptions and financial incentives are announced by the Central Government in respect of upgradation of National Highway Development Project (NHDP) through BOT model. On similar model some of the state governments also undertook similar initiatives to invite private financing for state roads by creating enabling legal framework. The states like Uttar Pradesh and Madhya Pradesh amended the Tolls Act to allow the private sector to levy and collect tolls on state roads and bridges. These Acts provide for several options to private entrepreneurs and use of transparent competitive bidding process based on technical and financial evaluation. Table given below provides a brief overview of legal provisions to encourage private financing of road projects.

State	Legal Provisions
Andhra Pradesh	The state government publication 'Private Investment in Road projects in Andhra Pradesh' proposes to amend the AP State Motor Vehicles Act along lines similar to the National Highways Act to enable private parties to levy tolls and regulate traffic on the facility constructed by them.

Madhya Pradesh	1992 Amendment to Indian Toll Act allows the state to lease the levy of tolls on roads and bridges, at prescribed rates, by public auction or private contract for upto 15 years.
Maharashtra	Amended Section 20 of the 1958 State Motor Vehicles Tax Act to enable private parties to levy tolls on any motor vehicle on bridges and tunnels through a BOT agreement. Section 17(4) of the 1975 MMRDA Act provides for charging tolls for the use of amenities provided by MMRDA.
Uttar Pradesh	1974 Indian Toll Amendment Act transfers State's responsibilities to the UP State Bridge Corporation Ltd., which is a State Government Company under the Companies Act with the right to manage and collect the tolls levied on roads and bridges. Section 2 of the same Act permits the state and the UP State Bridge Corporation Ltd. to lease the right to collect tolls to any third party.
West Bengal	Legal provisions relating to levy of tolls: (i) on heavy trucks and buses under the 1993 West Bengal Municipal Act, as amended in 1997; (ii) on roads and vehicles under the 1980 Calcutta Municipal Corporation Act, (iii) on the Howrah Bridge under the 1926 Howrah Bridge Act; and (iv) on all types of vehicles and animals passing over or through any bridge constructed under the 1969 Hooghly River Bridge Act.
Gujarat	Motor Vehicle Act Amended. Gujarat Infrastructure Development Act enacted. Amended in 2006

Source: India, Financing Highways – World Bank (2004) and Government of Gujarat.

5.7.2 Current situation

The states of Andhra Pradesh, Gujarat, Madhya Pradesh, Maharashtra, Punjab, Rajasthan and Tamil Nadu have entered into BOT concession arrangements using a fairly standardized model for BOT projects. However, the level of private investments so far is quite low compared to infrastructure needs at the state level. It would seem that both the government and the private developer are still on the learning curve and environment for private financing is still getting evolved. A study by the World Bank recently provides a brief snap shot (Table) of the comparison of certain fundamental parameters.

Comparison of State Fundamentals/Enabling Environment for Private Sector Participation in Highways

Fundamental Factor	Andhra Pradesh	Kerala	Karnataka	Gujarat	Tamil Nadu	Madhya Pradesh	Maharashtra	NHAI
Legal framework	✓	✓	X	✓	X	✓	✓	✓
Regulatory framework	✓	X	X	✓	X	X	X	✓
PPP policy	✓	✓	X	✓	✓	✓	✓	✓
Contracting transparency	✓	✓	✓	✓	✓	✓	✓	✓
Implementation capacity	X	X	X	✓	✓	✓	✓	✓
Semi autonomous road agency	✓	✓	✓	✓	✓	✓	✓	✓
History of tolling	✓	X	X	✓	✓	✓	✓	✓
Assured revenue stream for public contribution	X	X	X	X	X	X	X	✓
Relative level of private finance	Low	Nil	Nil	High	Medium	Medium	Low	High

Source: India, Financing Highways, World Bank (2004)

5.7.3 Capacity Augmentation through Private Financing

Volume of traffic on several sections of state highways would justify their widening from existing two-lane roads to multi-lane facilities including Expressways. Where these roads are not envisaged to be upgraded as National Highways, it will be advisable for the states to proceed for capacity augmentation of these roads with financial support of the private sector. By a careful concession design and phased approach for development, it should be possible to cover a large network of state highways for capacity augmentation from existing single lane to two lanes and from existing two lanes to four lanes, etc.

For roads identified to be taken up for 4-laning, some additional steps need to be taken by way of deciding the side on which the new carriageway is to be provided so that measures to acquire additional land, prior clearance from environment clearance and shifting/removal of utilities can be taken well in time before the projects are entrusted to the private entrepreneurs. Preparing a blue print in this direction by the states would considerably support the industry in planning their growth and creation of industrial establishments along such arteries.

5.7.4 Leveraging from Central Road Fund

Another possibility to take up larger programmes through the PPP route on BOT basis can be by leveraging the available funds from CRF to meet the viability gap and balance provided by the private concessionaire. In case of railway overbridges, it is quite possible for the state to undertake several projects through private entrepreneurs by entering into an MOU with the railways where the latter can pass on their share of such projects to private entrepreneurs. This would help the railways in improving their capacity on railway tracks as well as the road agencies in eliminating avoidable stoppages and improving safety.

5.8 Provision of Legal Cell

Private Sector Participation (PPP) will be one of the main arrangements for development as well as maintenance of National Highways. There are several legal issues in this PPP. In addition, there are several Acts which are managed and implemented by this Department. These Acts need constant review and amendments to cope up with the present demand. In order to streamline these activities this Department needs to have a permanent Legal Cell comprising the officers with legal background as well as technical officers.

CHAPTER-6

HIGHWAY MAINTENANCE

6.1 National Highways

6.1.1 The road transport cost comprises of vehicle operating cost and road related cost. The vehicle operating cost on Highways, which is major component of the total transport cost, is entirely dependent on the condition of the roads. In order to reduce this total transport cost it is essential to maintain the roads at a good level of service. In addition, repair activities, if required, on the road is to be taken up at an appropriate time to arrest further deterioration and consequently to avoid higher cost of maintenance due to delay as the rate of progression of deterioration of roads increases rapidly once the deterioration starts. Therefore, roads including National Highways are to be maintained in proper conditions to ensure its continuous utilisation in optimum manner.

6.1.2 The existing NH network is under severe strain due to rapid traffic growth, overloading of vehicles and the Government's past negligence to provide the required funds for maintenance of National Highways. Similarly, the bridges are also distressed. Many of the National Highways declared during Ninth Plan and Tenth Plan were sub-standard and the condition was poor which has further aggravated the problem. However, the recent accurate data of the condition in respect of this large network of 66,590 km is not readily available.

6.1.3 Norms for maintenance of roads including National Highways were finalised by a Committee set up by this Department. The Committee had submitted its report in 2000. The Committee, while deciding the norms for maintenance, considered the aspects such as huge increase in the number of motor vehicles, overloading, expectation of users, introduction of high speed modern vehicles and international exposure and competition of trade and commerce. The Committee had suggested for institutional development like training, data collection, monitoring of the maintenance activities. The Committee recommended for the need for development of scientifically best road infrastructure management system, the major components of which in the initial stages may be pavement management system (PMS) and bridge management system (BMS).

6.1.4 The basic cause for poor management of National Highways is the lack of funds made available for maintenance as per norms. They do not exceed 60% of normal requirements for main roads. The gap between the requirements as per norms and allocation has been accumulating over the years and now poses a threat to the system. Maintenance being a non-plan activity there is also a tendency by the Government to apply adhoc cuts in the face of resource constraints. The requirement of funds as per the norms and fund provided during the last five years are indicated below: -

(Rs. crore)

Year	Requirement as per norms	Amount provided	Shortfall	% Shortfall
2002-2003	2200.00	800.00	1400	63.64
2003-2004	2200.00	731.74	1468.26	66.74
2004-2005	2480.00	745.56	1734.44	69.94
2005-2006	2100.00	868.10	1231.90	58.66
2006-2007	2012.00	814.38*	1197.62	59.52

BE*

6.1.5 Apart from funds there are other factors too, such as outmoded system of gang labour, weak planning, scheduling and monitoring of maintenance operations, inherent deficiencies in structural thickness, lack of attention of drainage and poor enforcement of legal axle load limits which have hastened the process of decay of the NH network.

6.1.6 It is, therefore, necessary to reorganise maintenance activities by replacing the existing system of road gang labour with proper scientific system of maintenance. The NHAI has taken up new method of management of maintenance of the National

Highways entrusted with them. Many of the State PWDs are still continuing with gang labour system. These maintenance systems are to be replaced for effective utilisation of the meagre resources.

6.2 Norms for Maintenance

Norms for maintenance of roads have been updated by an all-India Committee headed by the Department of RT&H. These norms cover all categories of roads in plains and hills. For the first time, the concept of performance indicators and levels of quality for maintenance standards have been stipulated in terms of comfort, convenience and safety to road users. Table below gives the serviceability indicators for three levels of service recommended by the Committee. Level 1 is the desired level. Level 2 is the level to which the road deteriorates after two-three years of use before fresh maintenance is needed. Level 3 represents the minimum level necessary to protect the investment and provide reasonable level of safety.

Maintenance Levels for Main Roads*

Sl. No.	Serviceability Indicator	Level 1 (Good)	Level 2 (Average)	Level 3 (Acceptable)
1.	Roughness by bump integrator (maximum permissible)	2000 mm/km	3000 mm/km	4000 mm/km
2.	Potholes/km (maximum numbers)	Nil	2-3	4-8
3.	Cracking and patch repairs (maximum permissible)	5 per cent	10 per cent	15 per cent
4.	Rutting (20 mm) (maximum permissible)	1.0 per cent	1.5 per cent	2.5 per cent
5.	Skid resistance (skid number by ASTM-274) (minimum desirable)	50 SN	40 SN	35 SN
6.	Percentage defective bridge deck area and bump at approach	Nil	10 per cent	15 per cent
7.	User information	All road signs, km stones, road markings in good condition	Only major road signs, km stones, some road markings in good condition	Signs only for major destinations and km stones in fair condition

* Applicable for national highways and state highways.

6.3 Modernisation of Maintenance Management

(i) *Introduction of Pavement Management System (PMS):* The PMS based on the rationale method of assessment of distress and decision support system for taking up the maintenance activities is to be introduced for productive use of meagre resources. NHAI has developed Road Information System (RIS), which will include the inventory of the National Highways with NHAI and also be used for the PMS purpose. Similarly, the Ministry has started developing a programme for inventorisation and Pavement Management System with the assistance of Central Road Research Institute.

(ii) *Introduction of mechanisation in maintenance:* Several machines for repair of distresses in pavement have been introduced. Their use would need to be encouraged to improve the maintenance culture. Similarly, Mobile Bridge inspection units are also to be procured for proper inspection / distresses in bridges.

(iii) *Maintenance by contract:* Traditionally road maintenance works are executed departmentally by the Public Works Department. In order to raise efficiency these maintenance works may be outsourced to private sector. NHAI has introduced operation, maintenance and tolling contract for the National Highways entrusted with

NHAI. Similar concepts are also to be started for the National Highways with the State PWDs.

(iv) *Corridor Management:* It is being increasingly appreciated that the maintenance of only roads and bridges section of National Highways are not sufficient for safe movement of vehicles. Corridor Management; which comprises comprehensive management of the road section including engineering and non-engineering aspects are to be introduced for proper management and maintenance of National Highway sections. This Corridor Management should include: -

- Maintenance of roads and bridges to the desired standard
- Tackling safety hazards and traffic bottlenecks
- Traffic management
- Collection of Users Fee
- Incidence management
- Land management

For this purpose Highway Police Patrol, crane and tow truck service, medical aid posts, communication system, advance information system, setting up of control stations, etc. are to be considered. NHAI has initiated this corridor management aspect. All these sections of National Highways are to be covered in phases.

(v) *Legislative Matter:* The Control of National Highways (Land & Traffic) Act, 2002 has come into force from January, 2005. These acts give power for control of encroachment within right-of-way, control of access to National Highways, control of traffic plying on National Highways, control of construction activities by the side of the National Highways. The Highway Administration for enforcing the various provisions of this Act has already been established. Necessary steps are to be taken for enforcement of the various provisions of this Act for safe and speedy movement of traffic on National Highways.

6.4 Fund Requirement

The requirement of maintenance of National Highway network has been assessed as about Rs. 2,280 crore per year whereas the availability is only about Rs. 800 crore per year. Therefore, the allocation is required to be enhanced substantially for maintenance of the National Highways. It is estimated that the fund requirement for maintenance of National Highways during the 11th Plan period would be Rs. 11,400 crore. Considering the availability of resources as well as the infrastructure available with the states, the maintenance amount is to be raised to a minimum level of Rs. 2,280 crore per year and for the State Roads Rs. 6,000 crore per annum is required.

6.5 Finance Commission's Recommendations

(i) The 12th Finance Commission considered, among other issues, the issue of maintenance of state roads and bridges by the state governments. To quote from the Committee Report: "it is far more important to ensure that assets already created are maintained and yield services as originally envisaged than to go on undertaking commitments for creating more assets. We notice that maintenance of roads and bridges has not been given adequate importance by the states. We are, therefore, recommending additional grants separately for maintenance of roads and bridges, and maintenance of buildings."

(ii) The Finance Commission decided to provide an annual central grant of Rs.3,750 crore over the period 2006-10 for the country as a whole. This amount is in addition to the normal expenditure, which the states are expected to incur on maintenance of roads and bridges.

(iii) The year 2005-06 was intended to make preparations to absorb the grant funds. The Commission further observed that the element of grant should be spent on non-salary maintenance items for roads and bridges. Obviously, the idea is that the grant is used for normal routine maintenance of roads and periodic renewal of road surface

where conditions so justify. These amounts are for all roads (other than national highways) within the jurisdiction of the state. While the distribution of the grant element between different categories of roads would rest with the state government, it is hoped that some rational criteria would be evolved for allocation between the two main department's viz. PWDs and Rural Development Department/ Panchayat Department for the roads under their respective jurisdiction.

6.6 Institutional Reforms

(i) There is lack of accountability for performance by the road agencies under the pretext of inadequate funds being given for road maintenance. There is virtual absence of an efficient planning and management system for roads, which can identify and prioritise the maintenance needs at the road network level and individual project level and under different time horizons viz. immediate, short and long term. A large percentage of available funds is spent on labour gangs and their productivity is on the decline.

(ii) There is need to establish a Road Management Unit at the Head Quarters of the State PWD. This unit should have the following responsibility:

(a) Development of comprehensive database covering:

- Road inventory, bridge inventory
- Pavement condition survey: potholes, roughness, cracking
- Traffic counts
- Unit costs of various maintenance operations
- Resources in terms of budgetary allocation, material and machinery

(b) Institute Pavement Management System (PMS) and Bridge Management System (BMS) to serve as a tool for arriving at scientific assessment of maintenance requirements. Use should be made of the pavement deterioration models for prediction of different modes of pavement distress developed by the CRRI. Such systems should be applied only to National Highways and State Highways in the first instance. For Major District Roads, a simplified weightage system should be instituted for prioritisation of maintenance interventions that should involve only minimal data on road inventory and traffic as a pilot scheme.

(c) Arrangements to collect, store, retrieve and analyse the data. The output of database systems and prediction models should be available online (computer network) in the form of comprehensive charts, graphics and maps for use of various levels of management. GIS would be very helpful in this regard.

CHAPTER-7

ENVIRONMENTAL & SOCIAL ASPECTS

7.1 Introduction

Road projects generally improve economic and social welfare of people, reduce travel time, lower cost of vehicle operation and improve access to markets, medical and educational facilities. However, people in the direct path of the roads are affected due to loss of community assets. Other adverse impacts could be soil erosion, interference with animal and plant life. It is, therefore, essential to carry out social and environmental impact assessments to ensure that the individuals affected adversely are compensated and resettled adequately and mitigation measures to reduce the adverse environment impact are put on ground. The World Bank and the ADB also mandate such requirements as per their policy and guidelines as part of loan assistance programmes and execution of works by the implementation agencies.

7.1.1 The adverse impact of highways on the environment may be in the following ways:-

- Noise
- Air pollution
- Effect on wild life
- Effect on flora and fauna
- Effect on forests
- Visual effect
- Ribbon development
- Land consumption
- Severance
- Cutting trees
- Effect on existing residents, industrial and commercial activities
- Effect on archeological, historical and religious places

7.1.2 Vehicles are a major source of pollution. The automobile industry is well proved to meet progressive tighter emission norms for various categories of vehicles. The Government has also laid down emission standards. Apart from strict emission norms for new vehicles, attention has to be paid for regular maintenance and inspection of vehicles to ensure sustained emission performance. The automobile industries and vehicle operator should act in unison to bring about improvements in this direction.

7.2 Environment Aspects

(i) With increase in traffic volumes over years, suitable mitigation measures need to be in-built in design and construction of roads to preserve the environment. The Environment Impact Assessment (EIA) Notification in 1994 of the Ministry of Environment and Forests (MOEF) requires central government clearance for highway projects costing more than Rs.50 crore. However, four laning and widening projects have been exempted from obtaining such clearance. Roads in the Himalayan region and forest area, regardless of investment value, are subject to EIA.

(ii) Coastal Regulation Zone Notification in 1991 places restrictions on development activities in the coastal zone between high and low-tide lines. The Forest (Conservation) Act, 1980 (as amended in 1988) and the Forest (Conservation) Rules, 1981 (as amended in 1992) place restrictions on the conversation of forest for uses other than reforestation, including use for road. The Wildlife Protection Act, 1972, as amended in 1982 and 1986, and the Wildlife Protection Amendment Act, 1972, cover a wide range of matters relating to the protection of wildlife. Under this Act, no disturbance of wildlife is permitted in National Parks or sanctuaries.

Several states are now ensuring adherence to these provisions and put in place environment management plan for all projects sequel to preparation of Environment Impact Assessment (EIA).

7.3 Social Concerns

Several states are now mandating requirements of rehabilitation and resettlement of people affected due to various infrastructure and industrial projects including roads. These aspects are new getting incorporated at the time of preparing Detailed Project Reports and a proper R&R Plan is then implemented before actual execution of works on the ground.

7.4 Forward Path

The following actions can go a long way in effectively tackling of the environment and social impacts resulting from upgradation of road projects.

- (i) Creation of special cells in the MORT&H/NHAI/PWDs of States / UTs to coordinate all activities related to environmental impacts of highway projects.
- (ii) The social dimensions of resettlement and rehabilitation of affected people must be incorporated in all highway projects involving displacement of people at the project preparation stage itself and proper R&R plan implemented before execution of works.
- (iii) Removal of encroachments on NH/SH & MDR land and to prevent future encroachments.
- (iv) A Corridor Management Plan should be drawn up for major state highways so that the problems of ribbon development, encroachments, uncontrolled access and poor safety can be tackled.
- (v) Control on roadside advertisements to preserve the visual aesthetics.
- (v) Consideration may be given to recycling of existing pavements to reduce the need for more road building aggregates.
- (vi) Promotion of use of waste materials such as fly-ash and copper slag, etc.
- (vii) Use of bio-engineering techniques for protection of slopes in hill areas and reducing risk of landslides.
- (viii) Implementation of the Control of National Highway (Land and Traffic Act), 2002 for improved traffic management and control of access on National Highways.
- (ix) Upgradation of vehicle technology to meet the future emission standards laid down by the Government.
- (x) An effective Inspection and Maintenance programme of in-use vehicles.

7.5 Measures for Energy Conservation, Environmental Protection and reduction in pollution

In view of ever increasing prices of petroleum products, there is urgent need to undertake research on conservation of energy with special reference to its impact on environment. In order to contain air and noise pollution stricter steps needs to be taken at National level. Efforts needed in this area during the next five years are:

1. Use of marginal materials and development of new technologies for saving energy and materials in road construction.

2. Development of relationship between traffic and air pollution for different scenario such as Terrain, Traffic Volume, Traffic mix, vehicle speed, speed restrictions, road width & conditions, roadside features, etc.
3. Need for developing environmental friendly methods of construction.
4. Development of air and noise pollution model for Indian conditions.
5. Development of mitigation techniques to reduce air & noise pollution.

7.6 Measures for effective Land Management for optimum utilization of road capacity.

Road network increases the accessibility and hence the development of business alongside road takes place in the absence of any effective control through planning, policies and legislation. Therefore, while acquiring land for road projects, provision should also be made for acquiring land for providing wayside amenities. In order to avoid encroachments, the encroachers should be dealt severely by making it a cognizable offence. The powers given to the Highway Administrations under the Control of National Highways (Land & Traffic) Act, 2002 needs to be suitably supplemented by proper institutional arrangements and supporting structure including providing actual support of local administration at the field level to make the enforcement of the provisions under the Act effective.

The following areas also require critical considerations;-

1. Need for policy on utilization of right of way (ROW) of National Highways.
2. Study the implementation of various provisions of the Control of National Highways (Land & Traffic)Act, 2002, its effectiveness and the modifications required.
3. Need to establish guidelines for Asset Management inventories, creation and updating of relevant records.
4. Need for developing intervention criteria for maintenance / rehabilitation / disposal of highway assets.
5. Need to develop norms for depreciation of road assets to establish the market value of a road stretch. This will be quite relevant for BOT/Annuity projects.
6. Need to develop norms for road user participation in highway asset management. This aspect will gain importance once GQ/NHDP will be tolled and road user will demand quality service for their payments.
7. Need to develop norms for establishing ROW boundaries understandable to Engineers for effective land management.
8. Establishing norms for setting up wayside amenities for all income group road users.
9. Need to study impact of ribbon development on speed, accidents & road capacity. Need to study impacts of road access on speed, accidents and feasibility of paying charges for access denial / permission on road capacity.

CHAPTER-8

CAPACITY BUILDING OF IMPLEMENTING ORGANISATION AND HUMAN RESOURCE DEVELOPMENT

Constitutionally National Highways is a Central subject and all other roads fall within the responsibility of the State Government concerned. The Department of Road Transport & Highways is responsible for the policy planning and implementation of the development and maintenance of National Highways. Though the Department of Road Transport & Highways is constitutionally responsible for the development and maintenance of National Highways, the projects are implemented on the basis of agency system. The National Highways Authority of India (NHAI), the State Governments (though State PWDs), and the Border Roads Organisation (BRO) are the agencies for development and maintenance of National Highways. The formulation of policy and planning and decision support system requires an adequate and up-to-date database which is lacking at present. This area requires immediate attention for its improvement. Necessary arrangements are to be made both in personnel and in computer software and hardware for creation and regular updation of the database.

8.1 Roads Wing in the Department of Road Transport & Highways

This Department should continue its efforts for developing design standards, specification and encourage research works for roads and bridges so as to serve as an apex institution in technical excellence in this field. In this connection access to international literature, know-how and training is essential. Specialisation should continue to be one of the hallmarks of this organisation in guiding the development of National Highways and providing support for development of technology in the States.

This Department has a network of Regional Offices in all the States. The main function of this Regional Office is constant liaison with the State Governments in respect of works of National Highways. In the recent past the Regional Offices (ROs) have also been entrusted with the responsibility of the direct payment to the executing agency for development and maintenance works on National Highways entrusted to the State Governments. The Regional Officers have also been appointed as Highway Administrations under the Control of National Highways (Land & Traffic) Act, 2002 for the National Highways which are with the NHAI. The project works covering survey and investigations, detailed engineering of the development works can be looked after by these regional units for effective monitoring of the task being undertaken by the State PWDs. Similarly, the ROs should be repository of cost data bank of rates of various items of work. In order to achieve all these tasks the Regional Offices should be strengthened and it should be delegated with the appropriate power for both the administrative and financial side for approval of works as well as power of outsourcing of some of their activities.

8.2 National Highways Authority of India

The structure of the NHAI is basically on a sound philosophy of remaining lean and thin and functioning as a monitor of project preparation and implementation and outsourcing most of the work through Consultants and contractors.

However, the Authority must possess within its permanent staff, sufficient number of technical officers who effectively oversee its mandate. It is also necessary for the staff members to test check quality of projects preparation by the Consultants' team and supervision during construction.

There is a proposal to restructure NHAI to accord different expertise for raising of resources, implementation and management of National Highways. Action has already been initiated for obtaining the approval of the proposal from the government. These

institutional strengthening measures would considerably help the NHAI in improving implementation of National Highway projects.

Deputation of engineers and other officers to NHAI from Department of Road Transport & Highways and State PWDs could be of considerable mutual benefit.

NHAI need to prepare carefully worked out business plan for development, maintenance and operation of National Highways entrusted to them for proper utilisation of the resources as made available to them.

8.3 Border Roads Organisation

The Border Roads Organisation (BRO) is a well disciplined organization committed to take on all tasks related to Infrastructure development for Defence as well as other agencies in remote far flung and terrorist infested areas. Border Roads Organisation is playing a vital role in construction and maintenance of roads under their charge and has acquired special expertise and field experience of working in difficult and rugged terrain. Out of the total length of 66590 km of National Highways, about 5512 kms are with BRO in which 3336 km are in the North Eastern area and rest 2176 km are in other regions of the country. Similarly 1900 Km of Strategic roads are under BRO.

Their human resource development requirement and arrangement for improving their skills would need consideration. Adequate training of their officers and staff for project preparation, familiarisation with new specification and latest construction and maintenance technologies are also essential to cope up with the demand of development of National Highways. The development and maintenance works of National Highways entrusted to Border Roads Organisation are mainly being done departmentally. The Border Roads Organisation has to modify and amend their procedures of working so that the various works can be outsourced wherever possible.

8.4 Public Works Departments of the States / Union Territories

The State PWDs are responsible for policy, planning, design, construction and maintenance of the State Highways and Major District Roads. They also execute works on National Highways on agency basis. Basically, these organizations are performing extremely vital role in provision of road infrastructure on the ground. However, they need to be reoriented to the needs of current emphasis on private sector participation and implementation of large scale projects for which assistance from the multilateral funding agencies like the World Bank, the Asian Development Bank and the Japanese Bank for International Cooperation is being sought.

Presently 43,705 km of National Highways are with the State PWDs. Though NHAI is being entrusted in phases with the National Highways included in various phases of NHDP and other important projects substantial lengths of National Highways will continue to remain with the State PWDs. The PWDs are basically a strong institution and need to be preserved. Account codes and works manuals in the State PWDs are well developed. However, they need review in the light of procedural changes made at the Central level to keep up with the latest technology. There should be proper synchronisation of the workings of the procedures and systems at the Central and State levels. Many State PWDs have established a separate organisation for implementation of the works on National Highways. This needs to be done by all the State Governments. The State Governments should develop these National Highway departments by posting the officers having experience only in roads and bridge works. Due to present emphasis on private sector participation for development and maintenance of National Highways systems and procedures in the State PWDs are also to be amended.

There is considerable stagnation at the State level of the technical officers with adequate qualification and experiences. The State Government may adopt a policy of allowing the engineers of the Public Works Department to take up jobs with the contracting and consulting organisations both in private and public sectors for a fixed

tenure and retain lien with the parent Department. This would help to the Government departments, individual engineers as well as the contractor / consultancy organisations. Some State Governments like Rajasthan and Andhra Pradesh are following this practice. There is urgent need for the other State Government departments to adopt this policy. The Central Government may amend their policy in this regard.

8.5 Training

8.5.1 Present Scenario

In view of the large number of road projects coming up, there is an urgent need to train skilled and unskilled manpower so as to keep pace with the technological developments taking place world over and to meet manpower requirements for the ongoing infrastructure development works for various stakeholders. Some of the stakeholders are e.g. employer (Central/State Govt. level), Engineer / supervision Consultants / IE (for BOT/Annuity projects), contractors, BOT Concessionaires (if relevant), financial institutes (in case they fund projects e.g. in BOT/Annuity projects), Project affected persons / local people, etc., besides skilled/unskilled manpower required for the project implementation. Generating public awareness and sensitizing them about the project benefits may also enable encountering minimum resistance/bottlenecks from community level during project implementation and possibly may form a part of formal endeavor during project planning and report preparation stage.

8.5.2 Training Policy

The Training Policy for Highway Engineers is another issue requiring our careful attention. The number of Engineers and other technical staff is not sufficient to take up the development works on Highways as has been envisaged. Therefore, appropriate training arrangements are to be made for increasing the number of Highway Engineers and other professionals. In addition, to keep pace with the technological developments in the world over, it is essential to create awareness among the Highway Engineering profession.

The policy should therefore address the needs of training, at entry, on job site and periodic in service refresher courses. Apart from engineering disciplines training programmes are required for project management techniques, financial management, operation and management of Highways to enhance the capability of the officers and staff so as to improve their skills in various management aspects of manpower, material, equipment and finances. The Engineering and Technical institutions are to be encouraged and incentives are to be given for attracting students in Highway Engineering profession. The association of these institutions is also required for providing training to the new entrants as well as in service engineers. Private parties like contractors and consulting firms must also show full commitment for this purpose. They should make necessary arrangement either in-house or at outside for adequate and appropriate training of their officers and staff.

The R&D Institutions shall be supported by the industry for funding and Industry shall define their needs to reap the benefits of the association. The R&D staff shall be given opportunities to get exposure of construction industry and vice versa so that each can understand the others needs.

8.5.3 Role of National Institute of Training for Highways Engineers (NITHE)

The National Institute for Training of Highway Engineers set up by the Government of India would need to play a vital role in training effort and may consider entering into MOUs with the international and national training/academic and research institutions to provide the institutional support. NITHE should also come out with a comprehensive booklet indicating the various areas of training for different levels of

highway engineers, duration and course contents. NITHE should also function as a repository of documentation of all major projects for future lessons.

Simultaneously all the departments dealing with roads both in the Central and State Government should support the NITHE by sending adequate number of persons for training and also in financial terms by paying annual contribution. This will help in augmenting the activities of NITHE

8.5.4 Funds for Training

Funds should not be allowed to be a constraint. A portion of the CRF can be earmarked for this purpose. This should be supplemented by providing a small percentage (say 0.25%) of the project cost for training of departmental personnel, both within the country and abroad.

There is a marked reluctance of the State Governments to depute technical personnel for training abroad due to fund constrains. On the other hand, the states should be encouraged to depute their personnel for training abroad so as to be abreast of the international and latest know-how in various aspects of the highway sector. The MoSRT&H may consider formulating a comprehensive scheme for training of personnel from the centre and the states with a fair share of slots for training for the individual states. A Rs. 50 crore outlay is projected for the training during the 11th Five Year Plan period.

8.5.5 Measures to be taken up

1. Strengthening of existing training centers (such as CRRI, NITHE and Training Institutes at State level) for highway professionals by providing adequate resources.
2. Need to help and educate PWD officials for construction, maintenance and other activities.
3. Training to skilled, unskilled manpower in the field of road construction and maintenance to meet the requirements of the industry. In order to achieve this there has to be a dedicated fund which can be generated by earmarking some percentage in the budget for training activities.

CHAPTER-9

DOMESTIC CONSTRUCTION INDUSTRY AND CONSULTANCY ORGANISATION

9.1 Domestic Construction Industry

Prior to 1985 for improvement of National Highways, a policy of stage construction and labour intensive construction technology were followed to spread available meagre financial resources on larger lengths. Therefore, these projects were implemented mainly on small and medium sized contract packages and involving contractors of lesser capacity with the equipments which were mainly road roller and hot mix plants supplied by the Government of India. However, for bridge works comparatively bigger contractors were there but the equipment used was also limited.

(ii) A major push in the direction of improving the contracting industry in India came in 1985 when for the first time, the Government of India, while seeking loan assistance for roads from the World Bank (WB) accepted to adopt International Competitive Bidding (ICB) procedures and FIDIC conditions of contract for the highway projects, forming part of the loan package. In order to encourage modernization and mechanization (both these workers were considered synonymous), size of the project was kept at Rs. 100 to Rs. 150 million at that time. The Ministry of Road Transport & Highways insisted on short listing of contractors through the system of Pre-Qualification initially for only externally aided projects and later for other large and specialized projects.

(iii) The implementation of Phase-I and Phase-II of the National Highways Development Project (NHDP) has accelerated the growth of domestic contracting industry. The number of domestic contractors has increased substantially and they are capable of implementation of projects of package size even in the order of Rs. 400 crore. The implementation of further phases of NHDP like NHDP Phase-III, V and VI will involve bigger package size than were used in NHDP Phase-I and Phase-II. Therefore, the domestic contracting industry has to gear up for taking up this new challenge. The implementation of the joint venture with foreign contractors has not proved to be very encouraging. It has been found that many foreign contractors have not performed as per expectations and there have been contractual problems.

(iii) The Government has drawn up a programme of Rs. 2,20,000 crore for development of National Highways under NHDP alone and to be completed by the year 2015. These are in addition to the development works to be taken up by the State PWDs and the BRO. The Bharat Nirman programme also plans for investment of Rs. 1,75,000 crore. The annual expenditure is likely to increase by four times from the present level of expenditure. All the future packages of NHDP will be implemented in bigger package size. At present 222 numbers of contracts are under implementation for various phases of NHDP and under different forms of contracts like execution contracts, BOT contracts and annuity contracts. The shortage of trained technical manpower and quality equipment with the contractors has been felt. There is also a need for augmenting the financial resources of the contractors.

9.2 Contractors

(i) Contractors are the major partners in progress for both direct construction projects by the government and BOT projects through private entrepreneurs. The quality of works has considerably improved. However, given the scale of highway investments envisaged in the next 10 years, a quantum jump in contractor capacity is needed. Therefore, conditions for the healthy growth of the domestic contractors should be created and support from foreign contractors procured.

(ii) The States / UTs would need to devise packages of different sizes from say Rs.10 crore to Rs. 300 crore in respect of State Highways so as to provide space for growth of

different categories of contractors from small to large in order to handle the given size and complexity of project.

(iii) The current policy of providing mobilization advance and equipment advance free of interest should continue to enhance the capability of even small and medium size firms.

(iv) The system of dispute avoidance and resolution also needs to be further strengthened through joint consultation of the contractors, consultants and the PWDs of States / UTs.

(v) The State PWDs have been seized of the concerns of the contractors and have taken a number of measures by way of instituting Standard Bidding Documents, supervision of works through independent engineering consulting firms and allowing import of equipment free of customs duties and taxes. The implementation of such measures should be expedited.

(vi) There is need for further improving the business environment for growth of the contracting industry including entry of international contractors so as to improve technology transfer in construction methodology and equipment use. Some system of grading of projects and contractors implementing them should be evolved.

9.3 Consultancy Sector

Consultancy in the field of roads bridge engineering in India had started about 25 years back as the task of planning, design and construction as well as construction supervision were traditionally being responsibility of the State PWDs for implementation of the development and maintenance works of National Highways. The consultancy particularly in road engineering started primarily as a result of the implementation of the externally aided projects from the loan assistance of World Bank, Asian Development Bank and OECF Japan now JBIC.

(ii) The implementation of second NH projects from the loan assistance World Bank led to supervision of construction by the independent consultants. Traditionally this was in the domain of the State PWDs. The implementation of NHDP Phase-I and Phase-II saw the bigger involvement of the consultants in planning, design, peer review and construction supervision.

(iii) It has been decided that future phases of NHDP will be implemented mainly through PPP route. These works will mainly be implemented through the "Design Build Finance and Operate (DBFO) basis". The role of consultants in the implementation of such projects will become more crucial as they, in addition to the task / activities for implementation of traditional type of projects, would be expected to act as independent bodies and as an intermediary between the government and the entrepreneurs. Aspects like assessment of various risks and strategy to apportion the risks between various stake holders would require skills in multidiscipline - engineering, finance, legal, social and environment on the part of the consultancy organizations. Techniques for more realistic estimation of costs, O&M expenses and revenues (traffic volume and toll rates) would need to be refined. Independent engineering experts are also needed by the lenders and financial institutions.

(iv) The consultancy for such projects in respect of the following services will be required either by the government or by the entrepreneur: -

- Preparation of feasibility report
- Financial matters
- Legal matters
- Independent Engineer
- Supervision of works

(v) A system of internal quality audit by the consulting companies should be considered so as to ensure that the project delivered by their project unit has been test

checked before it is passed on to the client. A regular interaction and more effective monitoring of the task by the client alone will, however, help in improving the performance of the consultants. A system of Quality Assurance and Quality Audit of consultant's work should be introduced. There is also a need for instituting a system of grading the consulting firms in terms of size of project that they can handle and some system of keeping a track record of the performance of firms on various projects. While awarding consulting projects to consultants, their existing work load in relation to their capacity would also need to be kept in view.

(vi) The consulting organizations would need to have their own cadre for meeting various demands for the profession. The training and academic institutions in India like CRRRI, NITHE, Structural Engineering Research Centres, NICMAR, IITs, Regional Engineering Colleges should be utilized by the consulting firms in India to carve out special training modules of various disciplines and areas of work.

(vii) Encouragement needs to be given for formation of joint ventures with international firms to improve capability with their special inputs in areas where domestic exposure is still lacking. The staff members of the client would also need to update their knowledge regularly so as to enable them to effectively monitor the consultant's performance.

(ix) The system of evaluation and selection of consultants must provide for a conscious encouragement to small size and new firms provided they possess competent personnel and proof of access to suitable special expertise and equipment and instruments required in performance of the task expected.

(x) Notwithstanding the professional growth, weaknesses have also been experienced particularly in preparation of Detailed Project Reports. Not many firms have any system of internal audit by independent persons, before the outputs are delivered to the clients. Some system of performance evaluation of consulting firms and their grading by some independent professional agency like ICRA could be considered.

9.4 Equipment and Machinery

(i) The economic reforms introduced in 1991 gave a further impetus to import of world-class road making equipment. The modifications of the MORT&H specifications facilitated the use of modern equipment. During the last 5-6 years there has been a growth in the usage of modern equipment in the road sector, especially the projects undertaken by NHAI. The country has seen the change in thrust in respect of the use of equipment, born out of need. Earlier a single static road roller was used for the compaction of the sub grade, sub base, base and black topped layers whereas now a different type of road roller is used separately for each layer, like soil compactors, tandem vibratory rollers and pneumatic tyred rollers. Similarly the capacity of the Hot Mixed plants has grown from 20-30 TPH to 120-160 TPH in road projects. The stone crushing has shifted from conventional jaw type crushers to sophisticated cone crushers and impactors. In concrete roads, the conventional rigid pavers have been replaced with slip form pavers.

(ii) The evolution in technology for the road construction has resulted in the introduction of machines like Wet Mix Plants, pavers for the construction of base course, etc. Cold and hot milling machines, cold and hot re-cycling machines have also been introduced to reduce the thickness of the road crust and to recycle the used material for the highway construction. On the maintenance aspects the mechanized construction have been introduced in the form of pot hole repairing machines, slurry sealing machines and sophisticated machines like kerb laying machines and line marking machines.

(iii) To facilitate the use of imported sophisticated machinery in the highway sector in India, the Govt. has made policy level changes, regarding the import of the machines and the notification have been issued to facilitate the contractors and the road construction departments to import custom duty exempted sophisticated machines. The

projects funded by the World Bank and Asian Development Bank also allow for the import as well as purchase of machine exempted from custom and excise duties. With the induction of these policies the highway sector now appears to be flooded with modern machines. The next five year plan will further see the state of art machinery like Automatic Road Analyzers (ARAN) and Accelerated Loading Facilities (ALF) to be introduced in the road sector for the research and development purpose.

(iv) The introduction of sophisticated machines in the Highway sector has given a boost to the domestic industry. The manufacture of many modern sophisticated types of equipment has started in the country through joint venture with the leading manufacturers of the world. During, the coming five year plan, the emphasis will be to boost the local industry for highway equipments. Moreover the whole concept of public private partnership is formed as instruments for the transfer of know how. Many leasing companies have also come up for the task of leasing equipments to the firm, where the period of usage is inadequate to go in for a new equipment, loan covenants do not permit the borrower from exceeding the debt equity ratio, or the firm intends to incur a higher interest by way of leasing rather than acquiring the equipment.

(v) The scope for leasing or hiring of equipment is also increasing and supporting the contracting industry. The concept of equipment bank in the private sector needs to be encouraged.

9.5 Steps needed for growth of Road Construction equipment industry

In the implementation of NHDP program, high end sophisticated equipments and machineries are being used for mega projects in the country. However for projects on lower category of roads such as Rural Roads etc., there is necessity to develop low cost indigenous equipments and machinery suiting the Indian conditions so that the project costs are reasonable and projects could practically be implemented through smaller contractors. Endeavour should be channelized towards progressive usage of indigenous materials including waste materials / by-products and if required their qualities may be suitably modified through proper R&D efforts to suit the structural and functional requirements ensuring that the end quality and long term performance in actual site conditions is not compromised with. For this purpose the concerned waste producing industry/concerned Ministry may take up full initiative of conducting R&D in consultation with MoSRTTH. Thrust in this direction should be on the development of indigenous machinery and materials for road construction and maintenance. In order to achieve this, Government should create an environment to encourage private sector participation in this area to help the growth of the road equipment industry.

1. Definite role of construction machinery manufacturers in the process of road development for their sustainable growth.
2. Development of low cost indigenous equipments for road construction and maintenance suiting to Indian conditions.
3. To study use & effectiveness of machinery (movable road construction machinery) such as moveable hot mix plant for road construction.
4. Development of new materials for construction and maintenance of flexible and rigid pavements.

CHAPTER 10

MOBILISATION OF RESOURCES

10.1 Mobilisation of Resources for National Highways

The existing sources of financing are (i) Government Budget (ii) Fee / Toll on Bridges and (iii) Central Road Fund

10.2 Mobilisation of Resources for State Roads

10.2.1 Central Road Fund

There is wide gap between the funds available and those required for proper development and maintenance of roads to meet the social and economic growth of our country. Currently it is grossly under funded being in the range of 3 to 4 percent of public sector allocation. Recognizing the deficiencies in the road network, the Government of India revamped the Central Road Fund by levy of additional excise duty on petrol and diesel. Currently, this levy is Rs.2.00 per litre giving a resource base of around Rs.12,000 crore a year. Of this, about Rs.2000 crore per year, i.e. a total around Rs.10,000 crore over a five year period is likely to be available for SHs and MDRs.

10.2.2 Private-Public Partnership Initiatives

Another promising avenue for financing of roads will be through tolls. Being implemented on pay-as-you-use principle, projects of capacity augmentation may be implemented on commercial principles implying efficiency in execution and better level of service to road users. For commercially viable projects, it should be possible to attract reasonable finances from the market based on experience of some of the recent initiatives by the states. These states may continue with the strategy of setting up special purpose vehicles in which state government, EPC contractor and O&M contractor can participate on mutually agreed terms and conditions.

10.2.3 Dedicated Funds for State Roads

Budgetary resources for state roads are likely to be limited. Total resource requirements greatly exceed the capacity of the budget to meet cost of upgradation and maintenance. Hence, generation of additional resources through modern road fund at state level is a necessity. Some state governments have already done so but it is not clear whether these are really proving effective in the sense of being additional to the normal budgetary allocations. Many state governments prefer an infrastructure fund to a road fund. It is suggested that a present generation road fund, which provides substantial resources, is dedicated to roads, has clear norms for apportionment and involves various stakeholders so as to be acceptable, be introduced. Possible sources for such funds are road user charges, tolls, agricultural cess, additional sales tax on diesel and petrol, etc.

10.3 Enhancing Budgetary Allocations

Provisions for the road sector should be a certain minimum percentage of the Annual Plan of the states / UTs. Provision for CRF, E&I, PMGSY, etc. should not be considered in this percentage. Looking to the volume and commercial traffic being carried by the state roads and the fact that rural roads are partly centrally funded (PMGSY, etc.), bulk of the budget provision should be for State Highways and Major District Roads comprising the Core Network.

10.4 Borrowings from Multilateral Funding Agencies

Several states have taken up ambitious improvement programmes for their states roads with funding assistance from the World Bank, ADB, JBIC, etc. Many such projects have been completed or are on the verge of completion, while in some of the states works are ongoing, many more states are in line for such loans in the near future. Works completed are generally of good quality and high standards, with safety features and are in tune with modern day vehicles. Looking to the high costs of widening to 2-lanes with

paved shoulders (with 4-laning in urban sections, service roads, groundwater drainage, etc.) as well as the accepted fact that most states have severe maintenance backlog, these projects generally comprise a combination of widening and strengthening component and a less expensive, but cost effective road maintenance component which provides for profile corrective course and a pavement layer with shoulders treated with hard/granular materials, thermo plastic road marking and adequate traffic signs. These completed projects have given immense relief to the road users particularly where there is heavy commercial traffic, servicing industrial areas. Besides providing financial support, these loans have also helped the sector in strengthening the implementation capacity of road agencies, consultants and contractors. It is, therefore, necessary to continue with the strategy of seeking such external assistance for some more time. However, the Government of India has decided that borrowings from multilateral leading agencies in future shall be directly by the state governments. The effect of this needs to be studied and if there is reluctance of state governments to avail of such loans, alternative strategies to tap other financial resources should be explored.

10.5 Beneficiary Participation

Some funds can be tapped from beneficiaries for projects linking the Special Economic Zones (SEZs), satellite towns, ports, power plants, steel plants and other industries.

10.6 Calamity Relief Fund

The recent years have witnessed major damages to road infrastructure as a result of floods, cyclones, earthquakes, tsunami, etc. The Union Finance Minister while presenting Budget 2006-07 has also referred to the same. The Calamity Relief Fund norms do not provide for permanent restoration of damaged infrastructure and the States are unable to reconstruct due to paucity of funds. It is necessary to review the current norms for the Calamity Relief Fund and modified so that it becomes possible to restore the assets to their original condition.

10.7 The Imperative

Broadening of the country's revenue base to meet the infrastructure needs may be desirable but may not be achievable in the short run in the face of fiscal discipline requirements. It is becoming increasingly clear that any strategy for mobilization of resources for the road sector will need to involve the highway users themselves whether they are charged indirectly in the form of taxes on vehicles or fuels or directly in the form of tolls or user fees. Institutional arrangements would also need to be reoriented accordingly by improving the planning process to identify commercially viable projects, adopting strategies to cut down on initial costs by bringing in value engineering principles of phased development, enhancing the transparency of financing arrangements through public-private partnership approaches and obtaining support and acceptance of the road user communities including trucking associations for the required changes in the level and structure of charging for roads.

CHAPTER-11

DEVELOPMENT OF ROADS IN THE NORTH-EASTERN REGION

11.1 Introduction

The North-East Region comprises eight states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. Spreading over a vast expanse of 262,179 sq km with a relatively small population of about 39 million (2001 census), the Region accounts for about 8 percent of total area and 4 percent of total population of the country. The Region is divided into discrete plains encompassed within hills with a number of agro-climatic zones within them. Several rivers and streams flow through its territory. It has two important valley plains and flood plains of the rivers Brahmaputra and Barak. The Brahmaputra valley is some 700 km long (from Sadiya to Dhubri in Assam).

The Region has the potential to emerge as a strategic base for domestic and foreign investors to tap the potential of the contiguous markets of China, Myanmar, Bangladesh, Lao PDR, Thailand, Vietnam, Cambodia as well as Malaysia, Indonesia and beyond. The BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral, Technical and Economic Cooperation) is creating an enabling environment for rapid economic development through identification and implementation of specific cooperation projects in the sectors of trade, investment and industry, technology, human resource development, tourism, agriculture, energy, infrastructure and transportation.

11.2 Transport System

The Region is served by all transport modes viz. Road, Rail, IWT (Inland Water Transport), Air and Pipeline. Air Services are available for all states except Arunachal Pradesh, which has limited helicopter services. Civil aviation has important though limited role. The Railway network extends over a length of 2578 km, most of which is in Assam. There are practically no railway lines in Arunachal Pradesh, Manipur, Mizoram, Nagaland and Sikkim except that some rail heads connect these states with the rest of the country. The cost and operation of railways in the Region is very high due to hilly terrain and low volume of traffic. However, railways are a critical transport infrastructure for economic development and movement of bulk commodities as well as long haul movement of both goods and passengers. There are two major rivers – Brahmaputra and Barak. Brahmaputra is declared as National Waterway No.2 and its development and maintenance are the responsibility of the Inland Waterways Authority of India under the Central Government.

Roads are the true engine of economic growth and serve as principal mode of transport to meet the demand for movement of goods and services in the NE Region. The share of road transport would be well over 90 percent in the total movement by surface transport in the Region. The total road network now stands at 102,000 km out of which 7 percent are National Highways comprising the Primary road system, 20 percent are State Highways and Major District Roads comprising the Secondary road system and rest are Rural Roads providing links to villages.

11.3 Road Network

The state-wise distribution of the primary and secondary road network is given in the Table below:

State	Length (km)			Road Condition (Percent)*		
	National Highways@	State Highways	Major District Roads		Fair	Poor
Arunachal Pradesh	392	119	4045	-	4.5	95.5
Assam	2836	1474	6280	12.8	57.3	29.9
Manipur	959	675	964	4.7	35.2	60.1
Meghalaya	810	653	2712**	27.0	42.3	30.7
Mizoram	927	181	1176	-	29.5	70.5
Nagaland	494	637	669	12.4	45.3	42.3
Sikkim	62	186	464	NA	NA	NA
Tripura	400	-	454	-	64.4	35.6
Total for NE states	6,880	3925	16,764	10.7	40.9	48.4

11.4 Performance of the Road Network

11.4.1 Poor Road Condition

A perusal of road network status given in Table 11.1 brings forth two important messages:

Message 1: The hierarchy of roads is skewed; particularly the length of State Highways in the Region is much less than that of the National Highways. Some states are, however, already in the process of classifying certain district roads as State Highways. Government of India should assist the North Eastern States in upgrading these State Highways.

Message 2: The riding quality and condition of main roads is generally fair to poor. Only 10 percent of these roads are reported to be in good condition. About 50 percent of the network has poor riding quality. The position is much worse in case of State Highways and Major District Roads; position in case of National Highways being comparatively better as the Ministry of Road Transport and Highways has been undertaking a special programme of IRQP (Improvement in Riding Quality Programme) over the past five years.

11.4.2 Inadequate Road Crust

A broad review of the studies undertaken by the states through the consultants and sponsored by the World Bank and the North Eastern Council shows that only about 10 percent of the state highways can be said to be structurally adequate to carry the legally permissible single axle loads of 10.2 tonnes. Due to financial constraints, the states have not been able to provide strengthening overlays in any significant manner except for minor improvements to keep the roads trafficable somehow. The problem is compounded due to overloading of trucks resulting in accelerated deterioration of roads.

11.4.3 Semi-Permanent Timber Bridges

A problem unique to the NE region particularly in states of Assam, Tripura, Arunachal Pradesh and Sikkim is the presence of a number of semi-permanent timber bridges. These constitute a weak link in the movement of modern vehicles. Some states like Tripura are handling this requirement in two phases. Initially the timber bridge is replaced with a single lane bailey bridge and thereafter the bailey bridge is replaced with a two-lane permanent RCC bridge. The bailey bridge thus released is utilized for replacement of another timber bridge based on priority of the road link and condition of

the timber bridge. Till such time these bridges are replaced, their proper maintenance for safety of road users and keeping the roads in traffic worthy condition is crucial.

The State Government of Assam has recently undertaken a design review of the permanent bridges based on pre-cast systems to save on costs and time of execution. These initiatives need to be shared with not only other states of the Region but with the rest of the country as well.

11.4.4 ***Ineffective Maintenance***

There is lack of maintenance for state roads in all the states of the NE region. What is worse, some states have stopped or reduced allocations for road maintenance. The replacement cost of the existing state highways and major district roads in the region is assessed to be around Rs. 6000 crore and these assets are becoming a victim of negligence due to ineffective maintenance on the ground. Some of the problems being faced are:

- Lack of funds
- Erosion of soil, landslides which are more predominant in this part of the country due to physio-graphy, steep and unstable slopes.
- Lack of attention to drainage.
- The productivity of existing gang labour is not upto the desired levels. Routine maintenance tends to get neglected and it affects the road condition.
- Roads not being brought to maintainable condition deteriorate faster. Roads have inadequate road crust.
- Lack of appreciation between the initial standards and quality of construction and subsequent maintenance.
- Overloading of vehicles is aggravating the situation causing accelerated deterioration of road pavements.
- Lack of planning for maintenance activities by the road agencies in efficient utilization of available funds in absence of proper database and rational decision support system to prioritise maintenance interventions.

11.5 **Strategies Proposed**

11.5.1 ***Master Plan for Road Development***

Except for a recent initiative of the DONER and the NEC for preparation of a Perspective Transport Plan, there is no blue print within the NE Region of road network in various states for the next 10-15 years. There are no arrangements in place to collect and update data on flow of goods, passengers and services on existing roads. The Ministry of Road Transport and Highways have prepared a Road Development Plan Vision: 2021 through the Indian Roads Congress. This can serve as a guiding reference for formulating a comprehensive Master Plan for the Region as a whole. With possible opening of trade with the neighbouring countries as a follow-up of the BIMSTEC, the regional group has assumed considerable importance besides the basic requirements of accelerating the growth process.

It is necessary to work out scale of highway investments needed for filling up the existing road infrastructure gap and upgrading of existing roads and replacement of old timber bridges to meet the future traffic demand with due attention to safety. The following principles of prioritization could be considered:

- Regional linkages, connectivity to state capitals, international routes including Asian Highways.
- Intra-state connectivity to district headquarters
- Escape routes for areas posing as barriers to development
- Connectivity to railways and transshipment points (river terminals) of inland water transport
- Harnessing of mineral and other resources
- Opening up of isolated pockets.

11.5.2 **Road Investments**

The development of National Highways in this region is the responsibility of the Central Government and providing funds from budgetary support and cess on petrol and diesel. In addition, funds are also provided from Central Road Fund for development of state roads other than rural roads.

Following are the sources of the investment for the State Roads.

(i) *Central Road Fund:* Currently, the proceeds to this fund are of the order of Rs.12000 crore per year. A portion of this fund, viz. 30 percent of entire component of cess on petrol and half the component of cess on diesel, is earmarked for state roads covering essentially State Highways and Major District Roads. The NE Region also receives its share out of this fund. However, this needs to be supported with other financing mechanisms in view of the huge road investments required.

(ii) *DONER Fund:* The Ministry of DONER also provides good share of funds at its disposal out of the Non-Lapsable Central Pool of Resources (NLCPR) for road development. This fund was set up as a result of the policy decision taken by the Government of India some time back that 10 percent of the budgets of all line Ministries of the Central Government would be spent in the NE Region and unspent balance if any would be pooled together for future utilization on schemes in the NE Region. The fund is managed by the Ministry of DONER. The broad objective of this fund is to ensure the speedy development of infrastructure by increasing the flow of budgetary financing for specific viable infrastructure projects/schemes in the Region. The NEC also provides funds for road development.

(iii) *External Assistance:* The Government of India intends to accelerate the process by tapping resources from multilateral financing institutions such as the World Bank and the Asian Development Bank. The World Bank has already been supporting Mizoram and Assam. ADB is currently supporting Assam and has now included the Region in its future lending programmes for the road sector.

(iv) *Private Sector Participation:* It is to be recognized that in view of the current low level of development, basic financing for roads in this Region would need to come from the government. The private sector financing would take time to come by. At best some pilot projects of operation and maintenance of important state highways and national highways could be explored and that too after thorough study of commercial dynamics of such projects and interaction with the industry and prospective entrepreneurs.

11.5.3 **Maintenance of Road Assets in the NE region**

(i) *Challenge:* The challenge in the NE Region is not only upgrading of existing roads and filling up of the road connectivity gaps to supply the road infrastructure to serve as an engine of economic growth but also the preservation of the existing road network so that it continues to provide proper level of service to the road users. Problems of maintenance neglect are worse for roads than other sectors, because the cost of deferred maintenance is many times higher than timely regular maintenance particularly the effect on vehicle operating costs.

(ii) *Strategies Proposed:* The State Governments would need to demonstrate commitment to maintenance of the existing roads particularly main roads comprising State Highways and Major District Roads. Actually this problem is not unique to NE Region alone but is found in most states of the country. The prime requisite in this regard would be to set up dedicated state level road funds specifically for maintenance. The State Government of Assam has already undertaken positive steps in that direction in as much as the Assam State Road Board (ASRB) has since been set up. The Government of Mizoram is also coming up with a Bill to institute a dedicated road fund for maintenance.

It is also to be borne in mind that funds alone will not do. Several other aspects need attention for ensuring effective maintenance on ground. Performance based maintenance contracts on main roads are already being executed by the NHAI and the State Government of Andhra Pradesh, Karnataka, etc. The possibility of similar strategy being applied in the NE Region can be examined and a few pilot projects taken up. A gradual approach is recommended. The issue of gang labour productivity and options for improvement is another area of concern for technical support and training of small contractors and departmental personnel.

11.6 Role and Functions of the DORT&H in the North-East region.

The Department of Road Transport & Highways in the Ministry of Shipping, Road Transport & Highways primarily deals with the maintenance and development of National Highways, as far as road sector is concerned. Development of East-West Corridor under NHDP Phase-II and improvement of some of the National Highways in this region under NHDP Phase-III have been taken up.

A specific programme has also been initiated by the Central Government for the accelerated development of roads in the region covering 7616 km length of National Highways, State roads and GS roads. This programme is called as 'Special Accelerated Road Development Programme in North-East' (SARDP-NE).

The Ministry accords approval to the proposals/ schemes for the improvement/ up-gradation of State Roads funded out of the share of the States in the cess levied on petrol and diesel. These roads are generally in the State Highway and MDR categories. Projects/schemes are approved under the following heads:

- Improvement of State Roads under Central Road Fund (CRF)
- Improvement of State Roads under the scheme of Economic Importance
- Improvement of State Roads under the scheme of Inter State Connectivity

Major Projects

(i) East- West Corridor

Silchar in Assam is to be connected with Porbandar in Saurashtra region of Gujarat through a 4 - lane East- West Corridor, which would pass through Guwahati before ending at Silchar. Out of the total 3300 km length of the Corridor, 678 km falls Assam along NH-31C, 31, 37, 36 and 54. Four-laning of 18 km Guwahati bypass has already been completed at a project cost of Rs. 119 crore. Further contracts for 629 km have been awarded at project cost of about Rs 5217.50 crore and the works are in progress. For the balance 31 km tendering is in process.

(ii) NHDP-Phase III B

Under this programme all the State Capitals of the NE States are proposed to be connected to East-West Corridor through 4- lane National Highways. The programme envisages 4- laning of the existing 1246 km long stretches of national highways on BOT basis. The preparation of Detailed Project Reports has been taken up by NHAI.

(iii) Stretches under NHDP Phase IIIB as on 19.01.2007

Sl No.	NH No.	States involved	Stretch/ Corridor	Length (km)
1	36 & 39	Assam/ Nagaland	Daboka- Dimapur	124
2	31, 52 & 52A	Assam/ Arunachal Pradesh	Baihata Chariali (on EW Corridor)- Itanagar	345
3	39	Nagaland/ Manipur	Kohima- Imphal	140
4	44 & 53	Meghalaya/ Assam/ Tripura	Shillong- Churaibari (excluding Shillong bypass)	252
5	54	Assam/ Mizoram	Silchar (on E-W Corridor)- Aizawl	190
			TOTAL	1051 km

(iv) Special Accelerated Road Development Programme in the North-Eastern Region (SARDP-NE)

The programme has been conceptualised and initiated with the following objectives:

- To connect all State capital with improved/upgraded National Highways.
- To provide connectivity to all the 85 District Headquarters of the NE Region. Since 49 District Headquarters are already connected and connectivity to 2 District Headquarters is included in the plan of NEC, the remaining 34 District Headquarters are proposed to be connected to National Highways with improved State Roads.
- To improve connectivity to the neighbouring countries.
- To provide road connectivity to backward and remote area of NE Region to boost socio-economic development.
- To improve some of the important roads of strategic importance.

The programme is to be implemented in two phases: Phase 'A' and Phase 'B'. Phase 'A' covers 17 roads with an aggregate length of 1310 km. It includes improvement of 1110 km of various National Highways and 200 km of State roads and GS roads. The programme under Phase 'A' has been approved by the Government on 22.9.2005 for implementation. The estimated cost is Rs. 4618 crore, which is based on the rough cost estimates. The target for completion of roads under this Phase is year 2008-09.

- Phase 'B' comprises 83 roads with an aggregate length of 6306 km. Approval to undertake DPR preparation has been granted. Time-frame, cost estimates, sources of funds and the implementation agencies, are, yet to be decided.

National Highways not covered under East-West Corridor and SARDP NE Phase A are at present being improved under funds available under National Highways (Original) works and these have been dealt in the chapters dealing with the National Highways with the State Government and the Border Roads Organisation.

11.7 Institutional Strengthening and Human Resource Development.

The main implementing agency for development of the roads in this region is the State PWD concerned. The Border Roads Organisation (BRO) has also been assigned with the major share of roads for development and maintenance. However, in the light of modern technology, use of new specifications, machine oriented construction and different contracts for implementation, these implementation organisation needs to be upgraded to the challenge of accelerated development works. The technical officers of these organisations have adequate qualification and knowledge but they lack exposure to good and modern practices in other States of the country. The BRO relates mainly to

departmental construction methods in these areas. This method is not considered for attracting modern technology for construction. There are also lacks of big and good contractors in these areas. A review of strength and weakness of the existing procedures, rules and regulation, delegation of power, present method of implementation, opportunities forthcoming and threat from external environment is recommended.

Training is one of the measures for strengthening the capacity of the organisation. The training needs assessments of the technical officers in these states are required to be made. However, there is no state level or regional level training centers for the Highways engineering except in Assam where the state level road research laboratory is being refurbished and strengthened for training of PWD personnel. The region depends mainly on the National Instituted for Training of Highways Engineers (NITHE) located in NOIDA, Uttar Pradesh. NITHE is organizing, in collaboration with DONEAR for training officers in these States. However, the requirements being huge, a regional level training centre supported with state level inputs and networked with academic and engineering institution in this region needs to be set up. Till then most intensive use of NITHE is essential and necessary.

CHAPTER – 12

INVESTMENT NEEDS

12.1 National Highways

It is difficult to make an actual estimation of financial requirement for the Central Sector Roads without a detailed study of traffic and other parameters and existing physical condition of these roads. However, based on the approved financial plans for the implementation of NHDP, requirement fund for SARDP, implementation of works by the State PWDs and the BRO following are the assessment of the requirement of funds during the 11th Plan period. The major source of financing for the 11th Plan will be Cess on Petrol and Diesel and from the private sectors.

Table: Broad assessment of requirement of funds during the 11th Plan

S. No.	Scheme	Amount in Rs. crore
A.	Implementation of NHDP	
	1.Cess	36,589
	2.Externally Aided Projects	4,454
B.	Implementation of SARDP-NE	15,000
C.	Implementation of NH(O) works	
	1.By State PWDs	20,000
	2.By BRO	2,500
D.	Central Sector Schemes for State roads	
	1.Roads of Economic Importance & Inter-State Connectivity	900
	2.State Roads	500
E.	Other schemes like R&D, machinery, development of IT, etc.	200
	TOTAL:	80,143
F.	Internal and Extra Budgetary Resources	41,615
	GRAND TOTAL	1,21,758

12.1.1 It has also been assessed that Rs. 3108 crore during the 11th Plan period for implementation of NHDP will be available from the surplus of the users fee collected by NHAI after meeting the requirement of funds for maintenance of the National Highway sections and repayment of the government loan.

12.1.2 The share of the private sector will be substantial for implementation of NHDP as all the future phases of NHDP will be implemented mainly through PPP route. It has been estimated that Rs. 87,735 crore will be invested by the private sector during the 11th Plan period.

12.2 State Roads

As discussed earlier an estimate has been made for development works on State roads other than rural roads based on the recommendation of road development plan vision 2021 and performance during the Tenth Plan. It has also been proposed many of the programmes are to be implemented Public Private Partnership. A suggested programme both in physical and financial terms as well as possible element of Private participation are indicated below:

Programme proposed for the 11th Plan (2007-12)

	Scheme	Physical (km)	Financial (Rs. Crore)	Possible element of private finance (Rs. crore)	
I.	Core Network				
(i)	Expres sways	Land acquisition	500	500	Nil
		Construction	300	4500	3000
(ii)	Four-laning		5,000	20,000	10,000
(iii)	Two-laning	A. with Paved Shoulders	20,000	30,000	12,000
		B. with Hard Shoulders	20,000		
(iv)	Strengthening weak pavement and riding quality improvement		25,000	10,000	3,000
(v)	Bypasses, ROBs, bridges, flyovers		Lump sum	12,000	3,000
(vi)	Missing gaps to link up new SEZs, ports, ICDs, satellite towns, expressways, etc.		700	3,000	1000
	Sub-total for core network			80,000	32,000
II.	Non-Core Network				
A.	North-East Region				
(i)	Two-laning		2,500	2,500	Nil
(ii)	Providing hard shoulders and upgrading of surface on single lane roads including riding quality improvements		3,000	1,000	Nil
(iii)	Replacement of semi-permanent timber bridges		Lump sum	1,000	Nil
(iv)	Bypasses, safety engineering works, etc.		Lump sum	500	Nil
	Subtotal for NE region			5,000	Nil
B.	Other States				
(i)	Two-laning		10,000	7,500	Nil
(ii)	Riding quality improvement of existing two lane roads		10,000	1,500	Nil
(iii)	Providing hard shoulders and upgrading of surface on single lane roads		20,000	4,000	Nil
(iv)	Bypasses, ROBs, bridges, safety engineering measures		Lump sum	2,000	Nil
	Subtotal for other states			15,000	
	Grand Total			100,000	32,000

Note: Average unit rates have been adopted. However, these will vary depending upon the terrain , traffic volume and existing road conditions.

CHAPTER – 13

CONCLUSIONS & RECOMMENDATIONS

13.1. National Highways

- 13.1.1. The total expected expenditure during the 10th Five Year Plan (2002-2007) is Rs 41,371.57 crore including an amount of Rs 9,092.90 crore under IEBR. [Para 2.3.1]
- 13.1.2. The details of physical targets and achievements during the 10th Plan are given at Para 2.3.2.
- 13.1.3. The total deficiencies on the National Highways excluding the schemes included under NHDP Phase I, II and III has been assessed as Rs 73,000 crore. [Para 2.4]
- 13.1.4. Priorities for improvement of the National Highways entrusted with PWDs of the States / UTs have been identified, and accordingly the physical targets and the financial requirements for the 11th Five Year Plan have been proposed for such National Highways. The proposed fund requirement for achieving such targets is Rs 20,000 crore. [Para 2.5.]
- 13.1.5. The progress of the National Highways Development Project (NHDP) has been given at Para 2.7.
- 13.1.6. The future development under NHDP has been identified and details have been given. Further, the fund requirements for these for the 11th Five Year Plan (2007-2012) has been assessed as Rs.1,73,501 crore with sources of funding as given below:-

S. No.	Funding Source	Amount (Rs. Crore)
1	Cess	36,589
2	External Assistance	4,454
3	Borrowings by NHAI	41,615
4	Surplus from the user fee	3,108
5	Share of private sector	87,735
	TOTAL	1,73,501

[Para 2.8]

- 13.1.7. The fund requirement for the 11th Five Year Plan (2007-2012) for improvement of the remaining National Highways stretches entrusted with Border Roads Organisation (BRO) has been estimated to be Rs. 2,500 crore. [Para 2.9]
- 13.1.8. The target for new addition of length in NH network in 11th Five Year Plan would be about 7000km. For expansion of the NH network the following factors need to be kept in view;-
- Connecting industrial complexes, important growth nodes, pilgrimage and tourist centers and places of economic importance.
 - Filling up the grid in pockets of various regions without a National Highway.
 - Providing linkages with adjoining countries.

[Para 2.10]

13.2. State Roads

- 13.2.1. Total fund being made available for the State Highways (SHs) and Major District Roads (MDRs) is to the tune of Rs 8,000 crore to Rs 10,000 crore per annum as against the requirement of at least Rs 16,000 crore per annum. This has resulted into deficiencies in the existing network of SHs and MDRs. Losses due to poor condition of these roads would be around Rs 6,000 crore per annum besides their premature failure. The total replacement cost of the existing SH and MDR network has been assessed as Rs 2,50,000 crore. [Para 3.2]
- 13.2.2. Some of the major constraints faced by different States in the execution of programmes for State roads during the 10th Plan were in terms of lack of finances, spreading resources thinly, inadequate control on pre-construction activities such as works being awarded without acquiring full land or shifting of utilities or without obtaining environmental clearances, weak management by the contractors, etc. [Para 3.3]
- 13.2.3. Recognizing the necessity to develop a core network of major arterial routes covering National Highways and those State Highways / Major District Roads which are either already experiencing high volumes of traffic or have such potential in the light of industrial and other growth strategies by both the public and the private sector, a financial outlay of Rs. 80,000 crore has been proposed for the 11th Five Year Plan for covering about 71,500 km of such State Roads. [Para 3.4]
- 13.2.4. It has been suggested to accord the priority for development of State Roads connecting places of tourist importance, mining areas, power plants, industrial belt, steel plants, important railway stations, other areas which can further the economic development in vulnerable states & backward regions / communities, roads connecting neighbouring states and bridges in the border etc. [Para 3.5]
- 13.2.5. A dedicated Road Data Centre may be established in the Indian Roads Congress with financial supports by the States, wherein the data regarding road and bridge inventory, traffic flows, etc. for various categories of State Roads may be compiled in the form of a printed booklet on Basic Road Statistics by each States / UTs by end of September for the period ending previous March as per a standardized format; such data base may also be put on website of each State / UT and at the National Level. Analysis of such information should help in policy decisions and strategic planning at different levels of sectoral management. [Para 3.6]
- 13.2.6. The implementation capacities of the PWDs of the States / UTs needs to be improved through institutional strengthening and training etc. There is necessity for the contracting industry and the consultancy sectors to grow on healthy lines. [Para 3.7]
- 13.2.7. There is a need to carry on the momentum generated during the 10th Five Year Plan and commitment of the government to provide the much needed road infrastructure. A core network would need to be identified by each state and programmes for their development chalked out largely through the PPP route in due consultation with the Industry Associations like FICCI, CII, ASSOCHAM, PHD Chamber of Commerce and other regional industrial and trade organizations. The objective should be to enable a commercial vehicle to cover 500 to 600 km in one day so as to bring in the required transport efficiency to world class standards. [Para 3.8.1]
- 13.2.8. Under the proposed programme for development of State Roads during 11th Five Year Plan, construction of 300 km of expressways, 4-laning of 5,000 km, 2-laning of 40,000 km, strengthening of 25,000 km, 700 km missing gaps to link up new SEZs / Ports/ ICDs / Satellite Towns /Expressways etc., construction of by-passes/ROBs/ Bridges/ Flyovers have been proposed under the core network. Apart from this the programme under non-core network for North-East region

envisages 2-laning of 2,500 km, providing hard shoulders and upgrading of surface on single lane roads including riding quality improvements of 3,000 km, replacement of semi-permanent timber bridges, construction of by-passes and implementation of safety measures etc. For other States, it has been proposed to improve 10,000 km of State Roads to 2-lane standards, improvement of riding quality of 10,000 km, providing hard shoulders and upgrading of surface on single lane roads of 20,000 km and construction of by-passes / ROBs / Bridges / other safety measures. The total fund requirement for all the programmes mentioned above has been estimated as Rs. 1,00,000 crore for the 11th Five Year Plan period. This includes Rs 32,000 crore as the possible element of private finance. [Para 3.8.3]

13.3. Research & Development in the Road Sector

- 13.3.1. Emphasis needs to be given towards the research on conservation of materials used in the construction of roads, innovations in construction technology, environmental impact and road safety measures, updation of all obsolete technologies being used in design / construction / maintenance of roads and bridges along with road safety measures, cost optimization etc. With this in view, thrust areas for possible R&D initiatives have been suggested. [Para 4.1]
- 13.3.2. There is necessity to have reliable database for enabling scientific analysis of road accidents and for improvement in the method of accident data collection with involvement of Technical Specialists. The future thrust is required to be given in this direction for highway surveillance, post accident management, various aspects of road safety analysis, standardization of safety features for all types of roads, involving vehicle manufacturers in road development programme, establishment of norms for assessment of accident cost to the society. [Para 4.2]
- 13.3.3. Awareness has to be created amongst officers at all levels of the road agencies about the importance of the road safety measures. There is necessity for adherence to the prescribed safety guidelines in construction zones, making the driver aware of the situations / environment of the road ahead, installation of adequate road signs and pavement markings, maintenance of shoulders, trimming of road side trees, provision of proper super elevations, incorporation of safety measures in the DPRs with special attention to improve safety at night time and inclusion of traffic calming measures on highways passing through towns and villages, identification of engineering measures for vulnerable road users, safety features on cross drainage structures, carrying out road safety audits at various stages of development, strengthening of enforcement measures, accident analysis, etc. [Para 4.2.1]
- 13.3.4. Some States have enacted acts similar to “The Control of National Highways (Land and Traffic) Act 2002” which is intended to enhance the road safety, access management, control on ribbon development and prevention of encroachments on national highways. Similar Acts need to be enacted by other states as well. [Para 4.2.2.(i)]
- 13.3.5. The Transport Departments of State Govts./UTs need to improve the system of enforcement to ensure compliance with the Motor Vehicles Act. [Para 4.2.2.(ii)]
- 13.3.6. The parameter of judging effectiveness of enforcement should not be the quantity of fines collected but how these fines have reduced violations and improved ABC (attitude, behavior, culture) of road safety. It is pertinent to mention that as per the judgment given by the Hon’ ble Supreme Court imposition of penalty does not legally authorize plying of overloaded vehicles and excess loads of such vehicles are required to be offloaded. [Para 4.2.2.(iii)]
- 13.3.7. It has been suggested to earmark Rs 100 crore towards R&D activities in the National Highways sector in the 11th Plan. Further suggestions have been made

for an annual provision of about Rs 5 crore by each States / UTs for SHs and MDRs. [Para 4.3]

13.4. Role of Private Sector

- 13.4.1. There is a need to review the policy to offer all projects first under BOT (Toll) route based on only feasibility studies, then on BOT (Annuity) and then on Civil contracts after seeking approval of the Govt. at each stages, as this is likely to delay the entire process of project implementation. [Para 5.2]
- 13.4.2. There is requirement to enhance the capacity of the implementation agencies and also that of the private sector for implementation of PPP projects. [Para 5.2]
- 13.4.3. Regarding the toll policy, various measures have been suggested, such as study the concept of telescopic user fee for possible adoption, involvement of direct beneficiaries in capital structure of project through sale of long term passes for unlimited number of trips in a specified time period, review of exemption category to bring them in line with international practice, adoption of Electronic Toll Collection (ETC) technology, putting up effective mechanism for elimination of overloading on highways by planning weigh-in-motion bridges along with static weigh bridges with space for off-loading and storage, particularly at toll plazas. [Para 5.3]
- 13.4.4. Various measures have been suggested for encouraging PPP, such as creation of national level PPP unit for performing the functions of information dissemination and guidance so as to provide advisory to PPP programme, modifications regarding tax treatment / licensing / imports / banking / audits so as to facilitate encouragement for foreign investors, setting up of a regulatory mechanism to standardize processes and to ensure investors' confidence and to protect users' interests, necessity for accurate traffic projection, realistic estimation of project costs based on actual market forces, necessity to clearly spell out core technical requirements / standards and specifications / safety requirements etc. in the concession agreements, early initiation of land acquisition process, adoption of BOT (Annuity) and shadow tolling for medium / low traffic density corridors, incorporation of innovations and use of latest technologies / materials, exploring of possibilities for involving insurance companies in mitigation of traffic risks etc. [Para 5.4]
- 13.4.5. If a proper due diligence indicates any project to be unviable on BOT (Toll), then it should be offered on BOT (Annuity) basis in the first instance itself. Therefore, there is need to revisit the policy of first offering the project on BOT, and then BOT annuity, and then to civil works contracts, with an approval at each stage, since this process would not only take more time, but may also lead to lack of seriousness among the bidders. [Para 5.5]
- 13.4.6. The measures such as tax or other benefits such as cost subsidies and incentives might encourage some private players in doing meaningful R&D in roads. [Para 5.6]
- 13.4.7. The States / UTs may take up capacity of augmentation of such roads with financial support of the private sector, which are justified on the basis of traffic volume and which are not envisaged to be upgraded as National Highways. There is requirement to meticulously plan in advance for land acquisition, environmental clearance and shifting / removal of utilities of such project before entrusting them to private entrepreneurs so that considerable support is given to the industry in planning their growth and creation of industrial establishments along these roads. [Para 5.7.3]
- 13.4.8. Possibility of leveraging funds from CRF to meet the viability gap of BOT projects may be explored, especially for ROBs / RUBs. [Para 5.7.4]

13.4.9. There is necessity to constantly review and amend acts including setting up of permanent legal cell for projects implemented under Private Sector Participation. [Para 5.8]

13.5. Highway Maintenance

13.5.1. The basic cause for poor management of National Highways is the lack of funds made available for maintenance as per norms. A comparison of the year-wise fund provided for maintenance and repair of NHs from 2002-03 to 2006-07 shows that this varies to the tune of about Rs. 730 crore to Rs. 870 crore per annum as against the annual requirement of about Rs. 2,000 crore per annum as per the norms finalized by a Committee (in 2000) set up by the Department of Road Transport & Highways. The gap between the requirements as per norms and allocation has been accumulating over the years and now poses a threat to the system. Maintenance being a non-plan activity there is also a tendency by the Government to apply adhoc cuts in the face of resource constraints. [Para 6.1.4]

13.5.2. The maintenance activities should be reorganized by replacing the existing system of road gang labour with proper scientific system of maintenance for effective utilization of the meager resources. [Para 6.1.6]

13.5.3. For Modernization of Maintenance Management, Pavement Management System (PMS) based on the rational method of assessment of distress and decision support system for taking up maintenance activities is to be introduced for productive use of meager resources. [Para 6.3(i)]

13.5.4. Uses of machines for repair of distresses in pavement have been introduced and their use would need to be encouraged to improve the maintenance culture. [Para 6.3(ii)]

13.5.5. Operation, maintenance and tolling contract have been introduced by the NHAI for the National Highways entrusted with them; similar concepts are also to be started for the National Highways with the PWDs of the States / UTs. [Para 6.3(iii)]

13.5.6. Concept of corridor management, comprising of management of the road section including engineering and non-engineering aspects are to be introduced for proper management and maintenance of National Highway sections. [Para 6.3(iv)]

13.5.7. Necessary steps are required to be taken for enforcement of the various provisions of the Control of National Highways (Land & Traffic) Act, 2002 for speedy and safe movement of traffic on National Highways. [Para 6.3(v)]

13.5.8. The annual fund requirement for maintenance and repair of National Highway network has been estimated as about Rs. 2,280 crore per year as against the available fund of about Rs. 800 crore per year. Accordingly, the fund requirement towards M&R of NHs has been assessed as Rs. 11,400 crore for the 11th Plan. The estimated fund requirement for maintenance of State Roads is about Rs. 6,000 crore per year. [Para 6.4]

13.5.9. The 12th Finance Commission, inter-alia, decided to provide an annual central grant of Rs. 3,750 crore over the period 2006-10 for the country as a whole in addition to the normal expenditure, which the States are expected to incur on maintenance of Roads and Bridges. The element of grant should be spent on non-salary maintenance items for roads and bridges. While the distribution of the grant element between different categories of roads would rest with the state government, it is hoped that some rational criteria would be evolved for allocation between the two main department's viz. PWDs and Rural Development

Department/ Panchayat Department for the roads under their respective jurisdiction. [Para 6.5]

13.5.10. There is lack of accountability for performance by the road agencies under the pretext of inadequate funds being given for road maintenance. There is virtual absence of an efficient planning and management system for roads. A large percentage of available funds is spent on labour gangs and their productivity is on the decline. There is need to establish a Road Management Unit at the Headquarters of the PWDs of States / UTs. Pavement Management System (PMS) and Bridge Management System (BMS), should be used initially for National Highways and State Highways for scientific assessment of maintenance requirements, and a simplified weightage system should be instituted for prioritisation of maintenance interventions for Major district Roads (MDRs) that should involve only minimal data on road inventory and traffic as a pilot scheme. For arrangements for collection / storage / retrieval / analysis of data, the output and prediction models should be available online and that GIS would be very helpful in this regard. [Para 6.6]

13.6. Environmental & Social Aspects

13.6.1. Apart from strict emission norms for new vehicles, attention has to be paid for regular maintenance and inspection of vehicles to ensure sustained emission performance. The automobile industries and vehicle operator should act in unison to bring about improvements in this direction. [Para 7.1.2]

13.6.2. The actions which can go a long way in effectively tackling the environment and social impacts resulting from upgradation of road projects are;-

(iv) Creation of special cells in the MORT&H/NHAI/PWDs of States / UTs to coordinate all activities related to environmental impacts of highway projects.

(v) Incorporation of the social dimensions of resettlement and rehabilitation of affected people in all highway projects involving displacement of people at the project preparation stage itself and implementation of proper R&R plan before execution of works.

(vi) Removal of encroachments on NH/SH & MDR land and to prevent future encroachments.

(iv) Drawing up of a Corridor Management Plan for major state highways to tackle the problems of ribbon development, encroachments, uncontrolled access and poor safety.

(v) Control on roadside advertisements to preserve the visual aesthetics.

(vii) Recycling of existing pavements to reduce the need for more road building aggregates.

(viii) Promotion of use of waste materials such as fly-ash and copper slag, etc.

(xi) Use of bio-engineering techniques for protection of slopes in hill areas and reducing risk of landslides.

(xii) Implementation of the Control of National Highway (Land & Traffic Act), 2002 for improved traffic management and control of access on National Highways.

(xiii) Upgradation of vehicle technology to meet the future emission standards laid down by the Government.

(xiv) An effective Inspection and Maintenance programme of in-use vehicles.

[Para 7.4]

- 13.6.3. There is urgent necessity to undertake research on conservation of energy with special reference to its impact on environment. Further, efforts for containment of air and noise pollution needed to take up during the next 5 years are;-
6. Use of marginal materials and development of new technologies for saving energy and materials in road construction.
 7. Development of relationship between traffic and air pollution for different scenario such as Terrain, Traffic Volume, Traffic mix, vehicle speed, speed restrictions, road width & conditions, roadside features, etc.
 8. Need for developing environmental friendly methods of construction.
 9. Development of air and noise pollution model for Indian conditions.
 10. Development of mitigation techniques to reduce air & noise pollution.

[Para 7.5]

13.6.4. While acquiring land for road projects, provision should be made for acquiring land for providing wayside amenities. In order to avoid encroachments, the encroachers should be dealt severely by making it a cognizable offence. The powers given to the Highway Administrations under the Control of National Highways (Land & Traffic) Act, 2002 needs to be suitably supplemented by proper institutional arrangements and supporting structure including providing actual support of local administration at the field level to make the enforcement of the provisions under the Act effective. [Para 7.6]

13.6.5. The areas requiring critical considerations are;-

- a) Need for policy on utilization of right of way (ROW) of National Highways.
- b) Study the implementation of various provisions of the Control of NH (Land & Traffic) Act, 2002, its effectiveness and the modifications required.
- c) Need to establish guidelines for Asset Management inventories, creation and updating of relevant records.
- d) Need for developing intervention criteria for maintenance / rehabilitation / disposal of highway assets.
- e) Need to develop norms for depreciation of road assets to establish the market value of a road stretch. This will be quite relevant for BOT/Annuity projects.
- f) Need to develop norms for road user participation in highway asset management. This aspect will gain importance once GQ/NHDP will be tolled and road user will demand quality service for their payments.
- g) Need to develop norms for establishing ROW boundaries understandable to Engineers for effective land management.
- h) Establishing norms for setting up wayside amenities for all income group road users.
- i) Need to study impact of ribbon development on speed, accidents & road capacity. Need to study impacts of road access on speed, accidents and feasibility of paying charges for access denial / permission on road capacity.

13.7. Capacity Building of Implementing Organization and Human Resource Development

13.7.1. The formulation of policy and planning and decision support system requires an adequate and up-to-date database which is lacking at present. This area requires immediate attention for its improvement. Necessary arrangements are to be made both in personnel and in computer software and hardware for creation and regular updation of the database.

13.7.2. The Department of Road Transport & Highways should continue its efforts for developing design standards, specification and encourage research works for roads and bridges so as to serve as an apex institution in technical excellence in this field. In this connection access to international literature, know-how and training is essential. Specialisation should continue to be one of the hallmarks of this organisation in guiding the development of National Highways and providing

support for development of technology in the States. The project works covering survey and investigations, detailed engineering of the development works can be looked after by the department's Regional Offices (ROs) for effective monitoring of the task being undertaken by the State PWDs. Similarly, the ROs should be repository of cost data bank of rates of various items of work. In order to achieve all these tasks the ROs should be strengthened with delegation of appropriate power for both the administrative and financial side for approval of works as well as power of outsourcing of some of their activities. [Para 8.1]

- 13.7.3. The NHAI must possess within its permanent staff, sufficient number of technical officers who effectively oversee its mandate. It is also necessary for the staff members to test check quality of projects preparation by the Consultants' team and supervision during construction. The institutional strengthening measures to restructure NHAI to accord different expertise for raising the resources, implementation and management of National Highways, etc. would considerably help it in improving implementation of projects. Deputation of the officers from the Department of Road Transport & Highways and the State PWDs to NHAI could be of considerable mutual benefit. NHAI need to prepare carefully worked out business plan for development, maintenance and operation of National Highways entrusted to them for proper utilisation of the resources made available to them. [Para 8.2]
- 13.7.4. The PWDs of the State / UTs need to be reoriented to the needs of current emphasis on private sector participation and implementation of large scale projects for which assistances are being sought from multilateral funding agencies. The account codes and works manuals of the State PWDs need review in the light of procedural changes made at the Central level to keep up with the latest technologies. There should be proper synchronization of the workings of the procedures and systems at the Central and State levels. Establishment of separate organization for implementation of the works on National Highways, done by many State PWDs, needs to be emulated by all the Governments of States / UTs. These Governments should develop these National Highways departments by posting the officers having experiences only in Roads and Bridge works. These Governments may also adopt a policy of allowing the engineers of the PWDs to take up jobs with the contracting and consulting organizations both in public and private sectors for a fixed tenure and retain lien with the parent department; such practices are already being followed by some states like Rajasthan and Gujarat. [Para 8.4]
- 13.7.5. There is urgent need to train skilled and unskilled manpower for all the stakeholders of the highway projects to keep pace with the technological developments taking place world over and to meet manpower requirements. Generating public awareness and sensitizing them about project benefits may also enable encountering minimum resistance / bottlenecks from community levels during project implementation and this may possibly form a part of formal endeavour during project planning and report preparation stage. [Para 8.5.1]
- 13.7.6. Appropriate training arrangements are required to be made for increasing the number of Highways Engineers and other professionals. It is also essential to create awareness among the highway engineers regarding the technological developments world over. The training needs, involving trainings in engineering disciplines, project management techniques, financial management, operation and management of highways, etc., should be imparted during entry in services, at job sites and through periodic in-service refresher courses. These are applicable for contractors and consultants also. The engineering and technical institutions are to be encouraged and incentives given for attracting students in highway engineering profession. The association of these institutions is also required for providing training to the new entrants as well as in-service engineers. The R&D Institutions shall be supported by the industry for funding and Industry shall define their needs to reap the benefits of the association. The R&D staff shall be given opportunities to get exposure of construction industry and vice versa so that each can understand the others needs. [Para 8.5.2]

- 13.7.7. NITHE may consider entering into MOUs with the international and national training / academic and research institutions to provide the institutional support. It should also come out with a comprehensive booklet indicating the various areas of training for different levels of highway engineers, duration and course contents, and it should function as a repository of documentation of all major projects for future lessons. For augmenting the activities of NITHE all the departments dealing with roads should support the NITHE by sending adequate number of persons for training and also in financial terms by paying annual contribution. [Para 8.5.3]
- 13.7.8. A portion of the CRF can be earmarked for training, which may be supplemented by providing a small percentage (say 0.25 %) of the project cost for training of departmental personnel. An outlay of Rs. 50 crore has been suggested for training during the 11th Five Year Plan. [Para 8.5.4]
- 13.7.9. There are requirements for strengthening of existing training centres such as CRRI, NITHE and State level training institutes by providing adequate resources, and creation of a dedicated fund which can be generated by earmarking some percentage in the budget for training activities. [Para 8.5.5]

13.8. Domestic Construction Industry and Consultancy Organization

- 13.8.1. The domestic contracting industry has to gear up for the implementation of further phases of NHDP like NHDP Phase-III, V and VI, which will involve bigger package size than were used in NHDP Phase-I and Phase-II. The implementation of the joint venture with foreign contractors has not proved to be very encouraging. It has been found that many foreign contractors have not performed as per expectations and there have been contractual problems. [Para 9.1.(iii)]
- 13.8.2. The shortage of trained technical manpower and quality equipment with the contractors has been felt. There is also a need for augmenting the financial resources of the contractors. [Para 9.1.(iv)]
- 13.8.3. Given the scale of highway investments envisaged in the next 10 years, a quantum jump in contractor capacity is needed. Therefore, conditions for the healthy growth of the domestic contractors should be created and support from foreign contractors procured. [Para 9.2(i)]
- 13.8.4. The States / UTs need to devise packages of different sizes in respect of state Highways so as to provide space for growth of different categories of contractors. [Para 9.2.(ii)]
- 13.8.5. The current policy of providing mobilization advance and equipment advance to the contractors free of interest should continue. [Para 9.2.(iii)]
- 13.8.6. The system of dispute avoidance and resolution needs to be further strengthened through joint consultation. [Para 9.2.(iv)]
- 13.8.7. The measures taken by the State PWDs by way of instituting Standard Bidding Documents, supervision of works through independent engineering consulting firms and allowing import of equipment free of customs duties and taxes should be implemented expeditiously. [Para 9.2.(v)]
- 13.8.8. There is need for improving the business environment for growth of the contracting industry including entry of international contractors so as to improve technology transfer in construction methodology and equipment use; some

system of grading of projects and contractors implementing them should be evolved. [Para 9.2.(vi)]

13.8.9. The Consultancy sector, which primarily started about 25 years ago as a result of the implementation of the Externally Aided Projects, is now required to play a vital role with the decision to take up the future phases of NHDP mainly through PPP route. The services required to be delivered by the Consultants either to the Government or to the Concessionaires would be mainly for preparation of feasibility reports, financial & legal matters, role as Independent Engineer and for supervision of works. A system of internal quality audit by the consulting companies should be considered so as to ensure that the projects delivered by their project units have been test checked before it is passed on to the client. A regular interaction and more effective monitoring of the task by the client alone will help in improving the performance of the consultants. A system of quality assurance and quality audit for the consultants work including instituting a system of grading the firms and keeping a track record of their past performance need to be introduced. The specialized training and academic institutions in the country should be utilized by the consulting firms to carve out special training modules. There is need to encourage formation of joint ventures with international firms for improvement of capabilities especially in the areas where domestic expertise is still lacking. The system of evaluation and selection of consultants must provide for a conscious encouragement to small sized and new firms. Some system of performance evaluation of consultants by some independent professional agencies could be considered. [Para 9.3]

13.8.10. The policy of the Government for facilitating use of sophisticated machinery in the highway sector in the wake of intensive mechanization in development and maintenance activities through measures such as exemption of import custom duty etc. and also exemptions from custom and excise duties being granted in case of the projects funded by the World Bank and Asian Development Bank, has given a boost to the domestic industries. The emphasis will now be required to boost the local industry for manufacturing of highway equipments. Further, the concept of "Equipment Bank" in the private sector regarding leasing of equipments needs to be encouraged. [Para 9.4]

13.8.11. There is necessity for developing low cost indigenous equipments and machinery for projects on lower category of roads such as Rural Roads etc., so that the projects could be implemented within reasonable costs and through smaller contractors. Indigenous materials including waste materials / by products may be progressively used without compromising with the functional requirements, quality and long term performance criteria. For this purpose the concerned waste producing industry / concerned Ministry may take initiative of conducting R&D in consultation with the M/o S, RT&H. In order to promote development of indigenous machinery and materials for road construction and maintenance, Government should create an environment to encourage private sector participation. [Para 9.5]

13.9. Mobilization of Resources

13.9.1. The sources of financing of National Highways are Government budget, fee / toll on bridges, Central Road Fund. [Para 10.1]

13.9.2. For State Roads, an amount of about Rs. 10,000 crore is likely to be available for SHs and MDRs out of Central Road Fund (CRF) during the 11th Five Year Plan. [Para 10.2.1]

13.9.3. For commercially projects, it should be possible to attract reasonable finances from the market based on experience of some of the recent initiatives by the States. Such States may continue with the strategy of setting up of Special Purpose Vehicles in which State Government, EPC contractor and O&M contractor can participate. [Para 10.2.2]

- 13.9.4. Considering the fact that the budgetary resources for State Roads are likely to be limited, a present generation road fund dedicated to roads may be set up by the States, which may provide substantial resources with clear norms for apportionment, involves various stakeholders, with possible sources of funding from road user charges, tolls, agricultural cess, additional sales tax on diesel and petrol, etc. [Para 10.2.3]
- 13.9.5. The budgetary allocations for road sector should be a certain minimum percentage of the annual plan of the State / UT and provisions under CRF, E&I, PMGSY etc. should not be considered under this. Bulk of this budget provision should be for State Highways and Major District Roads comprising the Core Network. [Para 10.3]
- 13.9.6. The strategy of implementation of projects with external assistance should be continued for some more time for the State Roads. The effect of borrowing of funds by States from multilateral lending agencies need to be studied and if there is reluctance of State Governments to avail such loans, alternative strategies to tap other financial resources should be explored. [Para 10.4]
- 13.9.7. Tapping of some fund from project beneficiaries could also be done. [Para 10.5]
- 13.9.8. The current norms for Calamity Relief Fund need review for its modification, as this do not provide for permanent restoration of damaged infrastructure, so that the damaged assets could be restored to their original condition. [Para 10.6]
- 13.9.9. Since broadening of the country's revenue base to meet the infrastructure needs is not achievable shortly, highway users themselves would need to be involved directly or indirectly in mobilization of resources. Re-orientation of institutional arrangements by improving planning process to identify commercially viable projects, cutting down on initial project costs through value engineering principles of phased development, enhancing transparency of financing arrangements through PPP approaches, obtaining supports of road users and trucking associations are suggested. [Para 10.7]

13.10. Development of Roads in the North-Eastern Region

- 13.10.1. The North-Eastern region has the potential to emerge as a strategic base for domestic and foreign investors to tap the potential of the contiguous markets of China, Myanmar, Bangladesh, Lao PDR, Thailand, Vietnam, Cambodia, Malaysia, Indonesia and beyond. [Para 11.1]
- 13.10.2. Roads serve as the principal mode of transport for movement of goods and services, with a share well over 90% of the total movement by surface transport in the region. The total road network now stands at 1,02,000 km out of which 7 % are National Highways, 20 % are State Highways and Major district Roads and rest are Rural Roads providing links to villages. [Para 11.2]
- 13.10.3. The data on State-wise distribution of the primary and secondary road network including their condition demonstrates that the length of State Highways in the region is much less as compared to that of the National Highways. Therefore, there is necessity for the Government of India to assist the North-Eastern States in upgrading certain District Roads as State Highways. Further, the riding quality and condition of main roads is generally fair to poor with only about 10% of the roads are reported to be in good condition and about 50% of the network having poor riding quality, with NHs being in comparatively better situation as compared to SHs and MDRs. [Para 11.4.1]
- 13.10.4. Studies conducted have shown that only about 10% of the SHs are structurally adequate to carry permissible legal single axle loads of 10.2 tonnes. Financial constraints prevent provision of significant strengthening overlays. The

problem is compounded due to overloading of trucks resulting in accelerated deterioration of roads. [Para 11.4.2]

- 13.10.5. Presence of a large number of semi-permanent timber (SPT) bridges, particularly in the States of Assam, Tripura, Arunachal Pradesh and Sikkim, constitute weak link in the movement of modern vehicles. Till such time these SPT bridges are replaced, their proper maintenance is crucial. Further, the initiatives taken by State Government of Assam for design review of the permanent bridges based on pre cast systems to save on costs and time of execution need to be shared with the entire country. [Para 11.4.3]
- 13.10.6. The replacement cost of existing SHs and MDRs in the region is assessed to be about Rs. 6,000 crore and these assets are becoming a victim of negligence due to ineffective maintenance on the ground, lack of funds, soil erosion / land slide problems, inadequate road crust, overloading of vehicles, and lack of planning for maintenance activities by the road agencies in efficient utilization of available funds. [Para 11.4.4]
- 13.10.7. The “Road Development Plan Vision : 2021” of the M/o S,RT&H can serve as a guiding reference for formulating a comprehensive master plan for the region as a whole. Further, it is necessary to work out a fund requirement for filling up the existing road infrastructure gap, upgrading of existing roads and replacement of old timber bridges considering the prioritization under regional linkages / connectivity to State capitals /international routes including Asian Highways, intra-State connectivity to District Headquarters, escape routes for areas posing as barriers to development, connectivity to railways and transshipment points (river terminals) of IWT, harnessing of mineral and other resources, opening up of isolated pockets. [Para 11.5.1]
- 13.10.8. The sources of investment for the State Roads are Central Road Fund, DONER fund and external assistance. In view of the current low level of development, private sector financing would take some more time and therefore basic financing has to be from the Government. At best some pilot projects of operation and maintenance of important state highways and national highways could be explored after thorough study of their commercial dynamics and interaction with the industry and prospective entrepreneurs. [Para 11.5.2]
- 13.10.9. Dedicated State level road funds specifically for maintenance need to be set up. The possibility of applying performance based maintenance contracts (which are being executed by NHAI and some other State Governments such as Andhra Pradesh, Karnataka etc.) in NE region may be examined and a few pilot projects may be taken up gradually. The issue of gang labour productivity and options for improvement is another area of concern for technical support and training of small contractors and departmental personnel. [Para 11.5.3]
- 13.10.10. The Department of Road Transport & Highways approves the projects / schemes of improvement of State Roads under CRF, under the schemes of Economic Importance and Inter State Connectivity. Major initiatives taken for development of the national highways benefiting the NE Region include development of the east-west corridors, initiatives under NHDP Phase III B. Besides this the SARDP-NE is being taken up to provide NH connectivity for 34 district headquarters, provide road connectivity to backward and remote areas to boost socio-economic development and also to improve some of the important roads of strategic importance. [Para 11.6]
- 13.10.11. Institutional strengthening and human resource development of the PWDs of States / UTs and BRO need to be taken up keeping in view the use of modern technology, new specifications, mechanized construction, etc., and the challenge of accelerated development works. The lack of big and good contractors in these areas is also a serious handicap. A review of strength and weaknesses of the existing procedures, rules and regulations, delegation of power, present method

of implementation, opportunities forthcoming and threat from external environment is recommended. The training needs assessments of the technical officers in these states are required to be made. A regional level training centre supported with State level inputs and network with academic and engineering institutions needs to be set up in the NE region, and till that time such a centre is set up most intensive use of NITHE is essential. [Para 11.7]

13.11. Investment Needs

13.11.1. National Highways:-

The outlay required for the National Highways for the 11th five Year Plan (2007-2012) has been assessed as Rs. 1,21,758 crore during the 11th Five Year Plan (2007-2012) with break ups as given below:-

S. No.	Scheme	Amount in Rs. crore
A.	Implementation of NHDP	
	1.Cess	36,589
	2.Externally Aided Projects	4,454
B.	Implementation of SARDP-NE	15,000
C.	Implementation of NH(O) works	
	1.By State PWDs	20,000
	2.By BRO	2,500
D.	Central Sector Schemes for State roads	
	1.Roads of Economic Importance & Inter-State Connectivity	900
	2.State Roads	500
E.	Other schemes like R&D, machinery, development of IT, etc.	200
	TOTAL:	80,143
F.	Internal and Extra Budgetary Resources	41,615
	GRAND TOTAL	1,21,758

Further, it has been assessed that Rs. 3,108 crore would be available during the 11th Plan period for implementation of NHDP from the surplus of the user fee collected by NHAI after meeting the requirement of funds for maintenance of the NH sections and repayment of the Government loans. The share of private sector investment during the 11th Five Year Plan is estimated to be Rs. 87, 735 crore. [Para 12.1]

13.11.2. State Roads:-

The proposed programme envisages a financial outlay of Rs. 1,00,000 crore for the 11th Five Year Plan with possible element of private finance as Rs. 32,000 crore. [Para 12.2]

* * * * *

No.18/2/2005-Tpt
Government of India
Planning Commission
(Transport Division)

Yojana Bhavan, Sansad Marg
New Delhi, dated 10th April, 2006

**Subject: Constitution of Working Group on Roads in the Eleventh Five-Year Plan
(2007- 2012)**

In the context of the formulation of the Eleventh Five Year Plan, it has been decided to set up a Working Group on Roads. The composition of the Working Group will be as follows:

- | | | | |
|------|---|---|----------|
| (1) | Secretary, D/o RT&H | - | Chairman |
| (2) | Chairman, NHAI | - | Member |
| (3) | DG (RD), D/o RT&H | - | Member |
| (4) | AS & FA, D/o RT&H | - | Member |
| (5) | Adviser (Tpt.), Planning Commission | - | Member |
| (6) | Adviser to Deputy Chairman | - | Member |
| (7) | DG, Border Roads Organisation | - | Member |
| (8) | Director, CRRI | - | Member |
| (9) | Additional Member (Works), Railway Board | - | Member |
| (10) | Executive Director (Traffic – Commercial),
Railway Board | - | Member |
| (11) | Representative from Ministry of Tourism | - | Member |
| (12) | Representative from Department of Expenditure,
Ministry of Finance (Shri V.K. Lakhanpal, Director) | - | Member |
| (13) | Representative from DONER | - | Member |
| (14) | Representative from Ministry of Environment &
Forests | - | Member |
| (15) | Adviser (Tpt.), North Eastern Council | - | Member |
| (16) | Principal Secretary, PWD, Government of Gujarat | - | Member |
| (17) | E-in-C, PWD, Government of Haryana | - | Member |
| (18) | E-in-C, PWD, Government of West Bengal | - | Member |
| (19) | E-in-C & Secretary, PWD, Government of Mizoram | - | Member |
| (20) | E-in-C, PWD, Government of Karnataka | - | Member |
| (21) | CE (NH), Government of Rajasthan | - | Member |
| (22) | Representative from CIDC | - | Member |
| (23) | Representative from Confederation of Indian Industry | - | Member |
| (24) | Representative from Consulting Engineering Services | - | Member |
| (25) | Representative from L&T | - | Member |
| (26) | Representative from Punj Lloyd Ltd. | - | Member |
| (27) | Representative from M/s RITES | - | Member |
| (28) | Representative from C&C Construction Pvt. Ltd. | - | Member |
| (29) | Representative from Hindustan Construction Co. Ltd. | - | Member |
| (30) | Representative from IDFC | - | Member |
| (31) | Chief Engineer (Plg.), D/o RT&H | - | Convener |

II Terms of reference

1. To critically review the financial and the physical progress of the development of the entire road network both in the Centre and State sectors during the 10th Five Year Plan, highlighting the constraints faced and the remedial actions required to be taken in the context of the preparation of the 11th Five Year Plan.
2. Keeping in view the experience acquired from NHDP and launch of the expanded programme for highway development, recommend a policy framework for the development of roads in the 11th Five year Plan and a perspective for the next decade beyond 11th Plan – Vision 2021 – taking cognizance of various issues, including inter-alia the following :
 - i) need for providing world class infrastructure with a view to improving mobility with safety;
 - ii) need for enhancing the capacities of various implementing agencies in order to achieve time targets;
 - iii) need for balanced development of the entire grid of road network comprising of NHs, SHs, MDR, ODRs etc.;
 - iv) prioritization of development work in view of a large number of deficiencies in the existing network with a view to consolidating the network;
 - v) need for maintenance and preservation of existing assets;
 - vi) need for creating an environment conducive to public private partnerships, in view of the increasing role of private sector;
 - vii) need for upgradation of technology in order to improve quality of construction of roads and reduce construction time;
 - viii) energy conservation and environment protection;
 - ix) road safety and traffic management in view of increasing emphasis on speed and mobility;
 - x) need for integrated road-port linkage development programme to ensure faster transportation of traded cargo, especially container cargo.

3. To formulate a programme for development of roads for the Eleventh Five Year Plan indicating monitorable physical targets, financial outlays and their yearwise phasing during this Plan period. While formulating the Plan, various aspects should be examined including inter-alia the increasing role of the private sector, the emerging traffic demands on high traffic density road corridors and the development needs to meet these demands at economic costs, the need for improving mobility and speed of goods and passenger by higher category roads, the existing deficiencies of the road system and remedial measures and safety considerations for road transport operations.
4. To review the existing arrangements including the increasing role of the private sector for funding the development of various categories of roads and suggest innovative measures for augmentation of resources both for construction and maintenance of roads. To evolve a toll policies keeping in view the overall objective of reducing the cost of transportation.
5. To review the existing norms and criteria for maintenance and repairs for all categories of roads, assess actual requirement of funds for each year of the Eleventh Plan and recommend measures to meet such requirements. To create a conducive environment for public private partnership for maintenance operations especially, in respect of high density corridors.
6. To review the type of machinery and material presently being used in road construction and maintenance and suggest improvements, including steps needed for growth of road equipment industry in the country in order to deliver quality output in a time bound manner.
7. To review the existing manpower training arrangements at the central and State level and suggest improvements, keeping in view the need for construction of higher category roads including expressways.
8. To review the status of various implementing agencies involved in the development and maintenance of roads in terms of their capability to deliver

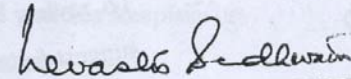
timely outputs and to recommend measures, including outsourcing and institutional for augmenting their implementation capacities.

9. To suggest measures for effectively monitoring the progress of construction and maintenance of roads. Also to evolve a mechanism to ensure that funds allocated for maintenance of roads in the 12th Finance Commission are optimally utilised.
10. To evolve a strategy for ensuring optimal utilization of the increasing Central Road Fund accruals going as Additional Central Assistance for the development of State road network.
11. To review the status of domestic construction industry in terms of its capability to absorb, utilize and augment the technology being presently used for road and bridge construction.
12. To review the existing status of research and development in roads and to suggest future directions and thrust areas in R&D programmes, including those for road safety.
13. With increased emphasis on speed and mobility, recommend road safety measures including setting up of a dedicated organization for the same detailing the funding, implementation and monitoring aspects to reduce the rate of accidents. To establish synergies with the Ministry of Health in managing accidents by setting up trauma centers on GQ and NS, E-W Corridor in the first phase.
14. To assess environmental impact and suggest measures to reduce the adverse environmental impact of construction of road, particularly in the hilly areas.
15. To suggest measures for effective land management, including provision of wayside amenities, control on ribbon development and prevention of encroachments alongside roads in the interest of optimum utilization of the road capacity.

16. To study the best practices adopted worldwide and to draw lessons for the Indian road industry focusing on public private partnerships; and

17. ^{Convenor} To examine any other matter considered important by the Working Group.

- III. The Chairman of the Working Group may co-opt officials or non-officials as Members and constitute sub-groups, if considered necessary. Representatives nominated, if any, by the Central Ministries/Organisation should not be below the level of Joint Secretary.
- IV. The non-official Members of the Working Group will be paid TADA at the rates applicable for Grade-I officers of the Central Government for attending meetings of the Working Group.
- V. The Working Group will submit its report to the Planning Commission by 31st August, 2006.

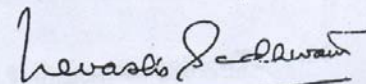


(Urvashi Sadhwani)
Director (Transport)

Chairman and Members (including Convenor) of the Working Group.

Copy to :

1. PSs to DCH/MoS (Plg.)/Members/Member-Secretary, Planning Commission
2. Prime Minister's Office (Shri Javed Usmani, Joint Secretary), South Block, New Delhi
3. For general information in Yojana Bhawan through e-mail.



(Urvashi Sadhwani)
Director (Transport)

Government of India
Ministry of Shipping, Road Transport & Highways
(Department of Road Transport & Highways)

Transport Bhawan
No.1, Parliament Street
New Delhi-110001

No.NH-22011/2/2006-P&M

3rd July, 2006

ORDER

Sub: Constitution of the Working Group on Road Sector for 11th Plan (2007-12).

In the context of the formulation of the Eleventh Five Year Plan, it has been decided to constitute following Sub-Groups:-

- (a) Sub-Group on National Highways
- (b) Sub-Group on State Roads
- (c) Sub-Group on R&D and Highway Safety
- (d) Sub-Group on Public Private Participation

2. The composition of the respective Sub-Groups is at Annexure-I
3. The Terms of Reference of different Sub-Groups are at Annexure-II.
4. The Sub-Groups will forward their reports to Chief Engineer (Planning & Monitoring) & Member Secretary of the Working Group on Road Sector, Ministry of Shipping, Road Transport & Highways, Transport Bhavan, New Delhi by 31st July, 2006.

Encl: As above.


(K.R. Gatti) 3/7/06

Under Secretary to the Govt. of India
Tel. Fax No.011-23710450

To

1. Chairmen of the four Sub-Groups
2. All Members of the different Working Groups

Copy also to: PS to Secretary (RT&H)/ PPS to DG(RD)/CE (P&M)/DS(A)/Estt.II
Section/Guard File.


(K.R. Gatti) 3/7/06

Under Secretary to the Govt. of India
Tel. Fax No.011-23710450

Ministry of Shipping, Road Transport & Highways (Department of Road Transport & Highways)

Scheme-wise breakup of 10th Plan (2002-07) outlay year wise

(Amount in Rs. Crore)

Sl No.	Scheme	Total Outlay for Tenth Plan 2002-07	Annual Plan																	Total Outlay Allocated from 2002-2007 BE
			(2002-03)			(2003-04)			(2004-05)			(2005-06)			Total Outlay/Exp.from 2002-2006			(2006-07)		
			Outlay		Expend.	Outlay		Expend.	Outlay		Expend.	Outlay		Expend.	Outlay		Expend.	Outlay	Expend. (upto 31.01.07)	
			BE	RE		BE	RE		BE	RE		BE	RE		BE	RE				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Col. 4+7+10+13+19
1	MINISTRY																			
	EAP	3200.00	154.80	68.70	9.54	60.80	25.00	0.02	113.50	30.00	2.65	200.00	4.00	3.34	529.10	127.70	15.55	0.00	0.00	529.10
	NH(O)	8664.00	1440.00	1452.28	1425.20	1544.00	1544.00	1500.57	1482.00	1629.50	1446.00	1427.30	1577.00	1570.34	5893.30	6202.78	5942.11	1550.30	1008.99	7443.60
	Sub total	11864.00	1594.80	1520.98	1434.74	1604.80	1569.00	1500.59	1595.50	1659.50	1448.65	1627.30	1581.00	1573.68	6422.40	6330.48	5957.66	1550.30	1008.99	7972.70
2	NHAI																			
	EAP	10789.50	2003.00	1503.00	1503.00	2294.74	1448.90	1448.90	3210.00	2000.00	1599.58	3000.00	2950.00	2950.00	10507.74	7901.90	7501.48	1978.00	1000.00	12485.74
	CESS / INVESTMENT	10500.00	2000.00	2000.00	2000.00	1993.00	1993.00	1993.00	1848.00	1848.00	1848.00	3269.74	3269.74	3269.74	9110.74	9110.74	9110.74	6407.45	5800.00	15518.19
	NHDP-III	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1400.00	700.00	700.00	1400.00	700.00	700.00	110.00	50.00	1510.00
	Sub total	21289.50	4003.00	3503.00	3503.00	4287.74	3441.90	3441.90	5058.00	3848.00	3447.58	7669.74	6919.74	6919.74	21018.48	17712.64	17312.22	8495.45	6850.00	29513.93
3	BRDB																			
	Works under BRDB	950.00	145.00	145.00	145.00	210.00	210.00	210.00	210.00	210.00	210.00	415.00	415.00	321.39	980.00	980.00	886.39	584.00	267.15	1564.00
	Strategic Roads under BRDB		10.50	13.25	10.25	19.50	24.50	24.50	19.50	19.50	19.50	71.00	71.00	49.88	120.50	128.25	104.13	74.17	43.77	194.67
	Sub total	950.00	155.50	158.25	155.25	229.50	234.50	234.50	229.50	229.50	229.50	486.00	486.00	371.27	1100.50	1108.25	990.52	658.17	310.92	1758.67
4	EI & ISC																			
	E&I for States	500.00	95.00	95.00	25.09	95.00	95.00	64.52	92.00	92.00	16.88	162.05	162.05	86.09	444.05	444.05	192.58	162.06	21.21	606.11
	E&I for UTs	0.00	5.00	5.00	0.00	5.00	5.00	0.00	4.00	4.00	0.00	8.54	8.54	0.00	22.54	22.54	0.00	8.55	0.00	31.09
	EI&ISC for State Roads																	110	0.00	110.00
	Sub total	500.00	100.00	100.00	25.09	100.00	100.00	64.52	96.00	96.00	16.88	170.59	170.59	86.09	466.59	466.59	192.58	280.61	21.21	747.20
5	Misc.																			
	Strengthening of PIC	1.00	0.20	0.20	0.20	0.20	0.10	0.00	0.20	0.20	0.07	0.30	0.05	0.00	0.90	0.55	0.27	0.00	0.00	0.90
	Travel Expenses	20.00	1.00	0.40	0.40	1.02	0.40	0.33	0.50	0.50	0.37	1.00	0.92	0.70	3.52	2.22	1.80	1.25	0.23	4.77
	Other Charges		1.00	0.10	0.03	0.50	0.10	0.00	0.40	0.40	0.00	1.00	0.08	0.00	2.90	0.68	0.03	0.50	0.00	3.40
	Development of IT	20.00	4.00	2.50	2.50	5.00	3.00	1.81	3.00	3.00	0.29	6.00	3.00	1.86	18.00	11.50	6.46	6.00	0.31	24.00
	Strategic Roads under RW	50.00	1.00	1.00	0.00	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	0.00	0.00	0.00	1.50
	R&D Planning	20.00	3.00	2.00	1.75	3.00	2.00	0.19	7.90	7.90	0.12	4.85	4.85	2.95	18.75	16.75	5.01	6.00	0.43	24.75
	Training	10.50	1.50	0.50	0.43	12.00	11.00	10.61	1.00	1.00	0.49	1.50	1.50	1.06	16.00	14.00	12.59	1.50	0.48	17.50
	Machinery & Equipment	15.00	2.00	2.00	1.50	7.00	7.00	6.29	3.00	3.00	3.00	15.72	15.72	13.88	27.72	27.72	24.67	10.00	0.47	37.72
	Charged Expd.	50.00	5.00	5.00	5.00	5.00	5.00	3.71	5.00	5.00	0.03	5.00	5.00	4.05	20.00	20.00	12.79	5.00	1.86	25.00
	SARDP - NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	450.00	450.00	0.00	450.00	450.00	0.00	550.00	23.40	1000.00
	Strategic Roads in Arunachal Pradesh under MoD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	0.00	100.00	100.00	0.00	0.00	0.00	100.00
	Sub total	186.50	18.70	13.70	11.81	34.22	29.10	22.94	21.00	21.00	4.37	585.37	581.12	24.50	659.29	644.92	63.62	580.25	27.18	1239.54
	Total	34790.00	5872.00	5295.93	5129.89	6256.26	5374.50	5264.45	7000.00	5854.00	5146.98	10539.00	9738.45	8975.28	29667.26	26262.88	24516.60	11564.78	8218.30	41232.04
6	IEBR	247000.00	5592.90		5592.90	0.00		0.00	3300.00		0.00	8500.00	4082.00		17392.90	4082.00	5592.90	3500.00		20892.90

Ministry of Shipping, Road Transport & Highways (Department of Road Transport & Highways)
Scheme-wise Physical achievement during 10th Plan (2002-07) year wise

SI No.	Scheme	Total Outcome for Tenth Plan 2002-07	Annual Plan												Total Outcome achieved during 2002-2007	Achievmt. During 10th Plan
			(2002-03)		(2003-04)		(2004-05)		(2005-06)		Total Targets/Achi.from 2002-2006		(2006-07)			
			Targets	Achivmt.	Targets	Achivmt.	Targets	Achivmt.	Targets	Achivmt.	Targets	Achivmt.	Targets	Achivmt. (up to 31.01.07)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Col. 5+7+9+11+15	Col. 5+7+9+11+14
1	MINISTRY															
	I) Improvement of low grade section (Kms.)	0.00	27.00	11.50	27.00	25.60	3.00	20.55	0.00	10.00	57.00	67.65	10.00	16.08	83.73	83.73
	II) Widening to four lanes (Kms.)	800.00	40.30	26.40	49.00	35.85	48.00	36.80	27.00	32.00	164.30	131.05	37.00	15.05	146.10	168.05
	III) Strengthening of existing weak pavement (Kms.)	2000.00	638.78	580.28	566.00	702.81	617.00	627.84	755.00	869.00	2576.78	2779.93	527.00	378.27	3158.20	3306.93
	IV) Widening to two lanes (Kms.)	4000.00	751.10	610.12	576.00	554.58	670.00	535.98	982.00	811.00	2979.10	2511.68	901.00	643.17	3154.85	3412.68
	V) Improvement of riding quality programme (IRQP) (Kms.)	10000.00	4631.18	4833.00	4129.00	3496.62	3035.00	2966.15	2299.00	2419.00	14094.18	13714.77	1821.00	1038.21	14752.98	15535.77
	VI) Rehabilitation / Construction of Bridges (nos.)	300	95	134	109	123	184	81	136	90	524.00	428.00	120	52	480	548.00
	VII) Construction of Bypasses (nos.)	25	5	6	7	5	4	1	4	1	20.00	13.00	4	0	13	17.00
	VIII) Construction of Missing link(Kms.)	LS	0.00	0.00	0.00	0.00	1.25	0.00	5.00	0.00	6.25	0.00	10.00	8.20	8.20	10.00
2	NHAI															
	I) Improvement of low grade section (Kms.)		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	II) Widening to four lanes (Kms.)			391.36	2196.00	763.33	2896.10	2348.97	755.00	727.00	5847.10	4230.66	1284.00	428.00	4658.66	5514.66
	III) Strengthening of existing weak pavement (Kms.)															
	IV) Widening to two lanes (Kms.)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	V) Improvement of riding quality programme (IRQP) (Kms.)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VI) Rehabilitation / Construction of Bridges (nos.)		0	6	0	5	2	6	1	17.00	3.00	4.00	1	4	7.00	
	VII) Construction of Bypasses (nos.)		3	5	1	8	4	5	1	18.00	9.00	0.00	1	10	10	
3	BRDB															
	I) Improvement of low grade section (Kms.)	82.51	0.00	0.17	0.00	42.29	20.90	21.77	43.00	27.08	63.90	91.31	29.00	16.39	107.70	120.31
	II) Widening to four lanes (Kms.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00
	III) Strengthening of existing weak pavement (Kms.)	200.82	138.60	137.00	253.00	22.95	22.20	4.17	0.00	0.00	413.80	164.12	7.00	0.00	164.12	171.12
	IV) Widening to two lanes (Kms.)	528.92	124.98	100.00	125.00	116.65	162.00	183.28	131.00	171.08	542.98	571.01	256.00	106.74	677.75	827.01
	V) Improvement of riding quality programme (IRQP) (Kms.)	613.03	507.20	61.00	507.00	194.58	174.50	167.59	235.00	230.28	1423.70	653.45	266.00	172.60	826.05	919.45
	VI) Rehabilitation / Construction of Bridges (nos.)	LS	0	9	67	0	43	22	19	8	129.00	39.00	20	6	45	59.00
	VII) Construction of Bypasses (nos.)	LS	4	3	8	0	0	0	0	0	12.00	3.00	2	0	3	5.00
	VIII) Construction of Missing link(Kms.)	LS	0.00	0.00	0.00	0.00	0.00	0.00	6.00	0.00	6.00	0.00	9.00	8.00	8.00	9.00

Annexure-IV

World Heritage Sites/other sites- not connected with National Highways

Sl. No.	Name of World Heritage Site	Stretch upto which National Highway connecting to the site	Stretch which is presently not a National Highway	Name of the State
1.	Khajuraho	Jhansi-Ganj (NH 76 & 75)	Ganj-Khajuraho	Madhya Pradesh/Uttar Pradesh
2.	Bandipur	Mysore-Gundulpet (NH 212)	Gundulpet-Bandipur-	Karnataka/ Tamil Nadu
3.	Kanha.N.P.	Jabalpur-Bicchia (NH 12 A)	Bicchia to Kanha	Madhya Pradesh
4.	Madurai	Sirivilliputhur - Tirumangalam (NH 7)	Tirumangalam - Madurai	Tamil Nadu
5	Goa	Hubli-Dharwad (NH 4)	Dharwad-Londa-Goa	Karnataka/ Goa
6	Khajuraho	Satna-Ganj (NH 75)	Ganj-Khajuraho	Madhya Pradesh
7	Darjeeling	Siliguri-Matigara (NH 31)	Matigara-Darjeeling	West Bengal
8	Konark	Bubaneswar-Konark (NH 203)	Puri-Konark (65 km)	Orissa
9	Darjeeling	Kurseong-Ghoom (NH 55)	Kurseong to Ghoom (30 km)	West Bengal
10	Bandhavgarh	Katni-Bandhavgarh (NH 78)	Katni-Bandhavgarh (102 km)	Madhya Pradesh
11	Varanasi	Mohansarai-Mughal Sarai (NH2)	Mughalsarai to Varanasi	Uttar Pradesh

Details of Buddhist Sites- connectivity to National Highway

Sl. No.	Name of the Buddhist Site	State	Stretch of Road from National Highway with distance.
1	Sarnath	Uttar Pradesh	Sarnath is near Varanasi (8km)
2	Sravasti	Uttar Pradesh	Sravasti is about 35 km from Baharaich
3	Sankasya	Uttar Pradesh	Sankasya is 47 km away from Farrukhabad
4	Nalanda and Rajgir	Bihar	Nalanda and Rajgir are on Gaya-Bihar Sharif section of NH-82
5	Bodh Gaya	Bihar	Bodh Gaya is around 2 km away from Gaya-Dobhi section of NH-83
6	Vaishali	Bihar	Vaishali is near Muzaffarpur (36 km)
7	Sanchi	Madhya Pradesh	Sanchi is about 68 km from Bhopal
8	Ajanta	Maharashtra	Ajanta is about 60 km from Jalgaon.
9	Ellora	Maharashtra	Ellora is on Dhule-Aurangabad section of NH-211.
10	Kanheri Caves	Maharashtra	Kanheri Caves are in Sanjay Singh Gandhi National Park in Thane district of Maharashtra.
11	Karla Caves	Maharashtra	Karla Caves are near Lonavala on Mumbai-Pune Section of NH-4.
12	Bhaja	Maharashtra	Bhaja site is near Lonavala about 12 km away from Mumbai-Pune Section of NH-4.
13.	Bhitar Kanika Sanctuary	Orissa	From NH 5 to the Destination.
14	Simplipal Sanctuary	Orissa	From NH 5
15	Nagarjun Konda	Andhra Pradesh	Nagarjun Konda is connected with State roads from Hyderabad-Vijaywada Section of NH-9 and Hyderabad-Bangalore section of NH-7 (150 km from Hyderabad)
16	Amravati	Andhra Pradesh	Amaravati is near Vijaywada (50 km)

17	Dharamshala	Himachal Pradesh	Dharamshala is connected with State Road from Pathankot-Palampur section of NH-20.
18	Tabo Monastery	Himachal Pradesh	Tabo is about 76 km from Khab on Shimla-Khab section of NH-22 and is connected with State roads
19	Namgayal Monastery	Himachal Pradesh	Namgayal Monastery is located in Dharamshala, which is connected with State road from Pathankot-Palampur section of NH-20.
20	Dhankar Monastery	Himachal Pradesh	Dhankar Monastery is about 108 km from Khab on Shimla-Khab section of NH-22 and is connected with State roads.
21	Monasteries of Leh	Jammu & Kashmir	Monasteries of Leh are connected with State roads.
22	Tawang	Arunachal Pradesh	Tawang is connected with State roads.
23	Lalitgiri, Ratnagiri and Udaigiri	Orissa	The National Highway leading to these sites is NH-5A connecting Paradeep Port with NH-5 (Bhubaneswar-Balasore section).
24	Dhauri	Orissa	Dhauri is near Bhubaneswar.
25	Pemyangtse	Sikkim	Pemyangtse is connected with metalled/non-metal road from Singtam on Gangtok-Sevoke section of NH-31A.
26	Rumtek Monasteries	Sikkim	Rumtek is around 1 km from Gangtok-Singtam section of NH-31A, which is identified for improvement under NHDP-III.
27	Puri	Orissa	New Jagannath Road connecting Rameswar on NH 5 to a point near Puri . Providing directly access to pilgrims coming from South to Puri.