Government of India
Ministry of Road Transport & Highways
12th Five Year Plan (2012-17)
Report of the Working Group on Central Roads Sector

1. Introduction

Working Group on Road Sector for the 12th Plan (2012-2017) was constituted under the Chairmanship of the Secretary, Ministry of Road Transport & Highways in April, 2011.

The Terms of Reference of the Working Group is at **Annex-1.**

The working Group constituted four 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) with Toll matters

Based upon the Reports of the above mentioned Sub-Groups and keeping in view the observations of the Steering Committee on Transport Sector during its meeting held on 14.10.2011 under the Chairmanship of Member (BKC), Planning Commission, the Report of the Working Group on Central Sector roads have been finalized.

2. National Highways

At present, National Highway network of about 71,772 km comprises only 1.7% of the total length of roads, but carries over 40% of the total traffic across the length and breadth of the country.

Considering the target growth rate of about + 9 %, it is estimated that the total target NH network of about 85,000 km may be considered as reasonable for the 12th Five Year Plan, for the development of the regions which are not connected by NHs.

3. Development of National Highways during 11th Five Year Plan (2007-12)

3.1. At present, out of 71,772 km of National Highways about 24% length is of 4-lane and above standard, 52% length is of 2-lane standard and 24% length of single and intermediate standard.

As on July, 2011, 28,740 km lengths of NHs were entrusted to NHAI, 38,629 km to State PWDs and 3,565 km to BRO. As more and more works are awarded under various phases of NHDP and subsequent phases of NHDP are taken up, additional length of NHs will be transferred from State PWDs to NHAI.

3.2. Progress of NHDP upto August, 2011

Phases	Total Length (km)	Length Completed (km)	Length under Imp. (km)	To be awarded (km)
I GQ,EW-NS corridors, Port connectivity & others	7,522	7442	80	
II 4/6-laning North South- East West Corridor, Others	6,647	5302	901	444
Upgradation, 4/6-laning Phase III (phase III A + III B)	12,109	2555	6173	3390
IV 2 - laning with paved shoulders	20,000	-	846	19154
V 6-laning of GQ and High density corridor	6,500	653	1984	3863
VI Expressways	1000	-	NIL	1000
VII Ring Roads, Bypasses and flyovers and other structures	700 km of ring roads/ bypass + flyovers	-	41	659

3.3. Physical Achievements under NHDP during 11th Five Year Plan

NHDP	Total length completed (km)*
NHDP Phase I	**604**
NHDP Phase II	**5040**
NHDP Phase III	**2587**
NHDP Phase V	**655**
NHDP Phase VII	**0**
Other Projects	**158**
Total	**9,044**

*Achievements upto Sept, 2011.

3.4. Special Accelerated Road Development Programme for North East including Arunachal Pradesh Package : -

- ✓ **Phase A including Arunachal Package –**
  SARDP-Phase A – total length – 4,099 km;
  Arunachal Package – total length – 2,319 km;
  Total length completed upto 31.3.2011 – 742 km; target for 2011-12 – 270 km;
- ✓ **Phase B -** Out of total length of 3,723 km 1610 km will be taken up for implementation in 12th Plan.

3.5. Special Programme for Development of Roads in the Left Wing Extremism (LWE) Affected areas: -

Phase I – Total length– 5,477 km

- ✓Target for completion – March, 2015
- ✓Length completed upto 31.3.2011 – 251 km
- ✓Target for completion for 2011-12 – 800 km
- ✓Balance 4,426 km to be completed by March, 2015

Phase II (Programme yet to be approved) – Total length– 8,014 km

To be completed by March 2017

3.6. Development of State Road segments in Orissa on the Vijayawada Ranchi route – Total Length – 600 km

- ✓ All the works under Vijayawada Ranchi route are likely to be awarded by March, 2012. The works are likely to be completed by March, 2015.

Physical Progress of Non-NHDP NHs during 11th Five Year Plan: -

Sl. No.	Category	Total completion of works from 2007-08 to 2010-11		2011-12	
		Target	Achv.	Target	Achv. (Upto Aug 11)
1	Missing Link (km)	59.4	55.3	-	-
2	Widening to 2-lanes (km)	4533	4379	1070	299
3	Strengthening (km)	3554	3950	1080	303
4	Improvement of Riding Quality (km)	7769	9321	1672	1228
5	Widening to 4-lanes (km)	301.5	267	104	23
6	Bypasses (No.)	32	13	7	0
7	Bridges /ROBs (No.)	518	388	129	17

3.7. Review of Financial Achievement for the 11th Plan

The year-wise details of allocations and expenditures / releases for the Central Sector Roads considering actual upto 2010-11 and targets for 2011-12 are as follows: -

(Amount in Rs. Crore)

Allocations (Revised Estimate)			Expenditure			Private Sector Investments
Budgetary sources	**IEBR**	**Total**	**Budgetary sources**	**IEBR**	**Total**	
79,069.17	**24,745**	**1,03,814.17**	**65,402.22**	**6,338.18**	**71,740.40**	**62,629.64**

-Expenditure upto Sept, 11.

The details of the sources of funds for the Central Sector roads during the 11th Plan are as under: -

Amount in Rs. Crore

Item	Cess	External Assistance	ABS for SARDP-NE and J&K	GBS	IEBR	Toll Revenue	Sub - Total	Share of Private Sector	Total
Allocation	**38,771**	**3,964**	**680**	**31,938**	**24,745**	**3,716**	**1,03,814**	**86,792**	**1,90,606**
Anticipated Expenditure	**38,771**	**3,963**	**680**	**29,632**	**12,809**	**3,716**	**89,571**	**62,630**	**1,52,201**

4. Programme for Development of National Highways during 12th Five Year Plan (2012-17)

4.1. Physical targets for National Highways Development Project (NHDP):-

The ongoing phases of NHDP-I, II, III and V involving upgradation to 4 or more lanes of about 32,750 km including overlapping length of about 5,850 km under GQ and NHDP-V), are required to be completed in a time bound manner within 12th Five Year Plan.

4.2. Estimated fund requirement for NHDP: -

The sources of funding for NHDP for the 12th Plan are as follows: -

Amount in Rs. Crore

Cess	External Assistance	Estimated surplus from Toll Revenue	ABS for SARDP-NE & J&K	IEBR	Sub-Total	Share of Private sector	Total
2	3	4	5	6	7	8	9
54,898	**180**	**27,507**	**7,771**	**66,680**	**1,57,036**	**1,66,738**	**3,23,774**

4.3. SARDP-NE including Arunachal Pradesh Package

4.3.1. Phase A including Arunachal Package – Balance 5,406 km to be completed by June, 2016.

4.3.2. Phase B - Out of total length of 3,723 km 1610 km will be taken up for implementation in 12th Plan.

(i) Fund requirement from GBS for Phase A including Arunachal Package (including Annuity payments to be made from GBS) – Rs. 25,740 crore

(ii) Fund requirement from GBS for Phase B – Rs. 11,934 crore

(A) Total fund requirements from GBS [(i) + (ii)]– Rs. 37,674 crore

4.4. Special Programme for Development of Roads in the Left Wing Extremism (LWE) Affected areas: -

4.4.1. Phase I – Balance 4,426 km to be completed by March, 2015. Total estimated fund requirement in 12th Plan = Rs. 5,376 crore from GBS.

For the first time, a Tribal Sub-Plan (TSP) component was included in the Central Roads Sector scheme of the MoRT&H during 2011-12 at the behest of the Planning Commission and the Ministry of Tribal Affairs. This entire TSP component included a part of this programme during 2011-12.

During 12th Plan, Phase-I of the programme would require a budgetary investment of Rs. 2,400 crore under TSP involving development of 2,200 km length of roads under Phase-I of the programme. Accordingly, the target for balance works under phase-I during 12th Plan is completion of 2,235 km entailing a budgetary allocation of Rs. 2,976 crore.

4.4.2. Phase II (Programme yet to be approved) – Total length of 8,014 km is proposed to be completed by March 2017. Total estimated fund requirement in 12th Plan = Rs. 10,700 crore from GBS.

(includes a TSP component of Rs. 2,500 crore aimed at developing about 1,600 km length of roads)

4.5. Development of State Road segments in Orissa on the Vijayawada Ranchi route – Total Length of 600 km is proposed to be completed by March, 2015. Total estimated fund requirement in 12th Plan = Rs. 1,100 crore from GBS.

4.6. Development of Expressways (other than under NHDP-VI): -

The MORT&H has prepared a Master Plan for the National Expressways Network for a total length of about 18,637 km. Further, "Guidelines for Expressways" was finalized through a Technical Cooperation from JICA and published in 2010 by MORT&H.

In addition to the initiatives taken up under NHDP-Phase-VI to develop about 1,000 km length of Expressways, a target of developing about 500 km length of Expressways may be fixed for the 12th Plan (200 km from budgetary support and 300 km through PPP mode) inter-alia by exploring the feasibility of taking up projects by giving already developed expressway stretches as sweeteners.

Closed System of Tolling with ITS application (viz. ETC, etc.) may be followed for the National Expressways Network equipped with State-of-Art Advanced Traffic Management System (ATMS) including integrated Way-side facilities, facilities to provide real-time and advance information for Users, etc.

The following additional suggestions may be considered particularly for development of Expressways Network in the country: -

- Due emphasis for preserving ecology and environment.
- Traffic segregation and discouraging 2 / 3 wheelers on expressways including tractors, etc.
- Development / construction of "Urban Links" to National Expressways Network.
- The programme would need to be implemented jointly by the Central and State Governments with participation of the private sector.
- Institutional strengthening with development of adequate in-house capabilities & sufficient numbers of skilled personnel.
- Thrust on R&D and acquiring State-of-Art Technologies.
- Encourage formation of JV of Indian contractors with overseas contractors along with Technology Transfer arrangements.

4.7. Non-NHDP National Highways with State PWDs: -

4.7.1. Expansion of NH System

It is proposed that the existing NH Network of 71,772 km may be increased to about 85,000 km in the 12th Plan period.

4.7.2. Development of Non-NHDP NHs

4.7.2.1. Two-laning

It is estimated that there would be about 9,220 km length of NHs having less than 2-lane standards at the beginning of the 12th Plan. It is proposed to develop them to 2-lane NH standards during the 12th Plan.

Apart from this, considering an addition of about 15,000 km length in the NH network during 12th Plan, and also keeping in view the likely availability of allocations under GBS, and inter-se priority, it is proposed to develop 2,000 km length of NHs to be declared during 12th Plan to 2-lane NH standards.

The mode of implementation has been estimated broadly as per the following break up: -

Through GBS (including toll remittances)	-	5,100 km
Through proposed World Bank Loan Assistance	-	3,770 km
Through Private sector funding on BOT (Toll) mode	-	2,350 km

Further, feasibility may be explored to put maximum lengths of stretches developed through GBS or proposed External loan assistance on Operate-Maintain-Transfer (OMT) Contracts after their development.

4.7.2.2. Four-laning / Six-laning

Existing 2-lane NHs are to be developed to 4-lane divided carriageway facilities or more as per necessity only as fully access controlled facilities with closure of all median openings, replacing of all at grade intersections by grade separated intersections, providing vehicular, pedestrian and cattle underpasses, segregation of slow moving traffic by providing service roads / alternate road connectivity wherever required, etc., from Road Safety point of view. In case it is not possible to do so, feasibility shall be explored to develop separate fully access controlled facilities, i.e. expressways (either as a green field project, or along any other feasible alignment) having 4 or more lanes with divided carriageway if the traffic on the existing 2-lane NH corridors exceed its design service volume.

It is envisaged that leaving apart the ongoing phases of NHDP (viz. NHDP-Phases-I to VI and NHDP-Phase-VII), there may be requirement to upgrade about another 200 km length of NHs to at least 4-lane divided carriageway facilities.

It is recommended the possibility may be explored to develop these entire lengths of NHs to 4-or more lane standards through PPP mode.

4.7.2.3. Riding Quality

Tentatively, it is estimated that Riding Quality of about 5,000 km may need to be improved during 12th Plan.

4.7.2.4. Bypasses and Over Bridges

For cities with population above 1 million on the NH Network, it is recommended that a desirable strategy would be to plan for bypasses in the form of peripheral expressways to interlink the highways radiating from these cities.

Further, there should be no railway level crossings on NH Network and all existing level crossings on NH Network should be replaced by Road Over / Under Bridges. A phase-wise programme may be drawn up accordingly depending upon the traffic and number of gate closures.

4.7.2.5. Bridges

A system of maintaining and updating database on Bridge Inventory and their conditions needs to be set up for enabling timely decision making regarding formulating their maintenance strategies. Development of Bridge Management System (BMS) may be considered to be set up in a time bound manner for this purpose.

4.7.2.6. Amenities

It is important the wayside amenities be integrally planned and developed along with Expressways and all projects for 4-laning / 6-laning of NHs. Due provision is required to be made for LA, etc. while conceptualizing and preparing such project reports. If the project is to be developed on BOT (Toll) basis, the concessionaire may develop the facilities and operate the same during the concession period or even after that. For projects developed through BOT(Annuity), Concessionaire may develop the facilities and the Government may consider entrusting operation and maintenance of the facilities through private participation. For projects developed through GBS funding, the facilities may be integrally developed by the Government and entrusted to private sector for operation and maintenance. Broadly, the Integrated Way-side amenities may have following features: -

- Facilities to be owned by Government operating / construction agencies.
- Operation & maintenance of individual facilities in the wayside amenities through lease on profit sharing basis with private companies.
- Earmark certain facilities in the wayside amenities exclusively to encourage local small scale producer on subsidy basis.
- Due consideration for preservation of ecology and environment including recycling of waste water and harnessing of alternative sources of energy (e.g. solar energy) for captive use.

Further, wherever feasible, State-of-Art Traffic Control Centres shall be provided (especially for stretches developed on BOT basis through Public-Private Partnership) along with facilities for information dissemination and exigency management system for alleviating traffic congestions, promoting more environment friendly, energy efficient and safe travel. For Expressways as well as any other access control facilities, these provisions should be made mandatory.

4.8. Broad Assessment of Investment Needs for Expressways and Non-NHDP NHs with State PWDs

	Scheme		
		Length (km) / Nos.	**Amount Rs. Crore**
A.	**Expressways**	500	
	L.A., R&R, utility shifting, project preparation (Budgetary Allocation)		4,625
	Construction		
	Budgetary Allocation including VGF for projects to be taken up on PPP mode	200	6,670
	Estimated Toll Remittances		90
	Private Sector Investment	300	4,140

	Sub-Total (Budgetary allocation)	**200**	**11,295**
	Sub-Total (Toll remittances)		**90**
	Sub-Total (Private Sector Investment)	**300**	**4,140**
B.	**National Highways**		
	(i)Four-Laning/Six-Laning		
	L.A. (40 m), R&R, utility shifting, project preparation (Budgetary Allocation)	200	850
	Construction (@ Rs. 11.50 crore per km as fully access controlled facilities)	**200**	
	Budgetary Allocation (@30% for VGF)		690
	Private Sector Investment (@ 70%)		1,610
	Sub-Total (Budgetary allocation)		**1,540**
	Sub-Total (Private Sector Investment)		**1,610**
	(ii) Two-Laning with hard shoulders	**11,220**	
	Budgetary Allocation	**5,100**	**24,800**
	Toll Remittances		**1,200**
	External Loan Assistance (World Bank)	**3,770**	**10,800**
	Private Sector Investment	**2,350**	**5,765**
	(iii) Riding Quality Improvement	**5,000**	
	Budgetary Allocation		**3,750**
	(iv) Strengthening Weak Pavements	**2,000**	
	Budgetary Allocation		**3,000**
	(v) Bypasses,	**5 nos.**	
	Budgetary Allocation		**450**
	(vi) Bridges, ROBs / RUBs etc.	**250 nos.**	
	Budgetary Allocation		**2,000**
	(vii) Miscellaneous	**LS**	
	Budgetary Allocation		**2,000**
	Total Budgetary Allocation		**48,835**
	Total Toll Remittances		**1,290**
	Total External Loan Assistance		**10,800**
	Total Private Sector Investment		**11,515**

4.9. The development of NHs with BRO It is proposed that an outlay of Rs. 3,000 crore may be earmarked for development of NHs under BRO for the 12th Plan.

4.10. Cross Sectoral Issues

4.10.1. Special Package for development of roads under Tribal Sub-Plan

Keeping in view the emphasis given by the Government to develop Scheduled Areas (i.e. the areas defined as Scheduled Areas as per Fifth Schedule under Article 244 (1) of the Constitution inhabited by Tribal population), it is proposed to take up development of primarily State roads in such areas (viz. in the districts identified in the Scheduled areas in the States of Andhra Pradesh, Himachal Pradesh, Gujarat, Odisha, Rajasthan, Maharashtra, Chattisgarh, Madhya Pradesh and Jharkhand) under Special Package under Tribal Sub-Plan during 12th Plan. These programme is intended at taking up development of roads in regions /

districts other than those covered under the Special Programme for development of Roads in the LWE affected areas undertaken under Phase-I / proposed to be undertaken under Phase-II. This is also considered essential for enabling an equitable socio-economic development of these scheduled areas to bring them into national mainstream.

It is proposed to take up development of about 1,000 km length of roads to 2-lane standards @ Rs. 5 crore / km estimated cost (including cost of LA, utility shifting, etc.,) during 12th Plan in these scheduled areas in the above mentioned States entailing a total GBS requirement of Rs. 5,000 crore.

4.10.2. Special Package for the Development of Road Corridors for Delhi-Mumbai Industrial Corridor (DMIC) Project for Maharashtra and Rajasthan region on pilot basis

At the behest of Delhi Mumbai Industrial Corridor Development Corporation (DMICDC), the MoRT&H has identified about 812 km length of State roads to be developed primarily to 4-lane standards from additional budgetary allocations over and above the other schemes under Central Sector Roads in the Maharashtra Region (viz. (i) Dighi Port connectivity and (ii) Shendra - Bidkin Mega Industrial Park connectivity) and Rajasthan Region (Neemrana-Khushkhera-Bhiwadi Investment Region). The estimated fund requirement for completing these works in the 12th Plan is about Rs. 14,425 crore.

4.10.3. Special Package for Development of State Roads in the State of Jammu & Kashmir from strategic considerations

The State Government of Jammu & Kashmir has submitted proposal for developing the identified roads (103 nos. of projects) in August 2011 to the M/o Home Affairs for a total estimated cost of Rs. 932 crore. M/o Home Affairs vide their letter dated 15.9.2011, requested this Ministry to take up further necessary action in this matter.

Considering the necessity of developing these roads from strategic considerations, it is proposed to take up their development under a Special Package for an estimated fund requirement for 12th Five Year Plan is Rs. 700 crore over and above the other schemes under Central Sector Roads.

4.10.4. Road Connectivity to Minor Ports: -

Whereas the road connectivity for Major Ports are being developed under NHDP-Phase-I by NHAI through SPV mode, keeping in view the decisions taken in the meeting of the Steering Committee on Transport Sector for the 12th Plan held under the Chairmanship of Member (BKC), Planning Commission on 14.10.2011, it is proposed to develop primarily

2-lane road connectivity for about 50 minor ports in the 12th Plan for an estimated total budgetary investment of about Rs. 5,000 crore primarily through State PWDs provided the allocation is additionally made over and above the allocations for other schemes for the Central Road Sector.

4.10.5. Special Package for development of Road Connectivity to Airports

During the meeting of the Steering Committee on Transport Sector for the 12th Plan held under the Chairmanship of Member (BKC), Planning Commission, on 14.10.2011, it was agreed that a Special package may be included in the Central Sector Roads schemes for the 12th Plan to develop road connectivity for Airports.

The Ministry of Civil Aviation and the Airports Authority of India have identified specific road connectivity development needs for 24 such Airports.

Considering on an average development of 15 km road connectivity at an average cost of Rs. 5 crore per km, the total estimated cost of development of road connectivity to these 24 nos. of Airports during the 12th Plan is about Rs. 1,800 crore.

The allocation for taking up these works may be additionally provided under GBS over and above the allocations under other Central Road Sector Schemes.

4.11. Mode of Financing

It needs to be appreciated that it would not be practically possible to take up development of the majority of the highway stretches on BOT (Toll) mode. Further, BOT(Annuity) projects essentially require deferred payments to be made to the concessionaire from the public funds over a period of years. The Government needs to view this aspect carefully and recognize that the Government funding for highway infrastructure projects would also require substantial up-scaling if the sector is to be developed for broader objective of achieving socio-economic development of the country and maintain the targeted growth trajectory.

The present policy of the Government of dedicated earmarking of toll receipts as remittances in the Annual Budget for the Central Sector Roads would have to be continued.

The Government may consider levy of cess on petrol and High Speed diesel (HSD) oil as per the provisions of the Central Road Fund (CRF) Act, 2000 on ad-valorem basis in place of the current policy of charging it at Rs. 2.00 per litre of petrol and HSD oil.

The details of the total estimated fund requirement for the National Highways and Expressways including the Special Packages for the 12th Plan including the sources of funding are given below: -

Amount in Rs. Crore

Cess	External Assistance	GBS	ABS for SARDP-NE and J&K	ABS for Special Packages*	IEBR	Estimated surplus from Toll Revenue	Sub-Total	Share of Private Sector	Total
54,898	10,980	51,835	7,771	81,775	66,680	28,797	302,736	178,253	480,989

*** - viz. SARDP-NE including Arunachal Package, development of roads in LWE affected areas, development of Vijayawada-Ranchi Road, Special Package for development of roads in Scheduled Areas (under Fifth Schedule) under Tribal Sub-Plan, development of road corridors of DMIC Project on Pilot basis, development of State roads in J&K, development of road connectivity to 50 minor ports, development of road connectivity to 24 Airports, etc.**

As per the provisions of the Control of National Highways (Land and Traffic) Act, 2002, the Highway Administration, or the officer authorized by such Administration, having regard to safety and convenience of traffic and subject to such conditions as may be prescribed and on payment of prescribed rent or other charges, grant lease or license of highway land to a person for temporary use for a period not exceeding more than five years unless renewed by the Highway Administration or such officer.

The dedicated earmarking of the revenues thus generated may also be used for the National Highways sector especially self-financing of some of the activities such as Road Safety, pilot schemes to test the efficacy of new / emerging technologies and materials, etc. However, presently, there is very little enforcement of the provisions under these Acts. It needs to be ensured that these are implemented in the right earnest and the State Government Administrations may pro-actively ensure their enforcements.

4.12. Implementation Issues: -

4.12.1. Towards building National Highways @ 20 km per day: -

The Government has taken initiatives to develop the National Highways at the rate of about 20 km per day (i.e. about 7,300 km per year). Accordingly, considering Average project implementation period of about 3 years, works of about 20,000 km to be in progress at any point of time.

The Government has taken initiatives as per the recommendations made by the Committee under the chairmanship of Shri B.K. Chaturvedi, Member, Planning Commission, constituted by the Prime Minister for

faster development of NHDP with the objective to resolve procedural impediments to the programme as well as the financing issues and other priority areas of the Government.

It is important that the momentum generated is consistently maintained.

There has been significant improvement in award of works and their implementation already. As on 1.4.2011, works on a total length of about 15,600 km were in progress under NHDP, SARDP-NE and the Special Programme for development of roads in LWE affected areas. Further, it has been targeted to award works on a total length of about 11,050 km under these programmes and complete about 3,570 km during 2011-12. With this, it is anticipated that works would be in progress in a total length of about 23,079 km in the beginning of the 12th Plan period. Accordingly, it is expected that the target of building National Highways @ 20 km per day would be achievable by 2013-14 or first half of 2014-15.

4.12.2. Mode of Implementation: -

The present policy of the Government is deciding mode of implementation of projects on BOT (Toll), BOT (Annuity) and Item rate / EPC contract basis following a water-fall sequence. This results into lot of delays in implementation of projects. It is, therefore, desirable that based upon the project report, the Government may decide the mode of implementation of the projects upfront.

4.12.3. Progressive use of Technologies should be made for enabling real time monitoring of projects, putting the projects in right track by taking up of timely necessary corrective actions, fast decision making, etc.

4.12.4. Advanced Traffic Management System (ATMS) should be introduced in more and more stretches.

4.12.5. A shelf of projects to be taken up on BOT (Toll) mode may be created and such Ultra Mega Road Packages (UMRPs) may be tried out on pilot basis to design large, economically viable and technically feasible packages. Each package may constitute aggregate project cost of Rs. 15000 – 20000 crore. Packages may be developed by a Committee of experts representing the MORT&H, representatives from associated Ministries/organizations or departments (e.g. Environment & Forests, State Governments, etc.), Lenders, Technical and Traffic Consultants, etc. VGF funding may have to be pre-approved for certain packages. However given the size of these packages the VGF amount may be substantial putting a burden on government finances. Alternatively/Additionally alongside real estate development may be clubbed into the packages to improve viability.

4.12.6. Way forward

(i) The State Governments must extend their active cooperation for enabling successful implementation of the PPP Projects by signing of the State Support Agreements for the PPP Projects and providing necessary support and assistances in letter and spirit.

(ii) The Central / State Governments must gear up for taking up more projects on PPP basis by

(a) Setting up specific Cells for implementation of road projects on PPP mode; such Cells should also have Finance and Legal Specialities to support Technical Staff;
(b) Developing required Institutional capabilities.

(iii) The Model Concession Agreement (MCA) has to evolve on continuous basis in due consultation with all the stakeholders.

5. Development of National Highways in the North-Eastern Region

At present National Highways with aggregate length of 8480 km are serving the North Eastern Region. These National Highways are being developed and maintained by the Ministry on Agency basis. A specific programme has also been initiated by the Central Government for the accelerated development of roads in the region covering about 10,140 km length of National Highways, State roads and GS roads under 'Special Accelerated Road Development Programme in North-East' (SARDP-NE) including Arunachal Package.

Also development of the balance works under East-West corridor and NHDP-Phase-III shall have to be completed in the 12th Plan.

Leaving apart the above, development of balance length of about 1,766 km length of NHs may be taken up under NH(O) scheme of MORT&H as per availability of funds and inter-se priority.

6. Maintenance of National Highways

In order to reduce this total transport cost it is essential to maintain the roads at a good level of service.

The basic cause for poor management of National Highways is a lack of funds made available for maintenance as per norms. They do not exceed 60% of normal requirements for main roads. 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 issue needs to be urgently addressed to prevent premature failure of sections of NHs developed at large capital investments on account of self-accumulation of deficiencies due to thin spreading of available resources for M&R on large NH network. There is necessity of providing adequate allocation of funds for M&R of NHs either during B.E. stage or sufficiently early in the Financial Year are commensurate to the requirements.

The following suggestions may also be considered in this context: -

- Develop sound "Maintenance Strategies" with planned interventions of maintenance inputs.
- Do away with traditional system of funding M&R activities under non-Plan and take up M&R under Annual Plans separately segregated from construction.
- Ensure assured funding for development as well as maintenance and repair of NHs so as to enable taking up of preventive maintenance works rather than the compulsion of presently resorting to only reactive maintenance works.
- Take up short term maintenance works on already developed stretches through private sector on Operate-Maintain-Transfer (OMT) basis, which are targeted for further upgradation in say within about 4 ~ 9 year period.
- Long term O&M Contracts is a preferred mode and therefore Performance based maintenance system to be adopted for non NHDP developed reaches as well which may include Incident management.
- **Increase cess on petrol and High Speed Diesel (HSD) oil suitably from present level of Rs. 2 per liter and mobilize additional accrual entirely for National Highways. The Government may consider levy of cess on petrol and High Speed diesel (HSD) oil as per the provisions of the Central Road Fund (CRF) Act, 2000 on ad-valorem basis in place of the current policy of charging it at Rs. 2.00 per litre of petrol and HSD oil. The resource thus generate could be partly used for M&R of NHs.**
- Develop a system of maintaining and periodically updating the database on inventory of roads, bridges and other structures on NHs including their condition as decision support system for prioritizing development and maintenance works, viz. Pavement Management System(PMS) and Bridge Management System(BMS).
- Reorganize maintenance operations by replacing the road gang with mechanized mobile units to improve the productivity of the existing labour force.
- Encourage use of equipment for quick repairs of potholes, slurry seal machines, combined bitumen sprayer and chip spreader and cold/hot recycling plants to improve the maintenance culture.

7. Environment & Social Aspects

7.1. Environmental Aspects

There is necessity to review the existing policy of environmental clearances as this causes substantial delay in project award and implementation. It is proposed to de-link the grant of environmental clearance from the forest clearance and exempt environmental clearance if widening is within the standard RoW for NH (i.e. 60m) and upto 100 km length.

It may be in the interest of the projects to prescribe a rational timeline for processing and finalising the various clearances. MoEF may also consider enhancing the powers of Regional Offices of MoEF for granting forest clearance. Standard conditions may be laid for forest clearance.

It has also been observed that wildlife proposals also take more than 3 years for clearance. It is proposed that resurfacing, strengthening and widening be allowed on the existing roads where no diversion is involved. Also, once the approval is granted for certain alignments, for doing surveys, the proposal should not be rejected subsequently on some other grounds. A time line be drawn for granting wildlife clearance.

7.2. Land Acquisition related issues: -

Land acquisition is a long drawn process. Synergy of efforts between State Governments and NHAI is essential to complete smooth acquisition.

One of the major reasons for delay in implementation of road projects is because of the delay in acquisition of Land required for the project.

It is needed to be ascertained that at least 80 % of the required land is available at the time of award of the projects; further it also needs to be ensured that the balance 20 % of the land shall be available within a period reasonable enough so as not to delay the implementation of the projects as per the stipulations of the Contract / concession agreements (say for e.g. balance land should be available within Appointed Date for BOT projects or as per provisions of Contract Agreements so as to enable Contractor to get all the required Work Fronts within stipulated periods, etc.).

The possibility of allowing real estate development on part of the land acquired for the purpose of developing Highways need to be explored so that sweetener could be offered to the potential concessionaires for developing the stretches on BOT (Toll) mode. Land value capture in addition to real estate development are other strategies for resource mobilization particularly for expressways and building of

bypasses, peripheral highways. However, this aspect needs to be widely debated before taking a final view. Accordingly, the Government may explore the feasibility of suitably amending the provisions of the NH Act, 1956.

It is of paramount importance to regulate and control the development activities in land abutting the Right of Way (ROW) of Highways so as to ensure availability of adequate clearances, enhance safety of traffic, obviate possible encroachments of ROW in future, etc. Accordingly, State legislations are required to be promulgated to this effect.

The policy of Land Acquisition is presently governed by the Land Acquisition (LA) Act, 1894. The Government has taken up the initiatives for amendment of the same and this is in advanced stages of finalization. It needs to be ensured that the LA as per the provisions of the NH Act, 1956 are also amended accordingly in conformity with the same.

Regarding BOT projects, Land acquisition for highways needs constant support of the concerned state where the highway project befalls. However, there is absence of any overall framework or mechanism specifying the role and steps to be undertaken by the State Government in providing assistance to NHAI in acquiring land in their state.

7.3. Rehabilitation & Resettlement (R&R) of Project affected persons: -

It needs to be ascertained that a uniform R&R policy is evolved for all types of projects, applicable both for the Central Sector and State Sector, so that the compensations offered to the project affected persons are uniform and not at variance.

Necessary legislations are required to be promulgated specifically for the Green Field Expressway Projects considering its vast socio-economic implications, land severance issues, consequences due to change in land use, etc., apart from environmental issues. The Government may explore the possibility of inducting the affected persons also as stake holders in the Green Field Expressway projects.

8. Specific issues related to implementation of projects through Public-Private Partnership (PPP)

8.1. Experiences learnt so far: -

(i) Delhi-Gurgaon Project on Golden Quadrilateral: - Experience in this project highlight the importance of reliable and up to date traffic data, single window clearance for large projects, deeper stakeholder consultations for design finalization during project preparation especially in urban areas, and need to closely monitor project performance as well as to ensure that audited results reflect true performance of the project.

(ii) <u>Ahmedabad-Vadodara (NH-8) 6 laning project combined with Ahmedabad-Vadodara Expressway: -</u> Highlights importance of innovative project structuring leading to win-win situations.

<u>(iii) Mumbai-Pune Expressway: -</u> This project was developed by State Government of Maharashtra. Such new-alignment projects always carry a risk of traffic and thus there is significant uncertainty in initial years.

Government of Maharashtra allowed the project to first establish a definite revenue stream over few years and then awarded the project on operations and maintenance contract with tolling rights.

This experience highlights the need of a reliable and established revenue stream for PPP projects to be successful on toll basis.

8.2. Major issues: -

(i) State Support Agreements (SSA): - Umbrella SSA was so far signed by only 24 States/UTs. Signing of SSA itself does not entail complete co-operation from the relevant state machinery. Steps should be explored to incentivise the states to fulfil their commitments in a time bound manner.

(ii) Alternate revenue mechanisms: - Alternative revenue sources could be from a)advertisement rights, b) Real estate development along the Highway Corridor, c) Way side amenities , and fee from ROW users like fibre – optics cables, mobile towers etc.

(iii) Environmental, forest & wildlife clearances: - It has been observed that various PPP projects face issues relating to delays in receiving environmental, forest or wild life clearances and permission to cut trees etc.,. Process for taking such clearances from concerned department at centre or state level should be initiated at an early stage of the project cycle.

(iv) Need for a Regulator: - There is no independent regulatory authority for India's Roads & Highways sector. Current arrangement both at centre and states (MORTH, NHAI, MPRDC , PWDs etc.,) results in a potential conflict as the rule making body is also the implementing body and there is no independent assessment of its performance across various parameters.

Potential Key functions of the Regulator can be in areas of

- Tariff Setting
- Regulation of Service Quality
- Assessment of Concessionaire Claims
- Collection and Dissemination of Sector Information
- Service-Level Benchmarks
- Monitoring Compliance of Concession Agreements

(v) Capacity Development: -

Some of the key considerations for the same are:

- Enhancing cross-functional understanding of personnel in implementation agencies through training and development programmes.
- Restructuring of NHAI in order to best use and develop capacity to raise resources, vendor management, concessionaire management and implementation of projects.
- Segregating project implementation from project formulation and therefore, the need for a separate procurement division in NHAI
- Decentralization of power and enhanced availability of skill manpower at regional levels
- Adoption of professional management principles and manpower
- Creation of databases as policy and decision support system.
- Development of streamlined processes & systems leveraging information technology.
- Better synchronization between central and state level agencies for sharing resources and knowledge.
- Training policy focusing on needs of training at entry, on job site and periodic refresher courses.
- Encouraging Engineering and Technical Institutions to attract students in Highway Engineering profession.
- Respective institutions to carry out Training Needs Analysis to identify the skill gaps.
- Involvement of contractors/ developers in developing skilled resource pool on a sustainable basis.
- Apprenticeship development by contractors/developers with provisions for subsequently deploying trained manpower to authorities.

(vi) Tolling Issues

Tolling issues relating to Government

A.1. The Road Pricing and rate of user fee should be fixed purely on the basis of the benefits accruing to the users on account of upgradation of the facility as compared the facility existing before. The Government may also consider undertaking a sound cost allocation study of providing and maintaining roads due to cars, buses and trucks.

A.2. The existing policy of fixation of toll rates needs to be reviewed especially for 2-lane NH sections and bypasses, permanent bridges, tunnels, etc.

A.3. Similarly, the reduction in rate of tolling after recovery of capital cost for public funded projects or after expiry of the concession period for private investment projects need to be reviewed.

A.4. The remittances from toll receipts should be entirely ploughed back and earmarked for development and maintenance of NHs only.

A.5. Standardizing electronic and cash tolling system by using RFID based tolling for electronic toll collection and one toll card for toll payment across all/major toll plazas.

A.6. Weigh in motion systems should be used as a primary overweight detection equipment, which should divert only the overweight vehicles to static scale systems.

A.7. To develop holistic approach towards toll road management and ensure proper maintenance and timely overhauling of tolling system

A.8. Leakage in tolling is a cause of serious concern. Steps need to be taken towards full automation of tolling.

A.9. Integration of Tolling amongst various projects across the country needs to be taken up.

A.10. Electronic Toll collection (ETC) system need to be progressively introduced in all the sections in order to avoid congestions at toll plazas and facilitate smooth flow of traffic.

A.11. Closed system of tolling need to be introduced. However, this is possible only if the facility is fully access controlled.

A.12. The "Congestion Pricing" policy may be adopted for levy of additional toll, especially for Heavy Goods Vehicles (HGVs) depending upon number of axles and emission class in line with the existing policies in the countries such as Germany, Czech Republic, etc. This would enable collection of additional revenue, help in protecting environment and encourage mode shift to rail and water.

A.13. Currently, in case of significant and unexpected increase in traffic on any National Highway stretch under DBFOT (toll), the upside is partially shared with the Authority. Such sharing is linked with the capacity of the road and in such situation the project anyways faces issues relating to service levels, capacity augmentation and termination. A suitable methodology is required to be devised so that such upside can be effectively shared with the Authority without unfavourably affecting the rights of the Concessionaire.

A.14. Express ways might require separate toll policy relating to competing facilities, level of services and congestion management.

Tolling Issues relating to Private Parties

A.15. There are leakages in toll collections because of presence of alternate routes to various stretches

A.16. In extreme situations, it is difficult to take a decision from user benefit perspective as viability & profitability of project is directly linked to toll collections (in case of DBFOT(toll) projects)

A.17. Changes in traffic profile & level based on decisions of various Government agencies relating to development of region, development of alternate roads, level of support to economic activities etc.

Tolling Issues relating to Users

A.18. Users' willingness to pay affected by factors including socio-economic culture and capacity.

A.19. MCAs provide for partial linkage of toll rates with Wholesale Price Index (WPI) over and above some fixed increment every year. Such continuous increase in toll rates might not be always acceptable to users especially when it is not linked to service levels.

A.20. As per the existing Toll Policy, in 6-laning projects users are required to pay the toll rates applicable for 4/6laned roads even during the construction stage when the road is being upgraded from 4 lane to 6 lane. During such period service levels on the roads decline and payment of full toll rates during such period adds to the inconvenience faced by the users.

(vii) Key post-award issues in PPP projects: -

(A) Financing of Projects

(a)An underdeveloped bond market has constrained PPP road projects to mainly depend on debt from commercial banks.

(b) Lack of presence of long-term savings institutions, such as insurance companies and pension funds having long-term liabilities, with appetite for long-term debt instruments in PPP project funding.

(c) Commercial banks are increasing facing limits on their exposure to infrastructure sector, which would also affect funding of road PPP projects.

(d) Commercial banks also face issue of asset liability mismatch as PPP projects require long term funding
(e) Re-financing scheme from IIFCL has not helped the market as initially envisaged because of certain attached conditions relating to tenure and interest rates.
(f) External Commercial Borrowing (ECB) is limited in road PPPs because of certain constraints in the policy framework.
(g) Debt to road PPP projects is classified as unsecured by commercial banks since no tangible physical security is available to lenders. Due to this such debts carry higher interest rates and quantum limitations.
(h) Issues relating to Model Concession Agreement and its provisions, such as, issues of creation of charge on receivables, assignment of project agreements etc.

(B) Financing & Viability

- Explore other sources or revenue for PPP projects such as advertising, real estate development, way side amenities, mobile towers, additional stamp duty on road side properties etc.
- Implementing recommendations of committees on financing of PPP infrastructure projects in India and other related initiatives which are being debated with the stakeholders.
- Project specific Value for Money (VFM) analysis to be undertaken to decide the maximum level of Government support for the project rather than having a general cap of 40% of total project cost.
- Ultra Mega Road Packages (UMRPs) may be tried out on pilot basis to design large, economically viable and technically feasible packages. Each package may constitute aggregate project cost of Rs. 15000 – 20000 crore. Packages may be developed by a Committee of experts representing the MORT&H, representatives from associated Ministries/organizations or departments (e.g. Environment & Forests, State Governments, etc.), Lenders, Technical and Traffic Consultants, etc.

(C) Monitoring Performance of Private Developers

Performance Indicators for Monitoring

a) Timeliness: Timeliness of tasks and reporting
b) Value for Money: Cost justifies the quality and work output as per market standards and best practices.
c) Quality: Work meets standards and requirements
d) Responsiveness: Coordination with awarding authority and ability to find win-win situations
e) Reputation: Market reputation and perception
f) Experience and Skills: Level of experience and skills suitable for work.

g) Capacity: Resources and organization capacity varying with variety and size of work
h) Dispute History: Track record in disputes and litigious nature.

(viii) The Central / State Governments must gear up for taking up more projects on PPP basis by

(a) Setting up specific Cells for implementation of road projects on PPP mode; such Cells should also have Finance and Legal Specialities to support Technical Staff;
(b) Capacity development of Central and State level agencies on aspects relating to evaluation of projects, project structuring, bid process management & contract management covering multi-functional skills from legal, technical & financial domain.

(ix) The Model Concession Agreement (MCA) has to evolve on continuous basis in due consultation with all the stakeholders.

9. Consolidation and preservation of Road assets

9.1. Preservation of Road Assets: -

A system / model has to be established for the prediction of the functional and structural condition of pavement, as built, and after providing different types of maintenance measures or rehabilitation treatments.

Road networks need to be managed now and not just maintained.

A uniform format should be developed to compile the information related to Right of Way (ROW) and other assets starting from panchayat / block levels, etc. and compiled State-wise. The data should be available in electronic form with facility for periodic updation on real time basis as and when land is acquired to augment the existing ROW; further, there should be facility to add the inventory in case of newly declared National Highways or Expressways, etc., almost on real time basis.

It needs to be ensured that there is proactive support from State Administrations and Law enforcing machineries so that the stipulations of the "The Control of NHs (Land & Traffic) Act, 2002" in the ground to remove encroachments, etc., could be effectively implemented. Further, District Administrations must ensure, as a part of its overall duties and responsibilities, that the provisions of these legislations are not violated rather than simply providing its support to the Highway Administrations.

Similar frameworks may be evolved for all categories of roads in the line of the Control of NHs (Land & Traffic) Act, 2002.

The huge road asset should be maintained in proper serviceable conditions without sacrificing their functional requirements. The focus has to gradually shift from traditional departmental based maintenance also to those based on outsourcing, whereby the expertise and skills of the experts available in the construction industry shall be fully harnessed and utilized to bring in cost effectiveness in maintaining the road assets being developed at enormous costs in most optimal manner with least maintenance efforts.

"Pavement Preservation Strategy" has to be evolved supported by extensive R&D in the field through numerous reputed R&D organizations / academic institutions including simulations for accelerated testing of pavement performance analysis may also be done in order to predict long term pavement performances.

It is suggested that an Asset management framework is created that encapsulates:

- Performance matrix and encourage concessionaires to benchmark with best O&M practices across the world.
- Responsibility metrics to assign responsibility to each of the stakeholders in the process
- Framework is created for resourcing aggregates: cement, bitumen, POL, etc.

9.2. Institutionalization of the system of database: -

The current system of collecting the data on the road sector is ad-hoc and is not conducive to taking rational decisions in planning and prioritizing development and maintenance strategies and programmes. There should be a system for institutionalizing the database for the road sector. Further, such system should also enable proper integration of the database of the State level with that of the Central level and their storage with adequately equipped data warehousing.

9.3. Over Loading of Vehicles: -

The issue pertaining to plying of overloaded vehicles on highways has been raised from time to time in various High Courts and finally in the Supreme Court. Hon'ble Supreme Court in a case—Paramjit Bhasin & Others Vs UOI:WP No.136/2003 has categorically made it clear that detection of overloading and collection of compounding fee does not mean authorization for the overloaded vehicles to ply. The excess load needs to be necessarily offloaded before allowing the vehicle to proceed further. Thus the Hon'ble Supreme Court restated the provisions of the Motor Vehicles Act, 1988 and directed to States to implement the same in letter and spirit.

The directions of the Hon'ble Supreme Court are yet to be implemented by most of the States in the right earnest. The factors cited for inability to enforce the law regarding mandatory off-loading of the

excess loads are such as indivisibility of the load, lack of infrastructure to off-load and store excess loads etc. Implementation of the following measures may help in solving the problems:-

(i) Measures for offloading and handling of the excess load.
(ii) Planning of necessary infrastructures for effective implementation of the policy.
(iii) Financing and Implementation of the policy.

While necessary investment on the infrastructure can be planned, the keenness of the States to enforce the measure is the key to success of initiative. One way could be to link the central assistances made available to the States in the road sector to their seriousness and initiatives taken in tackling this menace in a time bound manner.

10. Capacity Building of Implementing Organisations and Human Resource Development

10.1. Institutional Development of all Stake holders

10.1.1. Central Government / Ministry of Road Transport & Highways (MoRT&H): -

MoRT&H 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.

In order to streamline activities related to PPP Projects, MoRT&H needs to have a permanent Legal Cell comprising the officers with legal background as well as technical officers.

The Regional Offices (ROs) of the MoRT&H 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.

Proper monitoring of the works and taking necessary corrective actions to resolve the problems and for removal of bottlenecks the monitoring arrangement in MoRT&H is to be strengthened in this direction. Networking of different project sites, Regional Offices, State PWDs with the Headquarters with two-way communication system and delegation of decision making arrangement need to be done.

10.1.2. National Highways Authority of India: -

There is a Government mandate to restructure NHAI to accord different expertise for raising of resources, implementation and management of National Highways. Action should be expedited for fully implementing the mandate. These institutional strengthening measures

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

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.

Deputation of engineers and other officers to NHAI from MoRT&H and State PWDs could be of considerable mutual benefit.

10.1.3. Border Roads Organisation (BRO): -

The development and maintenance works of National Highways entrusted to Border Roads Organisation are mainly being done departmentally. They are presently taking up some works through Contracts also. The BRO has to modify and amend their procedures of working so that more and more such works can be outsourced wherever possible.

10.1.4. State Public Works Departments: -

Presently about 39,000 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 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.

10.1.5. Training Policy: -

The training policy should address the needs of training, at entry, on job site and periodic in service refresher courses.

The Engineering and Technical institutions are to be encouraged and incentives are to be given for attracting students in Highway Engineering profession. Private parties like contractors and consulting firms must also show full commitment for this purpose.

The Indian Academy of Highway Engineers (IAHE) [formerly National Institute of Training for Highway Engineers (NITHE)] would need to continue playing a lead role in the training of highway professionals with support from other research and technical organisation and educational institutions. State level training centres are also to be developed and the activities of IAHE need a quantum jump to meet the challenges squarely.

Respective organizations must carry out a Training Need Analysis (TNA), of their employees taking into account the competence level required for the job and the employee data. Periodic training rosters should be prepared and needs to be followed for effective results.

Unfortunately funds are a constrain for training, particularly for overseas and other state exposure in almost all state governments. Therefore it is necessary that there is some compulsion on the states, either through central funding or earmarking of portion of CRF or 13th Finance Commission provision for the same. Since the states are also providing most of the manpower to NHAI/Indian territory etc. more engineers from the states need to be covered under the training component of MoRTH as is done by the MoRD for PMGSY and various central ministries.

10.1.6. Domestic Construction Industry: -

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.

10.1.7. Consultancy Sector: -

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.

Formation of joint ventures with international firms needs to be encouraged to improve capability with their special inputs in areas where domestic exposure is still lacking.

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. It needs to be recognized that the number of consultancy firms in the highway sector need to grow in tune with the demand of the sector.

10.1.8. Concessionaires firms: -

The Concessionaires may be allowed to mobilize the expert services (viz. technical, financial, legal, etc.) and satisfactorily demonstrate and manage the availability of such services for the duration of the Concession Period.

The Concessionaires should introduce not only cost effective technologies/materials, but also try to promote more environment and ecology friendly constructions, with utilization of waste/marginal materials or industrial by-products and try to minimize depletion of natural reserves such as bitumen, aggregates etc. They should also demonstrate commitment for proper operation and maintenance services after the highway is open for commercial operations so that quality of service to road users is maintained, and provide satisfaction to the users

10.2. Equipment & Machinery: -

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 highway sector now appears to be flooded with modern machines. The introduction of sophisticated machines in the Highway sector has given a boost to the domestic industry. The next five year plan will see more and more leasing companies coming in the field equipped with the use of more modern equipment.

10.3. Skill Development (both skilled and unskilled)

Apart from National Academy of Construction (NAC), Hyderabad, Firms like L & T etc.(which have its training institutes for workmen), the agencies like CIDC etc. may take the lead and two to three ITIs in each State may be identified where training for both skilled and unskilled staff can be imparted. National Academy of Construction in Hyderabad is an example worthy of emulation by other States.

10.4. E-procurement is becoming quite widespread in the road agencies.

This process can be further deepened by vibrant websites of the states. With the RTI Act in force, disclosure policy and proactive action by the road agencies would further enhance the image of the department. The MoRT&H, NHAI and the states should conduct regular road shows to inform the citizens of the achievements being made.

10.5. Best practices adopted by various implementation agencies need to be disseminated. Documentation of these at central level is an immediate need.

11. Investment Needs

Amount in Rs. crore

Sl No.	Scheme	Estimated Fund Requirement for 12th Five Year Plan
1	External Aid	10,980
2	NH (O)	
	Widening to 2-lanes, Strengthening, IRQP, Bridges, ROBs, Bypasses, etc.	37,540
	Development of Expressways	11,295
3	Works under BRDB	3,000
4	Other Charges & IT	40
5	Strategic Roads under BRDB	500
6	R&D and Training	100
7	Charged Expd.	30
8	NHAI (Investment) (Cess)	54,898
9	Remittance of toll receipts	28,797
10	NHAI (ABS for J&K package, etc.)	7,771
11	E&I for States/UTs from CRF	1,664
12	Special Packages	
(i)	Special Accelerated Road Development Programme for North Eastern Region, including Arunachal Pradesh Package	37,674
(ii)	Special Programme for development of road connectivity (NH and State Roads) in LWE Affected Areas	16,076
(iii)	Development of Vijayawada-Ranchi Road (State road portion)	1,100
(iv)	Special Package for development of roads in the Scheduled Areas (under Fifth Schedule) under Tribal Sub-Plan	5,000
(v)	Special Programme for development of State roads for DMIC Project for Maharashtra and Rajasthan region on pilot basis	14,425
(vi)	Special Package for development of State roads in the State of J & K from strategic considerations	700
(vii)	Special Package for development of road connectivity for about 50 minor ports	5000
(viii)	Special Package for development of road connectivity for 24 Airports	1800
(A)	TOTAL GBS+Cess+Toll remittances+ABS for J&K package + Special Packages	2,38,390
(B)	IEBR / Borrowings by NHAI	66,680
(C)	Grand Total	3,05,070
	Private Sector Investments (Non-NHDP)	
	Widening to 2-lanes	5,765
	4-laning of NHs	1,610
	Development of Expressways	4,140
	Sub-Total – Private Sector Investments (Non-NHDP)	11,515

	Private sector Investments (NHDP)	**1,66,738**
(D)	**Total Private Sector Investments**	**1,78,253**
(E)	**Grand Total for Central Sector Roads (incl. Private Investments)**	**4,83,323**

The above includes total Tribal Sub-Plan (TSP) Component of Rs. 9,900 crore [which is about 4.15 % of the total projected budgetary allocation of Rs. 2,38,390 crore (ref. Col (A) in above table) for Central Roads Sector]

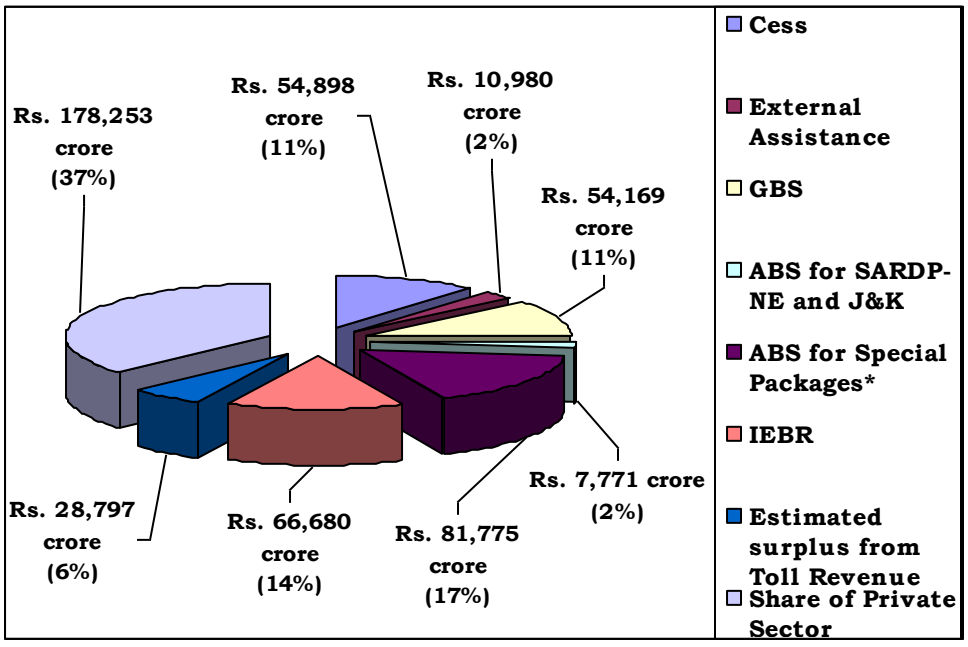
However, it is pertinent to mention that the cost of LA and R&R (which have been assumed as Rs. 1 crore per Ha) may escalate significantly consequent to promulgation of revised legislations by the Government in this regard, for which necessary actions have already been taken up.

Sources of funds: -

Amount in Rs. Crore

Cess	External Assistance	GBS	ABS for SARDP-NE and J&K	ABS for Special Packages*	IEBR	Estimated surplus from Toll Revenue	Share of Private Sector
54,898	10,980	54,169	7,771	81,775	66,680	28,797	178,253

*** - viz. SARDP-NE including Arunachal Package, development of roads in LWE affected areas, development of Vijayawada-Ranchi Road, development of roads in Scheduled Areas (under Fifth Schedule) under Tribal Sub-Plan, development of road corridors of DMIC Project on Pilot basis, development of State roads in J&K, development of road connectivity to 50 minor ports, development of road connectivity to 24 Airports, etc.**



12. State Road Sector

12.1. State Road Network – Review of Progress and Constraints Faced

State Highways (SHs) and Major District Roads (MDRs) constitute the secondary system of road transportation in the country. Their total length SHs stands at about 154,000 km and that of MDRs is estimated at around 300,000 km. State roads carry heavy to medium traffic. It is assessed that the secondary system carries about 40 percent of the total road traffic.

Their present condition and stage of development varies widely from state to state. The status of MDRs is particularly worrisome. One of the main reason for this is that the funds made available for these roads are inadequate. Against requirement of Rs.25,000 crores per annum, a total amount of only Rs. 8,000 crores per annum is being made available. Some of the major constraints faced by different states in the execution of the programmes for state roads during the 11thPlan are – (i) Lack of Policy and Planning, (ii) Control on Pre-construction Activities, (iii) Capacity Constraints, (iv) Lack of Finances, and (v) Need for further strengthening Consultancy and Contracting Industry.

There is lack of data base in the road sector. This needs to be strengthened with support from MoRTH and IRC.

12.2. Planning for State Highway Development Project

There is need now to identify a **CORE NETWORK** of major arterial routes. It is important that Core road network should have a Corridor Concept. Holistic planning in this corridor needs to be done where necessary, involving SH and MDR under this concept. It should be possible for traffic to move at an average speed of 60-70 km per hour, so that commercial vehicles being the carriers of economy can cover a distance of 500 to 600 km in one day.

The “Core Network” of State Roads should, essentially, comprise of SHs and MDRs, which have high volumes of traffic or have such potential.

Further, entire length of existing 4-lanes and stretches on which 4-laning of SHs and MDRs are being / to be undertaken should essentially be part of the “Core Network”.

All SHs / MDRs having traffic beyond a certain threshold (say e.g. about 5,000 PCUs per day AADT at present) may also be included under ‘Core Network”.

Surfacing and 2-laning of such roads under “Core Network” may be done on priority if already not done.

Priority may be given for development of “Core Network”. Further, Priority may be given for roads under “Core Network” for their future up-gradation as National Highways.

12.3. Urban Linkages to National Expressways Network

It is important to provide urban linkages to National Expressways Network or to any inter-city Expressways developed by the State Governments. These should also desirably be access controlled facilities wherever required and feasible. For this purpose, the Road Authorities responsible for Urban Road Development shall have to be associated. An integrated scheme may be parallely evolved and implemented to address the specific requirements to provide Urban Connectivity under a separate initiative involving Planning Commission, concerned State Governments and the concerned Road Authorities besides M/o Urban Development and M/o Road Transport & Highways with clear identification of the roles and responsibilities of each organization to obviate implementation difficulties, etc.

The State Governments shall have to be primarily responsible for development of these Urban Linkages. Feasibility shall have to be explored to develop these Urban Linkages on PPP mode. For the sake of estimation, it is presumed that 50 % of total length would be implemented through budgetary allocation. The balance 50 % length would be implemented through private sector participation on PPP mode. For the projects to be taken up on PPP mode, about 30 % of project cost is assumed to be met from budgetary allocations towards payment of VGF, etc. and balance 70 % is to be mobilized by private sector.

12.4. Like NHDP, the States should formulate State Road Development Programme/Project (SRDP) to be developed in defined phases. The total network of SHs and MDRs should be identified by each State as a long-term vision (say by 2031). The policy should be to cover the entire "Core Network" under this programme as far as possible.

In relation to protection of environment the Concept of Green Highways is another initiative that can be appropriately planned and designed. States may take up some Pilot projects and implement the same.

12.5. Strategies for Implementation of State Roads through Private Sector Financing

The Central Government has created a window for providing viability gap funding (VGF) upto an amount of 20 percent of the project cost. Additional cost of 20% of project cost can be provided by the State Government to the private entrepreneur. By a careful concession design and phased approach for development, it should be possible to cover some part of SHDP through private sector financing by leveraging the budgetary resources. SHDP would need the support of the government budget. For this, the support of the World Bank/ADB towards financing of these roads needs to continue. Preparing a blue print of identified major state road sections for PPP/PSP will help the states to achieve its'

part financing needs. Implementing the projects would enable states to achieve its growth objectives.

BOT (Annuity) Models being currently practiced need study and review with respect to - the cost and level of service vis-a- vis government regular budgeted and externally aided projects. This will help to firm up clear opinion. There has been hesitancy from some state governments on annuity type of projects, as it is generally considered as a form of deferred liability. Undertaking study across all the states and Government agencies will not only help in taking an opinion but also will enable formulation of guidelines for deciding on the extent of such projects.

The Planning Commission has formulated a Model Concession Agreement (MCA) for undertaking capacity augmentation of National Highways and State Highways on BOT basis. This agreement provides for a sound legal framework and addresses the concerns of various stakeholders in a balanced manner. They have also standardised the documents on procurement of projects as also procurement of services of technical, financial and legal advisors. The state governments have taken and may continue to take advantage of these documents with slight modifications relevant to their milieu.

12.6. Road Maintenance Strategies

The existing road network is under severe strain due to traffic growth, overloading of vehicles and government past neglect 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. 6,000 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 was broadly assessed in the year 2001 to be about Rs.2,50,000 crores. The current replacement value may be much more. These are very costly assets requiring our careful attention. Studies undertaken by the World Bank have shown that one rupee spent on maintenance saves two to three rupees in vehicle operating cost. It is essential to salvage the roads already deteriorated and guarantee proper maintenance. A healthy system for road maintenance has to be evolved.

The 13th Finance Commission considered, and decided to provide a central grant of Rs.19,930 crores over the period 2011-15 for the country as a whole. Annual grant would come to around Rs 5,000 crores. This amount is in addition to the normal expenditure under the Non –Plan revenue head of the States, which the states are expected to incur on maintenance of roads and bridges. This is about Rs.11,000 crores a year. It is necessary to study the reduction in renewal cycle as a result of the same.

Some states could consider taking up high traffic density road and bridge projects through tolls (rates of toll should be affordable by road users – e.g. charging not more than 50 percent of the perceived savings in vehicle operation cost) and award them to private entrepreneurs for a fixed concession period of say 15 years. This would relieve the state from maintenance of such projects as the obligation will get passed on to the private entrepreneur. However this would vary state to state and depending on willingness to pay.

Technology of maintenance operations should also be upgraded by introducing mechanization gradually e.g. repairing of potholes through machines. Such machines are now being manufactured in the country. Our strategy should be to encourage the local contractors to procure such machines.

There is a need to establish a Road Asset Management in the States. Internal accountability among the technical officers at various levels needs to be strengthened. A few pilot projects should be undertaken by the state PWDs by contracting out performance based maintenance covering routine and periodic maintenance for a minimum period of say three years at a time.

12.7. Road Safety (focus on State Roads)

There has been tremendous growth of both road network and road traffic in India. The situation is worsening. The total number of fatalities and injuries in the year 2009 is reported as about 125,700 and 5,15,500 respectively. The Central and State Governments generally adopt the standards and guidelines issued by the Indian Roads Congress. There is need to provide road signs, pavement markings and safety features on State Highways and selected Major District Roads as a first priority and as an integral part of road development projects.

Some PWDs have now initiated the task of undertaking Road Safety Audits on their projects during different stages of design, implementation and operations. The implementation of measures suggested by such audits is expected to prove useful in reducing the accident potential on the roads in question.

It is suggested that each state should appoint a Standing Committee to inspect the roads and suggest road improvement measures. Police has made considerable improvement in enforcement of traffic regulations in major cities. However, inter-city highways (National Highways and State Highways) have not received serious attention. There is need to give thought to such a system being put in place on high density State Highways also.

A computer based road accident database management system should be set up as part of the Road Data Centre. The government may provide financial support for creation of Centres of Excellence in each State. It is suggested that a special amount should be earmarked to improve traffic safety out of both plan and non-plan grants to be spent

on improvement of accident prone spots and other engineering measures on the roads. An annual provision of a certain percentage of annual budget by each state for SHs and MDRs is suggested.

12.8 Resource Mobilisation

12.8.1 Budgetary resources for state roads are likely to be limited, compared to resource requirements. Hence, generation of additional resources through modern road fund at state level is necessary. Enhancing Budgetary Allocations is vital. Provisions for the road sector should be a certain minimum percentage of the Annual Plan of the state. Bulk of the budget provision should be made for State Highways and Major District Roads comprising the Core Network.

12.8.2 Several states have taken up improvement programmes for their states roads with funding assistance from the World Bank, ADB, JBIC, etc. Works completed are generally of good quality and high standards, with safety features. These projects have resulted in providing a much needed boost to road funding besides strengthening the institutional capability of state governments to execute large size projects. It is, therefore, necessary to continue with the strategy of seeking such external assistance for some more time.

12.8.3 Central Road Fund although revamped, only about Rs.2,300 crores per year, i.e. a total of around Rs.11,500 crores over a five year period is likely to be available for SHs and MDRs. The Government may consider levy of cess on petrol and High Speed diesel (HSD) oil as per the provisions of the Central Road Fund (CRF) Act, 2000 on ad-valorem basis in place of the current policy of charging it at Rs. 2.00 per litre of petrol and HSD oil.

12.8.4 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. Funding for the last mile connectivity can be obtained from the developer to the extent possible. It is necessary to explore possibility of land value capture and real estate development on case-to-case basis.

12.8.5 Frequent flood etc. resulting major damage to road infrastructure 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 and amend the current norms for the Calamity Relief Fund so that it becomes possible to restore the assets to their original condition.

12.9. Road Management System

E.11.1 The States should institute simple Road Management System comprising modules such as road information, traffic information, pavement and bridge management, environmental & social information.

12.10. Special Needs and Strategies for the North East Region

Roads are the principal modes of transport 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 riding quality and condition of main roads is generally fair to poor. The position is much worse in case of State Highways and Major District Roads. Only about 10 percent of the state highways can be said to be structurally adequate to carry the legally permissible single axle load. Due to financial constraints, the states have not been able to provide strengthening overlays in any significant manner. From safety consideration, several sections of single-lane roads need to be widened to two lanes of carriageway. The states may need support to undertake a special programme of IRQP (Improvement in Riding Quality Programme) on the lines of National Highways. It needs to be recognised that construction cost per kilometre is maximum whereas possibility of private financing is minimal and resources available with the NE states is low. Hence infusion of central fund is a must.

Another problem unique to the NE region is the presence of a number of semi-permanent timber bridges. An accelerated program of replacing these bridges is to be implemented. Safety also needs to be enhanced by taking several engineering measures.

The State Public Works Departments (PWDs) are responsible for policy, planning, design, construction and maintenance of state roads. They lack exposure to good practices in other states of the country and outside and need training. DONER has provided good support in this direction.

There are no state level or regional level training centres except for Assam where the state level road research laboratory is being refurbished and strengthened for training of PWD personnel. The Region depends basically upon the IAHE. This aspect requires serious consideration of DONER. Until then, more intensive use of the IAHE is necessary. There is also a need to develop core faculty from within the Region also for which a scheme of training the trainers should be prepared and implemented.

12.11State Roads - Programmes proposed for the 12thFive Year Plan (2012-17)

12.11.1 There is need to maintain and increase the momentum generated during the 11thFive 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.

12.11.2 A broad indication of the requirements for the 12th Plan, keeping in view the major thrust areas identified by the sub group and removal of deficiencies on the network has been attempted and is given below. A combination of private and public financing is proposed in respect of SRDP component.

12.11.3. Investment Programmes proposed for the 12th Five Year Plan (2012-17): -

	Scheme		Physical (km)	Financial (Rs.crore)	Possible element of private finance (Rs. crore)
I.	**Development of Core Network including SHDP**				
(i)	Expressways including Urban Links to National Expressways	Land acquisition	1,000	9,250	0
		Construction	1,000	23,000	13,800
(ii)	Four-laning		10,000		
		Land acquisition	10,000	42,500	0
		Construction	10,000	75,000	37,500
(iii)	Two-laning	A. with Paved Shoulders	30,000	1,50,000	45,000
		B. with Hard Shoulders	30,000		
(iv)	Strengthening weak pavement and riding quality improvement		60,000	60,000	0
(v)	Bypasses, ROBs, bridges, flyovers		Lump sum	30,000	10,000
(vi)	Missing gaps to link up new SEZs, ports, ICDs, satellite towns, expressways, etc.		1500	4,500	2,000
	Sub-total for SHDP			**3,94,250**	**1,08,300**
II.	**Other SHs and MDRs**				
A.	***North-East Region (SARDP – NE)***				
(i)	Two-laning (and four laning in selected stretches near Towns)		2,500	10,000	0

(ii)	Providing hard shoulders and upgrading of surface on single lane roads, strengthening including riding quality improvements	3,000	3,000	0
(iii)	Replacement of semi-permanent timber bridges	Lump sum	1,500	0
(iv)	Bypasses, safety engineering works, etc.	Lump sum	1,500	0
	Subtotal for NE region		**16,000**	**0**
B.	***Other Programmes***			
(i)	Two-laning	20,000	40,000	0
(ii)	Riding quality improvement of existing two lane roads	20,000	10,000	0
(iii)	Providing hard shoulders, strengthening and upgrading of surface on single lane roads	50,000	50,000	0
(iv)	Bypasses, ROBs, bridges, safety engineering measures	Lump sum	10,000	0
	Subtotal for other states		**1,10,000**	**0**
III	**Training and Skill Development**	Lump sum	**2,000**	**0**
	Grand Total		**5,22,250**	**1,08,300**

12.12. Roads are valuable assets and justify preservation and regular maintenance. Assuming a modest erosion of 5 per cent due to current deficiencies in maintenance, the annual loss would be much more than the total amount of funds that may be required for preservation of these roads. There is no economic sense in losing our assets. Each state may work out the realistic requirements and ensure regular maintenance.

13. Road Safety (Engg. Aspects) and Research & Development

13.1. Road Safety

13.1.1. Standards and Guidelines for Highways and Urban Roads

- Highway and urban road design standards and guidelines will be made consistent with the safety requirements and in tune with the international best practice.
- All existing standards/guidelines/ manuals/codes, etc., of IRC/MoRT&H will be reviewed for their specific Focus to Road Safety, and deficiencies/shortfalls identified in relation to safety.
- New standards and manuals will be prepared for filling the gaps in the current standards.
- There should be adequate engineering measures supported by strict enforcements to ensure segregation of fast and slow moving traffic, especially on the multi-lane (i.e. having 4-or more lanes) highways. To that extent the Project Scopes defined in the Concession Agreements of projects being undertaken under various phases of NHDP need to be adequately reviewed. This should also apply to the O&M contracts / OMT concessions.
- All road projects being delivered at present (either at planning stage, design stage, construction stage, or even at implementation stage and operation stage), whether on BOT or as Item Rate / EPC Contracts, will be reviewed at each stage to identify any issue related to road safety.
- All State Highways and National Highways are to be provided with both pavement markings and road signs as per the requirements specified by the standards of IRC/MoRT&H. These shall be mandatory requirement for road safety.
- Initiatives are required to be taken for taking up adequate State-of-Art Traffic Calming Measures in the relevant areas / places, especially in urban areas, near habitations, etc. for enhanced safety to vulnerable road users.
- For ensuring the construction zone safety for traffic operation, there should be proper estimate prepared at the stage of Detailed Design, and it should be part of the total project cost like any other item in the form of BOQ items.

13.1.2. Monitoring and evaluation of road designs and traffic management strategies

- Road Safety Audit should be made an integral part of the project planning, report preparation, appraisal, designing, implementation, operation and maintenance, etc. The project should be duly reviewed and necessary corrective actions should be taken pursuant to the report of the Road Safety Audit at every stage.

- The entire network of NH and SH are to be subjected to Road Safety Audit (RSA) in a planned and time bound manner. The RSA shall identify all the potential hazards in terms of deficiencies observed in the network, which are required to be corrected on continuous basis for making the road network safe.
- The States and MoRTH will prioritize the network to be audited, and will implement the improvements recommended by Road Safety Audit. The priority roads with high accident records are to be taken up first in a time bound manner.
- To carry out Road Safety Audit (RSA) for the entire primary network, required capacity is to be developed through proper training of qualified engineers, who are eligible for training. For this purpose, a special committee will be set up to draw up guidelines for a RSA procedure suitable for Indian traffic and safety issues with special reference to vulnerable road users by December 2011. Teaching and research institutions including IITs, NITs, CSIR, etc. will be identified for establishing training programmes for RSA professionals.
- Road Safety Audit is to be carried out for the roads using the trained auditors available in the country and in accordance with the manual of Road Safety Audit adopted by IRC. All steps of audit delivery including the initial meeting and audit completion meeting with the Client must be completed with submission of audit report and exception report etc for every road assigned for audit. This will bring out what all is required to be done for the road ensuring highest level of safety.
- No compromise, whatsoever, should be made in essential road safety features and all safety concerns must be addressed as per the recommendations of the Road Safety Audit Report. This aspect needs to be critically considered especially while analyzing project viability.
- Encourage Institutionalization of conducting Road Safety Audits by certified Road Safety Auditors.
- An accreditation body is required to be created for Road Safety Auditors, which will control the utilization of these trained auditors and will maintain the register of certified auditors. Such auditors will have to undergo training and retraining as per a set of guidelines to maintain a high standard of auditing.
- Capacity for Road Safety Audit works in the country is to be enhanced by training and conducting certifications courses for Road Safety Auditors.

13.1.3. Accident Investigation

- Accident data recording system is to be adopted uniformly across all States for roads in urban and non-urban areas in a standard

format. This standard format is to be evolved with national consensus and should include all rational data that are required for accident investigation, accident reconstruction, and also adjudication of the accident cases.

- The data collection should be tech-savy with hand-held GPS and computer interface so as to collect all data with highest precision.
- There will be standard accident analysis module for accident investigation and adjudication uniformly to be used across the country without any exception.
- Only a few specialized centres shall study selected accidents, using the accident reconstruction technique, etc. and the same data system.
- Institutionalized System of Database storage shall be developed.

13.1.4. Training

- The engineers involved in planning, design, construction and operation of roads and highways in the country are to be trained on road safety aspects covering engineering measures, safety at construction sites and hands on experience in road safety audit.

13.1.5. Research & Development related to Road Safety

- To establish about five to seven Centres of Excellence for Road Safety Research and Accident Analysis in Academic Institutions across the country in addition to the existing research institutions.
- The capacity in road safety research and accident analysis is also to be developed, for which bright young professionals are to be identified for specialized training.

13.1.6. National Road Safety & Traffic Management Board

Government is already initiated the process of approving the Bill for creation of a Road Safety & Traffic Management Board. This Central Body is an urgent requirement along with the counterparts in the States.

13.1.7. Institutional Arrangements for planning, delivery, evaluation, monitoring and improvement

The concerned Road Agency should be made responsible for the planning, delivery, evaluation, monitoring and improvement with specific focus to road safety. For this purpose, it is of utmost importance that necessary institutional arrangements be developed within a fixed time frame.

13.1.8. Inter-Disciplinary Coordination

It is very important to establish synergy between various stakeholders at various levels (i.e Central, State, District, etc.), which is presently missing, e.g. between the engineering authorities (viz. Road Agency, R&D / Academic organizations,) enforcement authorities (viz. Police, State Transport Authorities), organizations responsible for emergency care (viz. M/o Health & Family Welfares, Hospitals, Trauma Care Centres, etc.). The focus should be to establish a robust mechanism to address road safety issues in a comprehensive manner.

13.1.9. Availability of Resources

Adequate funds should be made available commensurate to the requirements, especially for development and maintenance of non-NHDP National Highways Network. It needs to be appreciated that in the absence of required allocations, there is inevitable compulsion of compromising with many of the essential features and requirements which have significantly adverse road safety implications. Similarly resources provided for State roads shall have to be commensurate to the estimated requirements.

13.1.10. Capacity Building in Safety Administrations

Due emphasis is required to be given to fast track capacity building of all stakeholders and organizations associated with Road Safety aspects. Further, these aspects shall also have to essentially reviewed on a continuous basis for needful adaptation with changing environment and evolving State-of-Art practices.

13.2. Research & Development

(i) Specific R&D schemes need to be taken up for possible adaptation of State-of-Art innovative technologies and materials in the highway development and maintenance in Indian context. Field / Pilot testing of such technologies / materials may be taken up under ongoing projects under NHDP, SARDP-NE, and other projects to test their efficacy and for enabling their adaptation.

(ii) Possible use of waste materials / by-products, etc., in highway development and maintenance by necessary treatments for their qualitative improvements (if required) should be explored and R&D should focus on adaptation of such technologies corroborated by field testing in a time bound manner.

Further, recycling of pavement materials should be also considered.

These suggested measures are considered to be very important considering the depletion of natural resources such as aggregates, etc., besides their adverse effects on environmental degradation.

(iii) The R&D schemes, having immediate practical relevance in the context of the initiative of the Government to develop highways in the country, needs to be taken up on priority.

(iv) There are Committees in IRC for giving accreditation to new materials / technologies, etc. However, in numerous occasions, the general experience is that there are reluctance on part of executive agencies to allow field testing of these new technologies / materials, etc., as a means of their performance evaluation for enabling taking up of further necessary action for their possible wider use in the sector.

It is important that the Government encourages field testing of such new technologies / materials, etc., accredited by the IRC Committees, by the executive agencies.

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