

Roads and Road Transport in India: Past – Present - Future consequence

¹ Kandarp Saparia, ² Dr. Nanak Pamnani

¹ PhD Research Scholar, ² Professor

Dept. of Civil Engineering, Madhav University, Pindwara (Sirohi), Rajasthan, India¹²

Abstract: Roads are the key to development of an economy of a country. A decent road network constitutes the basic infrastructure that drives the development process through connectivity and inaugurates trade and investment. Roads have a key role in transport and other infrastructure development, starting links with airports, railway stations and ports. In addition, they have important roles in encouraging national assimilation, which is particularly important in a large country like India. The paper has reviewed Deficiencies of Road Network, Recent Initiatives in Road Network Development and future plans. Than the paper have annalis current issues in terms of Development Strategy, Maintenance and Management of Highways, Highway Improvements on User Pay Basis, Quality and Appropriateness of Main Roads, Corridor Management, Institutional Arrangements. And finally this paper concludes with the vision for the coming years to improve road network in India.

Keywords - Road network, Transportation, Infrastructure, Connectivity, Highway, Quality of roads.

I. INTRODUCTION

India has extensive road network of more than 3.3 million km making it one of the leading road networks in the world. For the purpose of their management and administration, the country's road network consists of Express-ways, National High-ways, State High-ways, District Roads and Village Roads. Under the Constitution, accountability for development and repairs of national high-ways reposes with the Central Government while other roads are the accountability of the State Government concerned.

The road network includes around 66,600 km of National Highways, 1,30,000 km of State Highways, 4,90,000 km of Major District Roads and about 2.80 million km of other District and Rural Roads. National Highways contain only about 2 percent of the total length of roads and carry about 45% of the total traffic across the country. Over the years, roads have grown in importance as a mechanism for moving goods and people in the country. This is partly reflected in greater innate flexibility of road transportation. However, this development is giving tough competition to the Indian railways.

While the national highways are planned to assist medium and long haul inter-city traveler and cargo traffic across the country, state highways are meant to carry traffic within the state. Together, they provide the main mobility function in the transportation system. District roads and village roads serve to connect villages to provide accessibility and market linkages. Major district roads deliver the secondary purpose of linkages between the main roads and the rural roads. Presently, National highways are being maintained, managed and developed under agency system. The overall liability including planning, budgeting, and standardization is handled by the MOST (Ministry of Surface Transport). The Government of India has, however, under an Act of Parliament in 1988, established the NHAI (National Highways Authority of India) for maintaining, managing and developing the national highways as a single agency.

Funds required for the national highways are provided by Central Government budgets year by year and for State Roads, funds come from by the respective state government's budget. The states are directly responsible for development of State Roads and their management.

Being capital-intensive in nature, road construction requires enormous amounts of funds. Current assessments recommend that cost of a six-lane express-way works out to around Rs. 9 cr/km and four-lane highway works out to roughly Rs. 5 cr/km. As of today, the involvements of tolling submit that there is restricted opportunity for earning user charges through tolls. This has outstretched difficult queries about road construction that how it would be funded.

A key revolution in recent years has been the creation of a most important new source of finance for all types of roads - national, state and rural roads, viz. - the Central Road Fund (CRF), formed under the Central Road Fund Act, 2000. This was an important landmark in gaining user charges to fund road construction. In fact, this fund is the monetary base of an important project NHDP (the National Highway Development Project), which involves expansion of the existing two-lane highways to four-lane or six-lane and strengthening of present or existing lanes on nearly 15,000 km. This is one of the largest/longest single highway projects in the entire world.

The Control of National Highways (Land and Traffic) Act, 2002 was passed by Parliament and notified. The legislation aims at avoiding unauthorized utilization of highway land and seeks to switch access points to National Highways and regulate traffic on them. It also envisages setting up of Highway Managements to implement the law and setting up tribunals to hear demands against orders.

Deficiencies of Road Network

From the time after Independence, there has been a marvelous growth in the volume of road traffic in all the way of passenger as well as freight traffic. Much of the widening and expanding of the road network has been through building the rural areas to provide connectivity to villages, even though around 40% of the villages are not yet connected with roads survives in all seasons. Even the major roads have also not kept bound with the traffic quantity as their quality.

Despite their status to the national economy, the road network in India is exceptionally poor in several aspects. The current road network is insufficient and is unable to handle heavy traffic at numerous of places and has unfortunate riding class. The key reason for these weaknesses is lack of funds for maintenance. Efforts are now ongoing to report these issues and improvement in the road network has been rendered a high priority in India.

To bridge the gap of resource and to instill competitive efficiency, efforts are being made to associate the private sector with road projects. However, the initial response has not been very encouraging and it is felt that more innovative methods are needed to ensure greater participation of the private sector. Simultaneously, it is also necessary to priorities road projects according to resource availability so that resources are not spread thinly among large number of projects leading to unnecessary delays.

Inadequate networks have led to higher transportation expenditure which have also severely eroded international competitiveness of the Indian economy. Commercial vehicles are able to run only 200-250 km on an average per day as compared to 500-600 km per day in developed countries. The problem is further compounded by congested sections, existence of railway level crossings, octroi posts and other tax barriers, all of which lead to anomalous delays in travel and higher fuel cost. Apart from economic losses due to the bad condition of roads, there are security, safety and pollution problems. The deficiencies in the road network have contributed to safety hazards with about 60,000 human lives lost every year. The fatality rate is about 25 times more than that in the US. The inadequate road system is also responsible for enhance in pollution levels.

Recent Initiatives in Road Network Development

A. National Highways Development Project: In the extent of National Highways, India has boarded upon a historic project in terms of the Golden Quadrilateral, North-South and East-West corridors. These highways, which will give nonstop speeds of more than 80 kmph, will convert the movement of goods and people in India. The effective getting of NHDP, with projects finished on time and within budget, and the successful preservation of the new roads, are crucial point to focus. The next demands of National Highways will be conveying inquiries about what and how new projects coming about. Specific new linkages will essential to be constructed between metro cities, and some 4-lane highways will requisite to be improved into 6-lane highways or Express-ways. It is essential to create market-oriented mechanisms for addressing these problems, so that unusual public resources generate the best construction of required National Highways.

The National Highways Development Project (NHDP) - the largest and longest highway project started by the country - which is being executed by NHA (The National Highway Authority of India), consists of the following components.

- i. NHDP Phase I & II envisage 4 and/or 6 laning of about 15,000 Km of National Highways, at a total estimated cost of Rs. 75,000 cr. These two phases containing Golden Quadrilateral, North-South and East-West Corridors, Port Connectivity along with other more projects. The Golden Quadrilateral connects the four Capitals i.e. Delhi, Mumbai, Kolkata and Chennai. The North-South connects Srinagar in North to Kanyakumari in South and East-West Corridor connects Salem in East to Porbandar in West.
- ii. Government has permitted up gradation of around 5,000 Km under NHDP Phase HI-A at an estimated cost of about Rs. 25,000 cr as also to take advance achievement in the form of planning of the DPRs for the balance length of around 8,000 Km under Phase-IIIB.
- iii. On October 5, 2006, Government has already sanctioned six-lane NH of 6,500 Km including 5,700 km of GQ and balance 800 km of other sections under NHDP Phase-V at a total of Rs. 41,210 cr.
- iv. Similarly, on November 2, 2006, Government has sanctioned production of 1,000 km of expressways with 'full access control' on fresh alignments at a cost of Rs. 16,680 crore under NHDP-Phase VI.

In year of 2006, 6,776 km of national highways concerning to NHDP had already completed, the bulk of which 5,475 km lied on the GQ. Constraints faced in the timely completion of NHDP include delays in land acquisition, removal of structures and shifting of utilities, law and order problem in some States, and poor performance of some contractors.

For execution of NHDP Phases I and II, the main source of funding of NHA is the fuel cess. The current rate of cess is Rs. 2 per litre on each petrol and diesel. A part of this cess is assigned to NHA to fund the NHDP. This cess is leveraged to borrow additional funds from the domestic traffic. Besides, the Government of India has also negotiated various loans from World Bank, Asian Development Bank, and Japan Bank for International Cooperation for financing various projects under NHDP. These loans from the multi-dimensional institutions are passed on to NHA by the Government partly in the form of grant and loan. NHA also negotiated a direct loan of US\$ 165 million from ADB for one of its projects. The funds provided to NHA, including its borrowings from the market, are utilized for meeting project expenditure as well as debt servicing.

For the execution of NHDP, innovative contractual agreements are being discovered like allowances. Under the annuity method of financing, the originator is paid the annuity over the enterprise period after sovereign engineer certifies that worth service

available to end users of roads is in accord with agreement of concession. This is a smart mechanism for contracting. An open auction could be conducted where developers submit bids to the government, specifying the annuity that they would require to build an assured expanse. Using this smart, rare public resources could be directed to the roads which require the least annuities.

Observance in these huge fund requirements, and given the huge accumulation of the previous years, all sources of financing will have to be tapped. Some highway improvements will have to be carried out on 'user pays' basis through NHAI or any other agency which can borrow money from the market and repay the loans through tolls. In addition it is necessary to involve the private sector to supplement the government's efforts which, in addition to bringing in additional funds, may also bring in the benefit of private sector management and entrepreneurial skills.

The expansion and preservation of financing viable for bypasses of Highways around congested towns and spot repairing on bridges, interchanges and road over bridges should be taken up through the private sector or in partnership with them.

The development of the proposed National Highways and network in the country will take quite some time. Except for bridges, bypasses and certain other super-links, it would be difficult to fund the construction through toll finance. The considerable percentage of the development of both National and State Highways will have to be undertaken by the government. However, the volume of funds required will not be available from standard budgetary sources. It is therefore, essential to specifically earmark sources of funds for road development. In particular, the various taxes which are currently levied on motor vehicles of different types, the use of fuel in transportation etc. should really be viewed as charges for road usage. Consequently, substantial portions of such revenues should be earmarked for road development.

B. Pradhan Mantri Gram Sadak Yojana (PMGSY): In direction to increase rural linkages, rural roads programme PMGSY was launched in October 2000. The prime objective of PMGSY is to make available connectivity, by way of all-weather roads, to the unconnected dwellings in the rural areas, so that dwellings with population of 1,000 and above are covered in three years (2000- 2003). All unconnected dwellings with a population of 500 persons and above are to be connected by the end of the Tenth Plan Period (2007). In respect of the hill Stations (North-East, Sikkim, Himachal Pradesh, Jammu and Kashmir, and Uttaranchal) and the desert areas, the objective is to connect dwellings with a population of 250 persons and above. The programme also aims to achieve an equitable increase of the rural roads network in different States districts so as to fully exploit the latent probable for rural growth. The PMGSY is being implemented as a 100 per cent centrally sponsored scheme.

C. Public-Private Partnership (PPP): Investments in Road infrastructure were being made by the Government mainly because of the large capacity of funds required, long conception period, uncertain return and associated externalities. The careering supplies and the concern for executive productivity currently have led to dynamic connection by the private sector also. To encourage contribution of them, the Department of Road Transport and Highways has generated policies and guidelines. Government has also declared some incentives to road building equipment and machinery to encourage private sectors. It has been decided that all the sub-projects in NHDP Phase-III to Phase-VII would be taken up on the basis of PPP (Public Private Partnership). The private sector involvement envisaged in Phase-II of NHDP has also been improved.

D. Special Accelerated Road Development Programme in the North Eastern Region (SARDP-NE): The SARDP NE envisages widening of around 3,500 km of National Highways, up gradation including widening of 3,000 km of State roads and 2-laning of 2,000 km of roads of strategic significance in the northeastern region. This program will provide at least 2-lane road linkage to all State capitals and district head-quarters of all the eight North Eastern Estates. This programme will be implemented in two Phase one consists of 1,200 km of national highways and 200 km State/general staff (GS) roads and second Phase involves improvement of 2,200 km national highways and 4,200 km State/GS Roads.

Future Plans

Government has set ambitious plans for up-gradation of National Highways in upcoming years. A presentation was made before the Committee on Infrastructure proposing the following projects in addition to the completion of the ongoing works included under NHDP Phase-I and Phase-II:

- i. 4-laning of 11,113 km (NHDP Phase-III) including 4,035 km already approved.
- ii. Accelerated road development programme for the North Eastern region.
- iii. 2-laning with paved shoulders of 20,000 km of national highways (NHDP Phase-IV).
- iv. 6-laning of GQ and some other selected stretches covering 6,500 km (NHDP Phase-V).
- v. Development of 1,000 km of express ways (NHDP Phase-VI).
- vi. Development of ring roads, bypasses, grade separators, service roads etc. (NHDP Phase-VII).

As a policy, Government has approved future phases of NHDP tenders largely on a PPP basis. Execution of projects through contracts will be only in unique cases where private sector participation is not possible anyhow.

Current Issues in Road Network Development

A. Development Strategy: It is imperative that the development plans for the main roads be highway-user oriented. Priority should be given to the reconstruction of weak and distressed bridges and major missing bridges. Improvement works must be taken up depending on the intensity of vehicular traffic. This approach has already been initiated for National Highways by dividing the network into high, medium and low traffic volume zones. A similar approach should be followed for the State Highways.

Corridor development should form the basis of highway strategy based on the traffic volume to be served and other development potential in the corridor. Improvements have to be planned in the form of expressways, widening to four-lanes, construction of paved shoulders and strengthening of pavement etc. for a period of 20 years and projects taken up accordingly in stages and in order of priority. Highway policy should address the issue of the sources of funding such improvement projects.

B. Maintenance and Management of Highways: The maintenance of existing highways should be given priority over their improvements. Existing assets cannot be allowed to deteriorate. Modern maintenance and management systems have to be implemented. Maintenance depots should be established all along the highway network. Maintenance activities should also be contracted out in a gradual manner. The management of highways should encompass the maintenance of the entire right of way, prevention of encroachments on highway land, regulation of the development along highways within a defined width of say 200 meters. Facilities to be provided for traffic, including providing relief to accident victims and ensuring removal of bottlenecks in traffic movements, should also feature in the highway management. Entire control of the traffic as well as of the highway land should thus form part of highway management activities.

C. Highway Improvements on User Pay Basis: Four-laning of some of the existing highways should be done through the public toll roads method. Funds should be borrowed from World Bank or ADB for this purpose. The local-counterpart funds may be raised from financial institutions. Traffic on existing roads as well as newly constructed ones should be charged. This concept is gaining acceptability the world over, since it is considered prudent to charge the traffic rather than deny the facility. The National Highway Act, 1956 already provides an enabling provision in this regard. The legal option is that an alternative free facility is not necessary.

D. Quality and Adequacy of Main Roads: The main roads have not kept pace with traffic also in terms of their quality. Improvements have been usually undertaken as a stage development process by spreading resources thin and wide over the network, leading to several weaknesses like inadequate structural thickness of pavements.

E. Corridor Management: The substantial conclusion of NHDP Phase-I, namely GQ, calls for a shift in importance to corridor management the technique of managing all highways to deliver maximum amount in terms of speed and traffic volume, while minimizing working cost and increasing safety. The concept of corridor management is being applied on the finished sections of NHDP through O&M (operation and maintenance) agreements. The various safety measures being adopted as a part of corridor management are the following.

- i. Timely maintenance of roads.
- ii. Usage of road safety furniture like crash barriers, road signages, delineators, road studs, median railing, thermoplastic road marking, and plantation of shrubs in the central median to reduce glare of light of vehicles from the opposite direction.
- iii. Deployment of round the clock route patrol vehicles, ambulances for immediate rescue of accident victims and tow-away cranes for rapid clearance of the highway.
- iv. Development of wayside amenities to reduce the fatigue of long-distance driving.
- v. Involvement of NGOs for dissemination of road safety principles among the rural masses living along the high-speed corridors.
- vi. Conduct of road safety audits and studies for identification and improvement of black spots on the highways.
- vii. Development of pavement management system for timely and appropriate maintenance and improvement.

Guidelines and procedures must be laid down for the approval of private sector projects, spelling out the nature of clearances required and the authorities to be approached. The onus of traffic running smoothly, quick attention to maintenance, speedy help to drivers, efficient traffic management, removal of encroachment etc. will be primarily on the private party and it is this agency which will have to take the brunt of the decisions. Other regulatory agencies, no doubt important, will have a somewhat smaller role.

II. CONCLUSION

The vision for the coming years to improve road network in the country should include the following.

1. Mobilisation of resources through direct and indirect user charges to bridge the gap between requirement and availability of funds.
2. Monitoring and review of the performance of the EOT annuity scheme and take steps including bridging the information gap of encourage private sector participation. Sharing the downside risk of traffic flows could also be considered.
3. According a higher priority to the maintenance of roads and associate the private sector in this activity.
4. Placing emphasis on the development of the existing network rather than on declaration of new National Highways.
5. Prioritizing the projects and programmes relating to development of National Highways.
6. Initiating planning for expressways.
7. Developing wayside amenities by associating private sector and integrating the development of these amenities with the development of tourism in various regions.

REFERENCES

1. J.G. Valan Arasu (2008). "Globalization and Infrastructural Development in India", Atlantic Publishers, New Delhi, p.2
2. Sahoo, P and Dash, R.K. (2008). "Economic Growth in South Asia: Role of Infrastructure". The Journal of International Trade & Economic Development, Volume 21, Issue 2, April 2012, p. 217-252
3. Sahoo,Pravakar (2011). "Transport Infrastructure in India: Developments, Challenges Lessons from Japan." Published by Institute of Developing Economies, Japan External Trade Organization (IDE-JETRO), 2011, p.465
4. Cervero, Robert and John Landis. 1997. Twenty Years of the Bay Area Rapid Transit System: Land Use and Development Impacts. Transportation Research PartA.31(4), p. 309-333.
5. Commission for Architecture and the Built Environment and Department of Environment Transport and Regions London, (2001): The Value of Urban Design
6. Akcelik, R. (1991) Travel Time Functions for Transport Planning Purposes : Davidson's Function, its Time-Dependent Form and an Alternative Travel Time Function. Australian Road Research, 21 (3).
7. Taylor, M.A.P. (1996) Planning and Design for On-Road Public Transport in Traffic Engineering and Management. Edited by Ogden, K.W. and Taylor, S.Y. Department of Civil Engineering. Clayton, Victoria.
8. World Bank (2002a). India's Transport Sector: The Challenges Ahead - Volume 1: Main Report. Washington DC: The World Bank.
9. World Bank (2002b). India's Transport Sector: The Challenges Ahead - Volume 2: Background Paper on "Urban Transport, Alok Bansal, Zhi Liu, Balakrishna Menon, Arun Mokashi, N. Ranganathan (pp 78-90). Washington DC: The World Bank.
10. World Bank (2013). Urbanization Beyond Municipal Boundaries: Nurturing Metropolitan Economies and Connecting Peri-Urban Areas in India. Washington DC: The World Bank.
11. Ministry of Urban Development (2006). National Urban Transport Policy. New Delhi: Government of India.
12. Ministry of Urban Development (2011). Report on Urban Infrastructure and Services. New Delhi: The High Powered Expert Committee for Estimating the Investment Requirements for Urban Infrastructure Services.
13. Ministry of Urban Development (2012a). Working Group on Urban Transport for the National Transport Policy Development Committee: Final Report. New Delhi: Government of India.
14. Ministry of Urban Development (2012b). Report of the Working Group on Urban Transport for the 12th Five Year Plan. New Delhi: Government of India.
15. Ministry of Road Transport & H.ghways (2012). Working Group on Roads for the National Transport Policy Development Committee: Final Report. New Delhi: Government of India.
16. Ministry of Urban Development (2013). Metro Railway Policy. New Delhi: Government of India.
17. Ministry of Urban Development (2013). Metro Railway Policy. New Delhi: Government of India.
18. Planning Commission (2012a). Twelfth Five Year Plan (2012-17) - Faster, More Inclusive and Sustainable Growth: Volume I. New Delhi: Government of India.
19. Planning Commission (2012b). Twelfth Five Year Plan (2012-17)-Economic Sectors: Volume II. New Delhi: Government of India.
20. Planning Commission (2012c). National Transport Policy Development Committee: Interim Report. New Delhi: Government of India.
21. Michael, S, Clarke, A.P., Buckley, R.M. (Ed) (2009). Urbanization and Growth. Washington DC: The World Bank on behalf of the Commission on Growth and Development.

