

STRATEGY FOR FINANCING OF MAINTENANCE OF ROADS IN INDIA

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ABSTRACT

Indian Road network has presently a total length of approximately 4.87 million km. and is reckoned as second largest in the world. A well maintained road provides good surface to road users. It also lowers the vehicle operating costs besides savings in travel time. Conversely, a badly maintained road provides a rough and uneasy riding surface. It gives high vehicle operating costs and induces damages to vehicles and is environmentally undesirable. Road management authorities therefore always aim at having well maintained road network. But maintenance of this huge national asset is a challenging task, specially in view of complexity arising due to political system, technical requirements and financial constraints. Though road sector is very important from the point of view of growth of economy, availability of funds for the sector is quite low in the budget because of competing urgent societal needs. Consequently, funds for maintenance of road which is sub set of road sector funds is also toned down to the minimum. India has therefore been continuously striving for a sustainable strategy for financing of maintenance of roads.

1. INDIAN ROAD NETWORK

Indian road network comprises various classes of roads Table-1 below gives the road classification and their present lengths maintenance:

Table-1

Road classification	Total length
National Highways	*92,851
State Highways	242,687
Rural Roads, and Urban roads and other roads	4,629,462
	*4,865,000

**Source – MoRT&H*

The network carries over 65 percent of its freight and about 85 percent of passenger traffic. National Highways, which constitute about 2% of road network, carry 40% of total road traffic.

2. INSTITUTIONAL ARRANGEMENT

Given the federal form of government, principal authorities who are responsible for development and maintenance of various clauses of roads are given in the Table-2 below:

Table-2

Road classification	Authority responsible
National Highways	Central Government (through Ministry of Road Transport & Highways)
State Highways	State Governments
Rural Roads	State Government Rural Roads Departments
Urban Roads	Local authorities like corporations, Municipalities
Other Roads	Various Govt. and private organizations

2.1 Central Government through Ministry of Road Transport & Highways is responsible for National Highways. However, an agency called National Highways Authority of India (NHAI) has become operational in 1998 for implementation of development and maintenance work on National Highways. NHAI has its own high level Board, which makes all financial and administrative decisions. It also has an Advisory Board, which has several representatives from public and private sector besides NGO's. About 40% of total lengths of National Highways have now been entrusted to NHAI, while the remaining lengths are developed and maintained by Central Government through State Governments as its 'Agents'.

2.2 State Highways are the responsibilities of respective State Governments. However, in most of the States, specific agencies for development and maintenance of State Highways, on similar lines as NHAI, have been established. On the same pattern, they have also been entrusted specific State Highways, while the remaining roads are developed and

maintained by Road Construction Department of the respective State Governments.

- 2.3 State Governments through their Rural Roads Organization carry out the development and maintenance works of rural roads. Being vital link to a large population, the Central Government constituted, an agency, called National Rural Roads Development Agency (NRRDA) in the year 1999-2000 to provide technical and financial support to the State Governments for development of rural roads.
- 2.4 Urban roads are generally developed and maintained by local authorities like corporations and municipalities which mostly functions under grants from State Governments besides the local tax collection. However, large size works are executed by the respective Road Construction Departments of the State Governments.

3. **PRESENT STATUS OF NETWORK**

- 3.1 Road transport is vital to Indian economy. The Road Development Plan Vision: 2021 emphasized that 'Considering that India has ambitious plan for GDP growth of 6 to 8% annually in the coming years, it is essential that transport infrastructure is improved and expanded in tune with the economic growth and kept in serviceable condition through proper maintenance. The Government of India also considers road network as critical to the country's development, social integration and security.

- 3.2 In keeping with the Vision 2021, there has been large emphasis on strengthening and capacity augmentation of roads under various programmes. National Highways are the principal arterials of the network managed by Central Government, Ministry of Road Transport & Highways (MoRT&H). Though isolated development projects were taken up every year, a well-structured National Highways Development Project was commenced in 1999, which initially envisaged widening and strengthening to 4/6 lane carriageways of about 13,000 kms. Later, this has been expanded in stages to cover 50,618 kms. of National Highways for strengthening and widening to 2 lane, 4 lane or 6 lane carriageways. The aim is to modernize the roads for capacity building, with due geometric design, adequate pavement crust and road safety measures. Present status of National Highways is as under:

- 4 lane carriageways and more - 21,026 kms. (23%)
- 2 lane carriageway - 42,830 kms. (46%)
- Intermediate / Single lane carriageways - 28,995 kms. (31%)

A very important aspect in development process is that Build, Operate & Transfer (BOT) concession agreement under Public- Private Partnership, with all possible variants, have been widely adopted. Thus the direct budgeting allocations are made available for sections having lower economic returns.

- 3.3 State Highways are the secondary arterials in various states. About 99% of the State Highways are paved. Since the turn of the century, there has been greater emphasis on development of State Highways, particularly for strengthening and widening to two lane carriageways. A few four lane sections have also been constructed. Financing of development projects are done through Build, Operate & Transfer Concession Agreement under budgetary source as well as through Public-Private Partnerships.

- 3.4 The third category comprises Rural Road, Urban Roads and other roads. The most important sector of this category is Rural Roads. These roads comprise about 85% of the total network and are managed by respective State Governments. They are the last link in the network and are critically important in terms of providing access to social and economic services. In view of the importance of rural roads, the Central Government has set up an agency called National Rural Road Development Agency (NRRDA) to provide management and technical support to State on the programmes related to rural roads. About 929,000 kms. of rural roads have been reconstructed as all-whether road, since the year 2000.
- 3.5 The development in road sector has been welcome. Yet there are many deficiencies. Only 2.53 million km. roads are surfaced and the rest are unsurfaced. About 29,000 kms. of National Highways have single / intermediate lane carriageway. There is heavy backlog of strengthening and up-gradation of all categories of roads. Riding surface of roads vary largely. While roads which have been recently strengthened or upgraded are in good condition, other roads have fair to bad riding quality. Some sections become unpassable in rainy seasons. The deficiencies range from distressed pavements, weak and narrow bridges, congestions, bad geometrics and lack of safety measures. Congestion on many sections of highways and urban roads is a common sight. Road safety measures on the roads are also varying and may be rated as inadequate to deficient. Therefore, much still remains to be done for augmentation in respect of the following:
- Geometrical design deficiencies, black spots and inadequate road safety provisions
 - Weak pavements and bridges
 - Capacity constraints

4. TRENDS FOR ALLOCATION OF FUNDS FOR MAINTENANCE

- 4.1 In India, Government budget is prepared by respective departments and is voted and passed by Parliament at the Centre and by the State Legislature in States. Politically, new construction is favored. Therefore in India, new construction represents almost 90% of total budget allocation to National Highways. Other classes of roads have similar provisions. Division of funds for new construction and maintenance in other countries shows varying proportions. In Portugal, over 80 per cent of the total funds is spent on new construction. The United States spends less than 20 per cent of the total funds on new construction. Canada (Ontario) spends less than 10 per cent of the funds on new construction. In other countries' expenditures for new construction represent 25-65 per cent of the total budget.
- 4.2 The allocations that are provided to the State Governments for Maintenance of National Highways are about 40% of the actual requirements as per the Ministry's stipulated norms. A broad indication of year-wise **shortfall in availability of funds for maintenance of NHs** is given in **Table-3** below:

Table-3

(Amount in Rs. million)

Year	Estimated requirement of funds as per norms	Amount provided to the Ministry	Shortfall	% Shortfall
(1)	(2)	(3)	(4)	(5)
2004-05	24,800	7,456	17,344	69.94%
2005-06	24,800	8,681	16,119	65.00%
2006-07	24,800	8,140	16,656	67.16%
2007-08	22,800	10,017	12,783	56.07%
2008-09	22,800	9,740	13,060	57.28%
2009-10	25,000	10,591	14,409	57.64%
2010-11	28,000	20,570	7,430	26.53%
2011-12	28,000	13,274	14,726	52.59%
2012-13	30,000	19,980	10,020	33.34%
2013-14	47,000	19,952	27,049	57.55%
2014-15	53,500	20,999	32,501	60.75%

(INR 60= US\$1)

Similar is the case for funding of maintenance of other roads.

- 4.3 It is clear from the above that dependency on budgetary source for maintenance of roads will end up in increasing the burden of unmaintained roads, specially when large portion of network is weak, narrow and deficient. Political system and social objectives demand enhanced maintenance needs. In order to support economic growth, the road is required to be well maintained continuously so as to be have good riding surface for reduced vehicle operation cost and provide safety features for safe journey. Therefore, performance based specifications have been developed which stipulate the time within any deficiency has to be rectified, such that the users are able to avail the best service possible. In order to implement the performance based specifications, there is increased cost. Thus there is further increase in the fund requirements for maintenance.

5. MANAGEMENT OF ROADS

- 5.1 In 1995, Ian G. Heggie of World Bank published the remedy to backlog of maintenance in Sub-Saharan Africa through "Management and Financing of Roads". The key concept is 'commercialization: bring roads into the market place, put them on a fee-for-service basis and manage them like any other business enterprise'. However, since roads are a public monopoly and ownership of most roads will generally remain in government hands, commercialization requires complementary reforms in four other important areas. These are referred to as the *four basic building blocks*. They focus on: (i) creating **ownership** by involving road users in management of roads to win public support for more road funding, to control potential monopoly power, and constrain road spending to what is affordable; (ii) stabilizing road **financing** by securing an adequate and stable flow of funds; (iii) clarifying **responsibility** by clearly establishing who is responsible for what; and (iv) strengthening **management** of roads by providing effective systems and procedures, and strengthening managerial accountability.

- 5.2 Commercialization of roads and management principles have been under consideration in India since then. In fact, an international seminar on 'Highway Rehabilitation and Maintenance' was also organized in November 1999 in New Delhi by Indian Roads Congress in association with International Road Federation.
- 5.3 As envisaged in the building blocks for efficient management of roads, direct involvement of public in making the allocation of funds for road development and maintenance, as the country is large with vast population which is difficult to be represented in the authorities control. Accordingly, this function has been left to Central Parliament and State Legislatures. Public sentiments and views are made available through public representatives such that the road authorities cannot ignore the requirements of general public. In fact, Parliament and State legislature have always been overseeing the functions of various areas of Government, including roads. In the past 15 years or so, the concerns of public representatives about roads in their localities are very much expressed in questions and floor discussions. They also make direct correspondence to the road authorities about condition or problem of roads in their localities. There are given very high weightage while preparing planning, and budget.
- 5.4 A strategy for financing of maintenance has therefore evolved on the basis of the above recommendations including development of building blocks with suitable modifications, primarily due to following considerations:
- a.) The status of road network
 - b.) Size and population of the country

6. **STRATEGY FOR FINANCING OF MAINTENANCE**

There is a huge backlog of both development and maintenance of roads in all categories in India. The 12th Five Year Plan (2012-2017) therefore envisages an investment of US\$ 1 trillion in roads. The roads are not able to give desired service to users. It was estimated in year 1999 that Vehicle Operating Costs (VOCs) could be reduced by \$4 billion per year through better road maintenance.

It is also realized that provision of direct funding source for maintenance is only limited, which can be to a practicable extent only. A strategy has therefore been evolved, over the years to maximize the length of well-maintained roads. These are brought out hereinunder:

6.1 **Enhancing funds for maintenance**

- 6.1.1 The Govt. of India enacted a law, levying a cess on diesel and petrol under Central Road Fund (CRF) Act, 2000. This is non-lapsable fund exclusively for development and maintenance of roads. Presently the amount of cess is Rs.2.00 (USD 0.033) per litre of petrol and HSD. This is being distributed in various categories of roads as under:
- 50% of the cess on HSD for rural roads.
 - 50% of cess on HSD and the entire cess collected on petrol allocated as follows:
 - 57.5% for the National Highways
 - 12.5% for safety works at railway crossing; and

- 30% for State Roads

Year-wise collections of funds under CRF are as under:

Year	Total (INR) million	US\$ million
2007-08	128,300	2138
2008-09	136,500	2275
2009-10	144,000	2400
2010-11	166,000	2767
2011-12	186,768	3112
2012-13	194,239	3237
2013-14	194,239	3237

As mentioned, this fund is meant for both development and maintenance. For National Highways and Rural Roads, this fund is generally utilized for development whereas for state roads, it is generally used for maintenance. Cess on fuel has also been levied in many states for generating funds for development and maintenance of roads under their responsibility.

- 6.1.2 Levy of user fee was enacted by Central Government in 1997, wherein the Government is authorized to charge user fee on all vehicles on a particular section of National Highways, provided the Government has made a minimum investment of USD 400,000 per km. This helps in collection of additional funds, for development and maintenance of roads. Such levy of user fee has been also mandated by some States, which increases their resources.
- 6.1.3 Village Panchayats levy tax on market commodities in villages. These are used mainly for maintenance of the roads within their respective jurisdiction.

6.2 Reduction of Maintenance Liabilities

- 6.2.1 Politically and administratively development projects are more favored in comparison with maintenance projects. Development projects however help in reduction of weak and congested sections. Therefore, this has been given due support by road authorities. As a result, the length requiring recurring maintenance is reduced.
- 6.2.2 During past 15-20 years, several development projects have been taken up under Build, Operate and Transfer (BOT) system under Public Private Partnership. The concessionaire constructs the project on the land allocated by the Government. After construction, the concessionaire operates and collects toll during agreed concession period, varying from 15 to 25 years including construction period. The Concessionaire also maintains the roads to prescribed standards for user's satisfaction, during concession period. This includes any strengthening and upgradation to be carried out based on actual traffic demands. In certain cases, some sections of BOT project is clubbed with adjacent section which had been improved earlier. This has double advantage, as it increases the viability of BOT project, besides responsibilities of maintenance of earlier improved portion is also allocated to the Concessionaire for full concession period. Already 15,000 kms. of National Highways have been completed under BOT. Several State highway projects have also been completed under BOT. These concessions effectively reduce the burden of maintenance

of roads in a major way and for a long period. These also ensure high level of service.

6.3 **Improving quality of maintenance**

It has been realized that quality of maintenance works, particularly routine maintenance are generally not up to the mark, even under contract maintenance. Thus the maintenance activities have to be repeated very often, involving higher fund requirements. Contract formats have therefore been suitably changed as under to ensure better quality work.

6.3.1 The Defect Liability Period which is usually kept as 12 months in any road construction contracts has been increased to 5 years. Any maintenance works required during the period are required to be carried by the contractor. This contract was adopted in some rural road contracts, as it solves the immediate issue of maintenance of completed roads. The system has some drawbacks, as contractors generally demobilize after completion of construction work. Therefore they have to remobilize requisite team and equipment for maintenance works as and when required. This causes delay in execution of maintenance works. However, this format may be adopted for newly constructed roads with suitable instructions for maintenance period. Moreover the road is off maintenance budget for the period envisaged.

6.3.2 Performance based contracts, which is very much prevalent in other countries have also been adopted. Various parameters of inspection and performance levels are spelt out in specifications. The contract period ranges from 3 to 5 years. This format ensures timely maintenance interventions with high quality work. Such roads provide best service to users at least cost. Since the work involved are specialized maintenance works, highway contracting industry needs to respond to such works, as compared to highway construction works.

In India, specialized contracting industry for maintenance has now developed which helps in implementation. The only drawback of the system is that maintenance funds are required to be provided continuously for the same section of road for at least 5 years, whereas other sections may have to wait. This dilemma is due to gross inadequacy of funds for maintenance.

6.4 **Public Private Partnership for Maintenance**

This system of Public Private Partnership (PPP) for maintenance – “Operation, Maintenance and Transfer” has been evolved where the funding for maintenance is provided by Private sector. The Concessionaire collects toll during the period of concession and pays certain amount to the Government as ‘Fee’. Thus, Government funding is not required for such projects. Salient features of Operation, Maintenance and Transfer, (OMT) system are detailed below:

6.4.1 *Model Concession Agreement*

Government has prepared a ‘Model Concession Agreement (MCA) for ‘Operation, Maintenance & Transfer (OMT)’, project, so that the concerns of all parties are addressed uniformly. The framework addresses issues which are typically important for PPP, such as mitigation and unbundling

of risks; allocation of risks and rewards; symmetry of obligations between the principal parties; precision and predictability of costs and obligations; reduction of transaction costs; force majeure; and termination. It also addresses other important concerns such as user protection, independent monitoring and dispute resolution. The objective is to provide efficient and cost-effective services to the users.

6.4.2 Financial viability

The three critical elements that determine the financial viability of OMT concessions are traffic volumes, user fee and capital costs. As the existing highways have dedicated traffic and the user fee is pre-determined, revenue streams for a Project Highway can be assessed with a fair degree of accuracy. The capital cost of OMT projects would normally be limited and predictable. The project structure would not, therefore, suffer from volatility or unmanageable commercial risks from the perspective of bidders. The main risk that they would be required to take is the rate of growth of traffic, which would determine their profitability.

6.4.3 Technical parameters

Unlike the normal practice of focussing on input specifications, the technical parameters proposed in the MCA are based mainly on output specifications, as these have a direct bearing on the level of service for users. Only the core requirements of design, construction, operation and maintenance of the project Highway are to be specified and enough room would be left for the Concessionaire to innovate and add value.

6.4.4 Concession period

The guiding principle for determining a project-specific concession period should be the periodic maintenance cycle of the Project Highway based on the current practice of undertaking major maintenance works once in five years. As such, the concession period is proposed to be determined on a project-specific basis depending on the balance period remaining before the forthcoming maintenance cycle. The concession period should terminate at a point where the life of previous maintenance works has expired so that fresh investments are left to the next concessionaire who would have a greater incentive in ensuring the quality and longevity of its maintenance works. Generally, concession period is fixed as 4 years or 9 years.

6.4.5 Concession fee

Concession fee, the share of toll revenues payable to the Authority / Government, will be determined by competitive bidding. The concession fee offered for the first year is increased for each subsequent year by five per cent thereof (or as stated in the bid documents) to capture the increase in traffic volumes.

6.4.6 Selection of concessionaire

Selection of the Concessionaire will be based on open competitive bidding. All project parameters such as the concession period, toll rates, price indexation and technical parameters are to be clearly stated upfront, and short-listed bidders will be required to specify only the amount of annual concession fee offered by them in the first year. The bidder who offers the highest first year concession fee should win the contract.

6.4.7 *Construction*

The Project Highway may require construction of facilities such as toll plaza, truck laybys, bus shelters, etc. Some additions and alterations may also be necessary for improving the safety and quality of service. Major maintenance works on the Project Highway may also be necessary in some cases. The Concessionaire would be entitled to commence tolling soon after the concession agreement comes into effect and construction of works would follow with the obligation to complete them within a time frame justified by good industry practice, to be determined by the Independent Engineer.

6.4.8 *Operation and maintenance*

Operation and maintenance of the Project Highway is governed by strict standards with a view to ensuring a high level of service for the users, and any violations thereof would attract stiff penalties. In sum, operational performance would be the most important test of service delivery.

6.4.9 *Monitoring and supervision*

Day-to-day interaction between the Authority / Government and the Concessionaire has been kept to the bare minimum by following a 'hands-off' approach, and the Authority / Government shall be entitled to intervene only in the event of a material default. Checks and balances have, however, been provided for ensuring full accountability of the Concessionaire.

Monitoring and supervision of construction, operation and maintenance is proposed to be undertaken through an Independent Engineer (a qualified firm) that is selected by the Authority / Government through a transparent process.

6.4.10 Already a number of projects under OMT are under implementation, covering about 2000 kms. of roads for the last 5-6 years and they have more or less served the desired objectives.

7. **Conclusion**

The strategy for financing of maintenance has been evolved within the system of the government and has proved to be effective in providing high or adequate level of service of roads in general. However, the strategy is flexible and any additional measure may be added to it at any time, if considered appropriate. There are still some roads having poor condition. It is hoped that the implementation of the strategy for maintenance will cover the whole network shortly. This sets an example for implementation of reforms with necessary modifications, amendable to the existing system, including practical considerations.

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