BOT Road Infrastructure Projects: Process, Problems, and Suggestions  
Nayan C Parikh and Rajesh Samson

Studies conducted by expert groups have established that the funding requirements for development and maintenance of road infrastructure in India will probably have to be met by private funding. Initial efforts to induce private investors to fund such projects have been based on the concessionaire/BOT approach. This article by Nayan Parikh and Rajesh Samson discusses the BOT model, which has been adopted with a few variations and refinements in the infrastructure sector, and puts forth suggestions that may help streamline the implementation of future road BOT projects.

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Allocations of outlay by the Planning Commission in the transport sector as a percentage of total planned outlay has been steadily declining since the First Plan. Planned outlay on roads has dropped from 6.5 per cent of total outlay in the First Plan to 3.0 per cent in the Eighth Plan. The planned outlay on National Highways (NHs) as a percentage of total outlay dropped from 1.3 per cent in the First Plan to 0.58 per cent in the Eighth Plan (Narain, 1995).

This is despite the fact that the importance of the road network in India has been rising. The share of roads in the transport of freight has risen from 11 per cent in 1951 to about 60 per cent in 1995, while the share of roads in passenger traffic has increased from 26 per cent to 80 per cent over the same period (Gupta, 1995).

A study of funding requirements for development and maintenance of roads in India reveals a large likely funding gap. Compared to an annual funding requirement of Rs 32,700 crore (Rs 327 billion) projected for the years 2001-2006 for development and maintenance of State Highways and NHs, the likely quantum of public funds available annually for this purpose is estimated to be Rs 10,100 crore (Rs 101 billion) (Mohan, et al. 1996) (Table 1).

It will clearly not be feasible for the state to meet the funding gap projected without affecting its ability to meet the requirements of other priority social and economic programmes. The obvious solution is attraction of private funds into the infrastructure sector by formulating a structure for projects that makes them commercially viable and attractive.

Project Structuring

Infrastructure projects may be suitably structured using the concessionaire approach. A project may be implemented by a new company promoted specifically for the purpose of this project. Such a company is known as a Special Purpose Vehicle (SPV). An SPV is an entity which has a distinct identity from its promoting company or companies (the sponsors).
Table 1: Funding Requirements for Development and Maintenance of Indian Roads

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Development Programmes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Super National Highways</td>
<td>10,000</td>
<td>30,000</td>
</tr>
<tr>
<td>National Highways</td>
<td>13,000</td>
<td>21,200</td>
</tr>
<tr>
<td>State Highways</td>
<td>9,000</td>
<td>11,500</td>
</tr>
<tr>
<td>Total</td>
<td>32,000</td>
<td>62,700</td>
</tr>
<tr>
<td><strong>Maintenance Programme</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Super National Highways</td>
<td>700</td>
<td>1,500</td>
</tr>
<tr>
<td>National Highways</td>
<td>3,800</td>
<td>5,000</td>
</tr>
<tr>
<td>State Highways</td>
<td>5,200</td>
<td>5,500</td>
</tr>
<tr>
<td>Total</td>
<td>9,700</td>
<td>12,000</td>
</tr>
</tbody>
</table>


The mandate for project implementation and maintenance may be offered to such a SPV by the competent government authority in exchange for certain rights (concessions) which enable the SPV to earn a stream of revenue from the project after project commissioning. In this case, the SPV is known as the ‘concessionaire.’ Concessions include the right of the SPV to charge users certain fees for use of the infrastructure facility. The period during which the concessionaire enjoys these rights is called the concession period.

Tolling of users of the infrastructure facility, or implementation of the ‘user to pay’ concept, has already been implemented in India. For instance, in Gujarat State, the Department of Roads and Buildings, Government of Gujarat, collects toll from users of the Sabarmati Bridge on the Ahmedabad Link Road connecting to NH8.

Finances for the project are raised by the SPV rather than the sponsors, and lending agencies will have recourse to the assets of the SPV but not those of the sponsors, unless specifically agreed upon. Implementation of a project by a SPV has the effect of isolating a single project into a recognizable entity so that lenders and investors can effectively lend to or invest in a particular project, without exposure to any other projects in which the same sponsors may be involved. The earnings capability, financial position, financial statements, and various financial parameters of such an SPV are indicative of the project itself. Credit rating of such an SPV, in essence, reflects the rating of the project. For example, the Noida Toll Bridge Company Ltd., which is implementing a toll bridge project linking Delhi and Noida estate, has issued bonds which were rated 'BBB' by CARE. This rating is a reflection of the rating agency's perception of the earnings capacity and associated risk of the project. Rating of this kind of project will rely heavily on the accuracy of traffic forecasts.

Financing of this nature, in which the lender has no recourse to other assets of the borrower in case of default, is known as 'non-recourse finance.' It may be observed that non-recourse financing in India is at a nascent stage, and lenders may often still insist on some form of collateral security from the borrower before lending to such a project.

While implementing the concessionaire approach, project sponsors are likely to face some procedural difficulties in project termination. After a project facility is transferred back to the central/state government, the SPV will serve no more useful purpose. The sponsors may redeem their shareholders' funds through share buyback by the SPV. However, dissolution of the company is likely to be a time consuming process. One alternative is to reuse the SPV for implementation of another infrastructure project. At present, the question of what happens to an SPV after project completion is still a grey area in infrastructure privatization as the SPVs formed in this manner are still enjoying their concession periods.

The concessionaire approach may be adopted in various forms as shown in Table 2.

The BOT structure for construction, financing, and operation of infrastructure projects is particularly suitable for the implementation of road infrastructure projects as the ownership of the main asset created (the road, bridge or highway) usually does not lie with the private party. The BOT structure allows construction, operation, and management of a facility by a party that is not the owner of the facility. A diagram showing the BOT structure is presented in Figure 1.

**Road Infrastructure Projects**

In India, roads are divided into the following categories for management and administration purposes:

- National Highways
- State Highways
- Major District Roads
- Other District Roads
- Village Roads.

Under the National Highways Act, 1956, the central government has been assigned responsibility...
for developing and maintaining all NHs. The Act has been amended subsequently to allow private sector involvement in this work. At present, the Department of Roads and Buildings of the state governments performs day-to-day management and works execution on portions of the NH that fall within their respective states. The Ministry of Surface Transport (MOST) is in charge of planning, budgeting, and laying down of standards in matters pertaining to NH construction and maintenance. The National Highways Authority of India (NHAI) has been established under an Act of Parliament in 1988 for developing, maintaining, and managing NHs as a single agency.

The Compounded Annual Growth Rate (CAGR) of traffic on the Indian roads network between 1951 and 1995 was 10.57 per cent per annum. Over the same period, the CAGR of the total road network length has been 4.16 per cent (Verma, 1995). It is obvious that this disparity between traffic growth and road network growth will not be sustainable over an extended period.

Table 2: Main BOT-Type Schemes Used in the Roads Sector

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Description</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build-Operate-Transfer (BOT)</td>
<td>Provides private consortia with a concession to finance, build, operate, and maintain a facility/road. During the life of the concession, investors collect user fees to cover the costs of construction, debt servicing, and operations. At the end of the concession period, the facility reverts to the public authority in question.</td>
<td>The most frequently used technique to develop a country's highway network. Also used in the energy, utility, and port sectors.</td>
</tr>
<tr>
<td>Build-Own-Operate-Transfer (BOOT)</td>
<td>Same as BOT, except that &quot;ownership&quot; or &quot;possession&quot; of project assets is more explicit, and may also include underlying infrastructure. After a negotiated period of time, the project is transferred to the government.</td>
<td>For highway development, energy, utilities, and port sectors.</td>
</tr>
<tr>
<td>Build-Transfer-Lease-Operate (BTLO)</td>
<td>Government provides the right-of-way on which the highway is built, and agreements require the concessionaire/promoter to pay a nominal rent or payment for use of the land.</td>
<td>Applied to highway and expressway development.</td>
</tr>
</tbody>
</table>

Figure 1: BOT Structure
The 20-year Road Development Plan (1981-2001) prepared by a group of Chief Engineers under the auspices of the Indian Roads Congress has suggested that 66,000 km of NHs, 145,000 km of State Highways and 2,510,000 km of other roads will be required by the year 2001. This will require investment of Rs 100 billion annually. It is clear that some portion of this investment will need to be sourced from the private sector.

**Project Formulation**

Private sector participation in an infrastructure project will be encouraged under either of the following circumstances:

- Projects which are commercially viable owing to large revenue potential.
- Government support in financial terms enhances the returns to the private party from an otherwise unattractive project.

Of the two options, the second does not tend to adhere to the basic tenet of infrastructure privatization, which is that private investment in certain projects frees up public resources that may be used to finance other projects which are less likely to attract private investment. Ideally, private investment in infrastructure is to be used as a tool to optimize allocation of resources between commercially viable and non-viable but essential projects.

It will be difficult to induce private sector participation in projects that are not viable or made viable in this manner. For example, excessive delays and resultant project cost escalation in the Ahmedabad - Baroda Expresswayway have made the project commercially unattractive, and the project is likely to be completed by the NHAI without private sector participation.

In the State of Gujarat, the Gujarat Infrastructure Development Board approves projects to be offered to private operators. For road project identification, input is sought from the Department of Roads and Buildings, Government of Gujarat.

Limited private experience in road infrastructure privatization in India has shown that the most commercially attractive projects are relatively short length links which relieve bottlenecks or enjoy captive traffic which cannot feasibly be diverted to another route (e.g. bridges and road overbridges). These projects tend to be much more attractive than highway projects. The reasons for these are manifold:

- The benefit derived from using the facility is easily apparent to an average user and is less likely to induce user resistance to tolling.
- Project costs tend to be low and 'financial closure' (finalization of project funding) is easier to achieve.
- The amount of land acquisition necessitated is low.

A number of such projects is being implemented on a BOT basis in Gujarat, including a road overbridge project on the Dahej-Bharuch State Highway in lieu of a level crossing, a bridge over the Mahi river, a road overbridge at Chalthan, and a bridge over the Narmada River. It has been observed that such bridge and road overbridge projects identified at specific bottlenecks can achieve payback in only 5-8 years, while highway projects have payback periods ranging from 8 to more than 20 years. Certain portions of NH8 which pass through Gujarat have been studied for strengthening and widening on a commercial basis. This particular route is part of the so-called 'Golden Corridor' and is a dense traffic route with a projected payback of about 8 years. In comparison, the strengthening and widening of State Highway 87 from Baroda to Halol has an expected payback of 30 years.

Initial experience with toll collection has shown that the existence of multiple entry points creates difficulties in smooth operation of the facility. For example, a toll road between Surat and Hazira, being operated by the Gujarat Industrial Development Corporation, conducts both industrial traffic to an industrial estate and local rural traffic. Local traffic has been made exempt from paying toll, and this could complicate the process of traffic segregation and toll collection.

**The Selection Procedure**

Projects that have been identified for award to a private party may be offloaded through a competitive bidding process, which typically consists of three phases of evaluation:

**Prequalification**

Bidders are evaluated on the basis of experience and technical competence to execute the project envisaged, to arrive at a shortlist of technically competent bidders.

**Technical Bid**

Bidders who clear the prequalification round submit technical proposal for the facility envisaged.

**Financial Bid**

Bidders shortlisted after the technical evaluation are required to submit a bid on the basis of a bidding parameter.
Since the technical proposal has to conform to certain guidelines and standards laid down by the R&B/MOST for State Highways/NH projects respectively, the technical bid generally involves considerable duplication of effort. It is possible for the R&B/MOST to provide the technical design and do away with the technical bid, to speed up the bidding process and avoid duplication of designing effort.

In the bidding process for a normal construction contract, bidders may be evaluated on the basis of the price they quote for executing a particular work in conformance with the specifications laid down. In an EOT arrangement, the concession period has been identified as a highly effective bidding parameter. In order to arrive at a concession period quotation that suits him, a bidder must evaluate:

- His own expected cost of construction of the facility
- The likely toll revenue to be earned from traffic using the facility
- The rate of return which he finds acceptable for undertaking the project.

During financial evaluation, the lowest bid concession period may be considered as the most competitive bid. This approach has been used in awarding the EOT road overbridge project on the Bharuch-Dahej State Highway.

Therefore, a bidding procedure based on the concession period as the bidding parameter tends to identify a bidder who projects a low cost of construction and accepts a reasonable rate of return thereon. This approach has been used in awarding the BOT road overbridge project on the Bharuch-Dahej State Highway.

This method of bidding has one shortcoming. The concession period starts automatically from the commencement of toll collection, and is fixed, i.e., the concession period does not include the construction period. Bidding on the basis of concession period defined in this manner does not tend to reward the concessionaire for early completion of construction, or penalize him for delayed construction.

Therefore, the Department of Roads and Buildings, Government of Gujarat, has revised its method of bidding for subsequent projects, and has identified the concession period including construction period as a superior bidding parameter. Bidders are therefore encouraged to target lower construction periods in addition to the other considerations mentioned previously in arriving at a bid. Moreover, a concessionaire who completes construction before the targeted date is rewarded with a longer toll collection period. This approach has been used in awarding the BOT bridge project over the Mahi River.

The BOT operator will be encouraged to complete facility construction within an optimum period in order to begin toll collection earlier and increase revenues from the project. It is interesting to note that the shortest possible construction period is not necessarily the optimum construction period. As shown in the crossover chart in Figure 2, decreasing the construction period involves escalation in the project cost, so that the point of maximum benefit to the operator is not necessarily the point of shortest construction period.

**The Contractual and Legal Framework**

The concession agreement document forms the heart of the BOT project. A concession agreement typically addresses the following issues:

- Representations and warranties, rights and obligations of both parties.
- Issues related to land acquisition and acquisition of right of way for the project.
- Design and construction responsibilities.
- Terms and conditions for operation of the facility.
- Construction of wayside facilities (e.g. petrol pumps and motels) for additional revenue generation.
- Early termination of the concession for various reasons.

**Figure 2: Sensitivity Analysis for Construction Cost and Period**

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Conditions and procedures for facility transfer at the end of the concession period.

- Assignment of concessionaire's rights to lending agencies and banks, in case of default on loans ('step-in-right' of lenders).
- Definition of default by either concessionaire or government.
- Dispute resolution mechanism.

The NHAI has drafted a model concession agreement for NH BOT projects which have not been awarded through competitive bid. This standard agreement incorporates the following clauses of interest:

- The concessionaire is allowed to earn an annual compounded return of 20 per cent on the predetermined project cost. At the point where the concessionaire's cumulative discounted earnings reach the total of project cost + 20 per cent earnings thereon, the concession is automatically terminated and the project is to be handed back to the government.

- The concession period is fixed tentatively at 30 years. If the concessionaire is not able to earn his predetermined project cost + earnings thereon within this period, the concession period may be extended for two years at a time until the concessionaire does earn project cost + stipulated returns thereon.

- In case of revenue shortfall that may not be corrected even by extension of the concession period, additional wayside facility development rights (e.g. for petrol pumps or motels) may be given to the concessionaire.

- The NHAI may invest in equity in the SPV which promotes the project.

- The toll rate structure for different types of vehicles is specified in Rs chargeable per km of road length. Toll rates are linked to the Reserve Bank of India Wholesale Price Index (RBI WPI) and allowed to be increased in proportion to the rise in the WPI.

- Termination clauses are incorporated. Protection is accorded to the lenders to the project; in case of early termination of the project by the government, compensation to lenders and equity holders will be awarded by the government.

- Step-in rights of lenders are clearly defined.

- A direct agreement between the government, concessionaire, and lenders to the project is included.

Certain difficulties are likely to be encountered in the use of this model agreement:

- It will be observed that concession period is flexible, and so the stated concession period of 30 years is only an indicative figure. If this model agreement is to be used for projects awarded through a competitive bidding process, bidding for such projects will need to be carried out with 'project cost' as the bidding parameter, since the concession period is not fixed and, therefore, cannot be used for bidding purposes. Bids may be awarded on the basis of the lowest project cost quoted. It is not yet clear whether the NHAI will follow this method, or will revise the model concession agreement for projects awarded through competitive bidding.

- The flexible concession period tends to protect the concessionaire from revenue risk, as the concessionaire is assured of 20 per cent (compounded, and therefore taking into account the time value of money). The revenue risk will devolve on the lenders (who will be forced to reschedule their loans in case of initial revenue shortfall) and the government, who will have to extend the concession period in case of initial revenue shortfall.

Risk Allocation and Risk Mitigation

Risk allocation is the process of transferring most or all of the adverse effects of a particular risk to a particular party, e.g., a delay in construction of the facility will adversely affect the SPV which is implementing a project, since the project will incur time cost overruns and revenues will be delayed. However, a clause may be incorporated in the construction contract that imposes liquidated damages to be paid by the construction consortium in case of construction delay. If these liquidated damages are enough to cover most or all of the loss incurred by the SPV in case of delayed construction completion, it can be said that the risk of construction completion has been effectively reallocated to the construction consortium.

Risk mitigation is the process of structuring the project in such a way that a particular risk is allocated to that party which is in the best position to minimize or deal with that particular risk. In the example cited above, the risk of construction completion has been allocated to the construction consortium, which is obviously the party in the best position to avert or deal with this particular risk. Hence, in this case, the risk of construction completion can be considered to be 'mitigated.'
Table 3: List of Risks in BOT Road Projects and Methods of Mitigation

**Project Development Phase**

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Risk Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land acquisition</td>
<td>Make it obligatory for government to provide vacant possession of project site within certain period from the signing of the concession agreement</td>
</tr>
<tr>
<td>Delays in project development</td>
<td>Obtaining of clearances to be made obligatory on government’s part</td>
</tr>
</tbody>
</table>

**Project Construction Phase**

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Risk Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project completion risk</td>
<td>Reputed EPC contractors with adequate track record should be selected through a competitive bidding process</td>
</tr>
<tr>
<td></td>
<td>EPC contract structured as a fixed time and fixed price contract, with stiff liquidated damages for non-compliance</td>
</tr>
<tr>
<td></td>
<td>EPC contractor offered an equity component in the project, thereby devolving part of the construction risk on the contractor itself</td>
</tr>
<tr>
<td>(1) Project cost risk</td>
<td>EPC and O&amp;M contracts should be structured on a fixed price basis. Hence, cost overrun due to breach by contractor minimized.</td>
</tr>
<tr>
<td></td>
<td>Additionally, adequate contingency provision and insurance cost for unforeseen circumstances has been built into the project</td>
</tr>
</tbody>
</table>

**Project Operations Phase**

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Risk Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue risk regulatory and administrative risk (delay in toll increases)</td>
<td>Toll revision at rate indexed to WPI or other such index</td>
</tr>
<tr>
<td>Risk of shortfall in traffic</td>
<td>Provision to extend the concession period, in case of non-achievement of the designated return of 20% (in case of fixed return projects)</td>
</tr>
<tr>
<td></td>
<td>Provision to extend the concession agreement, in case of non-achievement of 20% return over the 30 year period, in case of fixed return projects</td>
</tr>
<tr>
<td>Under-reporting/Leakage of toll revenue</td>
<td>Concession agreement may provide for additional revenue streams being provided to the concessionaire in case of inadequacy of project revenues from tolls</td>
</tr>
<tr>
<td>Poor maintenance of the facility</td>
<td>Reputed O&amp;M contractor may be appointed</td>
</tr>
<tr>
<td>Termination risk</td>
<td>Equities to be offered to the selected O&amp;M contractor to share the risk</td>
</tr>
<tr>
<td>Force majeure risks</td>
<td>O&amp;M contractor to have strict maintenance standards, with penalties for non-compliance</td>
</tr>
<tr>
<td>Political and social risks —</td>
<td>Government to at least pay a compensation to meet the outstanding liabilities of SPY</td>
</tr>
<tr>
<td>nationalization</td>
<td>Comprehensive insurance coverage</td>
</tr>
<tr>
<td></td>
<td>Government to pay a compensation to meet all costs of project including takeout of lenders and other investors</td>
</tr>
</tbody>
</table>

Much of the risk associated with infrastructure projects needs to be mitigated through judicious inclusion of relevant clauses in the concession agreement. A list of risks typically encountered in BOX road projects and possible methods of their mitigation is displayed in Table 3.

**Issues in Financing of BOT Projects**

Practical experience has shown that the following hurdles are encountered while arranging finances for BOT projects:

**Lack of Prime Security**

Since the land on which the facility is to be constructed is owned at all times by the government, there is no prime security that can be offered as security against loans to the SPV. This is the reason that the concept of the 'step-in right' of the lenders has evolved. Essentially, this means that the right to collect toll on the facility is offered as security to the lenders. In case of default on loans by the SPV, the lenders may take over the toll collection rights in the same way they...
take over secured prime assets in industrial projects.

In practice, the value of the right to collect toll as a security against loans is questionable. The right to collect toll derives its intrinsic value from the revenue streams flowing from the project, which in turn depends on traffic observed on the facility. If revenue streams are not sufficient for debt servicing, the right to collect toll will itself be inadequate as security. Therefore, the assignment of right to collect toll to the lenders in case of default will only serve as a protection to the lender against gross mismanagement of the facility by the SPV or willful default on loans by the SPV. This shortcoming highlights the importance of professional traffic studies and traffic forecasts prior to investment in a project.

For small projects (bridges and road overbridges), as the quantum of loan is fairly small, the sponsor may be in a position to offer other assets as collateral security. In large projects, the lack of either prime or collateral security induces financial institutions to charge higher interest rates and demand other methods of protection such as Letters of Credit from banks or escrow accounts.

The Escrow Account

The escrow account is often advocated as an alternative security in the face of lack of prime security. Receipts from the project are assigned to the escrow account on a regular basis, and the lenders are assigned a charge on the escrow account. However, the escrow account, like the right to collect toll, derives its intrinsic value from the revenue streams flowing from the project. In case of project failure owing to poor revenue streams, the lender is not in a position to salvage significant value from the project. Lending to BOT projects is, therefore, non-recourse lending, and there appears little alternative to this kind of financing for BOT infrastructure projects.

In practice, the escrow account also presents operational difficulties as toll receipts are deposited daily, while institutions accept interest and loan repayments on a quarterly basis. Locking up of toll receipts in the escrow account on a daily basis results in huge interest losses to the SPV, while deposit of funds on a quarterly basis in the escrow makes the arrangement meaningless and risky from the institution's point of view.

On the other hand, the escrow serves an alternative useful purpose in that the revenue received from the project cannot be used by the developers for any other purpose until the debt has been repaid. This aspect should offer some level of comfort to the lenders while undertaking non-recourse finance.

Placement of Equity

Experience shows that raising funds for such projects through equity issue is extremely difficult. Road infrastructure projects are highly risky in nature and, generally, the expected returns from equity investment do not appear commensurate with the risk involved.

The equity portion of the project means of finance may be subscribed to by implementing a combination of the following measures:

- Partial project support by the NHAI/State Government through equity investment in the project.
- Compulsory equity subscription by the Construction Consortium and Operations and Maintenance Contractors for the project.
- Bundling of debt with equity while negotiating with financial institutions so that lenders are required to invest in some token equity as well.
- In practice, it seems unlikely that lenders will be willing to support a project with a debt equity ratio of more than 2:1. Therefore, the equity investment in the project cannot be brought down beyond a reasonable level during the creation of the financial structure.

Back-ended Cash Flows

Bridges and road overbridges in well identified bottleneck areas generally have reasonably low payback periods. However, limitations to the toll that can be reasonably charged to users, coupled with the initial user resistance to toll payment results in poor initial cash inflows in highway projects. It is expected that later flows will improve over time, as users begin to appreciate the benefit from the new facility vis-à-vis alternative routes, and resistance to toll payment declines.

Because of the skewed nature of the cash inflows from highway projects, debt servicing ability of the project in the initial years is low. Broadly speaking, highways with initial traffic levels of 30,000 + passenger car units may show adequate debt servicing capabilities with reasonable assumptions of interest rate (17%), project cost (about Rs 4 crore per km of road length for a project strengthening and widening project) and traffic CAGR of 7 per cent per annum (the assumptions are indicative figures based on the parameters observed in projects being undertaken in the country).
However, some highways being strengthened and widened as private projects do not show this level of traffic as yet. In such cases, the project revenues during the initial years will be clearly inadequate for debt servicing. In such cases, complicated financial structuring has to be carried out. The debt portion of the means of finance of the project is built up using a mix of conventional term loans (moratorium of 2-3 years), Deep Discount Bonds (DDBs — repayment after 10-20 years), and institutional bonds with varying interest and repayment patterns. The Infrastructure Development Finance Corporation (IDFC) may assist in such projects by offering to take out DDBs before their maturity from initial investors, making the DDBs safer and more attractive.

In theory, this kind of complicated financial structuring makes these highway projects viable from the point of view of debt servicing capability. However, the resulting financial model tends to be highly sensitive to variations in revenue and changes in the financial structure. Failure to meet targeted revenues in a particular year or inability to raise finances at the exact rates and maturities assumed in the financial model could trigger series of cash deficits and hence loan defaults. In practice, it is not yet clear whether Indian financial institutions are open to the idea of financing on the basis of such finely balanced financial models.

It is also observed that the financial model for such projects with initial PCU levels of 20,000-25,000 PCU require concessional funding from the government, in the form of soft loans or loans with disproportionately large moratoriums.

The Learning Curve

In all the issues mentioned above, a natural reluctance on the part of financial institutions in the country to explore new methods of repayment, securitization, and financing makes financial closure for highway projects difficult.

The Road Ahead

Initial experience with the BOT structure in road infrastructure development indicates that a number of issues needs to be addressed:

Project Formulation

The rationale of private sector investment in infrastructure is that private funding of commercially attractive projects will free up public resources that can then be invested in essential but commercially non-viable projects. As debottlenecking projects are generally observed to be very attractive to both operators and financiers, these may be identified for private involvement first. Otherwise, poor experience of the private sector in less attractive projects will act as a disincentive to private investment in infrastructure in future. There is little point, therefore, in offering risky or mediocre projects for private participation, particularly during the initial years of experience in infrastructure privatization.

Project formulation should involve developing a project with definite commercial viability. If sops from the government are necessary for commercial viability, the quantum of assistance and support should be worked out in advance and offered as part of the project package.

Involvement of Financiers

Once a BOT project has been awarded to the successful bidder, the terms and conditions in the original tender document cannot be changed. However, in the present system of BOT project promotion, financiers are involved only after the project has been awarded to the successful bidder. If financiers are not comfortable with the existing conditions of the concession regarding project termination, lender step-in and so on, not much can be done to change the situation at this stage.

Alternatively, the government may consider involving potential financiers at the project conception. Since financing the BOT SPV is tantamount to financing the project itself, institutions may conduct preliminary appraisal and provide in-principle assistance to a project before the BOT operator is identified. Therefore, when the project is offered for competitive bidding, it is already established as bankable, and a complete ‘package’ including in-principle finance will be put up for auction to bidders. The lenders may be involved during bid evaluation to ensure the creditworthiness of shortlisted candidates. A ‘creditworthiness evaluation’ round of evaluation may be added to the bidding process after the technical evaluation and before financial proposal evaluation.

The project package may include a reliable traffic study conducted by a professional consultant, which can be used by bidders in arriving at their quotations during the financial bid, and also by financiers while assessing the project for lending. Such a study conducted during project formulation will reduce considerable duplication of work and will also provide a level of comfort to bidders and financiers.

The Bidding Process

Practical experience shows that a bidding parameter of concession period including construction period
would provide good results in road BOT projects, because it tends to encourage both speedy and cost effective construction, and penalize tardy construction. These ends are not achieved by the use of the definition of concession period as exclusive of construction period.

An efficient operator will attempt to arrive at an optimum construction period to maximize gains. It is observed that the shortest possible construction period is not necessarily optimum, because of excessive cost involved in speeding up construction beyond a point. Therefore, the optimum construction period must take into account both additional revenue likely by speeding up construction as well as additional cost to be incurred in speeding up construction. Therefore, the bidding parameter of concession period including construction period appears the best bidding parameter identified so far.

Minimum Government Stake

There is not much reason for large government stake in projects except where financial closure of the project will be difficult to achieve without government support. Partial government investment in profitable private projects reduces the earnings to the private sector and may hinder smooth functioning of the SPV. It will also reduce the government’s capability to support less attractive projects.

Conclusions

Definitive steps have already been taken in privatization of road infrastructure through the BOT process. The experiences of the pioneer projects in this sector must be used as guidelines for modifying the existing framework where necessary, so that more private investment is attracted into this area. Only then will it be possible for the targeted growth of the road network in India to be achieved.

References


Indian Roads Congress, "Road Development Plan 1981-2001."


Mohan, R et al. (1996b). *Volume III Sector Reports*, Ministry of Finance, GOI.
