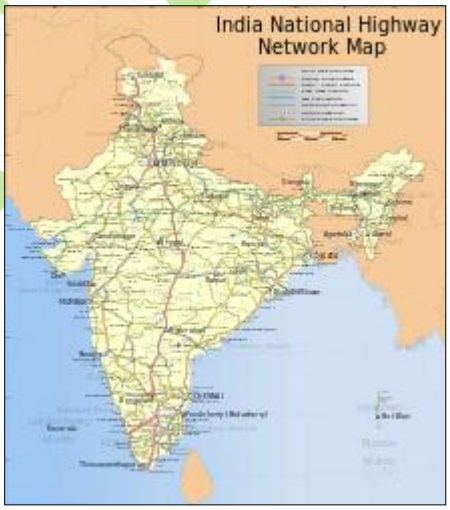
International Journal of Advances in Engineering Research http://www.ijaer.com
(IJAER) 2012, Vol. No. 4, Issue No. V, November **ISSN: 2231-5152**

SCENARIO IN PUBLIC-PRIVATE PARTNERSHIP FOR HIGHWAY PROJECTS IN INDIA

Dr. Rakesh Chaudhary
Team Leader ICT PVT. LTD. NH-24 BAREILLY-SITAPUR HIGHWAY PROJECT

INTRODUCTION

Road development in India has seen a major boost in last one decade through major projects taken up by the Central Governments. Particularly, the National Highway Development Project (NHDP) has changed the manner in which roads were built in the past. The **National Highways Development Project** is a project to upgrade, rehabilitate and widen major highways in India to a higher standard. The project was implemented in 1998. "National Highways" account for only about 2% of the total length of roads, but carry about 40% of the total traffic across the length and breadth of the country. This project is managed by the National Highways Authority of India (NHAI) under the Ministry of Road, Transport and Highways. The project is composed of the following phases:



- Phase I: The Golden Quadrilateral (GQ; 5,846 km) connecting the four major cities of Delhi, Mumbai, Chennai and Kolkata. This project connecting four metro cities, would be 5,846 km (3,633 mi). Total cost of the project is Rs.300 billion (US$6.8 billion), funded largely by the government's special petroleum product tax revenues and government borrowing. In January 2012, India announced the four lane GQ highway network as complete.

- Phase II: North-South and East-West corridors comprising national highways connecting four extreme points of the country. The North-South and East-West Corridor (NS-EW; 7,300 km) connecting Srinagar in the north to Kanyakumari in the south, including spur from Salem to Kanyakumari (Via Coimbatore and Kochi) and Silchar in the east to Porbandar in the west. Total length of the network is 7,300 km (4,500 mi). As of April 2012, 84.26% of the project had been completed and 15.7% of the project work is currently at progress.[3] It also includes Port connectivity and other projects — 1,157 km (719 miles). The final completion date to February 28, 2009 at a cost of Rs.350 billion (US$8 billion), with funding similar to Phase I.

- Phase III: The government recently approved NHDP-III to upgrade 12,109 km (7,524 miles)of national highways on a Build, Operate and Transfer (BOT) basis, which takes into account high-density traffic, connectivity of state capitals via NHDP Phase I and II, and

connectivity to centres of economic importance. Contracts have been awarded for a 2,075 km (1,289 miles).

- Phase IV: The government is considering widening 20,000 km (12,000 miles) of highway that were not part of Phase I, II, or III. Phase IV will convert existing single lane highways into two lanes with paved shoulders. The plan will soon be presented to the government for approval.

- Phase V: As road traffic increases over time, a number of four lane highways will need to be up-graded/expanded to six lanes. The current plan calls for upgrade of about 5,000 km (3,100 miles) of four-lane roads, although the government has not yet identified the stretches.

- Phase VI: The government is working on constructing expressways that would connect major commercial and industrial townships. It has already identified 400 km (250 miles) of Vadodara (earlier Baroda)-Mumbai section that would connect to the existing Vadodara (earlier Baroda)-Ahmedabad section. The World Bank is studying this project. The project will be funded on BOT basis. The 334 km (208 miles) Expressway between Chennai—Bangalore and 277 km (172 miles) Expressway between Kolkata—Dhanbad has been identified and feasibility study and DPR contract has been awarded by NHAI.

- Phase VII: This phase calls for improvements to city road networks by adding ring roads to enable easier connectivity with national highways to important cities. In addition, improvements will be made to stretches of national highways that require additional flyovers and bypasses given population and housing growth along the highways and increasing traffic. The government has not yet identified a firm investment plan for this phase. The 19 km (12 miles) long Chennai Port—Maduravoyal Elevated Expressway is being executed under this phase.

The policy of Government of India has stated that a part of NHPD II and all subsequent phases of NHPD are to be developed as Public-Private Partnership/Build Operate and Transfer (PPP/BOT) schemes only. The role of private sector was considered particularly important in view of the investment required in road sector and the limited availability of public resources. As the public-private partnership (PPPs) were envisaged to play a vital role in asset creation, it was imperative to insure that the appropriate regulatory and procurement framework for private sector Participation (PSP) should be efficient.

Typically the Concession agreement (CA) of any of the highway projects under PPP scheme is based on the 'Model Concession Agreement' (MCA) provided by the Planning Commission. MCA and its associated bidding framework have been revised recently by Planning Commission (April, 2009) taking inputs from the experience of PPP projects delivered till then.Any dilution on the strictness in qualification of bidders, strict control on delivery, etc leaves it completely in the favour of Concessionaire of PPP project, making it in uncertain state in many ways, as it can be seen in the experience of last few years. There is no scrutiny for design, and if at all anything is there it is a review provided in MCA, to be done by Client's representative i.e Independent

Engineer, which is not pay attention by the Concessionaire. Thus, provision leaves little scope to ensure the quality delivery. Some of the major flaws or shortcoming in the MCA and its associated document are discussed in this paper.

Several alternative designs of PPP have been promoted with increasing responsibilities to the private sector, even in those where Road Authority should have been responsible. Such aberrations from the purity of the PPP fundamentals have given rise to several pre- and post- project award hurdles due to unrealistic cost estimates of old and poor DPRs, delays in land acquisition, lack of coordination with state government to facilitate shifting of utilities and unending disputes with Road Authority (for approval of increased project scope) the most prominent among these have been the issues with land acquisition and coordination issues with Road Authority and local (State) governments. As neither the government nor the private party can guarantee realization of estimated traffic for a longer duration it becomes a real challenge to allocate the risk of future traffic in transport infrastructure projects. The current MCA assumes a flat cumulative average growth rate (CAGR) for traffic of 5% over future years and based on the difference between target traffic (computed at 10 years from the start of concession) and the realized traffic on the target date provide for extension or reduction in the original concession period. As per the current economic growth scenario of the country the traffic is growing at a much higher rate than 5% at least one-and –half to two times. The effect of reduction in the concession period, as per the provisions of MCA proves to be negligible if compared with the actual toll revenue collections due to realized traffic over a number of years.

The paper also discusses issues related to the design freedom being given to the Concessionaire. Before the bidding process the Authority prepares a preliminary design for the purpose of cost estimation, which is grossly misleading as detailed engineering only can provide the true cost. This results into cost and time overrun, and of course, unending haggling and renegotiations between the concessionaire and the Road Authority at a later stage.

In most of the highway projects the time given for planning and design process (the development period) is much shorter than actually required because of the hurry to clear the projects with several mandatory approvals and the all-important ‘financial closure. Also, under the current DBFOT (design-build-finance-operate-transfer)pattern the supervisions of work done by the consultant appointed by the Authority is reduced to only review of the design and the works, which grant a total freedom to the concessionaire to deliver low quality work. Argument given against this view is that the Concessionaire will suffer in maintenance for the quality, but actually the road users suffer for it.

The infrastructure development binge and the objectives behind this (which is economic development) cannot make a blatant fleecing proposition out of these projects for the private parties where public money is involved in the form of toll charges as well as in the form of VGF that is given to the concessionaire. More ever, where is the third P of PPP anywhere in any of the projects delivered so far. The lack of clarity and rigor in the operating part of MCA has been fully exploited by the dishonesty all around us from all quarters. It is not necessary to list out the aspects of exploitations here, which anyone travelling through the PPP roads and connected to road development programme would understand it abundantly from the statement above.

The operation of a Concession is not an easy job for the any Road Authority, who ultimately owns the road. There has to be very structured responsibilities which must be delivered truthfully using an operation Manual, which till date does not exist, may be in the interest of leaving it loose.

SHARING THE TRAFFIC RISK

The first requirement for any highway project, to be attractive for private sector participants, is the financial viability of the project. Traffic volume on the project highway, user fees, concession period and capital costs of the project are the four critical elements to decide the financial viability of any project. Out of these four elements, the two critical ones, viz. traffic volume and concession period, are dependent on the actual rate of growth of traffic at which it will be growing in the future.

Ideally the risks shall be allocated to the party which has better capability to control them. The concessionaire has better capability to handle risks related to construction, maintenance and operation of the project highways, whereas, traffic risks can neither be handled appropriated by the concessionaire nor by the Road Authority. Due to this reason, assigning the traffic has become one of the greatest challenges in transport infrastructure projects.

The Road Authority, through a technical consultant does feasibility study and detailed project design for all the highway projects to be awarded under Design Build Finance Operate & Transfer (DBFOT) pattern before awarding the work. The traffic volume to be handled by project road is decided based on the traffic study, as a part of the feasibility study, and it is protected to future years based on the growth rates estimated by econometric modelling. Generally these vehicular traffic growth rates are found to be between 5% and 9% and in some cases it even exceeds the rate of growth of the economy. However the MCA suggests considering a uniform growth rate (CAGR) of 5% for all the projects. Based on this proposition traffic is considered to growth over the concession period, and target is decided.

According to the CA, concession Period is considered up to the year in which the projected traffic exceeds the Design Service Volume (DSV) of the projects highway. The concession period includes construction period and starts from the date of signing the agreement with the Road Authority. Similarly, the target traffic is the traffic (in PCUs) estimated based on % CAGR as the 'Target Date', which is considered to be 10 years from signing of the Agreement, provided that it does not fall later than 3 years prior to the end of concession period. The adoption of 5% as minimum traffic guarantee is understandable, but nowhere in the country today the traffic is growing at % and surely it much be higher than this rate as seen over the last one decade. However revision of MCA did not consider it realistically. However, for the determination of concession fee, the MCA specifies CAGR of 2%. The base year traffic is to be projected with 2% CAGR in order to compute the realizable toll revenue, and this is applied to tollable traffic only excluding the exempt vehicles in each category. The purpose of deviating from the 5% CAGR used for all other purpose is not stated in MCA. If the traffic is assumed to grow at 5%CAGR,why the toll revenue is assumed to be growing at only 2%?

VARIATION IN CONCESSION PERIOD

In order to overcome the variations in the actual growth of traffic from the assumed 5% rate, the MCA specifies the method for deciding variation in the concession period. The actual traffic on 'Target Date' (at the end of 10 years of concession) is to be measured by taking the average of the traffic determined through traffic sampling one year prior to the target date, on the 'target date' and one year after the 'target date'. The concession period shall be modified if the actual traffic is $\pm$ 2.5% or more of the 'target traffic'. For every 1% shortfall in the actual traffic the concession period shall be increase to 1.5% and whereas every 1% excess in the actual traffic the concession period is to be reduced by 0.75%. The MCA also specifies limits for increasing and reducing the concession period to 20% and 10% respectively.

The concept of varying the concession period based on realized traffic is very well understood by all, as the growth of traffic is neither controlled by the Concessionaire nor by the Road Authority. But there is no rationale for the rate of increase and decrease (which is only half of the increase) of the concession period as specified in MCA. Most important fact is that the Road Authority is kept in the dark about the actual traffic, as the Concessionaire always and invariably provides the data to the Road Authority which is totally cooked up to meet his objectives. There is no automatic data collection system available or deployed in India in any of the road projects till date which is able to count and classify the traffic, at least the tollable modes, with any degree of accuracy. Moreover, any independently collected traffic, at least the tollable modes, with any degree of accuracy. Moreover any independently collected traffic data is not liked by the Concessionaire, and the Road Authority is not able to prevail upon the Concessionaire (for unknown reasons) to accept the independently collected accurate traffic data as the proof of actual traffic. MCA directs the Concessionaires to implement the ATCC (Automatic Traffic Counter and Classifier), WIM (Weigh-in-Motion) weigh bridges, etc which is the Concessionaire comply by implementing some improper systems which never found to be working in any of the concessions. This provides enough room for the Concessionaire to dodge the Road Authority with cooked up data, which Road Authority also does not challenge, or not able to challenge.

(a) MCA Method

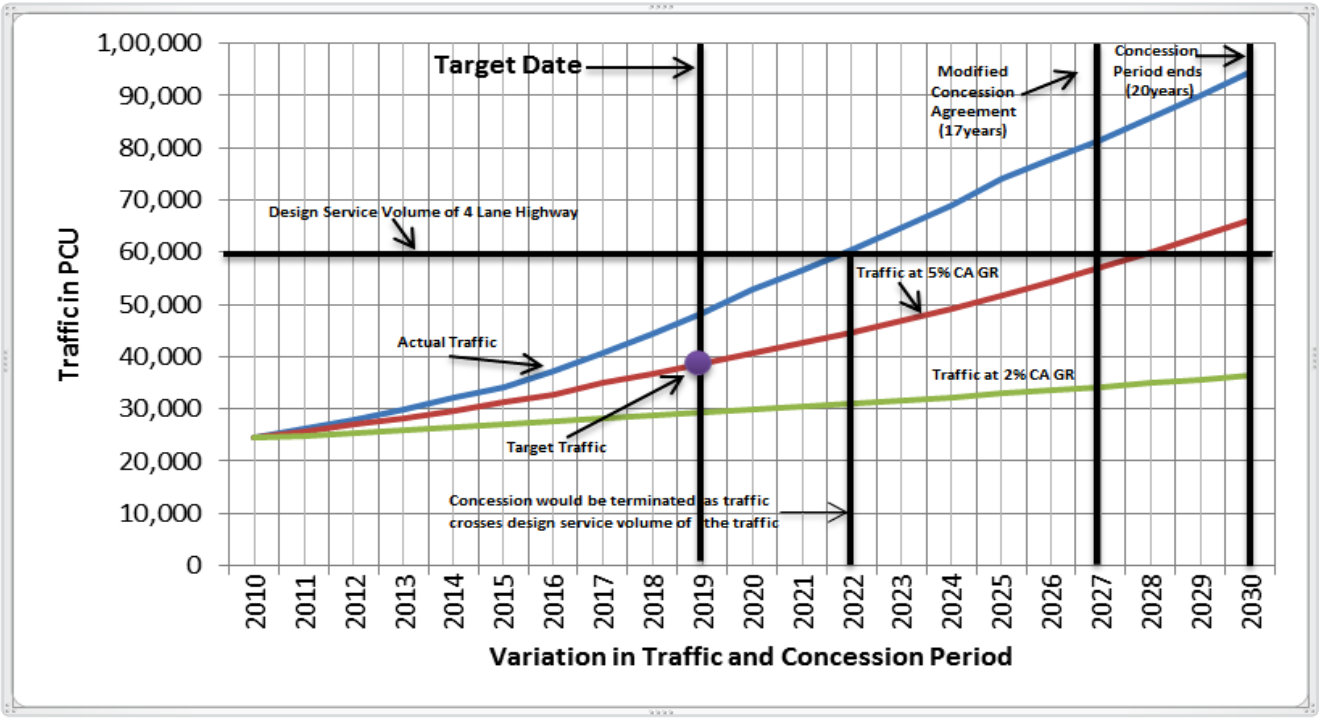
Let us see a hypothetical case of a highway being improved to 4-lane from its status of 2-lane with the flawed intricacies, which leads to huge loss to the Road Authority. The traffic on project highway is 24441 PCU in the year of signing the agreement i.e. year 2010. The concession period is 20 years, as the base year traffic grows to 60,000PCU (design service volume for 4-lane highway, beyond which the level of service is considered to be unacceptable) at a CAGR of 5%. The target date is kept as the year 2019 (10 years after award of concession) and the 'target traffic' is 38639 PCU. Table 1 shows the base year traffic growing at 5% CAGR and also the traffic which is considered to be actually realizable over the concession period in this case (based on growth rate found from econometric modelling).The 'actual/realizable traffic' is growing at varying growth rates over time which is assumed based on experience and also based on the observed trends on other highways in the country.

Table 1 Traffic Projection at 5% CAGR & Actual/Realizable Traffic for a Hypothetical Highway

SI. No	Year	Remarks	Actual/Realizable Growth Rate	Actual/Realizable Traffic (in PCU)	Traffic at 5% CAGR (in PCU)	Traffic at 2% CAGR (in PCU)
0	2010	Concession Period Starts	7.00%	24,441	24,441	24,441
1	2011			26,152	25,663	24,929
2	2012			27,983	26,946	25,428
3	2013			29,942	28,293	25,936
4	2014			32,038	29,708	26,454
5	2015			34,281	31,194	26,983
6	2016		9.00%	37,366	32,754	27,522
7	2017			40,729	35,047	28,072
8	2018			44,395	36,799	28,633
9	2019	Target Date		48,391	38,639	29,206
10	2020			52,746	40,570	29,790
11	2021		7.00%	56,438	42,598	30,385
12	2022	Actual Traffic Crosses DSV of 4-Lane Highway		60,389	44,728	30,992
13	2023			64,616	46,964	31,611
14	2024			69,139	49,293	32,243
15	2025			73,978	51,757	32,887
16	2026		5.00%	77,677	54,344	33,544
17	2027			81,561	57,061	34,215
18	2028			85,639	59,920	34,899
19	2029	Assumed Traffic Crosses DSV of 4-Lane Highway		89,921	62,916	35,596
20	2030	Concession Period Ends		94,417	66,062	36,307

As it can be seen in the table that the actual traffic (assumed here as shown in the table, but in actual projects it is to be obtained from traffic sampling) on 'target date' is 48,391 PCU, whereas the target traffic as per the provisions of MCA (based on 5% growth assumed) is 38,639 PCU,

which is lower by 20%. Thus, the concession period will have to be reduced by 0.75% for each 1% variation, and the reduction in concession period is calculated to be 15%. As the MCA specifies maximum reduction in the concession period as 10%, the modified concession period in this case would be 18 years, which actually should have been modified to 17 years. However, according to another provision of MCA, the actual/realizable traffic crosses the DSV of 4-lane, i.e. 60,000 PCU in year 2022, and the concession would be terminated at that stage. Fig. 1 shows the variation in traffic and corresponding changes in the concession period graphically. The above discussed hypothetical case makes it clear there is no rationale for the actual amount of the concession period. As the difference between actual/realized traffic and the assumed traffic (growing at 5%) is likely to remain high, and therefore, the additional toll revenue collected will surly proved to the extra beneficial for the concessionaire is never likely to say or will be ready to accept the fact that the traffic has grown has any stage more than 5%, and will be always with huge extra profit. As it can be seen in the figure, as the concession period progresses, the difference between the MCA specified traffic (at 5% CAGR) and the actual traffic becomes very huge, and all that benefits the Concessionaire throughout. The modifications in the revised MCA from BOT mode to DBFOT has not changed anything in these anomalies, rather it was diluted all other aspects where there was some bindings on the Concessionaire through the requirements of approval from Independent Engineer, which is not there in DBFOT projects.



DESIGN FREEDOM

The project and planning and designing is a serious exercise and it needs expertise even for the supervision or review by the officers of Road agencies/Authorities who should have core competence in such tasks. The feasibility and preliminary design, got prepared by the Road Authority through consultants, have always been found to be with many shortfalls primarily due to

extremely short time given for this work. The excuse often given is that the details will be worked out by the Concessionaire, and this exercise of the Road Authority is only for estimation of the cost. Stages of PPP projects and responsibility for each stage are presented in Table 2.

Table 2 Stages of PPP Projects and its Responsibility

Different Project Stages	Responsibility
Preparatory works Detailed Feasibility Study, Land for Right of Way (ROW), Clearance of ROW, Environmental clearances, and General Alignment Drawings (GAD) of Rail Over Bridges (ROBs) and clearance from Railways	Authority
Detailed Project Report	Concessionaire
Construction	Concessionaire
Operation & Maintenance	Concessionaire

It is not realized that an incomplete design work with poor details will provide a vague and unrealistic cost estimate, as well as leading to many post-award changes of scope, under escalation of costs and associated disputes. The feasibility and preliminary design cannot be prepared for a road project having length more than 100 kmwithin 3 months. In those, there will be very little ground truth in terms of culverts, bridges, and all other features of the existing alignment, etc in terms of their location, condition and requirements of replacement. The major and minor junctions are never fully studied nor elucidated. All these half-cooked designs are given as part of the Schedules in the CA, which is treated by Concessionaire as the frozen scope of work. Therefore almost every project has enormous variations from its design and specifications (given in the CA), which are seen to be important requirements at the time of implementation, each of which has serious cost implications. In BOT/DBFOT projects of the current format, these are demanded by the Concessionaire as extra scope of work and the Road Authorities consider them to be part of the Concession due to which Concessionaire is adamant not to carried out any extra work even it is required based on the site condition.

The ambitious programme of highway development, with hundreds of separate projects taken up so far, has not been able to standardize the preparation of feasibility and preliminary project report or detailed project report (PPR/DPR) across all projects. Different DPRs and Concession Agreements prepared by the Consultants for different projects are non-uniform in their contents. The Road Agencies/Authorities have failed to control the standard of the project preparation. In some of the projects, there is very little or no consideration for pedestrian and other NMT facilities, even in the developed/urbanized sections of the project road. So much so, one of the most important component, which is the Highway Traffic Management System (HTMS), has also been considered in a non-standard and non-uniform way in different projects. All such deficiencies are likely to lead to serious safety hazards for the proposed network of high speed primary roads. The sanctity of the development period given to the concessionaire as just 6 months is never

evaluated after so many projects which have not been delivered in time and cost stipulated in CA. Most of these projects eventually cost the nation not less than a road with similar specifications in North America or Europe (when all variations and disputes related costs are added). This means that a developing country is building roads at enormous cost, which probably is not justified and more so when actual output is of much lower quality.

SUPERVISION/MONITERING OF WORKS

In case of PPP projects/ the authority/Agency appoints Independent consultant (IC) or Independent Engineer (IE), who has a team of independent Engineers/Experts supposed to be supervision the development and construction activities on behalf of the Road Authority/Agency. This supervision was up to the extent of 30% only in case of BOT projects, and letter in case of DBFOT this requirement ismore diluted to 10% leaving total freedom to the Concessionaire to build anything which is going to last only to the date of handing over to the project road to the authority. Of course, in the intervening period the road may not have the level of service it is required to the users. The complacent Indian users may or may not initially resist the charges levied on them in spite of poor level of service offered to them. But, this may not continue for very long, and a time may come when road users will object to any payment for low quality services, and the system may collapse. There are many examples of BOT projects across the country where the maintenance of the facilities is extremely poor and overall services not commensurate to the toll fee charged. This issue needs a particular consideration in the concession, which is totally missing.

The road authority has recently appointed safety consultants for audits to be carried in respect of safety at all stages of development and delivery of the projects (a provision of MCA never met before). Concessionaire is asked to provide relevant drawings containing the design details that have a bearing on safety of users and the same shall be reviewed by the safety consultant and forward their comments to Independent Engineer, so far these requirements were completely overlooked, and left unattended. In any case as it is seen in actual working of the projects, there is nothing decentralised in terms of decision making, in spite of the extensive network of the offices of the road authority across the whole country. All decisions required in time are inordinately delayed or never decided. The road authority is to be made as an expert authority and a streamlined decision making process, without which this road development programme will never achieve the true objectives. There can be a system of an Empowered Committee of experts to take decisions on all technical matters, which will then be ratified by the Authority within 24 hours. This is one of the ways by which many of the ills of these PPP projects can be avoided.

CONCLUSION

The unprecedented road development programme of this country has changed the mobility concept and scenario of the country completely in just on decade. This programme with its objectives of providing connectivity to all sections of the society and to every enterprise of the nation will probably continue to flourish at least for next two decades. The PPP mode of infrastructure development and especially the road sector developments (which unlike other infrastructures spreads out to the region of the country) needs very careful and rigorous project planning and

implementation, as general public is affected by this. While resilience of Indian economy is seen by the world due to its huge infrastructure development programme, none of the short-cuts adopted by the government for a faster pace of it can be accepted as it is harming the programme more than helping it. PPP is a new institutional arrangement may be understood well for its financing mechanisms, but it is not understood yet for it engineering liabilities and risk handling. The task is enormous, and therefore, without a complete and transparent system of decision making, the setting of targets for 'X' kilometre per day can only ridicule the programme.

While the MCA and its associated documents have their limitations as discussed in the various sections of the paper, the operative part of the PPP concessionsis extremely week, has left a host of issues unresolved even after one decade of this most coveted development programme of the government. The loose structure of PPP in road sector, the way it is implemented with lack of rigor and operating controls, for the high density corridors it becomes a goldmine for the concessionaire. The common road user, ignorant of all these complexities, pays the toll diligently hoping that it will contribute to the nation building.

REFERENCES

1. Gomez-Lobo, A. and Hinojosa, S., Broad in a Thin Country: Infrastructure Concessionaire in Chile, http://www-wds.worldbank. Org /servlet/WDS Content Server/WDSP/IB/2000/02/28/000094946_00021105302972/Renderd/PDF/multi_page.pdf.
2. Mukhopadhyay, P., 2006, What ails the highway MCA?, The Financial Expert, http://www.financilaexpress.com/fe_full_story.php?contant_id=146627.
3. Public Private Partnership in National Highways Model Concession Agreement, Planning Commission, Government of India, April 2009.
4. Sikdar, P.K., 2010, A Highly Ambitious Road Development Programme in India Delivered with Serious Lack of Rigor, Indian Highways Vol. 38, No. 5.
5. Vassallo, J.K., The Tendering Mechanism Based on the Least Present Value og the Revenues: Practical Evaluation in the Highway Concession Scheme in Chile, http://www.etcroceedings.org/paper/the–tendering-mechanism- based-on-the –least-present-value-of- the- revenues-pract.