

## A Case Study on Built Operate and Transfer



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### ABSTRACT:

Infrastructure can be defined as the basic physical and organizational structures needed for the operation of the society or enterprise. It is the services and facilities necessary for an economy to function. The term typically refers to the technical structures that support a society such as roads, railways, airways, water supply, power grids, and so forth. Appropriate and reliable infrastructure is essential for sustainable development and poverty reduction in developing countries. The only way to meet these multiple and ongoing demands is to create financial and managerial systems that are capable of generating and maintaining infrastructure of all kinds and at various levels i.e. regional and national. The last decade has seen a fundamental shift in the paradigm of infrastructure provision around the world with governments regretting from the role of owners and operators of infrastructure and focusing more on their roles as regulators and facilitators of infrastructure services provided by private firms. In a proper execution of the project it becomes very important to identify the possible challenges, which are due to arise during the life of the project. Although it might not be completely possible to eliminate the risk and challenges in many cases but a proper for sight can make the consortium to be properly equipped to mitigate the problems arising due to them. In this thesis, challenges encountered during various phases and its mitigation in roads and bridge projects is studied.

### Key Words:

Toll Gates, Toll Collection, Internal Rate of Return Method, Risks, Traffic

### 1 Introduction:

Infrastructure can be defined as the basic physical and organizational structures needed for the operation of the society or enterprise. It is the services and facilities necessary for an economy to function. The term typically refers to the technical structures that support a society such as roads, railways, airways, water supply, power grids, and so forth. Appropriate and reliable infrastructure is essential for sustainable development and poverty reduction in developing countries. The only way to meet these multiple and on-going demands is to create financial and managerial systems that are capable of generating and maintaining infrastructure of all kinds and at various levels i.e. regional and national.

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In a proper execution of the project it becomes very important to identify the possible challenges, which are due to arise during the life of the project. Although it might not be completely possible to eliminate the risk and challenges in many cases but a proper for sight can make the consortium to be properly equipped to mitigate the problems arising due to them. In this context, challenges encountered during various phases and its mitigation in an infrastructure project becomes very important aspect.

## 2. Present Scenarios:

Modernization of Indian economy cannot be achieved without a massive up gradation of the highway network. If sustainable growth of the economy is to be achieved then some comprehensive plans for the development of highway sector should be framed. The rate of growth of the National Highway has increased from 22,000Km in 1951 to about 70,934 Km by 2010. However for forming an integrated grid of NH and for connecting the urban and industrial centers and ports, the total network should expand to at least 1 Lakh Km.

## 3. Objectives

- » To identify challenges in operational phase of road projects.
- » To give suggestive measures to mitigate constraints in the operational phase to ensure effective and efficient operation of the project.
- » To compare road and fly over BOT projects.

## 4. Scope of Work

- a) Challenges/risk identification and analysis
- b) Maintenance and traffic management

- » Related Clauses in the contract document
  - » Traffic management during maintenance
- c) Toll collection
- » Parameters of deciding toll rates
  - » Constraints faced at site
  - » Methodology of toll collection

## 5. Types of risks by phases

### 1. Development Phase

- Technology Risk
- Credit Risk

- Bid Risk

### 2. Construction Phase

- Completion Risk
- Cost Overrun Risk
- Performance Risk

### 3. Operation Phase

- Operation Cost Overrun
  - Performance Risk
  - Liability Risk
  - Equity Resale Risk
  - Off-take risk
4. On-going Risks
- Interest Rate Risk
  - Exchange Rate Risk

### 6. BOT Project Risk Summary

Risk	Participant	Machanism
<b>Development Phase</b>		
Technology Risk	Sponsors	Equity Subordinated Debt
Credit Risk	Sponsors, Lenders	Credit rating agency
Bid risk	Sponsors	Equity
<b>Construction Phase</b>		
Completion risk	Sponsors Contractors	Performance incentives and guarantes ; tum key contractors
Cost overrun risk	Sponsors Contractors	Fixed price contract and completion bond
Performance risk	Sponsors	Performance bond
<b>Operation phase</b>		

Cost overrun risk	Sponsors	Fixed price contract
Performance risk	O&M Contractor	Equity, Performance guarantee
Equity resale risk	Sponsors	Subordinated guarantee
Off take risk	Sponsors	Take-and-pay, take-or-pay, Advanced payments
Liability risk	Insurance company	Insurance contracts

**7. TOLL COLLECTION:**

**General:**

In recent years, many Asian countries and other countries in transition have encouraged road infra development in order to promote and sustain continued economic growth. India, for example, had seen demand for new highways achieve an unprecedented level. The government has been that essential player in the development of the roads in India. The road users in India have not been charged in terms of user fees or tolls is still an unanswered question as far as pricing of roads is concerned. In order to make the users aware of the need for pricing roads; the government should create a forum to explain the road users of the pros and cons of tolls. A Careful study on the user acceptability of tolls and the willingness to pay must be conducted so that the road projects can be financed.

**Significance of toll collection:**

The National highways act has been amended to enable levy of a toll on selected sections of NH so that private participation is road constructions on a BOT basis is facilitated. The other measures taken to encourage private participation in the road sector include permission to NHAI to find equity in private or public companies. NHAI has also considered providing cash support in selected projects.

**Policies for Tolling**

National Highways Act, 1956 and Rules made there under

- Section 7 for levying fees for services or benefits rendered;
- Section 8A-Power to enter into agreements from development and maintenance of NHs

**Methodology of toll fixation**

The concept of cost to the promoter versus benefits to the user is guiding principle behind toll fixation on any BOT project. The cost incurred by the promoter is recovered over a period of time. This period is fixed, keeping in mind that targeted return on investment and estimated annual revenues.

**The factors affecting users are:**

1. Travel distance
2. Travel time, fuel and wear and tear cost
3. Fee charged

**8. Toll collection system**

**Toll plazas:**

The number of toll booths required at each toll plaza, are estimated on the basis of average hourly traffic due to pass through them. This factor is taken into account to decide whether to go for Manual toll collection system or an ETC.

**A) Manual toll collection system**

**B) Automatic toll collection system**

**9. CASE STUDY**

**Project Overview**

**Indore Dew as road project as a BOT Project**

Indore is a major city and commercial centre of the state of Madhya Pradesh in central India. Indore is located 190 km west of state capital Bhopal. According to the 2011 Indian census, Indore city has a population of 1,516,918. It is the 15th largest city in India and the 147th largest city in the world. It serves as the headquarters of both the Indore district and Indore division. Dew as District is a district of Madhya Pradesh state in central India. The town of Dew as is the district headquarters. The district has an area 7,020 km<sup>2</sup>, and a population 1,306,617 (2001 census), an increase of 26% since 1991. Dew as District roughly corresponds to the territories of the twin princely states of Dew as. The district straddles the Vindhya Range; the northern portion of the district lies on the Malwa plateau, while the southern portion lies in the valley of the Narmada River. The Narmada forms the southern boundary of the district.

The district is bounded to the east by Sehore District, to the south by the Harda and Khandwa districts, to the west by the Khargone and Indore districts, and to the north by the Ujjain and Shajapur districts. Dewas District is part of Ujjain Division. National Highway Administration of India (NHA) has initiated process to increase width of Indore-Dewas section of Agra - Mumbai highway from four lanes to six-lane. The Administration will convert it from four-lane to six-lane on the basis of Built-Operate-Transfer. NHA has invited tenders for this work which will be opened on 25th of January 2010. A 45 km street will be converted into six-lane.

The Authority estimates its cost to be Rs.325 Crore. To encourage a better competition the authority has invited tenders globally

Developer	M/s Gayatri Infra Ventures Ltd
SPV	M/s DLF - Gayatri Consortium
EPCContractor	M/s Gayatri Projects Ltd
Consultant	M/s HBS Constants
O&MContractor	Ratna Constructions

### Fee Rates

Base rate of fee	(Rs per vehicle per trip)			
	Rs 10-15 crore	For every additional Rs 5 crore or part there of		
		15-100	100-200	over 200
Cost of permenent bridge,bypass or tunnel				
Car,jeep,Van,Light Motor Vehicle	5	1	0.75	0.5
Light Commercial Vehicle,Light goods vehicle or mini bus	7.5	1.5	1.15	0.75
Truck or bus	15	3	2.25	1.5
Heavy construction machinery, earth moving equipment,multi axle vehicles(3-6axles)	22	4.5	3.4	2.25
Oversized vehicles(seven or more axles)	30	6	4.5	3

### Traffic volume



Traffic Analysis	Toll Plaza @				
	Type of Vehicle	Tollable AADT	Through Traffic	Local Traffic %	Local Traffic
Car/Jeep/Van	7260	6534	10%	726	7260
LCV/Min Bus	2306	2075	10%	231	2306
Standard Bus	796	796	0%	0	796
2 Axle Trucks	2485	2485	0%	0	2485
Multi-Axle Trucks	3694	3694	0%	0	3694
Over Sized Vehicles	0	0	0%	0	0

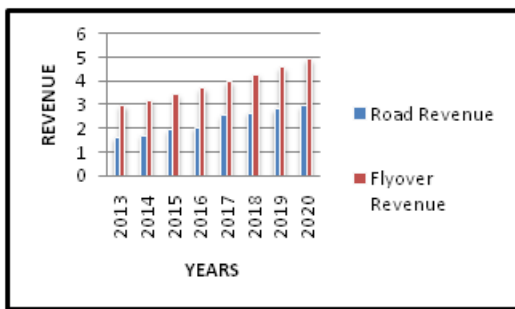
**10.RESULTS AND DISCUSSIONS**

ROAD PROJECT											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	Project Cost	-2.44	-2.44								
	Revenue			1.25	1.31	1.38	1.62	1.72	1.93	2.05	2.55
	Tax			-0.01	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02	-0.03
	Expenditure			-0.06	-0.07	-0.07	-0.08	-0.09	-0.10	-0.10	-0.13
	Intrest			-0.54	-0.54	-0.54	-0.54	-0.54	-0.54	-0.54	-0.54
	Net Amount	-2.44	-2.44	0.64	0.70	0.76	0.99	1.08	1.28	1.39	1.86
	IRR	11%									
FLYOVER											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2	Project Cost	-5.08	-5.08								
	Revenue			1.84	2.03	2.19	2.37	2.56	2.76	2.97	3.20
	Tax			0.02	-0.02	0.02	-0.02	-0.03	-0.03	-0.03	-0.03
	Expenditure			0.02	-0.02	0.02	-0.02	-0.03	-0.03	-0.03	-0.03

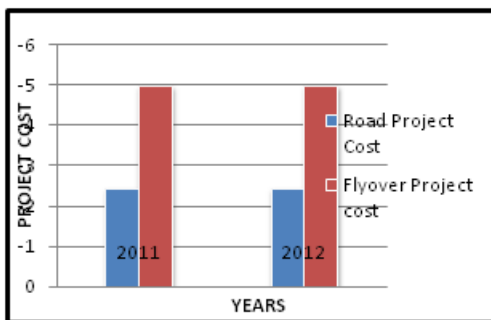
Intrest			0.81	-0.81	0.81	-0.81	-0.81	-0.81	-0.81	-0.81
Net Amount	-5.08	-5.08	0.99	1.18	1.34	1.51	1.69	1.89	2.10	2.32
IRR	4.60%									

**Graphs:**

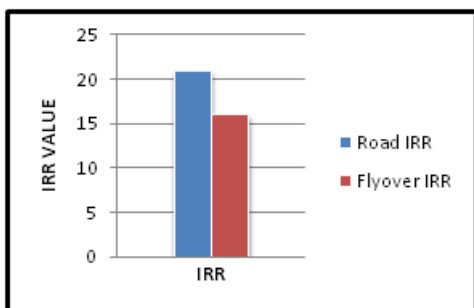
**1. Comparison of Road and Flyover Revenues**



**2. Comparison of Road and Flyover Costs:**



**3. Comparison of Road and Flyover IRR:**



**11. CONCLUSION:**

**Comparison of road and fly over BOT projects:**

By comparing road and fly over project ,we came to see that the initial cost of the fly over cost is high com

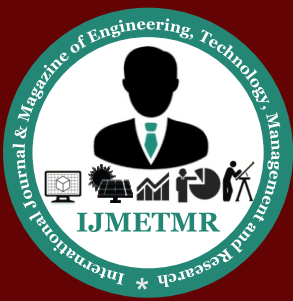
pared to road project, and revenue is high in flyover than road ,finally by internal rate of return method we can see that profits in road is more compared to fly-over So it is better to work on road projects than fly over because returns are more, although maintenance of road will be more compared to fly over but still road project will get more IRR.

**12. FUTURE STUDIES:**

The availability of infrastructure facilities is imperative for the overall development of any country. Today there is a need to focus on enhancing the quality of infrastructure services provided in India. Roads constitute an important part of infrastructure of a country. These projects are very huge and require lot of investment in the construction phase as well as operational phase. Due to funds constraints, the government is assigning several projects on a BOT basis in the last decade.

Although privatization has done the trick in the present scenario of Indian infrastructure sector but, acceptability of private investment to the public requires the assurance that the quality of construction comes up to the required standards, that the tolls charged are reasonable and also that any direct or indirect capital subsidy involved is determined in a transparent manner to ensure that the project represents a least cost solution for the economy.

The concept of financing highways or bridges on BOT basis is totally new in our country. A lot of study and research work has been carried out such as resources, funds etc. and pre requisites for such projects but the post development challenges are to be specific challenges associated with the operational phase has remained vastly unemployed.



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