

**Report of the  
Comptroller and Auditor General  
of India**

**for the year ended March 2007**

**Union Government (Commercial)**  
**Public Sector Undertakings**  
**Public Private Partnership in implementation of**  
**Road Projects by National Highways Authority of India**  
**No. PA 16 of 2008**  
**(Performance Audit)**

PARLIAMENT LIBRARY  
Central Govt. Publications

Acc. No. RC 130032

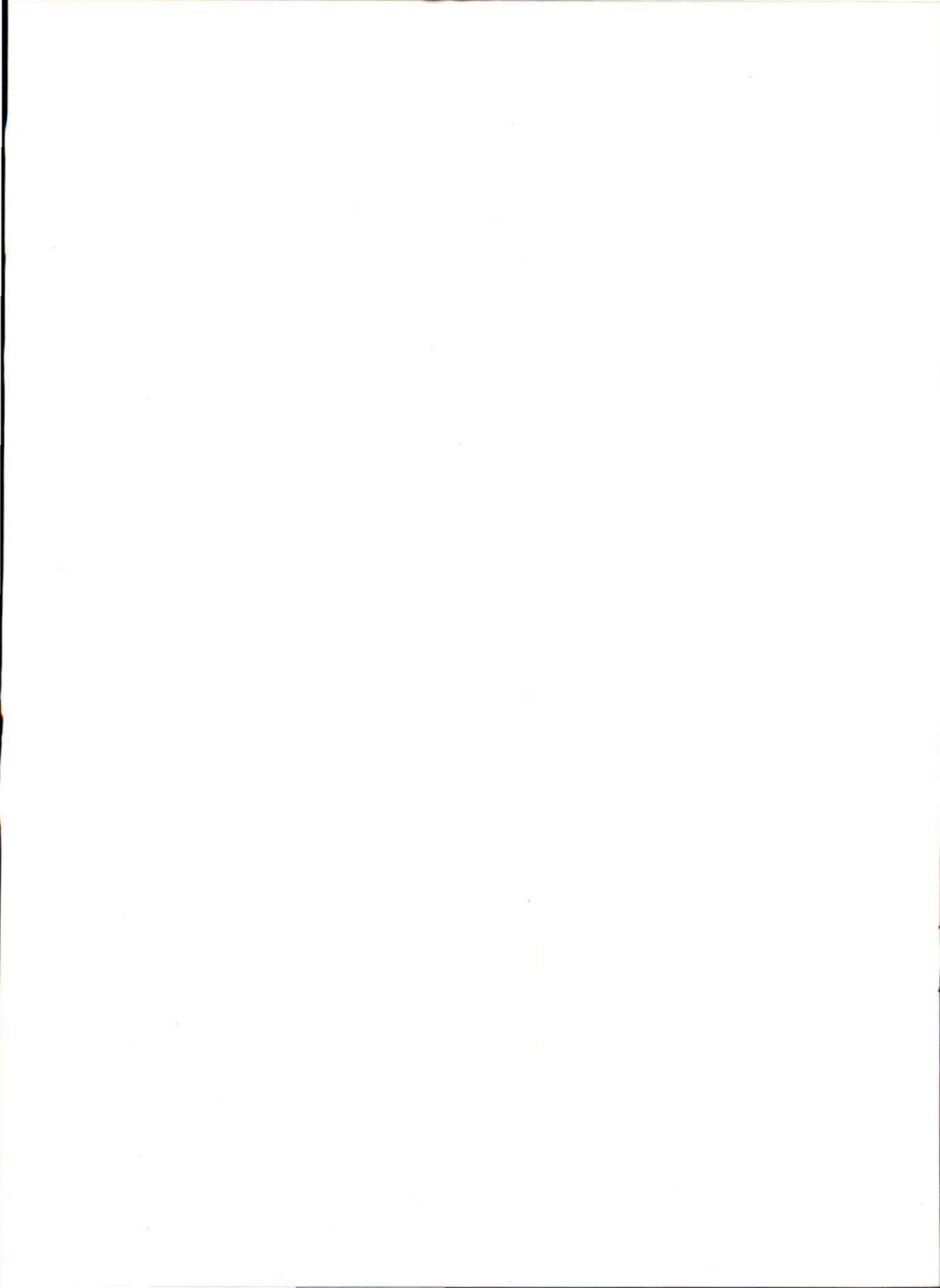
Date. 13-9-20

351.7232R

P731

## CONTENTS

CHAPTER NO.	SUBJECT	PAGE NO.
	<b>Preface</b>	iii
	<b>Overview</b>	v
	<b>Highlights</b>	ix
	<b>Summary of recommendations</b>	xii
<b>I</b>	Introduction	1
<b>II</b>	Planning	8
<b>III</b>	Project management	15
<b>IV</b>	Contract management	28
<b>V</b>	Conclusions	37
	Annexures	41
	Glossary of abbreviations	45
	Glossary of technical terms	46





## PREFACE

A reference is invited to the prefatory remarks in Report No. (CA 9) of 2008 – Union Government (Commercial) of the Comptroller and Auditor General of India where a mention has been made that reviews of the performance of Companies/Corporations by the Comptroller and Auditor General of India (CAG) are contained in separate audit reports including stand alone performance audit reports.

The Audit Board mechanism was restructured during 2005-06 under the supervision and control of the CAG. The Board, which is permanent in nature, is chaired by the Deputy Comptroller and Auditor General (Commercial) and consists of senior officers of the CAG office. Two technical experts are inducted as special invitees, if necessary. The Board approves the topics recommended for performance audit. It also approves the guidelines, audit objectives, criteria and methodology for conducting major performance audits. The Board finalises the stand alone performance audit reports after discussions with the representatives of the Ministry and Management.

This stand alone Report reviewed the performance of Public Private Partnership in the implementation of Road projects by National Highways Authority of India. The Report was finalised by the Audit Board with the assistance of Shri Krishan Kumar, retired Director General, Central Public Works Department and Shri U.K. Guru Vittal, Scientist, Central Road Research Institute, the two technical experts appointed by the Government of India (the Ministry of Shipping, Road Transport and Highways) as special invitees.

This Report as set out in the succeeding chapters is based on test-check of records of the Corporate office as well as four Build, Operate and Transfer-Toll and four Build, Operate and Transfer-Annuity projects and the discussions held with the Management of National Highways Authority of India and the administrative Ministry. The selection of the projects was on the basis of quantum of expenditure and stage of completion.

The cases mentioned in the Report are among those which came to notice in the course of audit conducted during the period October 2006 to April 2007.





## OVERVIEW

The National Highways Authority of India (Authority) was constituted with a mandate to upgrade the existing two-lane roads into four/six-lane high density corridors under National Highways Development Programme (NHDP), in phases. In Phase-I, 6359 Km. of existing roads were to be upgraded by June 2004 at an estimated cost of Rs.30,300 crore. To leverage scarce budgetary resources, the Government opted for private sector participation in execution of the projects through Build, Operate and Transfer (BOT) mode. Accordingly, 17 projects were opened for private sector participation between March 1998 and April 2003.

Although time and cost were key factors for successful implementation of NHDP, the Authority did not prepare a corporate or strategic plan to monitor the same. This coupled with delays in award of work and in acquisition of land, and issue of change of scope orders during execution led to delay in completion of the projects. The Authority could complete only five of the 17 BOT projects within the time schedule prescribed. The Authority did not have any written criteria on the basis of which to assign a particular project for execution under BOT-Toll or BOT-Annuity arrangement.

The Audit observations mentioned in this Performance Audit Report are based on the test-check of eight BOT projects (four each of BOT-Toll and BOT-Annuity projects) and quality tests conducted by CRRRI in six projects. The project-wise findings are detailed below:

### A) BOT-Toll projects

#### 1. Satara-Kagal

- The Authority did not prepare the DPR for this project.
- The completion of this project was delayed by 20 months due to execution of additional items of work and deficient performance of the Concessionaire.
- The independent consultant issued provisional completion certificate without conducting final tests and without obtaining 'as-built' drawings from the Concessionaire.
- The surface condition of the road was satisfactory at some locations while distresses like cracking, raveling, shoving and bleeding were observed in many locations. Roughness values in 164 out of 266 locations test-checked were within the 'desirable' level and in the remaining locations they were within the 'acceptable' level stipulated in the concession agreement. Deflection values were within the 'acceptable' level in all the sections test-checked. The combined thickness of wet mix macadam and granular sub-base layers did not comply with the specifications in any of the five test pits.
- The Authority did not levy penalties amounting to Rs.16.05 crore for delays in project completion, non-completion of punch-list items and non-achievement of individual milestones.



- The Authority did not recover from the Concessionaire Rs.8.79 crore being the remuneration paid to the independent consultant as per the provisions of the agreement resulting in loss of interest of Rs.3.89 crore.

## 2. Delhi-Gurgaon

- The completion of this project was delayed by 42 months beyond the scheduled completion date of June 2004 due to change in mode of execution from Special Purpose Vehicle to BOT-Toll, subsequent delay in award of concession and the delay in issuing change of scope orders valuing Rs.146.62 crore.
- The Detailed Project Report (DPR) of this project was deficient on many counts which resulted in execution of these items under change of scope orders for Rs.146.62 crore constituting 21 per cent of the project cost.
- The Authority did not have a system to compute the reasonable concession period. This resulted in fixation of a longer concession period of 20 years against a reasonable concession period of 14 years. During the extended concession period of six years, the Concessionaire would gain Rs.187.77 crore.
- The delay of 26 months in issuing orders for change of scope of work by the Authority delayed completion of the project.
- The condition of the road surface was good and no distresses were found. The combined thickness of wet mix macadam and granular sub-base layers did not comply with the specifications in three out of six pits test-checked.

## 3. Jaipur-Kishangarh

- The Authority did not prepare the DPR for this project.
- The Authority did not have a system to compute the concession period fairly. This resulted in fixation of a longer concession period of 20 years against the reasonable concession period of 12 years. During the extended concession period of eight years, the Concessionaire would gain Rs.121.63 crore.
- The entire road surface was in satisfactory condition except at some locations where rutting, shoving and cracks were seen. Roughness values in 168 out of 180 locations test-checked were within the 'desirable' level and in the remaining locations they were within the 'acceptable' level stipulated in the concession agreement. Deflection values in 11 out of 18 sections test-checked were more than the 'acceptable' level stipulated in the concession agreement requiring immediate overlay. The combined thickness of wet mix macadam and granular sub-base layers did not comply with the specifications in three out of six pits test-checked.

## 4. Tada-Nellore

- The Authority issued final completion certificate delinking 30 items included in the original scope of work, the cost of which has not been recovered from the Concessionaire.



- The Concessionaire was allowed to run restaurants, dhabas along the project site without paying any rent.

## **B. BOT-Annuity projects**

- In all the four Annuity projects, the Authority failed to incorporate a clause in the concession agreement for recovery of penalty towards non-achievement of financial closure and target dates for achievement of individual milestones.
- In all the four Annuity projects test-checked, there were delays in commencement of toll collection after completion of the project resulting in loss of toll revenue of Rs.23.89 crore. The Authority, while fixing the toll rate for annuity projects, did not adopt latest wholesale price index available at the time of sending draft toll notification to the Ministry, resulting in loss of toll revenue of Rs.22.73 crore in three annuity projects.

### **1. Tambaram-Tindivanam**

- The total project cost estimated by the DPR consultant exceeded the estimates of the lowest bidder by 33 *per cent* indicating unrealistic estimation. The DPR projections were deficient as it did not take into consideration the demands of local people, location of bus shelters and provision for capping of kerb which had to be subsequently accommodated through change of scope orders.
- The surface condition of the road varied considerably between various sub-stretches. Severe bleeding, rutting and displacement of pavement markings were noticed in some sub-stretches. Roughness values in all the 185 locations test-checked were within the 'acceptable' level stipulated in the concession agreement. Deflection values in 5 out of 17 sections test-checked were more than the 'acceptable' level stipulated in the concession agreement. The combined thickness of wet mix macadam and granular sub-base layers did not comply with the specifications in two out of five pits test-checked. The thickness of bituminous layer did not comply with the agreement specification of 190 mm and deficiency ranged between 8 mm and 20 mm.
- The Authority extended undue benefit of Rs.4.02 crore to the Concessionaire due to adoption of lower rate of interest on recovery of cost of deleted item.
- There was a leakage of toll collection of Rs.21.98 crore due to deficient performance by the toll collecting agency.

### **2. Tuni-Ankapalli**

- The surface condition of the road was satisfactory at some locations while distresses like shoving, bleeding and heaving were observed at many locations besides cracks and rutting at some locations. There were no potholes in the entire stretch of the road. Roughness values in all 120 locations test-checked were within the 'acceptable' level stipulated in the concession agreement. Deflection values in two out of eight sections test-checked were more than the 'acceptable' level stipulated in the concession



agreement. The combined thickness of wet mix macadam and granular sub-base layers did not comply with the specifications in two out of four pits test-checked.

- The Independent Consultant did not appoint any team leader for this project as per their terms of reference and the Authority allowed the Deputy Team Leader to act as the team leader till the project completion.

### 3. Panagarh-Palsit

- Cracks and patch repairs were found to be less than five *per cent* implying good maintenance. Roughness value in one out of 132 locations test-checked was within the 'desirable' level and in the remaining locations they were within the 'acceptable' level stipulated in the concession agreement. Deflection values in 10 out of 12 sections test-checked were more than the 'acceptable' level stipulated in the concession agreement requiring immediate overlay. The combined thickness of wet mix macadam and granular sub-base layers did not comply with the specifications in two out of five pits test-checked.
- The Authority's failure to adjust the time required for execution of deleted items in original time schedule and erroneous computation of extension of time due to delay in handing over site, resulted in non recovery of penalty of Rs.8.75 crore. The concession agreement for this project did not contain a clause for levy of penalty for failure to complete the punch-list items within the stipulated period.
- There was an estimated revenue loss of Rs.40.42 crore during the period August 2005 to December 2006 due to absence of toll plaza within the project road.

### 4. Palsit-Dankuni

- The Authority failed to take timely action to award the concession agreement and this resulted in a delay of 11 months at the award stage. There was a further delay of four months in execution of the project.
- The Authority extended unintended benefit of Rs.3.92 crore to the Concessionaire for use of granular sand instead of earth, despite the fact that the concession agreement stipulated that the Concessionaire should make his own arrangement for all materials required.
- The concession agreement for this project did not contain a clause for levy of penalty for failure to complete the punch-list items within the stipulated period.



## HIGHLIGHTS

- On 12 December 2000 Government of India approved Phase-I of National Highways Development Programme (NHDP) upgrading 6359 Km. of roads which included a number of ongoing projects along the Golden Quadrilateral, North-South and East-West corridors. Between March 1998 and April 2003, 930 km. of these road stretches representing 15 *per cent* were sought to be executed through a new mode of delivery plan known as 'Public Private Partnership' (PPP). These road projects to be developed under PPP were split into 17 individual projects; nine of which were meant to be delivered through Build Operate and Transfer (BOT)-Toll mode and eight projects *via* BOT-Annuity mode.

*(Paras 1.1 to 1.4)*

- An overriding consideration for the Government in deciding PPP as an alternative financing and service delivery model was to secure 'timely' and 'cost-effective' service delivery besides leveraging scarce budgetary resources.

*(Para 1.2)*

- This report examines various aspects of project implementation and assesses whether these PPP deals have effectively delivered a good value for money, taking into account the Government's objectives. It concludes that:

### Planning

- At the start of NHDP Phase-I, the Authority did not prepare a corporate/strategic plan which indicated the project priorities and scheduling and could be used as a monitoring mechanism. Their informal system of concurrent review could not provide adequate assurance for project monitoring. Even the internal guidelines from the Government to determine the mode of execution could not be issued until March 2006. Consequently, the Authority failed to systematically evaluate the relative merits and its financial implications in executing a project through BOT-Toll or BOT-Annuity.

*(Para 2.1)*

- Detailed Project Report (DPR) forms the basis of any project implementation. There were no DPRs in two BOT projects and the DPRs in respect of two other projects suffered from deficiencies in design, cost estimates and traffic projections. There was no benchmark IRR in the financial models. As a result, the concession periods in Jaipur-Kishangarh and Delhi-Gurgaon projects were unduly stretched over long periods benefiting the Concessionaires by an estimated Rs.121.63 crore and Rs.187.77 crore, respectively.

*(Paras 2.2, 2.2.1, 2.2.2 and 2.3)*



- Though the target date for completion of NHDP Phase-I projects was June 2004, the Authority was able to complete only five of the 17 PPP projects. There were inordinate delays in remaining projects ranging between two and 42 months.

*(Para 2.4.1)*

### **Project management**

- The concession agreements provided for 'acceptable' and 'desirable' levels of roughness measure of the roads to be constructed. The levels of roughness prescribed under the 'acceptable' and 'desirable' levels were uniform only in four of the six projects test-checked. In Jaipur-Kishangarh project, the standards of 'acceptable' and 'desirable' levels were relaxed as compared with the other five projects. As explained by the Authority, two levels were indicated in the concession agreement in order to make an attempt to achieve 'desirable' results. However in all locations test checked, though the 'acceptable' levels had been achieved, only in 37 per cent locations, the levels of roughness met the 'desirable' parameters.
- There were deficiencies in fulfilling technical parameters. For instance, deflection studies carried out in 82 locations on six road projects indicated the need for overlay of bituminous concrete in 28 locations. There was non-compliance of combined thickness of wet mix macadam (WMM) and granular sub-base (GSB) requirement in all the test-pits of one project and a significant non-compliance in other five projects. Inadequacies in the degree of compaction of granular layers were noticed in five projects.

*(Paras 3.7, 3.8 and 3.9.1)*

### **Contract and Revenue management**

- Escrow account arrangement is an effective tool available with the Authority to monitor funds utilisation meant for a particular project. It establishes a link between the sources and utilisation of funds. Concession agreements also stipulate that the Concessionaires furnish copies of escrow accounts for periodical scrutiny by the Authority. By failing to review this account in three BOT-toll projects and by not appointing an independent auditor in any of the four BOT-toll projects, the Authority has denied itself the benefits of these important control tools.
- (Paras 4.1.1 and 4.1.2)*
- Although concession agreements provide for levy of penalties for deficient/ non-performance, it failed to impose penalty of Rs.28.23 crore due in three out of eight projects test-checked. Also, the Authority did not incorporate the clause for recovery of penalty towards non-achievement of financial closure and target dates for individual milestones in BOT-Annuity projects.
- (Paras 4.2.1, 4.2.2, 4.2.3 and 4.3.1)*
- In BOT-annuity projects, the Authority was entitled to collect toll immediately after project completion. There were delays in commencement of toll collection in all the



four projects test-checked resulting in revenue loss of Rs.23.89 crore. The Authority did not index base toll rates with the latest whole-sale price index available at the time of sending draft toll notification to the Ministry which resulted in fixation of lower toll rates and consequential loss of revenue of Rs.22.73 crore in three BOT-annuity projects.

*(Paras 4.5.1 and 4.5.2)*



*Summary of recommendations*

1. *The Authority should strengthen its planning machinery to monitor and take corrective action as required for timely execution of projects.*
2. *The Authority should establish procedures and define staff accountabilities*
  - *for computing the concession period after sound financial evaluation has been carried out;*
  - *to ensure that detailed project reports are prepared for each project planned to be undertaken after extensive consultation with the district officials and public representatives; and*
  - *to review DPRs before commencement of tendering process for any significant variations between the DPR and tenders received to avoid award of additional items of work on nomination basis. The Authority should establish a review system at the appropriate level that includes fixing of responsibility for inaccurate traffic projections, project costs and other significant deficiencies in the DPR.*
3. *The Authority should strengthen the supervision mechanism by improving the quality assurance systems and methodologies.*
4. *The Authority should review the need to specify two levels of quality parameter viz. 'desirable' and 'acceptable'. Only the acceptable level of quality specifications in respect of structural and functional parameters viz. roughness and deflection should be specified in the concession agreement to ensure road safety, quality of construction, and riding comfort; and acceptance of deviation should be fully justified and approved at the appropriate level in the Authority.*
5. *The Authority should on completion of every road project and at periodical intervals thereafter, conduct tests through reputed agencies other than the Independent Consultant to ensure that all the quality specifications have been complied with and continue to be within the level mentioned in the agreement. In case of deviations, immediate remedial measures should be undertaken through the Concessionaire.*
6. *The Authority should establish procedures to ensure that bonus for early completion of project is approved only after the Independent Consultant fully reflect and justify the impact of addition/deletion of items of work on the scheduled completion date.*
7. *The Authority should ensure that the agreement clauses relating to opening and periodical submission of escrow account and the appointment of independent auditors are complied with.*



8. *The Authority should*

- *ensure commencement of toll collection through timely action to prevent loss of toll revenue and should ensure that the toll rates are fixed based on the latest available wholesale monthly price index;*
- *ensure that agreement clauses relating to levy of penalty are implemented in spirit ; and*
- *incorporate penalty clauses for non-achievement of financial closure and individual project milestones.*

The ...

...

...

...

...

...

...

...

...

...

...

## Chapter I

### Introduction

#### 1.1 Background of National Highways Authority of India

National Highways Authority of India (Authority) was constituted in 1988 by an Act of the Parliament with a mandate to upgrade the existing two-lane roads into four/six-lane high density corridors under the National Highways Development Programme (NHDP). The programme, initially linking Delhi-Mumbai-Chennai-Kolkata called the Golden Quadrilateral corridor, was subsequently extended to link Srinagar with Kanyakumari or the North-South corridor and Porbandar with Silchar or the East-West corridor. **Table 1** gives different phases of implementation of NHDP.

**Table 1: Phases of National Highway Development Programme**

Phase	Golden Quadrilateral (Km.)	North-South & East-West corridor (Km.)	Port connectivity (Km.)	Total length (Km.)	Estimated cost (Rs. in crore)
Phase-I (2001)					
BOT	756	174	--	930	
Others	4258	497	674	5429	
<b>Total</b>	<b>5014</b>	<b>671</b>	<b>674</b>	<b>6359</b>	<b>30,300</b>
Phase-II (2003-04)					
BOT	204	1413	--	1617	
Others	628	5216	--	5844	
<b>Total</b>	<b>832</b>	<b>6629</b>	<b>--</b>	<b>7461</b>	<b>34,339</b>

Phases-IIIA and IIIB of NHDP were approved in 2005 under which 10000 Km. of National Highways are to be converted into four/six-lane highways on Build, Operate and Transfer (BOT) basis at an estimated cost of Rs.55,000 crore.

As shown in Table 1, in Phase-I it was planned to upgrade 6359 Km. of roads at an estimated cost of Rs.30,300 crore by June 2004.

**Table 2** gives the status of implementation of Phase-I as on 31 December 2007.



**Table 2: Status of implementation of Phase-I of NHDP**

Particulars	Total length	Length completed	Length under implementation	Estimated cost (1999 prices)	Actual expenditure till December 2007
	Kilometre			Rs. in crore	
Golden Quadrilateral	5014	3845	1169	25,055	27,574
North-South and East-West Corridor	671	470	201	2,381	2,756
Port connectivity and others	674	445	229	2,864	3,325
<b>Total</b>	<b>6359</b>	<b>4760</b>	<b>1599</b>	<b>30,300</b>	<b>33,655</b>

### **1.2 Public Private Partnership**

Projects under Public Private Partnership (PPP) are based on a contract or concession agreement between a Government or statutory entity and a private sector company, for delivering an infrastructure service. It is a collaborative venture aimed at leveraging scarce budgetary resources and the delivery of the quality services at competitive costs. Between March 1998 and April 2003, 17 projects of Phase-I of NHDP were opened for private operators' participation. Similarly, 28 projects of Phase-II and the entire Phase-III A are planned to be executed through the BOT mode under PPP.

STRUCTURE OF PUBLIC PRIVATE PARTNERSHIP  
IN  
NATIONAL HIGHWAYS AUTHORITY OF INDIA



Government of India, Ministry of Shipping, Road Transport and Highways



- OPERATIONS**
1. GOLDEN QUADRILATERAL
  2. NORTH-SOUTH CORRIDOR
  3. EAST-WEST CORRIDOR
  4. OTHERS



BOT – TOLL PROJECTS 9 CONCESSIONS	BOT – ANNUITY PROJECTS 8 CONCESSIONS
Delhi-Gurgaon	Palsit-Dankuni
Jaipur-Kishangarh	Tambaram-Tindivanam
Vivekananda Bridge	Panagarh-Palsit
Nellore-Tada	Maharashtra Border-Belgam
Satara-Kagal	Anakapalli-Tuni
Tumkur- Neelamangla	Tuni-Dharmavaram
Nandigama-Vijayawada	Dharmavaram-Rajahmundry
Durg bypass	Nellore bypass
Rail Over Bridge Kishangarh	

INDEPENDENT CONSULTANTS

### 1.3 BOT-Toll

In BOT-Toll projects, the concession includes construction, maintenance and tolling. Budgetary support is restricted to an upfront grant to the Concessionaire determined through competitive bidding and is usually up to a maximum of 40 *per cent* of the project cost. Commercial risks are borne by the Concessionaire and its investment is sustained by toll revenues. **Table 3** gives the status of BOT-Toll projects of Phase-I as of March 2008.

**Table 3: BOT-Toll projects (A)**

Sl. No.	Name of the project	Length in Km.	Project cost (including grant) (Rs. in crore)	Grant (Rs. in crore)	Date of commencement	Date of completion
1	Delhi-Gurgaon	27.70	710.00	(-) 61.06	April 2002	January 2008
2	Jaipur-Kishangarh	90.38	644.00	211.00	April 2003	March 2005
3	Vivekananda Bridge	6.00	641.00	120.00	September 2002	June 2007
4	Nellore-Tada	110.52	621.35	127.30	August 2001	February 2004
5	Satara-Kagal	133.00	600.00	240.00	February 2002	May 2006
6	Tumkur-Neelamangla	32.50	155.00	24.83	June 2002	December 2003
7	Nandigama-Vijayawada	35.00	138.65	40.20	August 2001	June 2004
8	Durg bypass	18.00	70.00	0.00	March 1999	January 2001
9	Rail Over Bridge Kishangarh	1.00	18.00	16.66	March 1998	February 2000
	<b>Total (A)</b>	<b>454.10</b>	<b>3,598.00</b>	<b>718.93</b>		



#### 1.4 BOT-Annuity

In the case of projects built under BOT-Annuity mode, construction and maintenance form part of the concession and the Concessionaire relies on annuity payments determined by competitive bidding to recover its investment. All costs are borne by the Government in the form of deferred budgetary payments and the Concessionaire receives a fixed sum of annuity payment from the Authority directly on half-yearly basis. **Table 4** gives the status of projects executed under BOT-Annuity arrangement in Phase-I as of March 2008.

**Table 4: BOT-Annuity projects (B)**

Sl. No	Name of the project	Length in Km.	Project cost (Rs. in crore)	Six-monthly annuity (Rs. in crore)	Date of commencement	Date of completion
1	Palsit-Dankuni	65.00	432.40	40.00	October 2002	July 2005
2	Tambaram-Tindivanam	93.00	375.00	41.86	May 2002	October 2004
3	Panagarh-Palsit	64.46	350.00	55.50	June 2002	June 2005
4	Maharashtra Border-Belgam	77.00	332.00	50.51	June 2002	October 2004
5	Anakapalli-Tuni	59.00	283.20	29.48	May 2002	January 2005
6	Tuni-Dharmavaram	47.00	231.90	27.91	May 2002	August 2005
7	Dharmavaram-Rajahmundry	53.00	206.00	29.62	May 2002	March 2005
8	Nellore bypass	17.17	143.20	12.96	October 2002	September 2004
	<b>Total (B)</b>	<b>475.63</b>	<b>2,353.70</b>			
	<b>Grand Total (A+B)</b>	<b>929.73</b>	<b>5,951.70</b>			

### **1.5 Scope of audit**

This performance audit<sup>†</sup> covers projects executed under the PPP model in Phase-I of NHDP. Four BOT-Toll<sup>‡</sup> and four BOT-Annuity<sup>§</sup> projects comprising 71.58 per cent and 61.21 per cent of the awarded cost for BOT-Toll and BOT-Annuity projects of Phase-I, respectively were selected for audit. These projects were selected on the basis of quantum of expenditure and stage of completion.

### **1.6 Audit objective**

Audit objectives were to assess that:

- The system for the preparation of a long-term corporate plan and annual plans was effective and led to implementation of projects in time;
- The bid evaluation procedures were well established and functioning;
- The projects were executed through sound project management control system (PMCS) and monitored during the operation and maintenance stage;
- The revenue management system in toll collection was sound;
- The concessions were awarded on sound and equitable basis; and
- The Concessionaire fulfilled the objectives of NHDP.

### **1.7 Audit criteria**

Audit test-checked relevant records with reference to the following criteria:

- Departmental, technical and financial estimates as per the DPRs;
- The financial model worked out for each project by the financial consultant and the Authority;
- System of evaluation of bids;
- System for evaluation of technical and financial proposals for selection of Independent Consultants (IC) to supervise the project;
- Terms of concession agreement;
- Project Management Control System prepared by the IC for monitoring the implementation, operation and maintenance of the project;
- The agreed conditions for monitoring the performance of the IC; and
- Operation and Maintenance Manual for carrying out the operation and maintenance programme.

---

<sup>†</sup> A performance audit of the projects funded by cess, market borrowings and multilateral lending agencies and executed by the Authority was conducted during 2004-05 and its results were reported in C&AG's Audit Report No. 7 of 2005[0].

<sup>‡</sup> Delhi-Gurgaon, Jaipur-Kishangarh, Nellore-Tada and Satara-Kagal

<sup>§</sup> Palsit-Dankuni, Tambaram-Tindivanam, Panagarh-Palsit and Anakapalli-Tuni



### **1.8 Audit methodology**

Audit examined records of BOT projects maintained at the Authority's corporate office and at the Project Implementation Units (PIU) located at different places across the country. For quality assurance, Audit engaged Central Road Research Institute (CRRI) as a consultant for conducting technical audit of six projects - three each from BOT-Toll and BOT-Annuity projects. CRRI examined the Detailed Project Reports and carried out laboratory tests on the samples collected from the six selected project sites. The results of audit together with CRRI findings are mentioned in Chapters 2 to 5 of this report.

An entry conference with the Authority was held on 20 September 2006 to discuss the audit objectives. Audit teams completed the field audit during the period October 2006 to April 2007. CRRI conducted the technical audit between April 2007 and December 2007. The draft performance audit report containing audit findings was issued to the Authority and the Ministry on 2 January 2008. The reply of the Authority was received on 17 March 2008. The Audit Report incorporating Authority's replies was again issued to the Ministry and Authority on 21 April 2008 for discussion in the Audit Board meeting. An Audit Board meeting/exit conference was held on 29 April 2008 with the Ministry and Authority to obtain their views. The Ministry sent comments of the Authority on 30 April 2008.

### **1.9 Acknowledgement**

Audit acknowledges the cooperation and assistance afforded by the Authority at various stages including the support extended during site inspections conducted jointly.

## Chapter II

### *Planning*

#### *2.1 Corporate plan and project selection*

Phase-I of NHDP envisaged upgradation of 6359 Km. of National Highways at an estimated cost of Rs.30,300 crore by June 2004 using multiple execution cum funding models like BOT-Toll, BOT-Annuity and direct execution of the projects by NHAI. An essential prerequisite to ensure that the mammoth task achieved its objectives in a timely and cost effective manner was preparation of a corporate or strategic plan by the Authority that would help in prioritising, scheduling and monitoring the implementation of the projects. Better management practices required that guidelines for determining the mode of implementation of a project whether through Engineering, Procurement and Construction (EPC) mode, BOT-Toll, BOT-Annuity or Special Purpose Vehicle (SPV) should have been clearly laid down.

##### *2.1.1 Corporate Plan*

Audit observed that the Authority had not prepared any corporate or strategic plan for systematic implementation of Phase-I to provide a macro-level focus on the project. The execution of individual projects was being monitored through a system of concurrent review.

While accepting that the Authority did not have a published document on corporate or strategic plan, the Authority stated that NHDP projects were being implemented on the basis of the NHDP financing plan which was approved by the Committee on Infrastructure in March 2006 and monitorable targets fixed in consultation with the Planning Commission.

The reply confirms that the Authority did not prepare a corporate or a strategic plan at the inception of the NHDP Phase-I. Such a plan would have formulated a forward looking and realistic framework for implementation which would establish accountabilities for deviations, if any.

##### *2.1.2 Project Selection*

There were no internal guidelines or directions from the Government for determining the mode of execution of the projects when NHDP Phase-I was started. Such guidelines were first issued in March 2006. While seeking in-principle approval for NHDP Phase-I from the Ministry of Shipping, Road Transport and Highways (Ministry), the Authority indicated the mode in which each road project was to be executed i.e. BOT-Toll or BOT-Annuity or EPC. Audit, however, observed that in all the 17 projects selected for PPP, the Authority did not assign any basis for proposing execution of a particular project under PPP arrangement. For instance, Delhi-Gurgaon project was originally proposed to be executed either through EPC or through SPV while Panagarh-Palsit project was to be executed through EPC. These projects were, however, subsequently opened for BOT-Toll and BOT-Annuity modes, respectively. Further, no comparative evaluation of the financial implications of executing the projects being opened to PPP through BOT-Toll or BOT-Annuity was undertaken.

The Authority stated that PPP was a new concept introduced in implementation of NHDP Phase-I and 17 projects including Delhi-Gurgaon and Panagarh-Palsit projects were selected



for PPP mode as pilot projects in the interest of the Authority which matches with present thrust of Government on BOT projects. The Authority further stated that the Government approved the manner of execution of project and the funding mechanism and that for Delhi-Gurgaon project, the financial consultant recommended implementation of the project on BOT basis. The reply is not tenable as the Authority should have first analysed the financial implication and made a comparative study of executing the projects under alternate modes of execution before offering these projects under BOT mode. The absence of such guidelines rendered the decision making process susceptible to adhocism. For instance in Delhi-Gurgaon project, initially the financial consultant did not find the possibility of executing the project on BOT-toll basis viable. However, based on the Authority's direction of reworking the financial model based on increased toll charges, the viability was established but the financial consultant had still recommended preparation of revised cost estimates and traffic survey for a more realistic model. The Authority, however, decided to execute the project under BOT mode without undertaking any such activity. Under such uncertain conditions, it was imperative that some broad principles should have been laid down for deciding the mode of execution of Phase-I projects. In fact, as per the guidelines issued by the Ministry in March 2006, it has prioritised execution of projects through BOT-Toll over BOT-Annuity with the EPC route being the last resort.

## 2.2 Detailed Project Reports

Preparation of accurate and realistic Detailed Project Reports (DPR) for any highway project is the foremost critical activity. Of the eight projects selected for detailed audit, it was observed that the Authority did not prepare DPRs for two projects viz Jaipur-Kishangarh and Satara-Kagal and the DPRs of Tambaram-Tindivanam and Delhi-Gurgaon projects had the following deficiencies:

**2.2.1** In Tambaram-Tindivanam project, the total project cost estimated by the lowest bidder was Rs.378.70 crore against the DPR estimate of Rs.564.30 crore. The variation of 33 per cent of the DPR estimate indicated an unrealistic estimation by the DPR consultants. The Authority neither analysed the reasons for such a huge difference nor held the consultant, who had prepared the DPR, accountable in any way.

The Authority stated that considering the trend of bid price quoted for civil works in the region, the estimated cost of the lowest bidder was considered competitive and therefore accepted. The reply is not tenable as such huge variation defeated the very purpose of preparation of DPR. The Authority, therefore, should have analysed the reasons for such a substantial variation and recorded the same.

The DPR further suffered from following deficiencies:

- (i) The actual traffic was much lower than the estimates. This was due to the fact that the DPR consultant had not taken into consideration factors such as monthly concessional passes, multiple trips of vehicles, etc.
- (ii) The DPR omitted bus shelters to be provided at 25 locations for which the Authority had to make a fresh provision of Rs.eight crore.



- (iii) The DPR did not provide for capping of kerb in the existing four lanes between Km. 28 to Km. 61, with the result that this item of work was executed as an additional item at a cost of Rs.3.84 crore.
- (iv) The DPR was prepared without consulting the local population and one flyover in front of a temple between Km. 91 and Km. 92.750, at an estimated cost of Rs.21 crore, had to be deleted from the scope of work due to local demand.
- (v) CRRI also pointed out that the specifications of the material to be used in the project and the location of borrow area for soil were not properly mentioned in the DPR.

The Authority stated that the feasibility report was prepared in September 2000 and the traffic projection in feasibility report was only an estimated figure which did not match the actuals. The reply only confirms that the traffic projection was inaccurate and failed to take into account the known factors.

2.2.2 In Delhi-Gurgaon project, DPR envisaged construction of eight-lane highway from Km. 14.3 to Km. 36.63 and thereafter six-lanes up to Km. 42 in Gurgaon. In the course of detailed designing and execution of the project, the Authority issued change of scope notices between April 2003 and May 2004 for certain additional works. Accordingly, IC finalised and issued to the Concessionaire (June 2006) the change of scope order valuing Rs.146.62 crore constituting 21 *per cent* of the project cost. The change in scope of work included change in the height of underpasses from 3.5 metre to 5.5 metre, construction of elevated stretch from Rao Tula Ram Marg to Palam and additional underpasses at two locations, critical items that should have been foreseen at the time of preparation of DPR itself. Further, no responsibility was fixed on the DPR consultant for their failure to take into account the Indian Road Congress (IRC) specifications on the minimum vertical height of 5.5 metre for underpasses.

The Authority stated that at the time of preparation of DPR, provision of underpasses with 3.5 metre height was made as per site requirements and IRC norms. Due to unprecedented and unexpected growth in traffic, Government of Haryana insisted upon provision of underpass height as 5.5 metre to facilitate flow of heavy vehicles/fire tenders, etc.

The reply is not tenable as the pace of growth of traffic in the area did not pick up suddenly between April 2003 and May 2004, but was known even before the award of work. The DPR should have been prepared after taking into account the expected traffic growth of the area. The Authority's reply in respect of height of underpass is not tenable as IRC specifications clearly stipulate height of underpass as 5.5 metre for urban areas and the entire stretch is in an urban area. In fact the change of scope valuing Rs.146.62 crore which had to be borne by the Authority, set-off the premium of Rs.61 crore in the form of negative grant paid by the Concessionaire.

### 2.3 *Fixation of concession period*

The Authority, before calling for the bids in respect of BOT projects, fixed the concession period up to a maximum of 30 years. However, before fixing the concession period, the Authority had not systematically developed financial models to indicate the benchmark Internal Rate of Return (IRR) which would determine the optimum concession period within



which the Concessionaire would recover the capital cost of the project and other project-related expenditure besides earning a reasonable return. In the absence of such a system, Audit calculated the IRR of four BOT-Toll projects selected for audit based on discounted post tax cash inflows and outflows based on the projections made in the DPRs/concession agreements and found that the IRR of Jaipur-Kishangarh and Delhi-Gurgaon projects was 24 per cent each and it was 17.5 per cent and 20 per cent in respect of Tada-Nellore and Satara-Kagal projects, respectively.

Given the fact that the cost of borrowings at the time of evaluation of bids/award of contracts (2001/2002) was approximately 15 per cent<sup>\*</sup> and after allowing a premium of five per cent for the risk, the reasonable IRR for the above projects would work out to 20 per cent. Based on the reasonable IRR, the concession period that should have been allowed to the Concessionaire for Jaipur-Kishangarh and Delhi-Gurgaon projects worked out to 12 and 14 years, respectively whereas a concession period of 20 years each was fixed for these projects. Consequently, based on the projected traffic collection and reasonable concession period, the Concessionaires would gain Rs.121.63 crore and Rs.187.77 crore, respectively (after discounting at a rate of 20 per cent) during the extended concession period<sup>†</sup>. If the Authority had fixed the concession period on the basis of sound financial evaluation, the concession period in Jaipur-Kishangarh and Delhi-Gurgaon projects could have been restricted to 12 years and 14 years, respectively. By uniformly fixing the concession period at 20 years for both these projects, the Authority lost the opportunity of either collecting toll revenue by itself for the remaining eight and six years, or allowing the road users to use the project road by paying lesser or no toll during the same period.

The Authority stated that the system of preparation of financial model was in place though it was in the initial stages and that the financial analysis of these two projects were got done by SBI Caps and Infrastructure Development Finance Company. The Authority further stated that prior to bidding, the financial projections by the financial consultants were only available while audit observations are based on post tax cash inflow and outflow as per DPR/concession agreement. The Authority also stated that care was taken to include revenue sharing clauses in these two concession agreements.

The reply is not tenable as audit working is based on traffic projections in DPR of Delhi-Gurgaon project and revenue projections in concession agreement for Jaipur-Kishangarh project as no DPR was prepared for Jaipur-Kishangarh project. Inclusion of revenue sharing will not affect audit working as it is based on revenue projections up to the threshold limit and revenue sharing arises only after that limit is exceeded.

#### **2.4 Implementation of the projects**

The Authority's major work in BOT projects comprises preparation of Feasibility reports/DPRs, selection of the Concessionaire and the Independent Consultant (IC), making available land and thereafter monitoring the execution of the project through the IC.

---

<sup>\*</sup> 10.5 per cent after considering the tax savings

<sup>†</sup> From 2015-16 to 2022-23 in respect of Jaipur-Kishangarh project and from 2017-18 to 2022-23 in respect of Delhi-Gurgaon project

2.4.1 The Authority was required to award the contracts for 17 BOT projects of Phase-I by March 2002 and complete the execution by June 2004 as per the Government approval (December 2000). Audit observed that against this target date, the Authority could complete only five projects in time. There was delay of 2 to 42 months in completion of the remaining projects as per details given in *Annexure-I*. The delays occurred at the stage of award of contracts and during execution as discussed in the succeeding paragraphs.

2.4.2 *Delay in award of BOT-Toll and BOT-Annuity projects*

At the time of approving the projects, the Government set dates by which the contracts were to be awarded by the Authority. **Table 5** gives the details of dates of award of concessions for the eight projects selected for audit against the scheduled dates.

**Table 5: Delay in award of concessions**

Sl.No.	Name of the project	Due month for award of work	Actual month of award	Delay in months
1	Delhi-Gurgaon	March 2001	April 2002	12
2	Jaipur-Kishangarh	March 2001	May 2002	13
3	Satara-Kagal	March 2002	January 2002	-
4	Nellore-Tada	March 2001	March 2001	-
5	Panagarh-Palsit	March 2001	November 2001	7
6	Palsit-Dankuni	March 2001	March 2002	11
7	Tuni-Anakapalli	March 2001	October 2001	6
8	Tambaram-Tindivanam	March 2001	October 2001	6

Table 5 shows that concessions for only two of the eight projects were awarded in time. The analysis of the delays in award of remaining six projects is as follows:

- In respect of Delhi-Gurgaon project, the Authority changed the mode of execution from Special Purpose Vehicle to BOT-Toll in May 2001 despite the fact that the target month for award of contract was March 2001. This led to a delay of 12 months in award of concession.
- In respect of Jaipur-Kishangarh project, the single bid received in August 2000 was cancelled in October 2001. The revised bids were finalised in February 2002 and the concession agreement was signed in May 2002.
- In respect of Panagarh-Palsit project, the delay in award was due to re-tendering and subsequent negotiations with the lowest bidder.



- In respect of Palsit-Dankuni project, though the target month for award of concession was March 2001, the Authority initiated action for the same in September 2001 and finally awarded the contract in March 2002.
- In respect of Tuni-Anakapalli and Tambaram-Tindivanam projects, the delay in initiating the tendering process resulted in overshooting the scheduled dates.

#### 2.4.3 Delay in execution of projects

Table 6 gives the details of the due month for completion of the project as per contract and the actual month of completion.

**Table 6: Delay in execution**

Sl. No.	Name of the project	Due month for completion of work	Actual month of completion	Delay in months
1	Delhi-Gurgaon	July 2005	January 2008	29
2	Jaipur-Kishangarh	September 2005	March 2005	-
3	Satara-Kagal	August 2004	May 2006	20
4	Nellore-Tada	December 2003	February 2004	1
5	Panagarh-Palsit	December 2004	June 2005	5
6	Palsit-Dankuni	February 2005	July 2005	4
7	Tuni-Anakapalli	November 2004	January 2005	1
8	Tambaram-Tindivanam	November 2004	October 2004	-

The major reasons for the delay in execution in respect of three projects are given below:

- In the Satara-Kagal project, of the overall delay of 20 months there was delay of nine months in execution of additional items of work and a further delay of 11 months in completion of the project due to deficient performance of the Concessionaire.
- In Delhi-Gurgaon project, failure to provide land to the Concessionaire in time and delay of 26 months in finalisation of change of scope orders for Rs.146.62 crore (as discussed in para 3.12.1) by the Authority contributed to the delay in completion of the project.
- In the case of Panagarh-Palsit project, there was a delay of five months in making the required land available and finalising issue of change of scope orders.

The Authority stated that most of the projects were completed with marginal time overrun and the delay in award of some projects was due to delayed DPR, re-bidding, problems in

land acquisition etc. Delhi-Gurgaon project was delayed mainly due to delay in land acquisition and huge change of scope of work.

The reply is not tenable as the delay in finalisation of tender for Jaipur-Kishangarh could have been avoided if the Authority had planned its activities and fixed the yearly targets to match the target date of NHDP as a whole. In respect of Satara-Kagal, the environmental clearance, utility shifting and land acquisition were the responsibility of the Concessionaire and hence the Concessionaire should have been penalised for the delay. In respect of Delhi-Gurgaon, though the ownership of the land was not transferred, the Ministry of Defence and Airport Authority of India gave working permission to the Authority during July 2003 to April 2005 but the Concessionaire commenced the change of scope works only in July 2005 because of non-finalisation of rates for change of scope items by the Authority.

***Recommendation No. 1***

***The Authority should strengthen its planning machinery to monitor and take corrective action as required for timely execution of projects.***

***Recommendation No. 2***

***The Authority should establish procedures and define staff accountabilities***

- (i) for computing the concession period after sound financial evaluation has been carried out;***
- (ii) to ensure that detailed project reports are prepared for each project planned to be undertaken after extensive consultation with the district officials and public representatives; and***
- (iii) to review DPRs before commencement of tendering process for any significant variations between the DPR and tenders received to avoid award of additional items of work on nomination basis. The Authority should establish a review system at the appropriate level that includes fixing of responsibility for inaccurate traffic projections, project costs and other significant deficiencies in the DPR.***



## **Chapter III**

### ***Project management***

#### ***3.1 Execution of works***

The Authority invites bids for award of work for construction, maintenance and tolling in respect of BOT-Toll projects and for construction and maintenance in the case of BOT-Annuity projects. The work is awarded to the Concessionaire on the basis of competitive bidding. The Authority also appoints Independent Consultant (IC) to supervise the work executed by the Concessionaire; ensure compliance with quality specifications and time schedules; approve any proposals for change of scope and issue completion certificates. The concession agreements stipulate that the Concessionaire could commence work on an appointed date being the date on which the financial closure was achieved and commence commercial operations on obtaining a completion or provisional completion certificate from the IC. After the issue of provisional completion certificate, a punch-list of items was required to be prepared which includes certain minor items of work to be completed even though the road was opened to traffic. The Concessionaire was bound to complete the punch-list items within a stipulated period and obtain final completion certificate. Also, the Concessionaire was required to submit to the IC his work programme, proposed design/drawings, periodical progress reports, the work plans under Critical Path Method (CPM)/Project Evaluation Review Technique (PERT) chart of project monitoring, quality assurance plan, 'as-built' drawings, maintenance plan/manual, different test reports, etc., during the construction as well as operation and maintenance period.

#### ***3.2 Appointment of Independent Consultant prior to commencing of work by the Concessionaire.***

As per the terms of the concession agreement, the Authority was required to appoint an IC prior to the commencement of work by the Concessionaire. Of the eight projects reviewed in audit, it was observed that in respect of Palsit-Dankuni project, the Concessionaire commenced (May 2002) construction work well before commencement date (25 October 2002) and at the same time requested (May 2002) the Authority to approve the mix proportions of fly-ash and sand. The Authority allowed the Concessionaire to commence work before the appointment of IC, who was appointed in September 2002. Further, the Concessionaire used a different mix proportion of fly-ash and sand for embankment than what was approved. This mix design was comparatively new in India and therefore, required a strict quality control under the supervision of IC.

The Authority stated that the Concessionaire commenced the work at his risk and cost.

The reply is not tenable as the Authority allowed the Concessionaire to take up this work prior to the appointment of the IC which was the primary supervising agency.

#### ***3.3 Completion certificate***

As mentioned in para 3.1, the IC could issue a provisional completion certificate subject to execution of punch-list items by the Concessionaire. The final completion certificate was to



be issued only after execution of the punch-list items. While reviewing the records of the selected projects, the following deficiencies in this regard were noticed.

**3.3.1** The IC issued provisional completion certificate for Tada-Nellore project on 20 February 2004. Thereafter, the Authority, on the basis of the recommendations of the Variation Committee,\* directed the IC (October 2005) to issue final completion certificate from 12 July 2005 to the project as a whole, de-linking 30 items of work relating to facilities at the toll plazas, rest areas, truck lay-bye, etc., from the scope of work due to various reasons including problems in land acquisition. Audit observed (October 2007) that although these items were not executed by the Concessionaire, the Authority neither worked out the cost of these items, nor recovered any damages for non-execution of these items, thereby extending undue benefit to the Concessionaire.

The Authority stated that the items of positive and negative variations were under scrutiny of the IC and the outcome would be intimated to Audit in due course.

**3.3.2** In Satara-Kagal project, the IC issued the completion certificate without conducting the final tests to assure the quality of construction as required under clause 16.3 of the concession agreement.

The Authority stated that the Concessionaire continuously conducted tests for quality assurance during project implementation and hence IC did not insist on the final tests. The reply is not tenable as the final tests were required as per the concession agreement and the same were not dispensed with in other projects despite periodic testing.

#### **3.4 *Submission of documents by the Concessionaire***

As stated earlier, the Concessionaires have to furnish various quality compliance documents during and after completion of the project. Audit observed that the Concessionaire failed to produce certain important quality compliance documents in the following cases.

**3.4.1** As per the terms of agreement in respect of Delhi-Gurgaon project, the Concessionaire was required to construct road facility according to the approved designs in conformity with Government specifications. As per the reports of IC (November 2006), 87 quality related and 19 traffic and safety/environmental related non-conformity reports (NCRs) were pending for want of remedial action by the Concessionaire. The Concessionaire's quality team was not fully functional and was found under-staffed (November 2006). Even after 38 months of commencement of construction, the Concessionaire had not appointed a qualified/experienced team leader to ensure operational efficiency in the execution of project.

The Authority stated that the rectifiable NCRs pending as on the date of provisional completion certificate (January 2008) have been included in the punch-list items which have to be complied with within 120 days as per the concession agreement. But the fact remained that these NCRs were pending since November 2006 indicating deficient performance by the Concessionaire.

---

\* *Variation Committee is an internal Committee of the Authority constituted to finalise the rates for non BOQ items and the extension of time for completion of projects.*



**3.4.2** In Satara-Kagal and Tambaram-Tindivanam projects, the Concessionaire failed to furnish to the Authority 'as-built' drawings reflecting the highway project as actually designed and constructed on completion of the project.

The Authority stated that the 'as-built' drawings had since been received. However, the fact remains that these drawings were obtained after a delay of more than a year in both the cases and that too after audit pointed out such lapse.

### **3.5** *Quality of works executed*

As mentioned in paragraph 1.8, Audit took assistance of the Central Road Research Institute (CRRI) for assessing the quality of project execution. The scope of work of CRRI included scrutiny of DPRs, concession agreements, agreements with ICs and technical inspection of six road projects to ensure whether the quality of construction was as per prescribed standards and specifications indicated in the DPR. The results of quality checks conducted by CRRI on the six projects are summarised in the following paragraphs. These results are to be viewed in the light of the fact that five out of these six projects (except Delhi-Gurgaon) were completed between October 2004 and May 2006 and traffic is plying on these roads ever since.

### **3.6** *Assessment of pavement surface condition by visual inspection*

The basic purpose of evaluating the pavement surface condition, based on visual inspection is to find out the extent, magnitude and severity of distresses of various types. Pavement surface condition data is used as one of the indicators to identify the structural and functional deficiencies. The pavement surface condition was generally found to be satisfactory in all six projects. However, certain observations on visual inspection of the six projects are summarised in *Annexure-2*.

The Authority stated that the comment of CRRI in respect of Tuni-Anakapalli highway was general in nature wherein it was stated that cracks and shoving have been observed at few places which was normal for an operational flexible pavement due to spillage of diesel oil, accidents, etc. The Authority further stated that such defects were being repaired on regular basis. In respect of Tambaram-Tindivanam highway, the Authority stated that the minor deficiencies pointed out by CRRI had been rectified by the Concessionaire.

### **3.7** *Roughness test*

Roughness of a road is a key functional characteristic-lower the roughness value better would be the riding quality. Increase in roughness also significantly increases the maintenance cost of both vehicles and pavement. As per IRC specifications (IRC-SP:16-2004), roughness value of less than 2000 mm/Km. is indicative of 'good' condition of the road and for a value of 2000-3000 mm/Km., the condition of a road is considered to be 'average'. In its concession agreements, the Authority prescribed two levels of roughness viz. 'Desirable' and 'Acceptable'. In four\* of six concession agreements, the roughness level of less than 2000 mm/Km. was termed as 'desirable' and a roughness level between 2000 and 3000 mm/Km. as 'acceptable.' For the Delhi-Gurgaon and Jaipur-Kishangarh

---

\* Panagarh-Palsit, Tambaram-Tindivanam, Tuni-Anakapalli and Satara-Kagal



projects, the desirable levels were indicated as less than 2100 mm/Km. and 2500 mm/Km. respectively while the acceptable levels were indicated as less than 3000 mm/Km. and 3500 mm/Km., respectively. As is evident, the parameters for roughness levels were considerably relaxed in Jaipur-Kishangarh project.

CRRI conducted roughness test in six projects as specified in IRC:SP:16-2004 and the results of the same are given in *Annexure 3*. In all the 932 locations tested, 'acceptable' levels of roughness had been achieved. In fact, in 348 out of these 932 locations, the 'desirable' levels of roughness had also been achieved.

However, it was observed in audit that:

- (i) The Authority did not fix uniform levels of roughness while defining the 'acceptable' and 'desirable' levels in the six projects test-checked as discussed above. The Authority stated that a range for roughness had been indicated in the concession agreement in order to make an attempt to achieve 'desirable' results. The reply is not tenable as in most of the locations tested, the roughness value was only at the 'acceptable' level. Therefore the justification for prescribing two levels i.e. 'acceptable' and 'desirable' was purposeless.
- (ii) There were inconsistencies in the terms and conditions of maintenance in the concession agreements. The concession agreements of the six projects test-checked by CRRI laid down the requirement that a renewal coat of bituminous concrete/asphaltic concrete shall be laid every five years after initial construction or when the roughness value exceeded the 'acceptable' levels during the service life of the road at any time, whichever was earlier. However, the concession agreement for Jaipur-Kishangarh and Delhi-Gurgaon clearly stipulated that the renewal coat should bring down the roughness value to the 'desirable' level whereas the concession agreements of the remaining four projects stipulated that the remedial measures should bring down the roughness value to the 'acceptable' level. Such inconsistencies were indicative of lack of clarity within the Authority of the intended riding quality of roads.
- (iii) As per Operation and Maintenance requirements under the concession agreement, the Concessionaire was required to measure road roughness value at least twice in a year by a properly calibrated Bump Integrator Device, before and after the monsoon i.e. in June and November every year. Audit observed that the Concessionaire did not comply with this requirement in Tada-Nellore project. The Authority stated that the Concessionaire measured road roughness value once in a year since December 2003.

### **3.8 Structural evaluation using deflection study**

The structural condition of a road is evaluated by Benkleman Beam Deflection (BBD) Test. High values of deflections indicate that the road is structurally weak, whereas, low value deflections points to a structurally sound road. In the concession agreements for the six selected road projects, the Authority specified 0.5 mm as 'desirable' deflection and 0.8 mm as 'acceptable' deflection. The results of deflection studies conducted on the six selected projects by CRRI are given in **Table 7**.

Table 7: Results of deflection study

Sl.No.	Name of the project (Direction)	No. of sections checked	Deflection (in mm)		
			<0.5	0.5-0.8	>0.8
1.	Tindivanam-Tambaram	9	-	6	3
	Tambaram-Tindivanam	8	-	6	2
2.	Panagarh-Palsit	6	-	1	5
	Palsit-Panagarh	6	-	1	5
3.	Anakapalli-Tuni	5		4	1
	Tuni-Anakapalli	3	2	-	1
4.	Jaipur-Kishangarh	9	-	6	3
	Kishangarh-Jaipur	9	-	1	8
5.	Satara-Kagal	6	5	1	-
	Kagal-Satara	11	1	10	-
6.	Delhi-Gurgaon	5	5	-	-
	Gurgaon-Delhi	5	3	2	-

From the above table, it could be observed that the deflection values were more than the acceptable limit in 28 out of 82 sections tested, indicating the necessity of overlay requirement.

In Jaipur-Kishangarh and Delhi-Gurgaon concession agreements, the Authority stipulated that wherever the characteristic deflection exceeded 0.8 mm, a bituminous overlay shall be provided appropriately designed according to IRC: 81-1997 or its latest versions or amendments. The concession agreements for the remaining four projects simply indicated that the structural condition of the road shall be assessed every year by working out characteristic deflection as per the IRC: 81-1997 without specifying remedial measures.

The Authority stated that in respect of Tuni-Anakapalli project, the Concessionaire carried out survey in the presence of IC in 2006-07 and the deflections recorded were well within the specified limit of 0.8 mm. In respect of Panagarh-Palsit highway, the Authority stated that CRRRI conducted BBD tests at a few selected localised places where there were significant

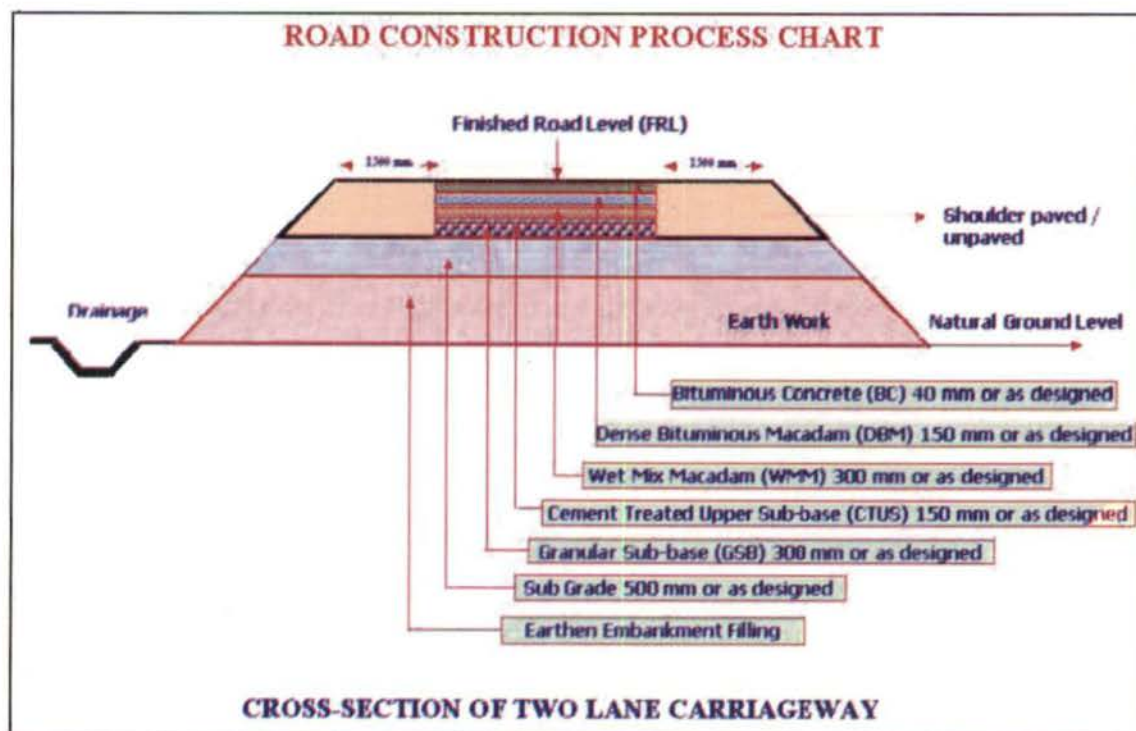


pavement distress caused by overloading and as such these do not reflect overall condition of the pavement.

The reply is not tenable as CRRI found that the deflection value in Tuni-Anakapalli highway was more than 0.8 mm in two sections out of eight test-checked. In respect of Panagarh-Palsit highway selected sections covered all the three types of pavement surface conditions viz. 'Good', 'Fair' and 'Poor' and tests on all these sections did not indicate significant pavement distress and therefore, the results reflected the overall pavement condition and majority of results ( 10 out of 12) exceeded the acceptable limit of deflection.

### 3.9 Assessment of quality of road construction

A finished road consists of earth embankment, sub-grade, granular sub-base (GSB), cement treated upper sub-base, wet mix macadam (WMM), dense bituminous macadam (DBM) and bituminous concrete in that order from the bottom as given in the following chart.



To assess the quality of different materials used during construction of various pavement layers vis-à-vis their conformity with the specifications stipulated in the concession agreement including the thickness of various pavement layers, test pits were dug on the road stretches.

#### 3.9.1 Granular layer thickness

The actual and specified thicknesses of WMM and GSB granular layers (combined) observed during test pits excavations are given in **Table 8**.



**Table 8: Results of road construction quality – Granular layer thickness compliance**

Sl.No.	Name of the project	No. of test pits dug	Specified thickness (combined) (mm)	Compliance with specifications		
				No. of pits that complied with specifications	No. of pits not complying with specifications	Range of variation (mm)
1	Tambaram-Tindivanam	5	550	3	2	19-63
2	Panagarh-Palsit	5	600	3	2	10-55
3	Tuni-Anakapalli	4	600	2	2	40
4	Jaipur-Kishangarh	6	480-500	3	3	11-30
5	Satara-Kagal	5	450-525	-	5	11-55
6	Delhi-Gurgaon	6	480	3	3	9-27

As shown in **Table 8**, the combined thickness of WMM and GSB was not complied with in all test pit locations in respect of one project (Satara-Kagal) and that the non-compliance was significant in the other projects. As regards degree of compaction of granular layers, based on the CRRI test results, Audit observed that the same was inadequate in five road projects\* with an adverse impact on the long-term performance of these roads.

The Authority stated that the range of variation in total thickness varied from 9 mm to 63 mm and that the maximum was about 10 *per cent*. It further stated that the variation in total thickness by five to ten *per cent* was not likely to affect the performance of the road.

The reply is not tenable as all the five pits excavated in Satara-Kagal project showed deviation in pavement layer thickness from the concession agreement specifications whereas in the remaining five projects, the thickness was complied with in some pits and deficiencies were noticed in some other pits. This indicated weakness in quality control supervision on the part of the Concessionaire and the IC.

### 3.9.2 Gradations and material properties of granular layers.

CRRI observed that the gradations and properties of WMM materials were in conformity with the Ministry's specifications in all the projects. However, in five projects (except Delhi-Gurgaon project) the combined flakiness and elongation indices of aggregates in WMM were higher than the limit of 30 *per cent* specified by Ministry. Higher values of combined flakiness and elongation indices may result in breaking up of flaky and elongated particles due to the impact of traffic loads and the actual gradation of the WMM mix might

\* Except Delhi-Gurgaon project which was completed in January 2008.



change resulting in reduction of the service life of the road structure and consequently reduced performance.

Further findings of CRRI indicated that GSB materials used for construction of Satara-Kagal project did not meet the technical specifications of Ministry.

The Authority replied that the manner in which CRRI carried out the gradation tests was not acceptable and that the effect of compaction during construction and in service loading of the road was likely to bring about changes in grading.

The reply is not tenable as CRRI carried out gradation tests as per Bureau of Indian Standards prescribed methods of test and that no considerable change in gradation of granular layer during the service life of a road was likely to occur. Further, if it was accepted that materials break down due to traffic loading, then there should have been finer gradations in all or at least majority of pits which was not the case.

### ***3.9.3 Gradations and material properties of bituminous layers***

Bituminous layer is structurally more sound and gives strength to the project road. The thickness of bituminous layers (Bituminous Concrete and Dense Bituminous Macadam) met the specifications in five road projects. In the case of Tambaram-Tindivanam project, the CRRI tests indicated reduction in thickness between 8 and 20 mm compared to the specification of 190 mm. The gradation of aggregates in BC layer in Tambaram-Tindivanam project was coarser than the specified limits.

The Authority stated that it was not possible to match the exact thickness in all cases because the profile of the existing roads was at times irregular which would increase or decrease the thickness with respect to the specified thickness. It further stated that if sample was taken at the centre of the roads, the thickness would be more. The variation was also not alarming being 4 to 10 *per cent* and the overall performance of the road was not likely to be affected.

The reply is not tenable as bituminous cores were extracted at random locations including the centre of the road and in this project, out of 15 cores, deficiency was noticed in eight, higher thickness in three and four had the exact specified thickness which showed that adequate quality control was not exercised during construction.

### ***3.10 Non-execution of repair and maintenance work***

As per the concession agreement, the Concessionaire is required to operate and maintain the project highway so as to comply with the specifications and standards and other requirements set forth in the concession agreement. In Satara-Kagal project, the Concessionaire had neither appointed any operation and maintenance contractor (OMC) nor carried out any maintenance work during the period from November 2005\* to April 2007 (the Concessionaire appointed the OMC in May 2007 only) and did not forward the quarterly progress reports as required in the concession agreement. Further, the IC observed that the quantities of damaged road facilities had increased day-by-day due to accidents on highway stretch and stressed the urgency of engaging the OMC through their monthly reports. Although the concession agreement provided for appointing separate OMC by the Authority

---

\* A portion of the project road (86 km) was completed in October 2005.



in the event of the Concessionaire's failure to appoint such OMC at their risk and cost and also levy penalty for such failure, the Authority did not recover penalty of Rs.50.60 lakh for the period up to April 2007.

The Authority stated that due to its persistent efforts, the Concessionaire had appointed the O&M contractor with effect from 15 May 2007.

The Authority's reply confirms that the O&M contractor was not appointed till April 2007 and it did not invoke the remedial/penalty clause in the meantime.

### 3.11 Functioning of Independent Consultant

3.11.1 As per the concession agreement entered into for all the BOT-Toll and BOT-Annuity projects, the Authority was to appoint ICs to supervise the project in consultation with the Concessionaire. The professional fee paid to IC was to be shared equally between the Authority and the Concessionaire. As per the general conditions of contract, the IC was to act as faithful advisor to the client i.e. the Authority and at all the times, support and safeguard their legitimate interests in any dealings with sub-consultants or third parties. To effectively supervise the work, the IC was to evolve a suitable project management control system (PMCS).

Audit noted that there were inconsistencies in the Terms of References (TOR) of the eight contracts entered into with the ICs of BOT-Toll and Annuity projects test-checked, as they did not stipulate the uniform contractual obligations as detailed below.

**Table 9: Terms of reference**

Sl.No.	Terms of Reference	Name of projects in which not included
1	Review of reasonableness of the total construction cost estimate.	All the BOT projects except Delhi-Gurgoan
2	Identify the construction delays and recommend remedial measures.	Tuni-Anakapalli, Panagarh-Palsit, Palsit-Dankuni and Satara-Kagal
3	Determine the extension of project completion schedule and resultant concession period.	Tuni-Anakapalli, Panagarh-Palsit, Palsit-Dankuni and Satara-Kagal
4	Assist the Authority in arriving at any cost variation due to change of scope orders and its impact on the concession agreement.	Panagarh-Palsit, Palsit-Dankuni, Satara-Kagal and Tuni-Anakapalli
5	Review the manpower and equipment deployed by the Concessionaire.	Jaipur-Kishangarh, Tada-Nellore, Delhi-Gurgoar and Tambaram-Tindivanam
6	Review compliance by the Concessionaire of its obligation under concession and other agreements.	Tuni-Anakapalli, Panagarh-Palsit, Palsit-Dankuni and Satara-Kagal

Audit also noted that as per the TOR, the ICs were to supervise the construction works on sample basis, but the basis of such sample selection was not indicated in the contract agreements leaving scope for ambiguity. Audit noted that there were instances of IC not



carrying out the items of works as per the terms of reference (TOR). Details of such cases are given in the succeeding paragraphs.

### **3.11.2 Professional and third party liability insurance**

As per clause 3.5 (c) of special conditions of contract for Delhi-Gurgaon project, the IC was to indemnify the Authority for a maximum value of their fee in the form of professional liability insurance (PLI). During execution of project, the IC was given supervision of change of scope of work as additional works at an agreed fee of 4.75 per cent of the change in scope order which worked out to Rs.6.96 crore. Audit observed (December 2006) that the Authority had so far not insisted on any additional PLI from the IC for entrustment of these additional works. Audit further observed that in the absence of an enabling provision in the agreement with the IC for furnishing PLI for additional change of scope, the IC was discharging duties without any liability to indemnify the Authority for the risk of the former's under/deficient professional performance.

The Authority stated that the observation is noted for future compliance.

### **3.11.3 Unjustified recommendation for bonus payment**

In Tambaram-Tindivanam project, during the course of construction, the change of scope order was issued deleting the flyover near Melmaruvathur temple and instead a four lane road was added. Similarly, three other change of scope orders were issued. The impact of each of the item in respect of time and their effect on commercial operation date were, however, not worked out by the IC. While issuing the completion certificate, the IC had deleted construction of one rail over bridge and one traffic intersection trumpet from the scope of work. The IC had also recommended bonus payment as the project was completed 28 days ahead of schedule without indicating the effect of omissions/deletions of certain items of work and change in scope. Hence, the recommendation for payment of bonus of Rs.8.83 crore was not justified.

The Authority stated that instead of the deleted works, (Rs.21.00 crore) the Concessionaire has done some additional works (Rs.21.90 crore) and hence it had no impact on the commercial operation date (COD). It further stated that time required for completion of positive and negative change of scope of work need not be seen separately because all the work was supposed to be completed within construction period.

The reply is not acceptable. The time required for deleted items of work and additional items of work have to be separately computed and cannot be set off based on their cost.

### **3.11.4 Non appointment of team leader**

As per terms of agreement with the IC on Tuni-Anakapalli project, the IC was required to appoint a team leader in the first week of March 2002. As the IC did not appoint the team leader, the Authority issued show-cause notice for termination of his contract. The Authority, however, decided (16 March 2002) not to terminate the contract but continued with a deputy team leader acting as team leader up to September 2002 on an undertaking by the IC to appoint the originally approved team leader by that time. The IC could not mobilise the



original team leader as promised and the deputy team leader continued to function as acting team leader till the completion of the project i.e. January 2005.

Audit observed that out of the 100 marks allotted for the IC team's qualifications and experience, 20 marks were given to the team leader and hence he played an important role in total technical score of a firm at the time of evaluation of technical bid. Therefore the non appointment of the team leader violated an important condition for selection of IC and the Authority could not penalise the IC in any way as there was no such provision in the agreement.

The Authority stated that the deputy team leader had enough experience and therefore it was agreed that he would act as team leader in the interest of the work.

But the fact remained that such action defeated the purpose of inclusion of a team leader in IC's team for which no deterrent action was taken by the Authority.

### ***3.11.5 Absence of Management Information System (MIS)***

Under the terms of reference on Delhi-Gurgaon and Tada-Nellore BOT projects, IC was required to develop a MIS to be used by the Authority, the Concessionaire, lenders and other stake holders in the project. Audit found that it was not developed and made operational either during the design, construction or operational stage. The Authority also did not insist on development of MIS.

The Authority admitted that there was no MIS developed by IC of Tada-Nellore project and further stated that in respect of Delhi-Gurgaon, the MIS was developed by the Authority themselves.

### ***3.12 Unintended benefit to the Concessionaire***

Audit found that the Authority extended benefits to Concessionaires that were not as per the terms of agreements or practices in the following cases.

#### ***3.12.1 Delay in taking decision***

In Delhi-Gurgaon project, the IC issued (April 2003 to May 2004) change of scope notices for execution of 10 additional items of work. Though the Authority issued change of scope notices during the period April 2003 to May 2004, it did not finalise the rates for these additional items of work. The Concessionaire intimated the cost of these additional items as Rs.257.50 crore in April 2005 and the IC initially evaluated the cost as Rs.223.26 crore in May 2005. Consequently, the Concessionaire did not commence execution of these items till June 2005. The Authority advised the Concessionaire (July 2005) to proceed with the execution of these items of work with the assurance that it would make payment at 85 *per cent* of the rates recommended by the IC. When the Concessionaire commenced the work on these additional items, he stated that because of the delay in finalisation of rates for additional items, the project would be substantially completed by September 2007 only i.e. 26 months after the scheduled COD. The Authority directed the IC to rework the cost based on the latest available approved drawings finalised and the IC revised the same to Rs.146.62 crore which was approved by the Authority in June 2006.



Audit observed that the inordinate delay (April 2003 to June 2005) on the part of the Authority in finalising the rates for additional items led to postponement of COD to September 2007 from the originally planned July 2005. This delay would also extend the concession period by 26 months and was likely to result in an unintended benefit in the form of differential toll income of Rs.62.11 crore\* to the Concessionaire during the extended period.

The Authority stated that though COD has been issued, concession period has not been extended by the Authority for whatever reason including delay caused by change of scope work and that the revenue loss anticipated by audit may not be correct.

The reply is not tenable as the clause 17.1 of the concession agreement clearly stipulates that in case the change of scope work adversely affected COD, the matter shall be referred to the IC and his decision in this regard would be final and binding on both the parties. The Concessionaire had already taken up the issue of delay due to delay in finalisation of rates for COS items.

### ***3.12.2 Use of wayside amenities***

As per agreement provisions of Tada-Nellore project, the Concessionaire was required to maintain the carriage highways, rest areas and other project facilities including wayside amenities. While the concession agreement allowed Concessionaire to levy and collect fees from the users of highway, it was silent about the use of other highway facilities by the Concessionaire. Along the highway, two rest areas with restaurant facilities, dhabas were constructed as per the agreement. The Concessionaire was allowed to run the restaurants without payment of any rent to the Authority.

The Authority stated that the wayside amenities were constructed by the Concessionaire and not at its cost. The Authority's reply is not tenable as the cost of constructing such facilities was being recovered by the Concessionaire through the grant given by the Authority and the toll. Hence the Concessionaire should have been allowed to operate such facilities on payment of reasonable rent.

### ***3.13 Excess claim of Rs.3.92 crore by the Concessionaire under COS items***

In Palsit-Dankuni project, the Authority issued 22 COS orders. Of these, 16 orders involved embankment work for which the Concessionaire used granular sand instead of the earth material on the plea that earth material was not available within the reasonable proximity of project site. The Concessionaire also pleaded that the cost of importing earth from the approved borrow pits beyond the reasonable distance from the project site would be higher than the cost of granular sand and claimed a rate of Rs.332.95 per cubic metre being the rate for usage of granular sand as per West Bengal Public Works Department (PWD) schedule of rate for 1.86 lakh cubic metre of granular sand used for the above items. The Authority admitted the claim.

Audit observed that the DPR for this project mentioned that sufficient earth material required for embankment work was available within the project site. The IC also recommended use

---

\* *Net present value of future toll revenue discounted at 15 per cent*



of earth for embankment works included under the COS orders. As per the agreed provisions, the Concessionaire was required to make his own arrangement for construction material. Hence, allowing use of granular sand instead of earth was not justified. This also resulted in unintended benefit of Rs.3.92 crore\* to the Concessionaire.

The Authority stated that the IC had certified that the requisite earth was not available within the proximity of highway and hence use of granular sand was allowed. The reply is not tenable as the concession agreement stipulated that the Concessionaire was responsible for making own arrangement for all the materials required for project construction. Therefore, extra payment due to non-availability of material within the proximity of highway was not justified.

**Recommendation No. 3**

*The Authority should strengthen the supervision mechanism by improving the quality assurance systems and methodologies.*

**Recommendation No. 4**

*The Authority should review the need to specify two levels of quality parameter viz. 'desirable' and 'acceptable'. Only the acceptable level of quality specifications in respect of structural and functional parameters viz. roughness and deflection should be specified in the concession agreement to ensure road safety, quality of construction, and riding comfort; and acceptance of deviation should be fully justified and approved at the appropriate level in the Authority.*

**Recommendation No.5**

*The Authority should on completion of every road project and at periodical intervals thereafter, conduct tests through reputed agencies other than the Independent Consultant to ensure that all the quality specifications have been complied with and continue to be within the level mentioned in the agreement. In case of deviations, immediate remedial measures should be undertaken through the Concessionaire.*

**Recommendation No.6**

*The Authority should establish procedures to ensure that bonus for early completion of project is approved only after the Independent Consultant fully reflect and justify the impact of addition/deletion of items of work on the scheduled completion date.*

---

\*Computed at the rate of Rs.210.52 per Cu. Metre being the difference between the West Bengal PWD schedule of rates for granular sand (Rs.332.95 per Cu. Metre) and earth (Rs.122.43 per Cu. Metre).

## Chapter IV

### *Contract management*

#### *BOT-Toll and BOT-Annuity agreements.*

In BOT-Toll agreement, the Concessionaire recovers the investment along with return from the tolling rights for a predetermined concession period. The grant which is given to fill the viability gap of the project is released periodically in proportion to the equity brought in by the Concessionaire. To keep track of the grant released, Concessionaire's funding and the revenue collected, escrow accounts are required to be opened under all BOT-Toll agreements. Under the BOT-Annuity agreement, investment is recovered through the predetermined annuity payments made by the Authority. The annuity payment commences after a predetermined date which is the stipulated date of completion of the project. In the event of delay in completion of the project, penalty is levied on the Concessionaire if the delay is attributable to the Concessionaire but the annuity commences from the predetermined date despite the delay. As these agreements are different from the traditional EPC contracts, framing of terms and conditions of the concession agreements and inclusion of relevant clauses to safeguard the financial interests of the Authority viz. sharing of surplus/profit in BOT-Toll agreements, recovery of savings in project cost due to deletion of items of work after the award of contract, operation of escrow account, penalty for delay in completion of the project attributable to the Concessionaire, etc., assume greater significance. Further, in respect of BOT-Annuity projects where the Authority collects the toll revenue, it has to ensure that there are no avoidable delays in the commencement of toll collection after completion of the projects.

#### *4.1 Monitoring of project financing*

The Authority should have an effective monitoring mechanism to ensure that the funds released for a particular project have actually been utilised for that project. This is achieved through the operation of escrow account by the Concessionaire. The other mechanism with the Authority is to appoint at its cost, another firm of Chartered Accountants as independent auditor to audit and verify the project finance. Audit noticed deficiencies in implementing the monitoring mechanism as discussed below.

##### *4.1.1 Escrow account*

As per the concession agreements for BOT-Toll projects, the Concessionaires were required to open an escrow account (EA) with a bank and all receipts and payments in respect of the project were to be routed through this account. The Concessionaires were required to forward monthly EA report within five days of the end of each month to the Authority. The terms and conditions of operation of the EA also required the bank to forward a copy of the account each to the Concessionaire, the Authority and the lenders. A review of such statements would provide insight into the utilisation of funds. Of the four BOT-Toll projects, Audit found that in respect of three projects, viz. Jaipur-Kishangarh, Satara-Kagal and Delhi-Gurgaon (BOT-Toll projects), the copies of the EAs were neither forwarded nor the Authority demanded the same. The urgency of periodic review of the EA statements was



illustrated by the report of the Financial expert, who was engaged by the Independent Consultant to scrutinise the accounts of Delhi-Gurgaon project, which pointed out (February 2005) that the assessment of efficient utilisation of project funds was hampered due to the following deficiencies in the operation of the EA:

- equity infusion of Rs.100 crore was not routed through EA.
- operations in the EA were not in line with the approved quarterly/ annual budgets.
- the actual expenditure pattern did not conform to the cash flow priority laid down in the escrow agreement.
- disbursal program under escrow arrangement was not in conformity with the drawal schedule of the loan agreement.

The Authority which initially stated that it had directed the Satara-Kagal Concessionaire to maintain EA in line with the agreement contradicted it by stating that the latter was already in operation since commencement of the project. The Authority further stated that it had directed the Concessionaire of Delhi-Gurgaon project to maintain EA in line with the concession agreement.

The reply does not address the core issue of monitoring the project funding and its utilisation through the EA statements which is an important instrument of monitoring timely flow of funds from different sources and their utilisation for the project activities.

#### **4.1.2 Independent auditors**

As per clause 28.4 of the concession agreement, the Authority had the right but not the obligation to appoint at its cost another firm of Chartered Accountants (independent auditor) to audit and verify all those matters, expense, costs, realisations and other assurances which the statutory auditors of the Concessionaire, are required to do, undertake or certify. However, in respect of none of the projects covered in this review, did the Authority appoint independent auditors. Though the appointment of such independent auditors was not mandatory, it had become desirable in the case of the Satara-Kagal project to safeguard the Authority's financial interests, as discussed below.

- The amount of grant was fixed at 40 *per cent* of the project cost. Even after more than one year of commercial operation (December 2007), the Authority had not determined the actual cost of the project, although the Authority had so far released Rs.233.10 crore as grant. In the absence of the information on the actual amount incurred in the project, the correctness of the grant released could not be ensured (also refer para 4.4).
- Further, as per the concession agreement, the Authority was to receive 50 *per cent* of the surplus in any financial year of commercial operation (refer para 4.4). The Authority had neither demanded nor the Concessionaire furnished the details of surplus till date (March 2008).

The Authority stated that the independent auditor for Satara-Kagal project has since been appointed. In respect of Palsit-Dankuni project, the Authority stated that the audit

observation was noted for future guidance. For Tambaram-Tindivanam and Delhi-Gurgaon projects, the Authority stated that it would exercise the option of appointing independent auditors on need or case-to-case basis.

#### **4.2 Levy of penalties**

Audit observed that the Authority did not levy penalty for deficient/non-performance despite the fact that there were relevant clauses in the concession agreements. Further the clauses of the concession agreements for recovering cost of the deleted items and remuneration paid to the IC were not implemented as elaborated below.

##### **4.2.1 Penalty for delay in completion of the project**

- As per the concession agreement, Satara-Kagal project was to be completed on 2 August 2004. The Concessionaire, however, obtained provisional completion certificate for the first 86 Km. of the road on 22 October 2005 and for the balance 46.76 Km. on 24 May 2006. The Concessionaire sought extension of time by 18 months but the IC recommended extension for nine months only i.e. up to 2 May 2005. Thus there were delays of 24 weeks and 55 weeks for the first and second sections, respectively (over and above the extension of time recommended by the IC) in obtaining provisional completion certificate. Audit observed that as per the provisions of the concession agreement, the Authority was entitled to levy a penalty of Rs.2.11 crore for the delay in completion of the project. The Authority, however, had not taken any action to recover this amount from the Concessionaire so far (February 2008). The Authority stated that the delay in completion of work was attributable to Government agencies and the total concession period would remain unaltered. The reply was not tenable as the reasons attributed by the Authority for the delay were all the responsibility of the Concessionaire as per the agreement. Further non-alteration of concession period is not relevant to levy of penalty for delay in completion.
- As per the concession agreement, the commencement date of Panagarh-Palsit project was 21 June 2002 and the scheduled completion date was 20 December 2004. The project, however, was completed on 9 June 2005. The delay of 171 days in completing the project was attributed by the IC to the Authority and other external factors not under the control of the Concessionaire. Audit noted (March 2007) that nine items valuing Rs.5.60 crore were deleted from the scope of work. The proportionate 9 days required for completion of the deleted items of work were not considered either by the Authority or IC. This simple omission of 9 days meant a penalty loss of Rs.2.73 crore for the Authority which was recoverable from the Concessionaire. The Concessionaire was also given 91 days extension of time for the delay in handing over site. Audit observed that these 91 days included 20 days of delay prior to the project commencement date. The delay in handing over site prior to the commencement date could not be a ground for extension of time. As such, the extension of time for delay in handing over the site would be justified for 71 days only. This excess allowance of extension of time for 20 days resulted in non-levy of penalty of Rs.6.02 crore on the Concessionaire.



The Authority in its reply did not give explanation for allowing extension of 91 days instead of 71 days as pointed out by audit.

#### **4.2.2 Penalty for non-completion of the punch-list items**

The Concessionaire was given a provisional certificate to allow commencement of commercial operations in Satara-Kagal project subject to the condition that the punch-list items were to be completed within 120 days from the date of issue of provisional certificate. Audit observed that the Concessionaire had not completed the punch-list items (February 2008) and as per the provisions of the concession agreement, the Authority is entitled to levy a penalty of Rs.1.89 crore for delay in completion of punch-list items. Audit, however, observed that the Authority had not recovered any penalty from the Concessionaire.

The Authority stated that the penalty for non-completion of punch-list items would be computed and levied on the Concessionaire as per the concession agreement before issue of final completion certificate.

#### **4.2.3 Penalty for non-achieving milestones**

As per concession agreement provisions of BOT-Toll projects, the Authority was entitled to recover penalty for non-achievement of individual milestones on the due dates and if the project was completed within the overall time schedule, the amount so recovered would be paid back to the Concessionaire without interest. In Jaipur-Kishangarh project, there were delays in achievement of individual milestones even though the project was completed within the overall scheduled date. Audit observed that the Authority did not recover Rs.75.90 crore for non-achievement of individual milestones. By failing to recover this amount on due dates, the Authority lost the interest it would have earned up to the date of refund. The Concessionaire had also agreed (March 2005) to pay the interest at the rate of SBI-PLR plus two *per cent*. However, the Authority had not claimed Rs.3.77 crore as interest from the Concessionaire.

The Authority admitted that the Concessionaire did not achieve two milestones and after detailed examination, IC calculated Rs.34.26 lakh as the interest charges that would have been earned by the Authority. The Authority further stated that this amount has been deposited by the Concessionaire.

The reply is not tenable as the Concessionaire themselves agreed to pay penalty with interest at the rate of SBI PLR plus two *per cent*. Based on this a sum of Rs.3.77 crore should have been recovered from the Concessionaire whereas only Rs.34.26 lakh was recovered.

Similarly in Satara-Kagal project, Audit observed that the Concessionaire failed to achieve three individual milestones and the delay ranged from 16 to 51 weeks. The Authority, however, did not recover Rs.12.05 crore on account of penalty for non-achievement of individual milestones.

The Authority stated that the Concessionaire being a Maharashtra Government PSU, possibility of taking up the unresolved issues at Government level would be explored.

#### 4.2.4 Share of IC's remuneration

As per concession agreement in respect of Satara-Kagal, the remuneration, cost and expenses of the IC were to be borne fully by the Concessionaire. The Authority was to make the initial payment to IC and the Concessionaire was to reimburse his share within 15 days of receiving such a statement of expenditure from the Authority. Audit found that the Authority could not recover Rs.8.79 crore (for the period from April 2002 to December 2006) from the Concessionaire due to failure in raising periodical invoices. Further, failure to raise monthly invoices for the reimbursement resulted in loss of interest of Rs.3.89 crore\* to the Authority.

The Authority stated that the reimbursement of cost of IC would be adjusted against the outstanding grant (Rs.8.27 crore).

The fact, however, remained that the Authority failed to recover the remuneration paid by it to the IC from the Concessionaire as per provisions of the agreement.

#### 4.2.5 Short recovery

As per Article 7.2 (h) of the concession agreement in respect of Tambaram-Tindivanam project, when change in scope of work leads to reduction in cost, the Authority shall deduct the amount equivalent to the reduction in cost along with interest as determined by the Authority based on the financing documents, in equal installments from the annuity. During execution of the project, construction of one flyover was deleted leading to a saving of Rs.21 crore as worked out by the IC. This amount would be recovered at the rate of Rs.70 lakh from the 30 half-yearly annuity payments. Audit observed that the Authority had recovered interest at 10.03 *per cent* instead of 12.67 *per cent* being the weighted average cost of debt based on the financing documents on the date of financial closure. Adoption of a lower rate of interest had resulted in an undue benefit of Rs.4.02 crore to the Concessionaire.

The Authority stated that the rate of 14.5 *per cent* was assumed by the Concessionaire for arriving at the amount of annuity whereas as per the concession agreement, the Authority shall deduct the amount equivalent to reduction in cost along with interest thereon at the weighted average rate. Accordingly, it was recovering interest at 10.03 *per cent* being the actual cost of borrowing by the Concessionaire.

The reply is not tenable as the concession agreement stipulated that the interest for the recovery of cost of deleted items would be at weighted average cost of debt based on the financing documents which was 12.67 *per cent* in the instant case.

4.3 Audit observed that the Authority did not incorporate a clause for recovery of penalty towards non-achievement of financial closure and target dates for individual milestones in BOT-Annuity projects. Audit also observed that there were instances of unintended benefits accruing to the Concessionaires due to absence of certain clauses in the agreements which would have protected the Authorities financial interests, as discussed below.

---

\* Calculated at the rate of 12.5 *per cent per annum* for the period 2003-04 to 2007-08.



#### **4.3.1 Financial closure**

Financial closure is the date on which the financing documents providing for funding by the lenders become effective and the Concessionaire has immediate access to such funds. The Authority did not incorporate a clause for recovery of penalty for non-achievement of financial closure within a stipulated period in BOT-Annuity projects, although such a clause was incorporated in BOT-Toll projects. In the absence of a suitable penalty clause for not achieving financial closure on a given date, the Authority could not levy penalty for delay of seven and six weeks in Tuni-Anakapalli and Tambaram-Tindivanam projects, respectively.

The Authority stated that model concession agreement for BOT-Annuity projects was under finalisation and penal provisions for delay in financial closure and non-completion of punch-list items have been incorporated in the same.

#### **4.3.2 Milestones**

Audit noticed that unlike the concession agreements for BOT-Toll projects, the concession agreements in respect of BOT-Annuity projects did not stipulate target dates for individual project milestones, consequent penalty for non achievement of milestones, period within which punch-list items had to be completed and penalty for failure to adhere to the stipulated period. In the absence of such milestones in the agreements, the Authority could not monitor the progress of work against agreed/stipulated milestones and penalise the Concessionaires for non-achievement of required progress. Similarly, the Authority could not levy penalties on Concessionaires for failure to complete the punch-list items within stipulated time in respect of Panagarh-Palsit and Palsit-Dankuni projects.

The Authority admitted to non-provision of such clauses in the agreements.

#### **4.4 Sharing of surplus**

As per the concession agreement for Satara-Kagal project, the surplus\* was to be shared equally between the Authority and the Concessionaire at the end of each financial year. The surplus was to be computed based on toll revenue actually collected and estimated expenses on operation and maintenance and cost of debt. Audit observed that the clause on sharing of surplus was not in the best financial interest of the Authority. In this particular case, though the project was completed in May 2006, the O&M contractor was appointed in May 2007 (also refer para 3.10). As per the agreement the estimated routine maintenance cost for the year 2006 was Rs.6.14 crore and this estimated cost would be set off against the revenue collected during the year, without any actual expenditure being incurred. Therefore, it was in the interest of the Authority to arrive at surplus based on toll revenue and the corresponding expenses actually collected/incurred. However, neither the Concessionaire paid any amount towards the Authority's share of surplus nor had he rendered relevant details for computation of the same to the Authority (December 2007).

---

\* Surplus being the excess of actual income over the estimated O&M expenses, expenditure on periodic maintenance, cost of debt service for any financial year and deficit, if any, for previous financial year.

The Authority stated that at present, the concept of revenue sharing has been introduced in the model concession agreement instead of sharing of surplus.

#### **4.5 Revenue management**

##### **4.5.1 Commencement of toll collection**

In BOT-Annuity projects, the Authority was entitled to collect toll based on the toll notification issued by the GOI. It would therefore become imperative that to avoid revenue loss, the toll collection should start immediately after the project completion. The Authority issued (April 2003) a circular to all PIUs prescribing the procedure for getting toll notification issued by GOI. As per this circular, the concerned unit was to initiate preparations at least 150 days before the anticipated date of completion of project so that there was no delay in commencement of toll collection. Audit, however, noticed that in respect of all the four annuity projects test-checked, there were delays in commencement of toll collection due to delay in obtaining toll notification and synchronisation of two completed stretches, resulting in revenue loss of Rs.23.89 crore as detailed in *Annexure-4*.

The Authority stated that in Tambaram-Tindivanam project, delay in issue of toll notification was due to delay in completion of punch-list items and protest from local public over toll collection. The reply is not tenable as non-completion of punch-list items would not come in the way of commencement of toll collection and the delay was mainly due to failure in taking timely action.

For Tuni-Anakapalli project, the Authority stated that the delay in submission of toll fee notification was due to change in overall plan of toll plaza location and the length covered in each plaza. The reply is not tenable as delay of over four months in revision of overall plan was not justified.

For Palsit-Dankuni project, the Authority stated that the work of improvement of 2.899 Km. was given to a different contractor which delayed the completion of the project. The reply is not tenable as the delay was due to lack of planning in synchronising the completion of a very small stretch.

As regards Panagarh-Palsit, the Authority stated that for tolling, four laning only is not sufficient but the project should be substantially completed and safety measures should be in place. The reply is not tenable because the IC had given the provisional completion certificate in June 2005 after being satisfied that the road was substantially complete and safe for the road users. Hence, the delay in toll collection beyond June 2005 on account of safety and substantial completion was not justified.

##### **4.5.2 Fixation of toll rates**

The National Highways (rates of fee) Rules, 1997 provides the basis of fixing toll rates. The fee for projects involving conversion of existing two-lane of National Highways into four-lanes should not exceed the base capping rates at June 1997 prices and the fee fixed might be reviewed after every five years based on wholesale price index and fixed in multiple of rupees five. The Authority did not index the base rates with the latest Wholesale Price Index



available at the time of sending draft toll notification to the Ministry which resulted in fixation of lower toll rates and revenue loss of Rs.22.73 crore as detailed in **Table 10**.

**Table 10: Fixation of lower toll**

Sl. No.	Name of the project	Month of draft notification sent to Ministry	Month of toll to be adopted	WPI actually adopted	(Rs. in lakh)		
					Loss of toll per month	Loss of toll till March 2008	Loss of toll till the next revision
1	Tambaram-Tindivanam	October 2004*	October 2004	2003-04	17.42	627.12	418.08
2	Tuni-Anakapalli	November 2004	October 2004	2003-04	14.64	512.40	366.00
3	Palsit - Dankuni	March 2005	February-05	2003-04	5.82	174.60	174.60
<b>Total</b>						<b>1314.12</b>	<b>1958.68</b>

The Authority stated that to avoid frequent change in toll rate, it had decided to use average annual WPI instead of monthly index and that if different WPI indices were used for different toll plazas, the chances of public resentment might be higher.

The reply is not tenable as the toll rates once fixed would be revised after five years only and any lower fixation would result in recurring revenue loss for the subsequent five years. The statement about public resentment is a matter of speculation. In fact toll rates for BOT toll projects are revised every year whereas the toll rates for annuity projects are revised every five years only.

#### 4.5.3 Leakage in toll collection

The Authority started toll collection in Tambaram-Tindivanam project by engaging the services of M/s Tamil Nadu Ex-servicemen's Corporation Limited (TEXCO) with effect from 1 April 2005. Audit noticed (January 2006) that the category-wise vehicles passing through the toll plazas were not recorded by the collection agent and that the IC had not conducted monthly traffic audit from November 2004. The Chartered Accountants firm appointed in July 2005 by the Authority to check the collection of revenue also pointed out several deficiencies in toll collection such as vehicles crossing the toll plaza without paying toll, issuing multiple use tickets and monthly passes without mentioning the dates and vehicle numbers, absence of vehicle barriers in the toll plaza, etc. and estimated a toll revenue loss due to these deficiencies to be Rs.21.98 crore per annum.

The Authority stated that the security of TEXCO and other payments has been withheld and all revenue losses would be adjusted from those payments. Audit, however, observed that the payments due to TEXCO were Rs.88.39 lakh and much lower than the estimated revenue loss of Rs.21.98 crore.

\*Date of completion

#### **4.5.4 Revenue loss due to absence of toll plaza**

As per the concession agreement for Panagarh-Palsit project, two toll plazas were to be constructed at Km. 519.400 and at Km. 554.600. During the execution of this project, these two toll plazas could not be constructed at the proposed locations due to construction of truck lay-by at chainage 554.600 and due to non-availability of land at Km. 519.400 as this land was owned by the Army authorities who refused to part with. The Authority decided to construct only one toll plaza and to locate the same at Km. 507 and approached Ministry for toll fee notification to collect toll at this location. The Ministry declined the proposal as the stretch between Km. 515 and 520 was only two-laned. Therefore, the Authority decided to utilise the toll plaza constructed at Km. 585.692 located in Palsit-Dankuni highway for collection of toll for Panagarh-Palsit project, obtained (July 2005) toll notification for collection of toll for Panagarh-Palsit highway (Km. 517.000 to Km. 581.000) and started collecting toll from August 2005.

Audit observed that the traffic entering Panagarh and going out before the toll plaza located in Palsit-Dankuni highway, used Panagarh-Palsit highway without paying any toll which resulted in loss of revenue. This would be evident from the fact that the actual monthly toll collections from the road users of this stretch during 2005 and 2006 were Rs.8.15 crore and Rs.23.51 crore, respectively against DPR projected revenue of Rs.18.01 crore and Rs.54.07 crore, respectively, resulting in combined revenue loss of Rs.40.42 crore during the period August 2005 to December 2006.

The Authority while accepting that there was no toll plaza in Panagarh-Palsit highway stated that the DPR toll revenue estimates could never be realistic due to various factors viz. return journey tickets, monthly passes, local concessions, exempted category etc. The reply is not tenable as the main reason for the huge difference between DPR toll projection and actual toll collection was due to the absence of toll plaza between the Panagarh-Palsit highway. The traffic could utilise the Panagarh-Palsit highway freely without payment of toll.

#### **Recommendation No.7**

***The Authority should ensure that the agreement clauses relating to opening and periodical submission of escrow account and the appointment of independent auditors are complied with.***

#### **Recommendation No.8**

***The Authority should:***

- (i) ensure commencement of toll collection through timely action to prevent loss of toll revenue and should ensure that the toll rates are fixed based on the latest available wholesale monthly price index;***
- (ii) ensure that agreement clauses relating to levy of penalty are implemented in spirit; and***
- (iii) incorporate penalty clauses for non-achievement of financial closure and individual project milestones.***



## Chapter V

### *Conclusions*

National Highway Development Programme is one of the prestigious projects undertaken in independent India for infrastructure development. With coverage of total road length of 13820 Km., the programme aims to upgrade existing two-lane roads into four/six-lanes. A major portion of the roads to be upgraded included Golden Quadrilateral of the four Metro cities and the North-South and East-West corridors. Phase-I of the programme, covering 6359 Km. was estimated to cost Rs.30,300 crore and was scheduled to be completed by June 2004.

In order to reduce dependency on its finance and to improve the quality of construction, Government of India decided to involve private sector participation through BOT mode. Accordingly 17 projects at a total cost of Rs.5,952 crore were awarded to private sector operators between March 1998 and April 2003. As of 31 December 2007, 4760 Km. of road had been completed at Rs.33,655 crore. However, execution of projects through private partnership suffered both in its planning and implementation from the following deficiencies:


- The Authority did not prepare corporate/strategic plan with milestones and targets for the execution of these projects. There were delays in both award and execution stages with the result that the Authority could complete only 5 of the 17 BOT projects within the prescribed time schedule. This was mainly due to delay in acquisition of land required for road projects and execution of additional items of work not envisaged at the time of award of work.
- The Authority did not prepare DPRs for two of the eight selected projects; and the DPRs of two projects were deficient in many ways such as substantial difference between DPR estimates and the lowest bid, requirement of large number of additional items of work, incorrect traffic projections, non consultation with local bodies, authorities, local public, etc.
- The Authority did not have a system in place to compute the reasonableness of the concession period to be allowed for BOT-Toll projects.

- The main objective of involving private sector in infrastructure development was to ensure superior quality construction. Quality checks conducted by CRRRI in six projects revealed that the pavement surface condition was generally found to be satisfactory in all the projects. The Authority had specified two levels of roughness viz. 'desirable' and 'acceptable' and the roughness levels in all locations test-checked were within the acceptable level. The Authority did not fix uniform levels of roughness while specifying these levels. Deflection values were more than the 'acceptable' levels in 28 out of 82 sections test-checked indicating immediate requirement of overlay. The combined thickness of wet mix macadam and granular sub-base layers did not comply with the agreement specifications in a majority of test pits locations. The conditions for maintenance were not uniform across various concession agreements.
- The Authority did not stipulate uniform contractual obligations as there were inconsistencies in the terms of references in the contracts entered into with ICs. There were instances of not carrying out the items of works as per the terms of reference in respect of appointment of team leader, professional and third party liability insurance and development of Management Information System. There was delay in appointment of IC. The IC issued completion certificate without conducting final tests and recommended unjustified bonus.
- As the financial arrangements and the execution model in the PPP projects were different from the traditional EPC contracts, framing of terms and conditions of the concession agreements and inclusion of relevant clauses to safeguard the financial interests of the Authority viz. sharing of surplus/profit in BOT-Toll agreements, recovery of savings in project cost due to deletion of items of work after the award of contract, operation of escrow account, penalty for delay in completion of the project attributable to the Concessionaire, etc., and invoking these clauses as and when required, assumed greater significance. The Authority failed to use the provision for obtaining escrow account statements and conduct independent audit as a tool for monitoring and control. Although concession agreements provided for levy of penalties for deficient/ non-performance, it failed to invoke the same. Also, the Authority did not incorporate the clause for recovery of penalty towards non-achievement of financial closure and target dates for individual milestones in BOT-Annuity projects. In respect of BOT-Annuity projects where the Authority collects




the toll revenue, it had to ensure that there are no avoidable delays in the commencement of toll collection. Such delays were noticed in all the four projects test-checked.

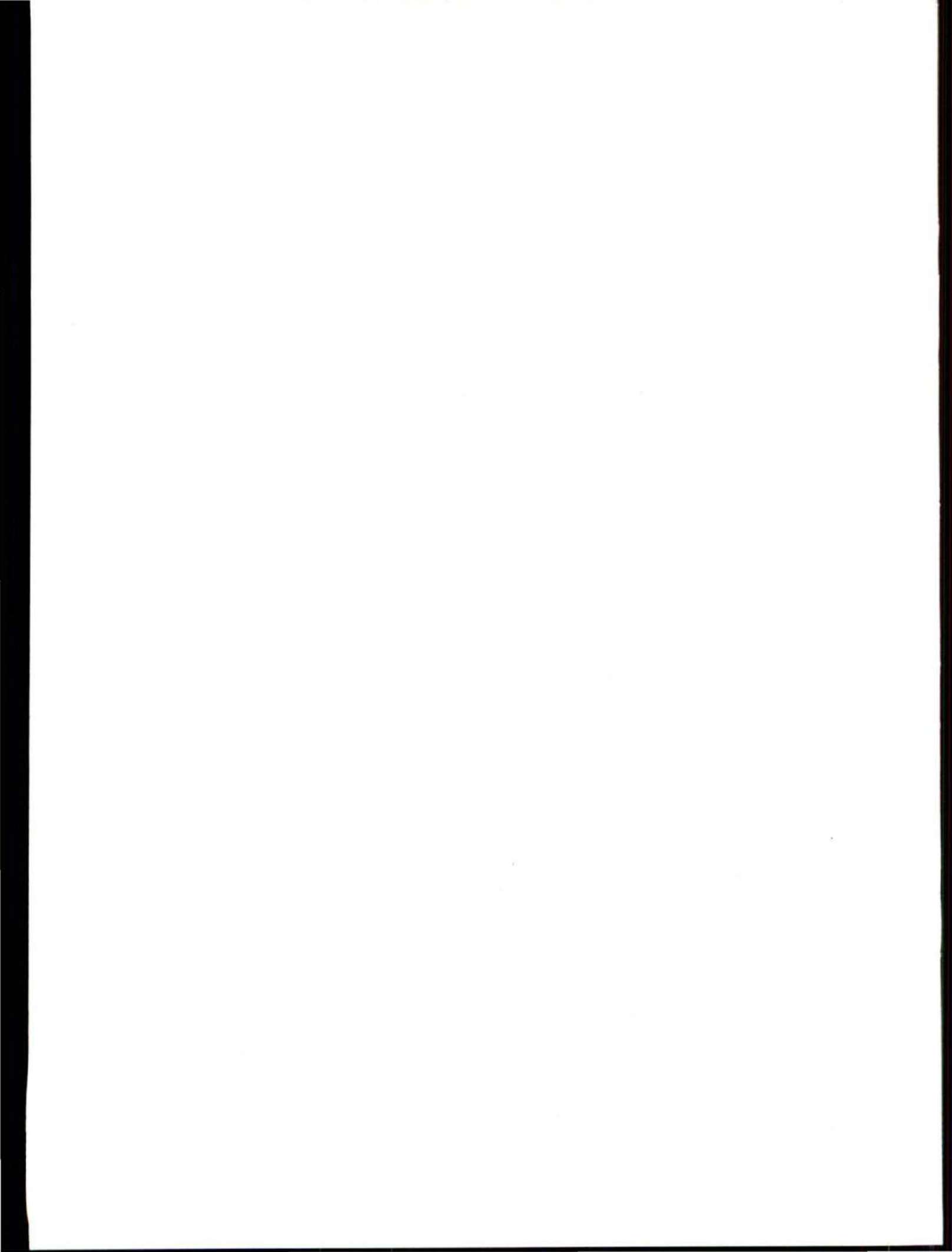
New Delhi  
Dated: 27 Jun, 2008

  
(BHARTI PRASAD)  
Deputy Comptroller and Auditor General  
cum Chairperson, Audit Board

Countersigned

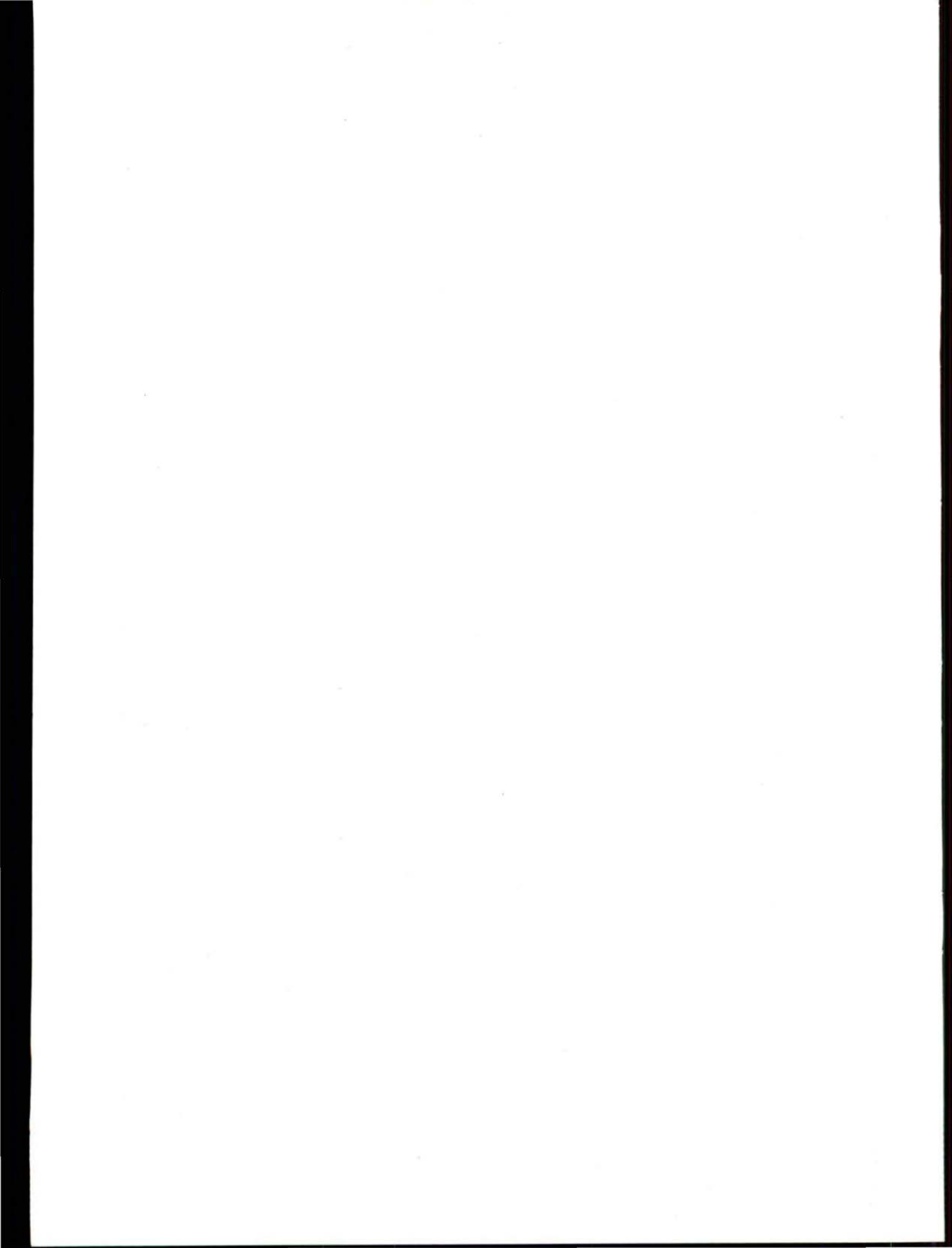
New Delhi  
Dated: 27 Jun, 2008

  
(VINOD RAI)  
Comptroller and Auditor General of India





# ANNEXURES





**Annexure 1**  
**(Referred to in para 2.4.1)**

**Details of time overrun**

Sl. No.	Name of the project	Project cost (including grant) (Rs. in crore)	Grant (Rs. in crore)	Date of Commencement	Scheduled date of completion*	Date of Completion	Time overrun in months (up to December 2007)*
1	Delhi-Gurgaon	710.00	(-) 61.06*	April 2002	June 2004	January 2008	42
2	Jaipur-Kishangarh	644.00	211.00	April 2003	June 2004	March 2005	8
3	Vivekananda Bridge	641.00	120.00	September 2002	June 2004	June 2007	35
4	Nellore-Tada	621.35	127.30	August 2001	June 2004	February 2004	Nil
5	Satara-Kagal	600.00	240.00	February 2002	June 2004	May 2006	22
6	Tumkur - Neelamangla	155.00	24.83	June 2002	June 2004	December 2003	Nil
7	Nandigama-Vijayawada	138.65	40.20	August 2001	June 2004	June 2004	Nil
8	Durg bypass	70.00		March 1999	June 2004	January 2001	Nil
9	ROB Kishangarh	18.00	16.66	March 1998	June 2004	February 2000	Nil
	<b>Total (A)</b>	<b>3598.00</b>	<b>718.93</b>				
10	Palsit-Dankuni	432.40	0	October 2002	June 2004	July 2005	12
11	Tambaram-Tindivanam	375.00	0	May 2002	June 2004	October 2004	3
12	Panagarh - Palsit	350.00	0	June 2002	June 2004	June 2005	11
13	Maharashtra Border-Belgam	332.00	0	June 2002	June 2004	October 2004	3
14	Anakapalli-Tuni	283.20	0	May 2002	June 2004	January 2005	6
15	Tuni-Dharmavaram	231.90	0	May 2002	June 2004	August 2005	13
16	Dharmavaram-Rajahmundry	206.00	0	May 2002	June 2004	March 2005	8
17	Nellore bypass	143.20		October 2002	June 2004	September 2004	2
	<b>Total (B)</b>	<b>2,353.70</b>					
	<b>Grand Total (A+B)</b>	<b>5,951.70</b>	<b>718.93</b>				

\* Scheduled date of completion has been reckoned as per the target date fixed by the Government while approving NHDP Phase-I

\* Excluding the scheduled and actual month of completion.

\* The amount has been paid by the Concessionaire to the Authority.

**Annexure 2**  
**(Referred to in para 3.6)**

**Results of visual inspection**

Sl. No.	Name of the project	Results of visual inspection
1	Tambaram-Tindivanam	Pavement surface condition varied considerably between various sub-stretches. The surface condition of some of the sub-stretches was satisfactory whereas severe bleeding, rutting and displacement of pavement markings were noticed on some of the sub-stretches. On few sub-stretches, alligator type fine cracks have developed on the pavement surface.
2	Panagarh-Palsit	Cracks and patch repairs were found to be less than 5 per cent implying good maintenance. Most of the project road in the direction of Panagarh to Palsit had rutting in the range of 3 mm to 9 mm due to heavy loading.
3.	Tuni-Anakapalli	Surface was in satisfactory condition at some locations while distresses like shoving, bleeding and heaving were observed at many locations besides cracks and rutting at some locations. There were no potholes on the entire stretch of road project. The pavement surface condition can be rated as average. In case of rigid pavement stretches, there were different forms of cracks.
4	Jaipur-Kishangarh	Surface was in satisfactory condition throughout except at some locations where rutting, shoving and cracks were seen. Pavement has deficient camber resulting in drainage problem.
5	Satara-Kagal	Surface was in satisfactory condition at some locations while distresses like cracking, raveling, shoving and bleeding were observed at many locations. In rigid pavement transverse, longitudinal, corner and settlement cracks were seen.
6	Delhi-Gurgaon	Pavement surface was rated as good to very good. No rut has been observed. Pavement distresses such as potholes, raveling and depression were not found.



**Annexure 3**  
**(Referred to in para 3.7)**  
**Results of roughness test**

Sl.No.	Name of the project (Direction)	No. of locations tested	Riding quality	
			Desirable	Acceptable
1	Tambaram-Tindivanam	93	-	93
	Tindivanam-Tambaram	92	-	92
2	Panagarh-Palsit	66	1	65
	Palsit-Panagarh	66	-	66
3	Tuni-Anakapalli	60	-	60
	Anakapalli -Tuni	60	-	60
4	Jaipur-Kishangarh	90	84	6
	Kishangarh-Jaipur	90	84	6
5	Satara-Kagal	133	76	57
	Kagal -Satara	133	88	45
6	Delhi-Gurgaon	25	7	18
	Gurgaon-Delhi	24	8	16
<b>Total</b>		<b>932</b>	<b>348</b>	<b>584</b>

**Annexure 4**  
**(Referred to in para 4.5.1)**

**Delay in commencement of toll collection**

Sl. No.	Name of the project	Period of delay	No. of days of delay	Loss of toll revenue (Rs. in crore)	Audit observation
1.	Tambaram-Tindivanam	11.10.2004 to 2.2.2005	115	6.14	The project was completed and the provisional completion certificate was issued on 11.10.2004. But the Concessionaire completed the punch-list items on 7.1.2005 and publication of notification was obtained on 2.2.2005. Thus failure of NHAI to initiate timely action for getting gazette notification immediately after issue of provisional completion certificate led to delay.
2.	Tuni-Ankapalli	25.12.2004 to 6.5.2005	133	9.61	As per Hqrs. Circular dated 21.4.2003, the PIU-Vishakhapatnam should have prepared draft gazette notification and forwarded the same to Hqrs. Office of NHAI before June 2004 considering 8.11.2004 as anticipated date of completion of project but the PIU forwarded the draft notification in October 2004. Further, the PIU initiated action for appointment of toll collection agency in December 2004 only. Thus the toll collection got delayed due to late initiation by the PIU.
3.	Palsit-Dankuni	21.6.2005 to 30.9.2005	102	5.23	The project was completed on 20.6.2005 and the gazette notification was also obtained on 17.6.2005. But the toll notification was published in local news papers on 28.9.2005. The toll collection started on 1.10.2005. This was due to subsequent inclusion of a small stretch of 2.899 Km. at the end point of Palsit-Dankuni stretch. Thus lack of planning and synchronising the completion of improvement work of a small stretch along with the main project had resulted in loss of toll revenue.
4.	Panagarh-Palsit	10.6.2005 to 29.7.2005	50	2.91	The completion of the project was scheduled in December 2004 but actually completed on 9 June 2005. The Authority did not initiate action for toll notification in advance as per its guidelines. But it sent the draft notification to the Ministry only on 28.3.2005, which was issued on 29.7.2005.
<b>Total</b>				<b>23.89</b>	



## Glossary of abbreviations

Sl.No.	Abbreviation	Full form
1	BOT	Build, Operate and Transfer
2	COD	Commercial operation date
3	COS	Change of Scope
4	CPM	Critical Path Method
5	CRRI	Central Road Research Institute
6	DPR	Detailed Project Report
7	EOT	Extension of Time
8	EPC	Engineering, Procurement and Construction
9	GQ	Golden Quadrilateral
10	IC	Independent Consultant
11	IDFC	Infrastructure Development Finance Company
12	IRR	Internal Rate of Return
13	MIS	Management Information System
14	MSRDC	Maharashtra State Road Development Corporation
15	NHDP	National Highways Development Programme
16	NPV	Net Present Value
17	O&M	Operation & Maintenance
18	PERT	Programme Evaluation and Review Technique
19	PIU	Project Implementation Unit
20	PLI	Professional Liability Insurance
21	PLR	Prime Lending Rate
22	PMCS	Project Management and Control System
23	ROB	Rail Over Bridge
24	ROW	Right of Way
25	SPV	Special Purpose Vehicle
26	TEXCO	Tamil Nadu Ex-servicemen Corporation Limited
27	TOR	Terms of Reference
28	WPI	Wholesale Price Index

## Glossary of technical terms

Sl.No.	Item of work	Description
1.	Bituminous Concrete	Laying and compacting for use in wearing and Profile Corrective Courses in the thickness of 25 mm to 100 mm, using prescribed aggregate and premixed with bitumen on a bituminous bound surface.
2.	Bitumen	A viscous liquid or solid material black or dark brown in colour, having adhesive properties consisting essentially of hydrocarbons, derived from petroleum and soluble in carbon disulphide.
3.	Borrow Pit	The source of approved material required for the construction of embankments, or other portions of earthwork requirements.
4.	Dense Bituminous Macadam	A dense bitumen macadam road base or base course manufactured with bitumen.
5.	Fly Ash	The finely divided residue that results from the combustion of ground or powdered coal, transported from the firebox through the boiler by flue gases.
6.	Granular Sub-base	A continuously or gap-graded granular material conforming to Ministry specification for highway works. Used in the sub-base layer of road construction, which consists of crushed rock, slag or concrete is the superior material and is the only one permitted for major trunk roads and motorways.
7.	Pavement	The part of a roadway having a constructed surface for the facilitation of vehicular movement.
8.	Professional Liability Insurance	Professional Liability Insurance is an insurance to cover a loss resulting from malpractice or other liability of a professional person to a third party. The insured's benefits under the policy begin when the insured's liability to a third party has been asserted.
9.	Specifications	The standard specifications, supplemental specifications, special provisions, and all written or printed agreements and instructions pertaining to the method and manner of performing the work or to the quantities and qualities of the materials to be furnished under the contract.
10.	Wet Mix Macadam (WMM)	Laying and compacting coarse and fine crushed rock or slag blended to meet the grading requirement. Clean crushed graded aggregate and granular material premixed with water to a dense mass on a prepared sub base.