

Delhi Noida Toll Bridge

Innovation Report

I. The Context

- (1) To cater to the ever increasing population of Delhi, the National Capital Region (NCR) was formed which included satellite townships of Noida, Gurgaon, Faridabad, Greater Noida, Ghaziabad
- (2) For development of these townships it was imperative to provide easy access between Delhi and these cities and in doing so establish quick connectivity that would minimize travel time as well as reduce congestion. The existing routes across Yamuna were severely congested. Travel times were of the order of more than an hour during peak hours with traffic jams causing environmental pollution
- (3) Given the constraint on budgetary support, the Delhi Noida Toll Bridge was conceived for implementing on a Public Private Partnership (PPP) basis to provide a faster link and direct connectivity
- (4) At that juncture, it was the first large Greenfield BOT project in the road sector to be taken up for implementation and at a time when there was widespread cynicism for doing such projects, to price consumers for services and where the financial system was yet untested for project recourse financing
- (5) The project was more complex as it involved two States Governments (Delhi and Uttar Pradesh) and involved a Local Authority (NOIDA)
- (6) **Being the first BOT project in the country, it was path- breaking at every step of the development and implementation. Once implemented, the project established the benchmark and provided guidelines for other projects to follow in the roads and bridges sector**
- (7) The innovative features of the project included:
 - (a) the first infrastructure project to be implemented on a commercial format within a PPP framework
 - (b) first project to adopt a Citizen's Committee to review construction
 - (c) first bridge to be designed for a life of 70 years

- (d) first project to integrate and implement environmental & social framework of entitlements to project affected persons on a PPP basis
 - (e) the unique financial engineering & financing products developed for facilitating financing of the project including the issuance of first long tenor "Deep Discount Bonds" with "Take Out Financing" for infrastructure
 - (f) first project to demonstrate substantial leveraging of the budgetary resources
- (8) Period: The project was conceived in April, 1992 when a Memorandum of Understanding was signed by IL&FS with the Delhi Administration and the New Okhla Industrial Development Authority (NOIDA) to develop the project within a PPP framework
- (a) IL&FS was made responsible for project development, for structuring the project to attract private sector investments, for marketing the project to involve private contractors and operators, for bid process management & selection of the private sector consortium, for achieving financial closure and managing the construction and operations
 - (b) Being the first case BOT project, a unique process of development was evolved. The project involved a number of stakeholders including two state governments, the Delhi Administration and the local authority, NOIDA and the Lenders, including the World Bank
 - (c) The project documentation had to be evolved taking consensus of all stakeholders associated with the project. The project development process was therefore complex and evolutionary. At every milestone, approvals of the Government and concerned stakeholders were sought. For efficient management a Steering Committee representing all stakeholders was formed for decision aking and process monitoring
 - (d) The project development process took over two years. The detailed design preparation was undertaken to define project cost to a $\pm 2\%$. In the process there were changes at the Government level, the concept went through immense structuring effort

The Steering Committee approved the formation of the Noida Toll Bridge Company Ltd. (NTBCL), a project company which was incorporated in November, 1997, to implement the project

- (e) The Concession Agreement was executed in January 1997, after significant due diligence and discussions with the governments. The project was bid out in 1997 and the EPC Contractor consortium of Mitsui-Marubeni Corporations was selected in December, 1997. The EPC contract was signed in January 1998. Financial closure took a little less over a year and construction was initiated in January 1999
- (f) **With the participation of efficient reputed contractors, the project was constructed four months ahead of schedule in January 2001. The commercial operations began in February 7, 2001. The project today also boasts of efficient operations and zero leakage in toll collection**

(9) Needs and Objectives of the Innovation :

- (a) Need for the Project: Nearly 30% of Delhi's population resides across the river Yamuna. Noida alone is inhabited by about 6,00,000 people, 50% of whom commute to Delhi daily for work. At that time, the existing route crossing Yamuna via the ITO bridge and the Nizamuddin which faced severe traffic congestion. An additional bridge across the river Yamuna was needed for better access between Noida and South Delhi

Various studies had been undertaken by the Government between 1983 and 1992 that emphasized the requirement for a new bridge across the Yamuna River between NOIDA and South Delhi. Additional traffic was estimated at 50,000 PCUs (equivalent Passenger Car Units) per day by 1997 which was likely to increase to 1,50,000 PCUs per day by 2017. Making an additional link between Nizamuddin Bridge and Okhla Barrage was an urgent proposition

- (b) Objective of the Innovation: The broad objective of the project was to develop a bridge that would not merely serve as a connectivity link, but it would:
 - (i) **minimize all risks and allocate residual risks to stakeholders** best able to manage them on a transparent basis

- (ii) have a design that would meet the following objectives
 - **be a beneficial and an affordable alternative to commuters** wherein willingness to pay would be explicitly established
 - serve the traffic needs of the project influence area over a period of at least 30 years
 - (iii) **create appropriate frameworks as benchmark best practices** in design, financing, contractual arrangements, construction, O&M etc., that would be replicable within the sector
 - (iv) strategise **a project development process as a best practice for development of BOT projects** in the country
 - (v) develop an environmental and social management policy framework that could be adopted across sectors/projects
 - (vi) put in place systems and procedures for expediting the process of clearances, approvals, documentation etc
 - (vii) **demonstrate private sector efficiencies** in project management across the entire life cycle of the project
 - (viii) **demonstrate leveraging of budgetary resources to the maximum** to attract private investments
 - (ix) **maximize the investment potential** in the land side areas of the bridge
- (10) Benefits of the Project: The implementation of the project has potential benefits to the population of Delhi and Noida
- (a) Established better connectivity integrating Noida/Greater Noida with Delhi
 - (b) Savings in Fuel & Costs: The project resulted in savings in travel time, savings in fuel and other vehicular operating costs to users, as well as savings in fuel consumption

- (c) Environmental Benefits: Reduction in congestion levels in existing bridges/routes due to diversion of traffic to the Toll Bridge. This facilitated reduction in air and noise pollution due to reduced congestion and smooth movement of traffic

The project also provided significant benefits to the government. Land prices in NOIDA and on Delhi side have risen due to better connectivity. Direct linkage between Noida and Delhi has increased overall economic activity in Delhi and Noida. **It is estimated that Noida and Greater Noida will attract Rs 30,000 crore investments in the form of Commercial and Entertainment and Infrastructure projects**

The project is an excellent example to the country today in terms of innovative construction practices, creation of a world-class facility on PPP basis at minimal cost to the Government. The project will be transferred free of cost to the Government at the end of the concession period with the concomitant revenue stream. With a remaining operational life, the project will continue to provide substantial net operating revenues to the government

II. Implementation of Innovation

- (1) To implement the project, the project company was developed into a full-fledged organization with skills ranging from project management, engineering, financial, relief & rehabilitation and local environment management
- (2) All contracts were awarded through transparent competitive bidding process including the EPC contract (M/s Mitsui Marubeni Corporation), Operation and Maintenance Contract (M/s Intertoll). This not only resulted in minimum cost but also bolstered the confidence of Government counter-parties, lenders as well as equity investors in the project
- (3) An Independent Auditor and Independent Engineer were appointed to ensure transparent reporting to the Lenders as well as the Concession grantor i.e. Noida Authority
- (4) A reputed International Engineering Consultancy firm M/s. Kampsax International A/S Denmark and their Indian affiliate were appointed as Project Management and Supervision Consultants. Review meetings were held every week with a fixed agenda which were attended by the Contractor, Client, Consultants, Sub-Contractors and representative of the Operations and Maintenance firm.

This ensured speedy decisions, high levels of project management including strict quality control. The result of this collaborative approach resulted in the Project being completed 4 months ahead of schedule. This resulted in saving of interest during construction and preoperative expenses

- (5) A Citizens Committee comprising of eminent residents in the project catchment area both in Delhi and Noida. This Committee provided an excellent forum for the citizens to interact with NTBCL, Contractor and Consultant and express their concerns in relation to the construction activities, particularly in respect of environmental aspects
- (6) Some of the major innovative technical features of the Noida Toll Bridge are listed below :
 - (a) **First 8 lane, 552.5 m long continuous bridge** with expansion joints only at the abutments
 - (b) **First bridge in India with external prestressing**
 - (c) **First bridge on pile foundation** across River Yamuna by using large diameter (1500 mm, 40m deep) cast-in-situ bored piles
 - (d) **First bridge in India to adopt 27K15 anchorage system (27.5 strands of 15.2 mm diameter) by using K-700 FPCC jacks for prestressing**
 - (e) First bridge in India (perhaps in the world) with the heaviest and widest single cell precast box segment, weighing 1200 tons and having the width of 16.275 m
 - (f) **First bridge with heavy duty finger type expansion joint to cater for a movement of 250mm**
 - (g) First bridge in India to deploy a specially designed multi-axle, 64-wheeled trailer for transportation of the 100 ton segments
 - (h) **First bridge in India to use HDPE pipes for encasing external tendons**
- (7) The Delhi Noida Toll Bridge is also the **first road project built solely by using dredged river** sand instead of the conventional method of earth-fill through road transportation. This resulted in substantial saving of time and cost as well as prevention of dust and noise pollution that would have resulted from transportation of earth-fill by 700 to 800 trucks per day