**DIGITAL INDIA INITIATIVE FOR SMART JOURNEY**

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* **WHAT IS A TOLLGATE?**

A measurable objective that is used to enable a prospective customer

to pass from one stage to another within the Six Sigma methodology.

By establishing the desired level of movement between

each of the stages of DMAIC (define, measure, analyze, improve and control),

team members can define barriers or gateways that allow

the prospect to move to the next step in the process or hold them

on a particular level until all desired objectives are completed.

A toll road, also known as a turnpike or tollway, is a public or

private road for which a fee (or toll) is assessed for passage.

It is a form of road pricing typically implemented to help recoup

the cost of road construction and maintenance.

* **WHAT IS ITS USAGE?**

Toll roads have existed in some form since antiquity, with tolls

levied on passing travellers on foot, wagon, or horseback; but their

prominence increased with the rise of the automobile,[citation

needed] and many modern tollways charge fees for motor vehicles

exclusively. The amount of the toll usually varies by vehicle type,

weight, or number of axles, with freight trucks often charged higher

rates than cars.

Tolls are often collected at toll booths, toll houses, plazas,

stations, bars, or gates. Some toll collection points are unmanned

and the user deposits money in a machine which opens the gate once

the correct toll has been paid.

In addition to toll roads, toll bridges and toll tunnels are also

used by public authorities to generate funds to repay the cost of

building the structures. Some tolls are set aside to pay for future

maintenance or enhancement of infrastructure, or are applied as a

general fund by local governments, not being earmarked for transport

facilities. This is sometimes limited or prohibited by central

government.

* **MAIN ADVANTAGES OF TOLL:**
* Its main advantage is that it enables the raising of more money

for road construction than would be possible through ordinary

public financing.

* Toll roads can be used as a method of

congestion pricing, encouraging users to make more efficient route

choices or use alternative transportation modes.

* Ensures greater safety.
* Toll roads reduce pollution.
* Increased fuel economy.
* Benefits to businesses such as traffic and safety administration.
* **DISADVANTAGES OF TOLL:**
* The drawbacks of toll financing include the extra expenses of toll

collection, the interest cost of borrowing funds, and the traffic

distortions caused by such roads.

* Vehicles wait on toll gates due to:

Need of Exact Change for an absurd amount of Rs27 or Rs54 etc.

(No One at NHAI heard about Rounding Off?)

arguments holding up traffic.

* Malfunctioning systems…

Changeover of staff, taking two minutes to log off and log in

as per the attendant and balancing cash .

* Drivers chatting with attendants too…
* Small undulations, imperfections on seemingly well laid roads

where you need to brake suddenly while cruising at a speed of 80+,

thus wasting precious fuel.

* Potholes, rather Martian craters necessitating deliberate

slowdowns, trying to find road to drive on, at roads which are

between Highways and City limits (‘No Man’s Roads’).

* Lack of road sense and feeling of entitlement, plying in the middle of two lanes holding up traffic, and upon asking for side, get a glare back.

* Wrong lane driving due to

* Missing U turns near a habitation
* Missing exits necessitating either long drives for exits or drive in wrong lanes
* Missing underpasses
* Bad road conditions

* Lack of sufficient signage well before the exits. Many a times exit signs are almost on EXIT, necessitating backing up, rather than taking the next exit (Indian trait).
* With almost 15 crore vehicles across India a 10-minute idling daily costs about Rs1,272 crore!

* **BEST SOLUTIONS TO MAKE OUT THESE ISSUES**
* There are almost 273 tolls as per the NHAI site. There are many other toll plazas in remote areas where toll is collected manually, with printed slips. To try and

untangle the mess, we need to start from the toll plazas.

* Interlink all NHAI tolls enabling usage of a single smart card 'INDIA-Pass', which works across all toll plazas in the country.
* Ensure that this smart card, named “INDIA-Pass” or 'i-Pass' is also compatible with metro services, trains and bus stations at a future date and time of choosing thereby encouraging widespread usage.

* All private, state transport buses, and trucks ( almost one crore in numbers ) to necessarily have these smart cards to breeze through the toll plazas, without holding up traffic.

* Incentivize smart card, tag users by lower toll fares as against cash payments.

* Compulsory road survey of state and national highways every two months, reporting any damages immediately and rectifying the same within a month.

* Every road Project to have a sacrosanct deadline, with heavy penalties for non performance.
* **SOME OF THE CHANGES HAPPENED IN RECENT TIMES IN TOLL PLAZAS...**

Indian Highways Management Company Limited (IHMCL) (a company incorporated by National Highways Authority of India) and National Payment Corporation of India (NPCI) are implementing this program with help from Toll Plaza Concessionaires, FASTag Issuer Agencies and Toll Transaction Acquirer (select banks).

For instance, they have implemented a project called “Automatic Toll Gate System Using Advanced RFID and GSM Technology”.

. Most Electronic Toll Collection (ETC) systems around the world are implemented by DSRC (Dedicated Short Range Communication) technology. The concept proposed is of automatic toll tax payment system and the amount transaction information sends to the cell phone of the motorists through the GSM modem technology. It is an innovative technology for expressway network automatic toll collection solution. In this paper, the frame composing and working flow of the system is described and data information is also easily exchanged between the motorists and toll authorities, thereby enabling a more efficient toll collection by reducing traffic and eliminating possible human errors.

Today on one side the importance for secured access is growing in several fields and on the other side with technology advancements the RFID cards and readers are becoming low cost. Both these aspects are the primary reasons for rapidly growing RFID based authentication system. Today, several wireless technologies are used for building wireless networks. Among them the 2.4GHz wireless network is most widely deployed and used. The wide usage of 2.4 GHz wireless communication indicates that this infrastructure can give near real time responses and makes suitable for crucial industrial systems. Global system for mobile communication is that it is an international standard. If you travel in parts of the world, GSM is the only type of cellular service available.

In order to stop all these problems and inconvenience, we introduce an automated or a more convenient way of collecting the toll and traffic management.

* **FASTag….**

FASTag is a simple to use, reloadable tag which enables automatic deduction of toll charges and lets you pass through the toll plaza without stopping for the cash transaction. FASTag is linked to a prepaid account from which the applicable toll amount is deducted. The tag employs Radio-frequency Identification (RFID) technology and is affixed on the vehicle's windscreen after the tag account is active.

FASTag is a solution for a hassle free trip on national highways. FASTag is presently operational at 180 toll plazas across national and state highways. More toll plazas will be brought under the FASTag program in the future.

FASTag is read by the tag reader at the plaza when the vehicle approaches the toll plaza. The vehicle with FASTag doesn't need to stop at the toll plaza for the cash transaction

FASTag offers near non-stop movement of vehicles through toll plazas and the convenience of cashless payment of toll fee with nation-wide interoperable Toll Services.

* **HOW IT IS IMPLEMENTED…?**

FASTag is a device that employs Radio Frequency Identification (RFID) technology for making toll payments directly from the prepaid or savings account linked to it. It is affixed on the windscreen of your vehicle and enables you to drive through toll plazas, without stopping for cash transactions. The tag can be purchased from Tag issuers and if it is linked to the prepaid account, then you need to recharge/ top up the tag as per your requirement.

It is a 10x 5 cm, rectangle shape, multi layered tag, which is made out of good quality paper, containing chip and antenna inside its layers, it is pasted on the wind screen of the vehicle, and through Radio frequency identification method, the information is read at the toll plaza from the tag. Tag gives convenience and ease while going through toll plaza to the customer.

FASTag is presently operational at 240+ toll plazas across National Highways.

A vehicle with FASTag may use any lane at toll plazas by making cash payment. However, the FASTag will work only in the lanes demarcated for FASTag. Vehicle without valid FASTag entering FASTag lane will be charged double the applicable toll amount in cash.

FASTag will work on all enabled toll plazas.

* **BENEFITS**
* Ease of payment – No need to carry cash for the toll transactions, saves time.
* Near non-stop movement of vehicles leading to lower fuel cost.
* Online Recharge – FASTag can be recharged online through Credit Card / Debit Card / NEFT/ RTGS or Net banking.
* SMS alerts for toll transactions, low balance, etc.
* Online Portal for customers.
* Validity of 5 Years.
* Other benefits are:

(a)Environmental benefits :     • Reduced air pollution,

 • Reduced use of paper

(b)Social benefits    :                      • Reduced toll payment hassles ,

• Analytics for better highway management

(c) Economic benefits :   • Reduced effort in management at toll plaza,

• Reduced effort in monitoring centrally

* **HOW CAN WE MAKE IT BETTER FOR FUTURE GENERATION WITHOUT ANY DRAWBACK?**

Toll lanes on most toll roads should allow a vehicle to proceed through the tollbooth at speeds of up to 25 mph (40 km/h). This is a safety guideline, not a technological limitation, and violation may be subject to a speeding ticket and associated fine. Most mainline toll barriers on the Turnpike system have been, or are currently being reconstructed with Open Road-Tolling (ORT)-only lanes that handle highway speeds.

The mainline toll barriers have dedicated lanes capable of full-speed. Upcoming toll booths must be upgraded to this open road tolling technology.

In Order to make this possible, We are implementing a project called “ELECTRONIC TOLL COLLECTION”(ETC) by which we can avoid all the drawbacks in any instance. It is a method in which a vehicle passes a through toll with an registered and relevant Id which will help the user to get his vehicle identification automatically without any issues with the help of “RADIO FREQUENCY IDENTIFICATION”(RFID) which will scan the details of the user accurately and it saves time of the user and it helps a lot economically.

Portable (hard case) transponders can be transferred between vehicles without damaging the transponder. The original transponders operate on battery power to communicate with toll barrier equipment and to operate audible and visual indications of toll paid, toll low, battery low, and so forth. The Type IIe transponder, an updated version of the requires no batteries, but does not have indicator lights or audible beeps.

This allows free-flowing movement on both toll roads, moving through toll gantries at the former toll plazas. Motorists without that id will be billed with the "Toll-by-Plate" program. Toll-by-Plate uses cameras and sends a bill to the registered owner of the vehicle. The bill consists of the toll and an administrative fee. For example: Rs 100 toll charge is assessed a Rs 20 fee when the bill is sent in the mail, bringing the total to Rs 120. If the toll is not paid by the due date, an additional amount should be charged. If the person fails to pay the toll and accompanying fees at all, the person should be fined with an extra amount; in some cases, court costs, points against the driver's license, and the suspension of the license and registration should also be implemented so that the user will not violate the rules and will have safe and happy journey.

* **ETC(ELECTRONIC TOLL COLLECTION)**

NHAI has rolled out program for Electronic Toll Collection on Toll Plazas on National Highways. It is a device that employs Radio Frequency Identification (RFID) technology for making toll payments directly from the prepaid account linked to it. It is affixed on the windscreen of your vehicle and enables you to drive through toll plazas.

It offers near non-stop movement of vehicles through toll plazas and the convenience of cashless payment of toll fee with nation-wide interoperable Electronic Toll Collection Services.

Electronic Toll Collection (ETC) system in India uses passive radio frequency identification technology (RFID)…

* RFID tag called FASTag is mounted on the vehicle’s windscreen.
* As the vehicle reaches the toll plaza, a unique identification number that is embedded on the tag is read by road side RFID reader.
* This unique number is sent to a central computer.
* Applicable toll amount is deducted from a prepaid account that is linked to that particular FASTag.

There are dedicated ETC lanes on toll plazas to aid faster traffic flow of vehicles using FASTag. Vehicles can do toll transaction without stopping thus making the process faster and more efficient.  This has many more advantages like reducing congestion at plazas, saving fuel, reducing travel time and so on. This will greatly enhance user experience and enable fuel saving.

ETC system relies on four major components: automated vehicle identification (AVI), automated vehicle classification (AVC), transaction processing, and violation enforcement.

* **RFID(RADIO FREQUENCY IDENTIFICATION)**

RFID is an acronym for “Radio-Frequency Identification” and refers to a technology whereby digital data encoded in RFID tags or smart labels (defined below) are captured by a reader via radio waves. RFID is similar to barcoding in that data from a tag or label are captured by a device that stores the data in a database.

RFID tag data can be read outside the line-of-sight, whereas barcodes must be aligned with an optical scanner.

RFID belongs to a group of technologies referred to as Automatic Identification and Data Capture (AIDC). AIDC methods automatically identify objects, collect data about them, and enter those data directly into computer systems with little or no human intervention.

RFID methods utilize radio waves to accomplish this. At a simple level, RFID systems consist of three components: an RFID tag or smart label, an RFID reader, and an antenna. RFID tags contain an integrated circuit and an antenna, which are used to transmit data to the RFID reader (also called an interrogator). The reader then converts the radio waves to a more usable form of data.

Information collected from the tags is then transferred through a communications interface to a host computer system, where the data can be stored in a database and analyzed at a later time.

RFID compliance is required, applications that currently use barcode technology are good candidates for upgrading to a system that uses RFID or some combination of the two. RFID offers many advantages over the barcode, particularly the fact that an RFID tag can hold much more data about an item than a barcode can.

* **WHAT ARE THE DOCUMENTS REQUIRED TO GET RFID**
* Registration Certificate (RC) of the vehicle.
* Passport size photograph of the vehicle owner.
* KYC documents as per the category of the vehicle owner (viz. Individual / corporate).

**For Individual :**

* ID proof and Address proof from the list mentioned
* 1 passport size photograph.
* Driving License
* PAN Card
* Passport
* Voter ID Card
* Aadhar Card (with address)

For instance, valid driving license would be sufficient for Address & ID proof.

* **TECHNOLOGIES USED**

RFID is a new technology that toll booths are installing to help you save that time and pass through it without even having to slow down your speed.

It’s called electronic toll collection system and it is designed to stop the delays at the toll gates. Here’s how it works:  
Every user has a **RFID Tag.**Every tag has a unique ID that is used to identify a particular user.  
The antennae at the toll gates communicate with the transponder on the vehicle, thus identifying the user and deducting the amount from the prepaid card or adding it in case of a postpaid card.

* **CONTENT REFERENCES**
* <http://www.fastag.org/fasttag>
* <https://www.sbi.co.in/portal/web/personal-banking/netc-fast-tagking/netc-fast-tag>
* <https://www.sunpass.com/>
* **VIDEO REFERENCES**
* [**https://www.youtube.com/watch?v=NgTJ1IBYTKI**](https://www.youtube.com/watch?v=NgTJ1IBYTKI)
* [**https://www.youtube.com/watch?v=Z\_FFvHaA4K4**](https://www.youtube.com/watch?v=Z_FFvHaA4K4)

**THANK**

**YOU**