AD358

The maintenance of rural and urban roads is becoming an increasing challenge as a result of the rapid growth of the network.

A large amount of money is going to waste due to irregularity and improper approach. **Sound asset management principles need to be introduced as an integral part of road policies and maintenance programs.**

Comprehensive maintenance planning with schedule,institutional reforms, linkage with initial construction, maintenance backlog, utilization of funds, regular on site inspections, training to the workforce, human attitude, existing practices and knowledge of different road patterns are the major challenges in record-keeping.

The maintenance and record keeping of maintenance is the key issue in the government department after the liability period of new construction.

A comprehensive system will help for planning of maintenance schedule, frame work, methodology. Also a prediction can be made for the timely maintenance fund requirements.

Effective techniques can be decided for the problems. Quality of initial construction work can be achieved. It is more important to say that wastage of public funds can be reduced from the repetitive approach. Mostly, Public infrastructure is developed by the government department.

It is obvious that various government bodies like municipalities, nagar palika, panchayat and road and building department of state and central government etc. will be the potential users. Also private residential and commercial communities may use it for the maintenance records and fund estimation.

A comprehensive maintenance record-keeping system will be the ready tool, which serve different aspects of complete qualitative maintenance such as, database of complete any type of inspection on-site, recording defects including capture of images and location data to aid in repair, repair methodology applied, cost of maintenance, effective area of work, frequency of maintenance including during liability period of new constructions and fund planning for the future.

It will be fruitful for the executors for social and economic development of users. Effective maintenance record keeping systems will create social and economic impacts of rural roads users. It will serve a ready record for long term budget planning as huge investment is incurred in road infrastructure development.

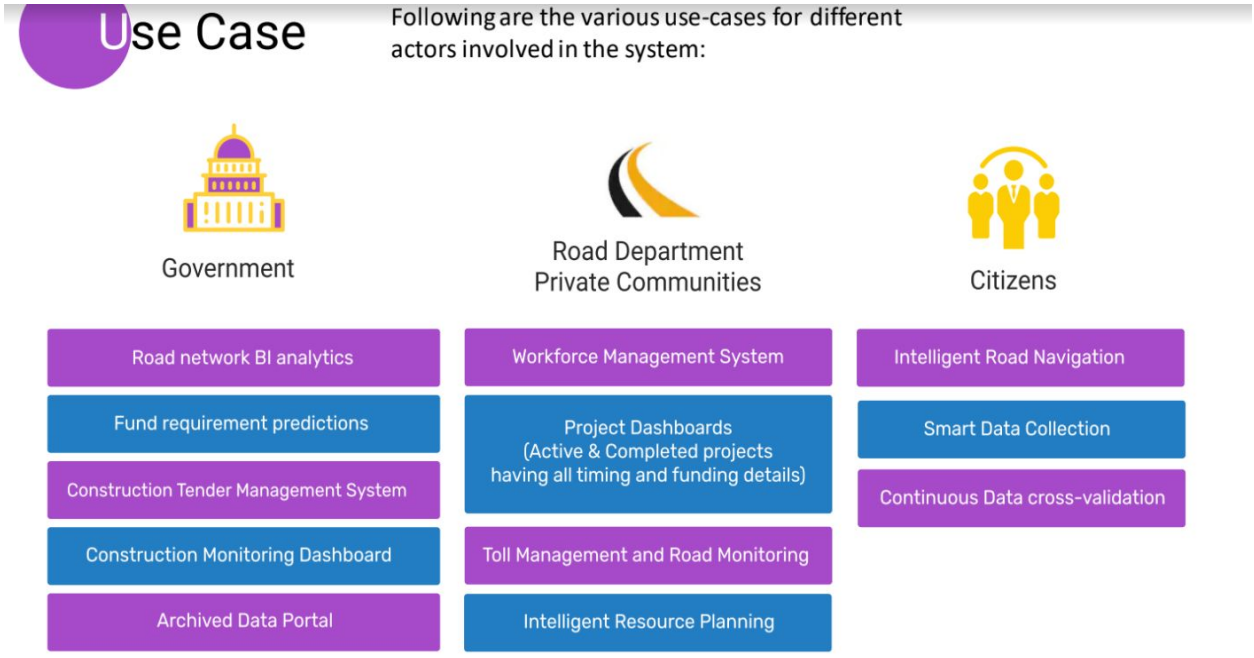
Some qualitative outputs such as, maintained roads provide access to where people live and important facilities such as markets, schools and health services.

Good access provides the opportunity for improving livelihoods and increased employment opportunities, thereby contributing to the alleviation of poverty.

Although it may be argued that the link between rural roads and poverty alleviation is mostly indirect, experience clearly shows that areas with poor road access are generally more disadvantaged than areas that are better served.

The web application will contain an effective dashboard (visualization like a BI tool) which will provide different kinds of analysis , in order to take quick actions and to avoid spending excessive time in analysing this information.

The application will be an effective tool as it will help save time and provide valuable information at a go to thus avoid wastage of public resources.



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Features To Be Provided, per actor involved

1. Road tender and inspection (for each tender) :
    a. Company/party repairing the road : See available tenders, place bid for them along with expected tender amt.
    b. Inspector from Road Dept. : File periodic (daily/weekly) inspection reports, in a digital format.
    c. Road Dept / Municipality : Advertise tender, see bidders, choose the winner. Monitor costs (on going (per tender) , completed, expected in given time frame), analyse inspection report.
2. Record preparing & keeping (Department/Municipality level):
    a. Per road : Costs Vs Time, Initial allocation vs Real expenditure
    b. Per Budget session : Incl. data of all tender (roads or any other)
    c. Database:

Data	Fields
Tender	Tender ID, Party ID, Allocated Cost Actual Costs Road No. Coordinates? Location Details, Invigilators, initial completion date
Repair Tender	Tender ID, Party ID, Allocated Cost, Actual Costs, Road No., Coordinates?, Invigilators, Last repair date, initial completion date, length of road.
Road	Road ID, last repair tender ID, initial construction tender ID, remarks Pincode Location Details Start Point, End Point, Length of

	Road, Zone, District, Sub Category Name (Major District Road, State Highway..) Technical Details: Road Material, Depth of Road Traffic Details: Har type ke traffic ka detail Heavy, Medium, Light vehicle density
Inspections Report	Inspection ID, Inspector ID, Attachments, Date, road ID, coordinates?
Party	Party ID, tenders completed, tenders won, contact person ?

3. Visualization:
    a. Cost Overruns
        i. Construction company wise
        ii. Road wise
        iii. Time-range
        iv. Overall
    b. Time delay
        i. Construction company wise
        ii. Road wise
        iii. Time-range
        iv. Overall
    c. Expenditure total
    d. Mix of a,b,c??
4. Suggestions:
    a. Cost allocation based on repair frequency
    b. Bidder profiling using cost and time overruns

5. Doubts :
    a. Cost estimation karna h ki bas tenders predict krde?
    b.

Modules :

1. **Android Application**

A. Normal Daily User (not very relevant as per problem statement, but an add on for us)

- Pothole reporting using android sensors
- OnGoing construction mapping
- Recognized potholes (both include a beep alarm)
- Feedback form

B. Government Supervisor (major part)

1. **POTHOLE**

- Selects the location/name from the list of reported potholes and approves it to issue the tender.
- Discard the reported pothole or add some comment to notify the nagar palika regarding the same.

2. **ONGOING CONSTRUCTION**

- Add a timestamp and submit the revised status application.
- Submit a construction report based on the last status and current status.
- Submit the approved status in case of construction is done.

2. Web Portal

A.

Main Features:

1. Select a road and view its entire history of construction, details, road type, repair history, tenders.

2.

Pre-Existing system:

Tendering

Link : https://eprocure.gov.in/cppp/ & http://www.bims.gov.in/

The Ministry of Road Transport and Highways has developed the Bidder Information Management System (BIMS) to streamline the process of Prequalification of bidders for EPC mode of Contracts with enhanced transparency and objectivity. BIMS shall work as a database comprising bidder wise information covering basic details, civil work experience, cash accruals and net worth, annual turnover etc. so that bidder's pre-qualification is quickly assessed based on evaluation parameters like threshold capacity and bid capacity from the already stored data.

TL;DR : Ek portal already exist krta h jahan tender display hote h aur bidder apni bid daalte h, bidder verified hote h through BIMS

* Isko aur accha bana sakte, accha ye hai ki details kya kya hoti hain vo mil jayengi apne ko. And tender vaala system to bas apna ek addon hai. Main to us kaam ka analytics hai

Repair Tender :

Example (Bihar) https://morth.nic.in/sites/default/files/8770111273.pdf

Parameters for road repair time :
[1]https://insightmaker.com/insight/15795/Calculating-Road-Wear-and-Tear-on-Community-Roads
[2]https://theconstructor.org/transportation/factors-affecting-pavement-design/12849/

1. Work ex (0 - 50) (+)
2. Kms of Roads constructed (0-50K) (+)
3. Weather (4 Type)
4. Road Type (8 Types)
5. No of repairs undergone (0-20) (-)
6. No of complaints (0-2000) (-)
7. Time since construction (0-50 yrs) (-)
8. Time since last repair (0-5 yrs)(-)
9. Heavy vehicles density (x/km/day) (-)
10. Medium Vehicles density (y/km/day)(-)
11. Light vehicles density (z/km/day)(-)

12. Average time of repair (0-5) (-)
13. Road Wear and Tear Factor[1]
14. Road Replacement Factor[1]
15. Wheel Load[2]
16. Axle Configuration[2]
17. Subgrade Type[2]

Inspection Form

- Location
- Name of the Road
- Images of the Road
- Type of Defect (Crack/Patch/Pothole)
-

https://public-library.safetyculture.io/products/road-inspection-form

Web ka chehra

Tender Portal, Road Maintenance Portal, Road Archive Portal

1. Priorities acc to budget : Road importance either manually filled or calculated based on factors like economic importance of surrounding, number of feedback etc
2. Prediction of number of repairs for next fiscal year and cost for each repair
3. Estimation based on time of year
4. Cost Overruns
5. Repair Frequency : road type, traffic density

Final Proposal

Android

Normal User, Inspector

Normal User App

Home Screen: Potholes reported by your mobile, potholes successfully repaired, tatti features saare,

Settings: Car details

Nav mein: Trip Start

Trip: Beep when you come near a pothole.

Feedback from 5-star after the trip ends.

Raise an Issue feature.

Inspector App

1. Pending Pothole Requests for verification
2. (Future - Assigning of Inspectors)
3. Classifi