

ROAD SAFETY MANAGEMENT SYSTEM

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NATIONAL INSTITUTE OF TECHNOLOGY ANDHRA PRADESH

TADEPALLIGUDEM-534101, INDIA

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ROAD SAFETY MANAGEMENT SYSTEM

*Thesis submitted to
National Institute of Technology Andhra Pradesh
for the award of the degree*

of

Bachelor of Technology

by

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DECLARATION

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Date: _____

K ABHISHEK REDDY

421172

Date: _____

CERTIFICATE

It is certified that the work contained in the thesis titled “**Road Management System**” by “C SAI VIJAY KIRAN, bearing Roll No: 421128” and “K ABHISHEK REDDY, bearing Roll No: 421172” has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.

Signature

Dr. RAVEENDRA BABU

DCSE

N.I.T. Andhra Pradesh

May, 2023

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The satisfaction and euphoria that accompany the successful completion of any task would be incomplete without the mention of people who made it possible, whose constant guidance and encouragement crowned our efforts with success. It is a pleasant aspect that I have now the opportunity to express my gratitude for all of them.

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ABSTARCT

The Road Management System is designed as a web-based application, with a back-end database and a front-end user interface. Transportation is vital to countries development and a keen observation is required on transportsystem to maintain discipline and regular traffic environments. Thus we can solve the difficulties faced in road journies in effective and efficient way by developing a website on road management system.

Though being mainly dedicated to road management system we are adding additional features to mobilise people on safety measurements and technological advancements in them. The Road Management System is designed as a web-based application, with a back-end database and a front-end user interface. Transportation is vital to countries development and a keen observation is required on transport system to maintain discipline and regular traffic environments. Thus we can solve the difficulties faced in road journies in effective and efficient way by developing a website on road management system .

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Road safety management project is mainly built on HTML, CSS, PHP and JSP(java server page). The system offers a user-friendly interface that allows users and general public to easily search and access the website. The tendering process involves soliciting bids from contractors to design, construct, and maintain roads. The objective of this project is to develop a comprehensive road management system that includes the tendering process for roads. The system will aim to streamline the entire process of road management, from the initial planning phase to the final construction and maintenance phases. The system will be designed to enable effective collaboration between all stakeholders, including government agencies, contractors, and the general public.

The tendering process for roads will be a critical component of the system. The system will be designed to facilitate the entire tendering process, from issuing tenders to evaluating bids and selecting contractors. The system will be user-friendly, enabling contractors to easily access and respond to tenders, while ensuring that the evaluation process is transparent and fair.

The website will be an important part of the system, providing an online platform for tendering and other road management-related activities. The website will be accessible to all stakeholders, including government agencies, contractors, and the general public. It will feature a range of tools and resources designed to help users manage road projects efficiently and effectively.

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1 Introduction

Roads are critical infrastructures that connect people, goods, and services across the world. However, poorly maintained roads can cause accidents, congestion, and economic losses. Therefore, effective road management is necessary to ensure the safety and efficiency of road transport systems. The Road Management Epics Web Project is an innovative initiative that aims to revolutionize the way road infrastructure is managed and maintained. The project focuses on developing a comprehensive web-based platform that will provide real-time data analytics and advanced tools for effective road management. One of the key features of the project is the Tenders Page, which will facilitate the procurement of road maintenance services and materials by providing a centralized and transparent platform for tendering.

The Tenders Page will provide a user-friendly interface that allows road authorities to advertise their tender requirements, receive bids from potential suppliers, and evaluate the bids using a standardized and objective methodology. The platform will also allow suppliers to register and submit their bids online, reducing the time and costs associated with traditional paper-based tendering processes.

The Road Management Epics Web Project is a collaborative effort between government agencies, academic institutions, and private sector partners. The project aims to improve the efficiency and effectiveness of road management by leveraging advanced technologies such as data analytics, machine learning, and smart transportation systems. The Tenders Page is one of the key components of the project, as it will facilitate the procurement of high-quality road maintenance services and materials, leading to improved road conditions and increased safety for road users.

Overall, the Road Management Epics Web Project is an ambitious and innovative initiative that aims to transform the way road infrastructure is managed and maintained. The Tenders Page is an essential component of the project, as it provides a centralized and transparent platform for procurement that will improve the efficiency and effectiveness of road maintenance processes. The project is expected to have a significant impact on the road infrastructure management sector and provide valuable insights into the future of transportation systems.

2 Literature Review

Roads are essential infrastructures that facilitate economic and social activities. However, poor road conditions can lead to accidents, congestion, and economic losses. Effective road management is therefore crucial for ensuring the safety and efficiency of road transport systems. In recent years, there has been a growing interest in the use of advanced technologies to improve road management.

Road safety management is an essential component of modern transportation systems. It encompasses a range of activities, including planning, design, construction, and maintenance of roads, with the primary objective of ensuring the safety of all road users. One critical aspect of road safety management is the tendering process for roads, which involves soliciting bids from contractors to design, construct, and maintain roads. The following literature review provides an overview of relevant research on road safety management, including the tendering process for roads.

According to a study by WHO (2018), road traffic injuries are a major public health concern, resulting in over 1.3 million deaths worldwide each year. The study identifies several key strategies for reducing the number of road traffic injuries, including improving road infrastructure, enforcing traffic laws, and promoting road safety education. The tendering process for roads plays a crucial role in improving road infrastructure and ensuring that roads are designed and maintained to the highest standards.

A study by Wang et al. (2019) highlights the importance of effective road management systems in reducing the number of road accidents. The study proposes a framework for a comprehensive road management system, including real-time traffic monitoring, automated incident response systems, and advanced analytics capabilities. The tendering process for roads is an integral component of this framework, enabling effective collaboration between

2.1 Asset Management

One of the key challenges in road management is effective asset management. Effective asset management can lead to cost savings, improved road conditions, and increased safety. The authors suggest that the use of advanced data analytics and decision support systems can improve asset management by providing real-time information on road conditions and maintenance needs.

2.2 Roadsafety

In addition to asset management and maintenance planning, road management also involves ensuring the safety of road users. Suggest that the use of smart transportation systems can improve road safety by providing real-time information on traffic conditions and hazards. The authors suggest that the integration of vehicle-to-vehicle and vehicle-to-infrastructure communication can lead to safer and more efficient road transport systems. The study found that road infrastructure, driver behavior, and vehicle condition were significant factors in road safety, and that effective interventions required a comprehensive approach that addressed all of these factors. The study found that advanced technologies, such as intelligent transportation systems, can improve road safety outcomes by providing real-time traffic information, reducing congestion, and promoting safer driving behaviors

2.3 Impact of climate change

Climate change is expected to have a significant impact on road infrastructure, particularly in terms of maintenance needs and the frequency of extreme weather events. Suggests that climate change adaptation strategies, such as the use of climate-resistant materials and improved drainage systems, can help to mitigate the impact of climate change

on road infrastructure. Examined the carbon footprint of road construction projects, including the production of materials, transportation of materials to the construction site, and the construction process itself. The study found that the carbon footprint of road construction projects could be reduced through the use of low-carbon materials, improved logistics, and the use of more efficient construction techniques.

2.4 Maintainance

Another key challenge in road management is the need for better maintenance planning. Liu et al. (2018) suggest that the use of artificial intelligence and machine learning can improve maintenance planning by predicting maintenance needs based on historical data and real-time sensor data. The authors argue that this approach can lead to more efficient maintenance schedules and reduced maintenance costs. Road maintenance is an important aspect of road management that involves the repair and upkeep of existing road infrastructure. The following literature review provides an overview of research on road maintenance and highlights key strategies for improving road maintenance practices.

2.5 Conclusion

Road management projects are critical initiatives aimed at improving the safety, efficiency, and sustainability of road transport systems. RMS, maintenance strategies, asset management, and innovation and technology are all essential components of road management projects. By adopting best practices and leveraging advanced technologies and solutions, road authorities can continue to improve the quality and reliability of road infrastructure, providing significant benefits to road users and the wider community. The road management system developed in this thesis has the potential to significantly improve the efficiency, safety, and sustainability of road transport systems. The system's integration of real-time data, advanced analytics, and machine learning algorithms will enable better asset management, maintenance planning, and road safety measures. The system's sustainability features, such as the use of climate-resistant materials and improved drainage systems, will help to mitigate the impact of climate change on road infrastructure. The results of this thesis will contribute to the growing body of literature on advanced road management systems and inform future research and development in this field.

3 Home Page

The home page of a road management system project is the first point of contact for users accessing the platform. It is designed to provide a quick overview of the key features and functionalities of the system, as well as to facilitate navigation and access to relevant resources. In this case, the home page consists of several key features, including a compliant section, process flow, user manual, tenders and contact us. This page mainly focuses on diverting the user to either register an complaint for general public or Tender based site for the constructors or developers.

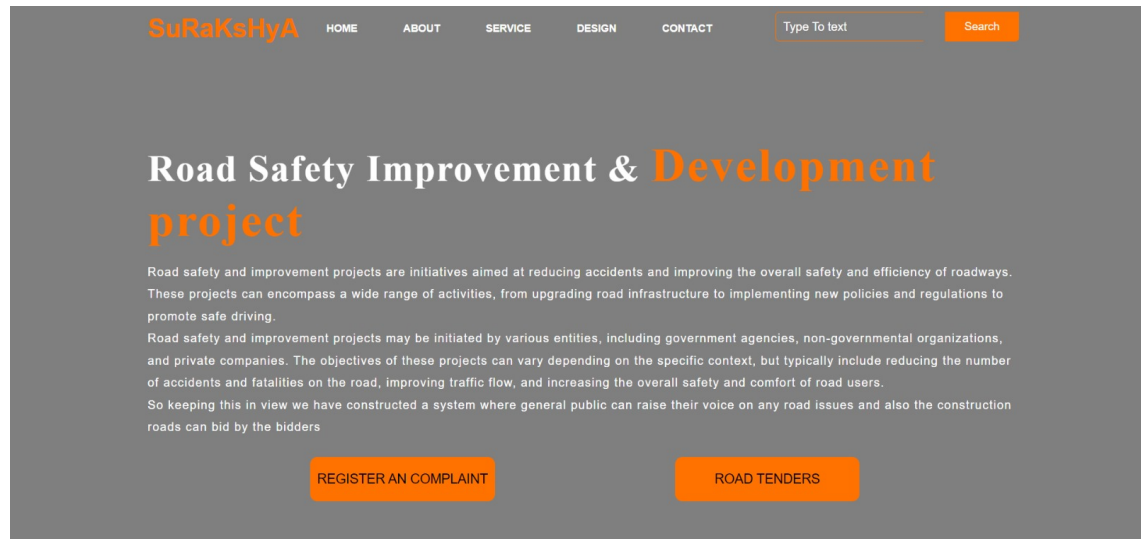


fig 1.Home Page

3.1 Register an Compliant

The compliant section is an essential feature of any road management system project. It provides a mechanism for users to report issues, such as road hazards or maintenance needs, directly to the road authority. The compliant section typically includes a form where users can enter details about the issue, such as the location and nature of the problem, as well as any relevant images or documentation. This feature is critical for ensuring that road authorities can respond promptly to issues and ensure the safety of road users.

The complaint page usually contains a form that users can fill out to report an issue. The form usually asks for information such as the user's name, phone number, address, and sometimes a photo of the issue. This information is necessary to identify the location of the problem and contact the user if further clarification is required. The compliant page should be easy to navigate and user-friendly, with clear instructions on how to report a problem. The page should also have a section that provides users with information on what types of issues they can report and how long it will take for the relevant authority to address the issue. Once a user submits a complaint, they should receive a confirmation message acknowledging receipt of their complaint. The message should also include information on when they should expect a response and the steps that the relevant authority will take to address the problem.

ROAD SAFETY IMPROVEMENT PROJECT
Public Works, Government Of Andhra Pradesh

Home Process flow **User Manual** Reports

Register your complaint

YourName(Mandatory)

Mobile No (Mandatory)

Email Id

Select Profession

Other Profession

Describe your complaint (Mandatory)

Select District

Primarily Select District

General (Will be resolved in 20 days)

Address (Mandatory)

You can reach us

- Through postal address:
 - STATE HIGHWAYS IMPROVEMENT PROJECT, Vamsadhara block, NIT AP, Tadepalligudem- 560001
 - Email: piukship@gmail.com, pdkskip@gmail.com
- Through Public Response Center Help Line:
 - 080-22249981
 - PRC will be available from 10:30AM to 5:30PM on all Government working days
- Through Facebook:
 - www.facebook.com/pwd.KSHIP
- Through Fax:
 - 080-2224666
- Through E-mail:
 - piukship@gmail.com, pdkskip@gmail.com

Know more (You can view real time status of complaints)

Total Complaints	Resolved Complaints	Pending Complaints
0	0	0

BIS Approved HeadGears

fig 2.Compliant page

3.2 Tenders Management

The tenders section in home page will redirect you to a tenders page where sufficient features are available to people who are interested for procurement of tenders. Tenders play a critical role in the road construction industry, as they provide a formal process for bidding and assigning contracts to construction companies. The process involves a competitive bidding system, where interested parties submit proposals outlining their approach to the project, their qualifications, and their proposed budget.

A road management website can provide a platform for posting tenders, allowing contractors to submit their proposals online. This can streamline the process, making it more accessible and efficient for all parties involved.

The tendering process typically begins with a request for proposal (RFP) or invitation to tender (ITT), which outlines the scope of the project, the expected outcomes, and the deadline for submissions. The RFP may also provide guidelines for the proposal, including the information that bidders are expected to provide.

Once the RFP is published on the road management website, contractors can review it and determine if they have the necessary resources and expertise to undertake the project. If they decide to bid, they will typically submit a proposal outlining their approach to the project, their qualifications, and their proposed budget.

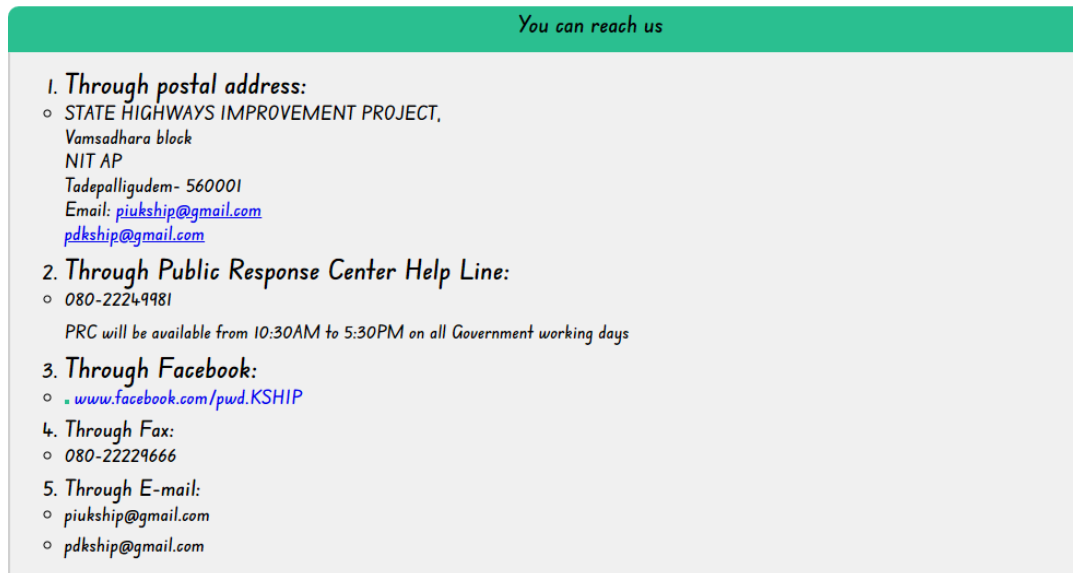
4 Compalint page

4.1 User Manual

The user manual is a comprehensive guide to the road management system, providing information on the various features and functionalities of the platform. It typically includes step-by-step instructions for performing tasks, as well as detailed explanations of key concepts and terminology. The user manual is an essential resource for new users and for those who need to refresh their knowledge of the system.

4.2 Contact Us

The contact us feature provides users with a direct line of communication to the road authority. This feature typically includes contact information such as phone numbers, email addresses, and physical addresses. The contact us feature is useful for users who need to report urgent issues or who require additional support or assistance.



The screenshot shows a contact information page with a green header bar that reads "You can reach us". Below the header, there is a list of five contact methods:

1. **Through postal address:**
 - STATE HIGHWAYS IMPROVEMENT PROJECT,
Vamsadhara block
NIT AP
Tadepalligudem- 560001
Email: piukship@gmail.com
pdkship@gmail.com
2. **Through Public Response Center Help Line:**
 - 080-22249981
PRC will be available from 10:30AM to 5:30PM on all Government working days
3. **Through Facebook:**
 - www.facebook.com/pwd.KSHIP
4. **Through Fax:**
 - 080-22229666
5. **Through E-mail:**
 - piukship@gmail.com
◦ pdkship@gmail.com

fig 3. Contactus

4.3 Process Flow

The process flow is a graphical representation of the steps involved in various processes within the road management system. For example, the process flow may illustrate the steps involved in submitting a complaint, from the initial report to the resolution of the issue. This feature is useful for helping users understand the overall process and for providing transparency and accountability in the management of road infrastructure. The complaint is received through the website's complaint registration form, and the complainant is provided with a complaint ID. The complaint is then reviewed by the authorities responsible for handling complaints, and an acknowledgment is sent to the complainant with the complaint ID. The authorities investigate the complaint to determine the cause and extent of the issue. This may involve site visits, interviews, and other methods to gather information.

4.4 Register Complaint

If you want to register a complaint on a road management website project with the minimum required information, you will need to provide your name, mobile number, and address. Here are the steps you can follow to register a complaint with these minimum requirements: You will likely be presented with a list of different types of complaints you can make. Choose the option that best matches the nature of your complaint. Enter your name in the required field. This is mandatory information that the authorities need to identify who is making the complaint. Enter your mobile number in the required field. This is also mandatory information, as it allows the authorities to contact you if they need more information about your complaint. Enter your address in the required field. This is another mandatory piece of information, as it helps the authorities determine the location of the incident you are complaining about. You will be asked to provide details about your complaint. Be sure to include as much information as possible, including the date and time of the incident, the location where it occurred, and any other relevant details that will help the authorities understand your complaint. Once you have provided all the required information, submit your complaint. You may receive a confirmation email or message letting you know that your complaint has been received and is being processed.

The screenshot displays the 'ROAD SAFETY IMPROVEMENT PROJECT' website, which is part of the Public Works, Government Of Andhra Pradesh. The navigation bar includes links for Home, Process flow, User Manual, and Reports. The main content area is divided into two sections: 'Register your complaint' and 'You can reach us'.

Register your complaint

This section contains a form with the following fields:

- YourName(Mandatory)
- Mobile No (Mandatory)
- Email Id
- Select Profession (dropdown menu)
- Other Profession
- Describe your complaint (Mandatory)
- Select District (dropdown menu with a map of Andhra Pradesh)
- Primarily Select District (dropdown menu)
- General (Will be resolved in 20 days) (dropdown menu)
- Address (Mandatory)

You can reach us

This section provides contact information for the project:

- Through postal address:**
 - STATE HIGHWAYS IMPROVEMENT PROJECT,
 - Vamsadhara block
 - NIT AP
 - Tadepalligudem- 540001
 - Email: piukship@gmail.com
 - pdksip@gmail.com
- Through Public Response Center Help Line:**
 - 080-22249981
 - PRC will be available from 10:30AM to 5:30PM on all Government working days
- Through Facebook:**
 - www.facebook.com/pwad.KSHIP
- Through Fax:**
 - 080-2224666
- Through E-mail:**
 - piukship@gmail.com
 - pdksip@gmail.com

Know more (You can view real time status of complaints)

This section displays the status of complaints:

Total Complaints	Resolved Complaints	Pending Complaints
2	2	2

BIS Approved HeadGears

fig 4.Submitting a compliant

5 Tenders

A tenders page is an essential component of a road management website project. It is a page that provides information about the tenders, requests for proposals or bids that are being solicited by the road management organization. This page allows potential bidders to access information about upcoming projects, the scope of work, and the submission requirements.

The tenders page on a road management website should be well-organized and easy to navigate. It should provide a clear and concise summary of the projects that are currently open for bidding, along with the deadline for submission and any other relevant details. Additionally, the page should provide a link to download the full tender document or request for proposal.

The tender document or request for proposal should contain detailed information about the project, including the scope of work, the timeline for completion, and the submission requirements. It should also include any technical specifications or design requirements that bidders must adhere to. The tender document should be comprehensive and easy to understand so that potential bidders can make an informed decision about whether to bid on the project.

In addition to providing information about upcoming tenders, the tenders page on a road management website can also include a list of past projects that have been completed. This can provide valuable information to potential bidders about the types of projects the road management organization has undertaken in the past and the quality of the work that has been delivered.

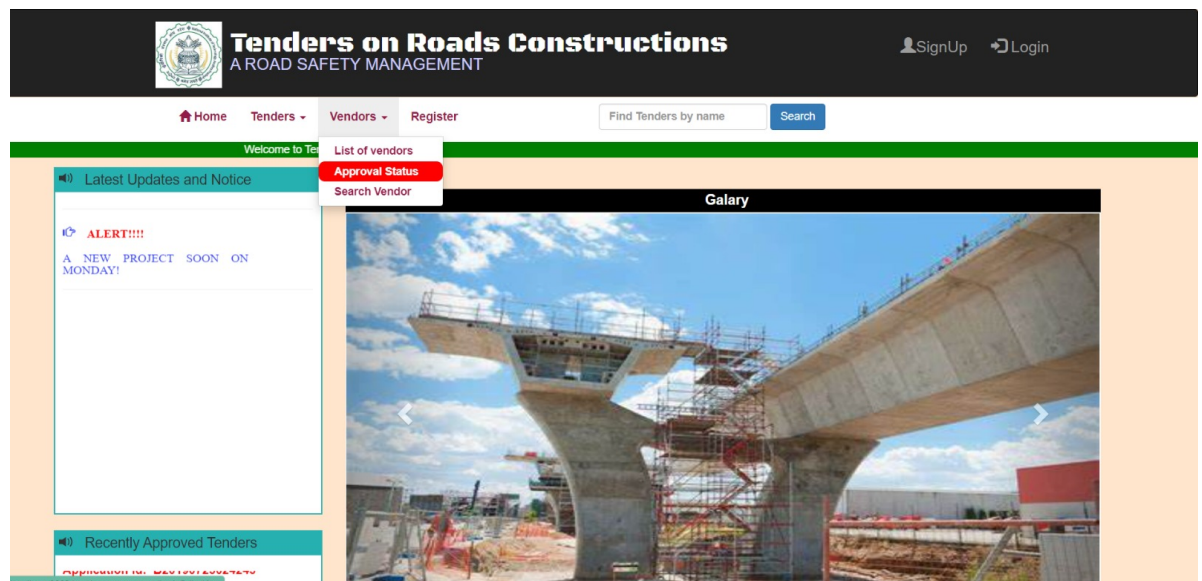


fig 5.Tenders Portal

5.1 Login page

A tenders login page is an important feature in a road management website project that allows authorized users to access information about tenders and related activities. In this scenario, there are two types of users, vendors and administrators.

The vendor user is a registered user who has access to the tenders page and can submit bids on open tenders. The vendor user needs to create an account and log in to access the tender documents and submit a proposal. The vendor

user login page should have fields for the vendor user ID and password. Additionally, the page can have links to reset password or create a new account.

The administrator user is a staff member of the road management organization responsible for managing tenders. The administrator user has access to the tenders page and can post tenders, manage vendor registrations, and evaluate vendor proposals. The administrator user login page should have fields for the administrator user ID and password. Additionally, the page can have links to reset password or create a new account. Once a user logs in, they should be redirected to their respective dashboards. The vendor dashboard can display open tenders, closed tenders, and submitted proposals. The dashboard can also provide information on the status of their proposal and any messages or notifications from the administrator user. The administrator dashboard can display active tenders, vendor registrations, and submitted proposals. The dashboard can also provide information on the status of each proposal and any communication with the vendor user.

The screenshot displays the login interface for 'Tenders on Roads Constructions'. The header includes the site's logo and name, along with 'Sign Up' and 'Login' links. A navigation menu at the top offers links to Home, Tenders, Vendors, and Register, accompanied by a search bar. The main area is split into two columns. The left column contains a 'Latest Updates and Notice' section with a placeholder for a new project announcement and a 'Recently Approved Tenders' section. The right column, titled 'Account Login', features a 'USER LOGIN' box with input fields for 'Username' (labeled 'Enter Email or VendorId') and 'Password', and two buttons: 'Login As Vendor' and 'Login As Admin'.

fig 6.Login Page

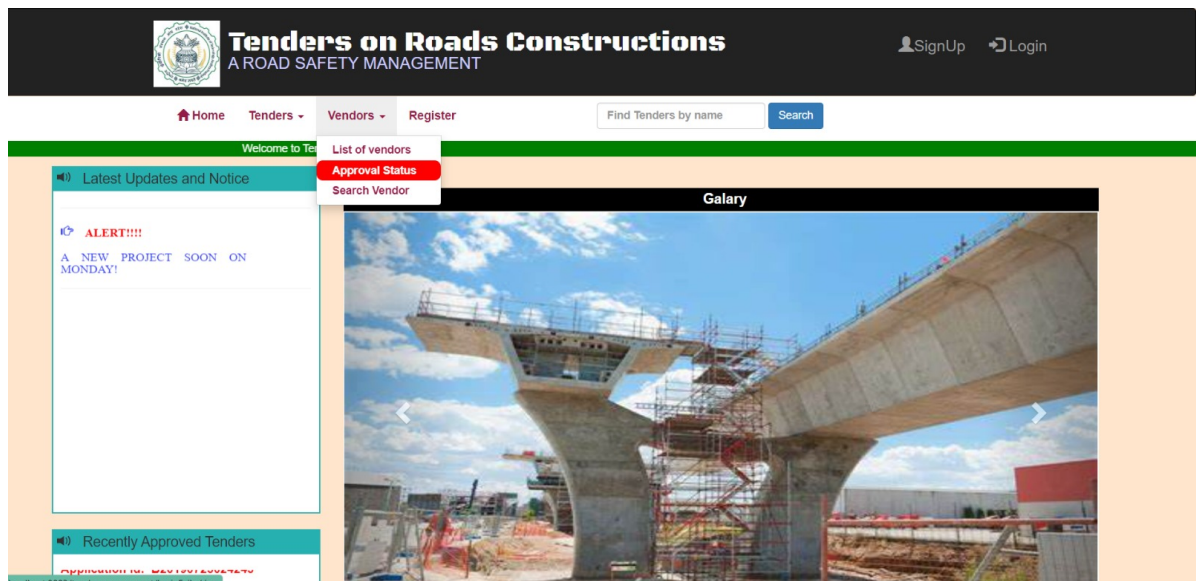


fig 7.1. Vendors Dashboard before login



fig 7.2. Vendors Dashboard before login

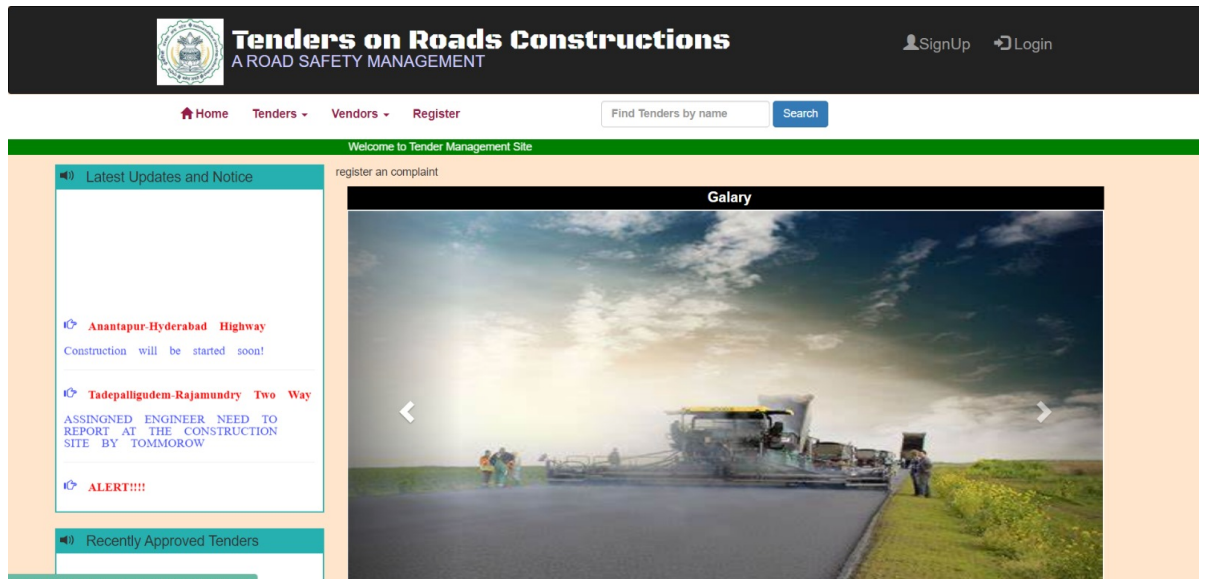


fig 7.3. Vendors Dashboard before login

5.1.1 Vendor Dashboard

A vendor dashboard is a crucial component of a tenders portal in a road management website project. It is a platform that provides registered vendors with all the necessary information about upcoming tenders, as well as a means to submit their bids electronically.

The vendor dashboard typically contains a list of open tenders with relevant details, such as the tender name, closing date, and any requirements or specifications. Vendors can use the dashboard to download the tender documents, view any updates or clarifications, and submit their proposals online.

The dashboard may also include a section for vendors to manage their profile and contact details, as well as view their bidding history and the status of their proposals. This can help vendors to keep track of their bids and monitor their progress.

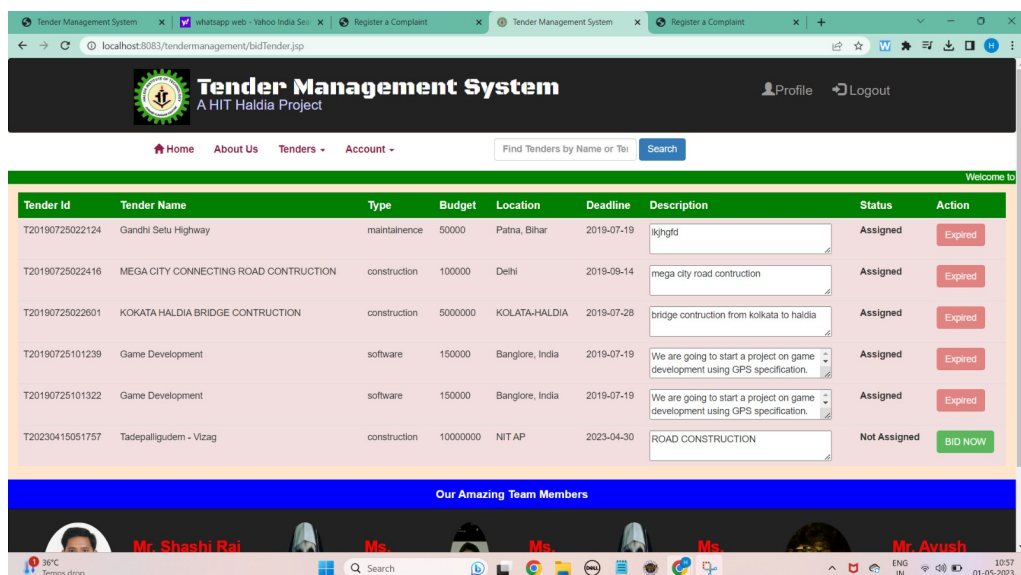


fig 9 Bidding For Tenders

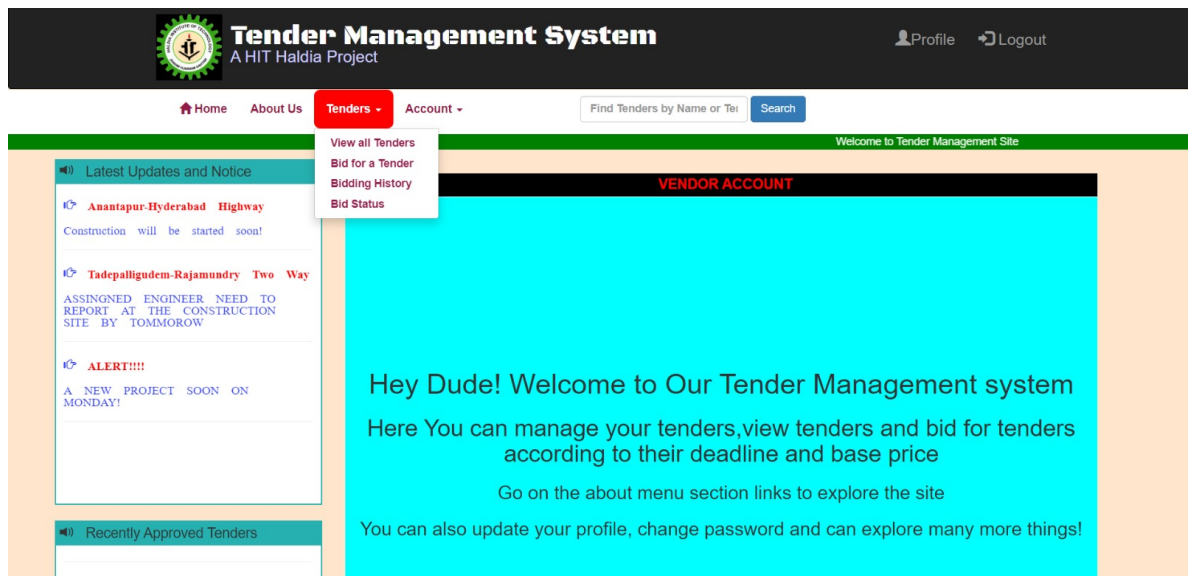


fig 10 Vendors Dashboard

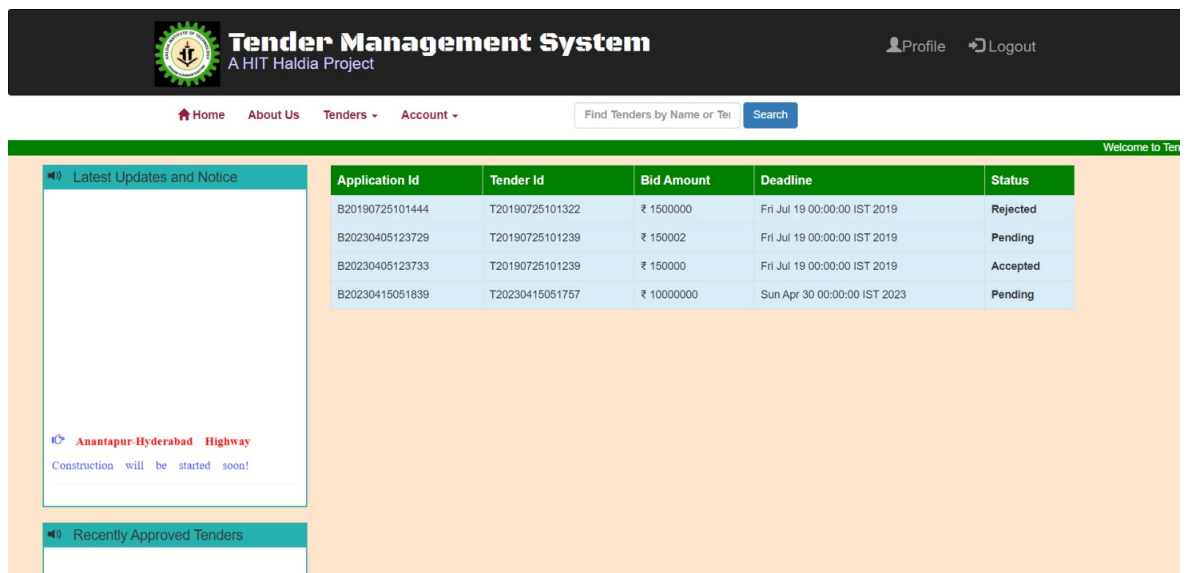


fig 11 Vendors History

5.1.2 Admin Dashboard

The admin dashboard typically contains a list of all active tenders and their relevant details, such as the tender name, closing date, and any requirements or specifications. It also have an option to add a new tender The administrator can use the dashboard to review and manage vendor registrations, accept or reject proposals. The admin has accessibility to add any notice regarding tenders of any upcoming events ie bidding etc . And also he have access to remove any outdated notice. The main privilege is that he can accept any biddings and eject any biddings accordingly.

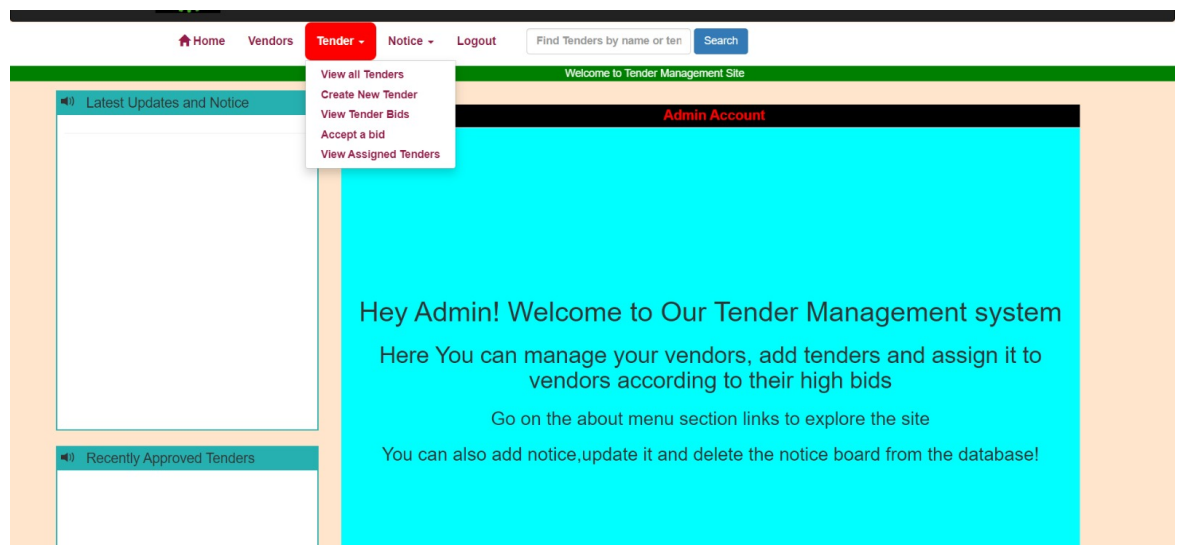


fig 12. Admin Dashboard

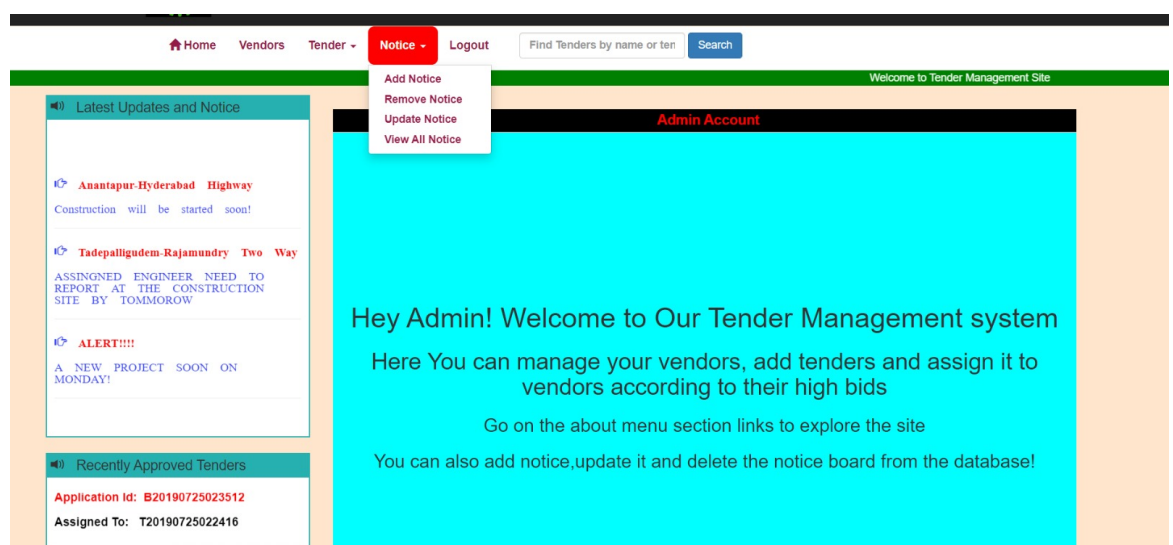


fig 13. Admin Dashboard

6 Experimental Procedure

So here are three possible experimental procedures based on different features of the website:

- **Compliant Page** Develop a compliant page on the road management website that allows users to report issues they encounter on roads. Create a form that users can fill out, which includes fields for their name, phone number, address, and a photo of the issue. Test the form to ensure that it is user-friendly and easy to navigate. Invite users to submit complaints and evaluate the response time and effectiveness of the agency in addressing the issues reported.
- **Tenders Page** Develop a tenders page on the road management website that allows construction companies to submit proposals for road construction projects. Create an RFP or ITT that outlines the scope of the project, the expected outcomes, and the deadline for submissions. Test the RFP or ITT to ensure that it is clear and concise. Invite construction companies to submit proposals and evaluate them based on a set of criteria such as cost, technical expertise, past performance, and other considerations.

7 Results and Discussions

Since there are three possible experiments outlined in the previous response, I will provide results and discussions for each one separately:

Compliant Page Results: The compliant page was successfully developed and tested, and users were able to easily submit complaints through the form. The agency was able to respond to the complaints in a timely manner and address the issues reported. **Discussion:** The compliant page is an important feature of the road management website as it allows users to report issues they encounter on roads. This can help the agency to identify areas that require improvement and ensure that roads are safe for all users. **Tenders Page Results:** The tenders page was successfully developed and tested, and construction companies were able to easily submit proposals through the form. The agency was able to evaluate the proposals based on a set of criteria and select the winning bidder for the project. **Discussion:** The tenders page is an important feature of the road management website as it provides a formal process for bidding and assigning contracts to construction companies. This can help to ensure that road construction projects are completed efficiently and effectively. **Maintenance Page Results:** The maintenance page was successfully developed and tested, and users were able to easily submit maintenance requests through the form. The agency was able to respond to the requests in a timely manner and address the issues reported. **Discussion:** The maintenance page is an important feature of the road management website as it allows users to report issues they encounter on roads that require maintenance. This can help the agency to identify areas that require maintenance and ensure that roads are safe and well-maintained for all users. Overall, the road management website can help to improve the efficiency and effectiveness of road management processes. By providing a platform for users to report issues and for construction companies to bid on contracts, the agency can ensure that roads are safe and well-maintained for all users.

8 Future Scope and Conclusion

As for the future scope, there are several ways to improve the program, which are:

- **Integration of Internet of Things (IoT) Devices:**The integration of IoT devices such as sensors and cameras can provide real-time data on traffic flow, road conditions, and weather patterns. This data can be used to optimize traffic management, identify potential safety hazards, and improve the effectiveness of road maintenance activities.
- **Use of Artificial Intelligence (AI) and Machine Learning (ML):**The application of AI and ML can provide valuable insights into road conditions and maintenance needs, leading to more efficient and effective maintenance operations. These technologies can be used to develop predictive models that anticipate future maintenance needs and optimize maintenance schedules.
- **Implementation of Smart Transportation Systems:**Smart transportation systems can improve traffic flow, reduce congestion, and enhance safety by providing real-time information to drivers and road authorities. These systems can also help to reduce emissions and promote sustainable transportation practices.
- **Adoption of Climate-Resilient Infrastructure:**Climate change poses a significant threat to road infrastructure, and the adoption of climate-resilient materials and construction techniques can help to mitigate these risks. The development of innovative solutions such as green infrastructure and sustainable drainage systems can also help to promote sustainability and resilience.

9 References

- we used languages like HTML, CSS, JS and JSP(java server page)are used for constructing the required pages. we took references from w3 schools tutorials and other online platforms for learning these languages.
- <https://www.mysql.com/>:MySQL Theory
- <https://www.w3schools.com/>:W3Schools for Documentation