A Review of The Analyzing Delayed Road Project Using Topsis Method

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Abstract*— Road infrastructure projects are vital for socio-economic development, yet delays in their implementation are common, leading to significant costs and disruptions. This study employs the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method to analyze delayed road projects, aiming to identify key factors contributing to delays and propose effective mitigation strategies. The research begins by identifying a set of critical parameters including delay causes, stakeholder satisfaction, cost overruns, quality of construction, environmental and social impacts, time management, risk management, and public perception. Data pertaining to these parameters are collected through surveys, interviews, and project documentation for selected delayed road projects. Using the TOPSIS method, the collected data are processed to rank the delayed road projects based on their performance against the identified parameters. The method enables the identification of projects that deviate the most from the ideal solution and those that exhibit relatively better performance in mitigating delays. Through a comparative analysis of the ranked projects, Moreover, the study highlights best practices and lessons learned from projects with minimal delays. The findings of this research provide valuable insights for policymakers, project managers, and stakeholders involved in road infrastructure development. By understanding the root causes of delays and implementing targeted interventions, future road projects can be executed more efficiently, ensuring timely completion and optimal utilization of resources.

Index Terms – Topsis Method, Delay Causes, Cost Overruns, Environmental Impact, Social impact, Questionnaire Survey.

I. INTRODUCTION

Road infrastructure projects are fundamental to economic growth, societal connectivity, and regional development. However, delays in the implementation of such projects have become a persistent challenge worldwide. These delays not only result in increased costs but also lead to disruptions in transportation networks, hindering socio-economic progress and affecting the quality of life for communities.

Understanding the causes of delays and implementing the effective mitigation strategies are essential for the successful execution of road projects. In recent years, various analytical methods have been developed to assess project performance and identify areas for improvement. One such method is the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), which provides a systematic approach for ranking alternatives based on their similarity to an ideal solution.

This study focuses on applying the TOPSIS method to analyze delayed road projects, aiming to identify the key factors contributing to delays and propose effective strategies for mitigation. By examining a range of parameters including delay causes, stakeholder satisfaction, cost overruns, quality of construction, environmental and social impacts, time management, risk management, and public perception, this research seeks to provide comprehensive insights into the dynamics of delayed road projects.

Through a comparative analysis of selected case studies, this study aims to shed light on the root causes of delays and evaluate the effectiveness of project management practices. By identifying best practices and lessons learned from projects with minimal delays, this research aims to inform policymakers, project managers, and stakeholders about strategies for improving the efficiency and timeliness of future road infrastructure projects.

Overall, this study contributes to the body of knowledge on project management in the context of road infrastructure development and provides practical recommendations for addressing delays and enhancing project performance. The Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) offers a structured framework for ranking alternatives based on their proximity to an ideal solution. By leveraging TOPSIS, this study seeks to systematically analyze delayed road projects, unraveling the underlying factors contributing to delays, and delineating effective mitigation strategies.

This research adopts a multifaceted approach, scrutinizing various parameters critical to project success. These parameters encompass an array of dimensions, including the identification of delay causes, evaluation of stakeholder satisfaction, assessment of cost overruns, scrutiny of construction quality, examination of environmental and social impacts, analysis of time management practices, evaluation of risk mitigation strategies, and consideration of public perception.

Through a meticulous examination of selected case studies, this study endeavors to unravel the intricate dynamics of delayed road projects. By conducting a comparative analysis, it aims to discern patterns, identify commonalities, and extract actionable insights that can inform decision-making processes. Furthermore, this research aspires to distill best practices and lessons learned from projects that have managed to circumvent delays, offering valuable guidance for policymakers, project managers, and stakeholders.

By systematically analyzing these dimensions using the TOPSIS method, this study aims to provide insights into the performance of delayed road projects and offer recommendations for enhancing project management practices. Through a nuanced understanding of the challenges and opportunities associated with road infrastructure development, stakeholders can work towards more efficient and timely project delivery, ultimately contributing to sustainable development and societal well-being.

II. LITERATURE REVIEW

1. Ibrahim Mahamid

In this study, delay causes in road construction projects in the West Bank in Palestine. 52 causes of delay identified. The identified causes were combined into eight groups. The field survey included 34 contractors and 30 consu;tants.

2. Mohammad Yonis

In this study, Interviews were conducted with experts involved in Afghanistan's road sector. And then questionnaire was carried out among participants from the private and public sector in Afghanistan to determine and analyze the major causes of delays.

3. Magdi Zumrawi

In this study, He investigated the causes of delay in 130 public projects in Jordan and found that the main causes of delay were related to designer mistakes and changes during construction.

4. Donati Kullaya

In this study, six significant causes of delays emerged, and these were inadequate access to finance and delayed payments for completed work, financial problems or difficulties of the particular project.

5. Ludwig Rivera

In this study, repetition ranks the cause of delay in the in the number of findings is that the frequency of delay of the most important causes of delay to be found.

6. Zeljko Stevic

In this study, Using fuzzy piprecia method a total of 20 causes for delay were investigated, and they were divided into four categories construction, managerial, financial, and technical.

7. Saravanan Karunakaran

It involved about 92 factors consisting of various construction phases. The frequency of occurrences of the factor in the construction projects and the percentage value was 25 times and 2.5% respectively.

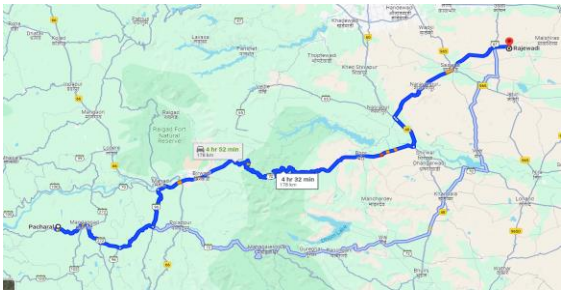
III. STUDY AREA LOCATION

This current research is limited to explore the concept of Delay in Road Construction Projects of two lane stretches with paved shoulder of

1. From Mahad to Raigad
2. From Pacharal to Mandanagad
3. From Waradha to Hinghanghat

4. From Parali to Pimapala

5. . From Seldoh to Pawner in the state of Maharashtra as a case study.



In monsoon season of kokan region below points shall be included :

Heavy Rainfall: The Kokan region experiences heavy rainfall during the monsoon season, which can lead to waterlogging, soil erosion, and flooding. These adverse weather conditions make it challenging to carry out construction activities, leading to delays in project timelines.

Soil Instability: Continuous rainfall saturates the soil, making it unstable and prone to landslides and soil erosion. Construction sites may become inaccessible or hazardous, necessitating suspension of work until the weather improves.

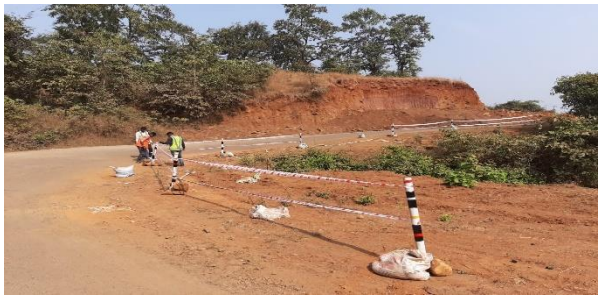
Road Damage: Existing roads in the Kokan region may suffer damage or deterioration due to the monsoon rains, requiring repair and maintenance efforts. Construction resources and manpower may need to be diverted to address immediate road repair needs, further delaying ongoing construction projects.

Transportation Disruptions: The monsoon season can disrupt transportation networks, making it difficult to transport construction materials and equipment to project sites. Poor road conditions and traffic congestion due to flooding or landslides can hinder the timely delivery of essential supplies, exacerbating delays in construction activities.

Safety Concerns: Safety risks increase during the monsoon season, posing threats to workers and equipment at construction sites. Slippery surfaces, falling debris, and electrical hazards are among the safety challenges that construction crews must contend with, often necessitating work stoppages or reduced productivity.

Budget Overruns: Delays caused by the monsoon season can result in budget overruns for road construction projects. Increased construction duration due to weather-related interruptions may lead to additional expenses for labor, equipment rentals, and project management, impacting overall project costs.

Community Disruptions: Road construction delays during the monsoon season can inconvenience local communities, affecting their daily routines, access to essential services, and livelihoods. Residents may experience difficulties commuting, accessing healthcare facilities, or transporting goods, leading to dissatisfaction and public outcry.



Proposed Scheme

IV. DATA COLLECTION

The main data will be acquired from the literature, while the secondary data will consist of Questinnaire Survey, traffic counts, and as per Contractors, Consultants and Government Authority's details.

Surveys and Questionnaires: Design questions to collect information from participants. Surveys can be conducted through various mediums like paper-based forms, online surveys and telephone interviews.

1. Interviews
2. Observation
3. Experiments
4. Archival Research
5. Focus Groups
6. Content Analysis
7. Case Studies
8. Ethnography
9. Mixed Methods

The data collected from the site for the various delay types having different types of causes and effects. As you can see in below image major problem is shifting of electric poles by government Authority it would be goes on delay.

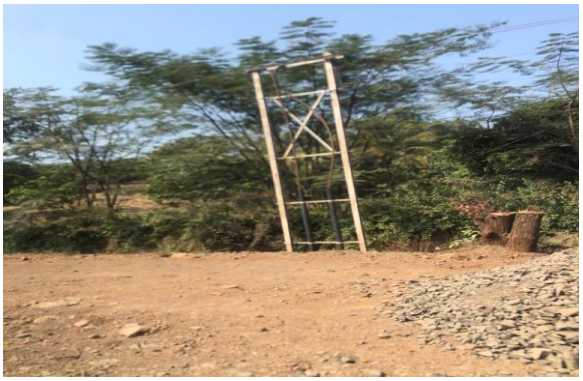


Table I: Questionnaire Survey Details

Sr. No	Questionnaire Survey	Participants
1	Government Authority	30
2	Consultants	30
3	Contractors	30

V. TOPSIS METHOD

The Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) is a multi-criteria decision-making method used to determine the best alternative from a set of options. It operates on the principle that the best choice should have the shortest distance to the positive ideal solution and the longest distance to the negative ideal solution.

Here's a concise overview

1. Identify Criteria
2. Normalize the Decision Matrix
3. Weight Assignment
4. Determine the Ideal and Negative Ideal Solutions
5. Calculate the Similarity Scores
6. Rank the Alternatives
7. Sensitivity Analysis:

TOPSIS is widely used in various fields, including engineering, business, and environmental management, to support decision-making processes where multiple criteria need to be considered simultaneously. It offers a structured and transparent approach to evaluating alternatives and selecting the most favorable option based on predefined objectives and preferences.

CONCULSION

The aim of Analyzing delayed road Projet Using Topsis Method is to determine employing the TOPSIS method provides a structured and systematic approach to analyze a delayed road project. By evaluating criteria such as cost, time, quality, environmental impact, and safety, and considering various alternatives, stakeholders can gain valuable insights into the best course of action for completing the project.

Through normalization, weight assignment, determination of ideal and negative ideal solutions, distance calculation, and similarity assessment, the TOPSIS method facilitates the identification of the most favorable alternative. Sensitivity analysis further enhances the reliability of the results by assessing the impact of changing weights on the rankings.

Ultimately, the application of TOPSIS enables informed decision-making regarding the delayed road project, empowering stakeholders to address challenges effectively and optimize outcomes.

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