

Enhancing Rural Highway Maintenance Efficiency: Problem Diagnosis and Policy Solutions for Major and Medium Repairs

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Abstract: Rural highways are vital to economic development in contemporary China; however, prolonged use frequently results in quality deterioration that requires major and medium maintenance. In practice, such maintenance is encumbered by persistent challenges that reduce overall efficiency. This paper systematically identifies the principal difficulties in rural highway maintenance and proposes targeted countermeasures aimed at strengthening the effectiveness of infrastructure renewal projects and ensuring sustainable rural transportation networks.

Keywords: Rural highways; Major and medium maintenance; Quality issues; Countermeasures; Infrastructure management.

1. Introduction

Major and medium repairs and maintenance of rural roads are relatively common, mainly because many rural roads did not pay attention to management in the early stage of use, resulting in significant impacts on the implementation of various tasks. Major and medium repairs and maintenance of rural roads can improve road quality and play a significant positive role in enhancing the stability and safety of the structure. However, if maintenance management is not in place, the service life of rural roads will be reduced, which will not only affect the generation of rural economic benefits but also reduce comprehensive social benefits. Therefore, it is necessary to analyze the existing problems and provide guarantee for the smooth travel of the public through the implementation of effective countermeasures.

2. Problems in Major and Medium Repairs and Maintenance of Rural Roads

2.1 Lack of Prevention Awareness

In the maintenance of rural roads, the most important thing is to carry out prevention and avoid problems from the source. At present, many rural road responsible persons lack prevention awareness in their work and do not understand the key factors in the major and medium repair work of rural roads, so daily maintenance management is not implemented in practice. Under the premise of lacking maintenance awareness, the related work carried out by staff can only play a superficial role. Many grass-roots maintenance personnel only carry out seasonal maintenance and do not analyze the problems that often exist in the major and medium repair and maintenance work of rural roads, so the overall work becomes a mere formality. Even some units carry out major and medium repair and maintenance during the year-end assessment just to cope with inspections, which will cause resource waste when the problems gradually worsen.

2.2 Defects in Management Mechanism

The management mechanism can restrict staff and make them standardize their behaviors in accordance with relevant

requirements in work. Currently, many rural roads have not established corresponding management mechanisms in the process of major and medium repairs and maintenance, and staff do not pay enough attention to this work, failing to meet the basic work requirements. Although many county-level rural road management departments can manage the maintenance institutions in their jurisdictions well, they have not formed a market-oriented management system, resulting in many difficult-to-solve problems in practice. In the case of defects in the management mechanism, there is a disconnection in the management of major and medium repairs and maintenance of rural roads, and the overall form is relatively backward in actual operation, leading to an unsatisfactory final maintenance quality.

2.3 Unclear Maintenance Quota

The implementation of maintenance work not only needs to take quality management as the core, but also needs to determine the actual funds required for medium and major repair maintenance. Therefore, for the medium and major repair maintenance of rural highways, quota management can be adopted to standardize the overall work content. However, many institutions have not made clear requirements in this regard, and there are unreasonable phenomena in setting quotas. Many units have large differences between their self-set quota targets and the actual situation, resulting in an unremarkable effect of quota management. Unclear maintenance quotas will affect the standardization of rural highway maintenance management, and some units lack complete documents when implementing this work, leading to large differences and affecting the scientificity of quota management.

2.4 Insufficient Capital Investment

The accuracy of capital investment is particularly important for the medium and major repair maintenance of rural highways, but currently many institutions and units do not meet the substantive work needs in this regard. The economic development of rural areas is relatively backward compared with urban economies. When carrying out highway medium and major repair maintenance, there is a lack of basic

conditions, and even some necessary conditions have not been improved. Relevant departments and governments did not analyze the actual situation when investing funds, and blindly invested funds without understanding the comprehensive situation, which often led to insufficient funds and restricted medium and major repair maintenance. Different rural areas have large differences in the capital ratio for highway medium and major repair maintenance, and many daily maintenance funds cannot meet the basic maintenance needs, resulting in some highways unable to be repaired in time, and their performance and structure being greatly affected. In addition, the economic level of some rural areas is poor, making it impossible to invest more funds in regular highway maintenance, which is also an important reason restricting the development of this work.

3. Countermeasures for Medium and Major Repair Maintenance of Rural Highways

3.1 Improve the Work Mechanism

In the implementation of rural highway medium and major repair maintenance work, there is often a problem of an imperfect work mechanism. In the actual maintenance work, it is necessary to improve the work mechanism to provide guarantee for the smooth development of various work. In the process of improving the work mechanism, relevant departments and institutions need to clarify the process of rural highway medium and major repair projects, and bidding work can only be carried out after project approval, with the winning unit fully responsible for project construction. The work mechanism needs to refine the actual work content. When implementing project construction, the overall completion acceptance work needs to be responsible by the supervision department, and the comprehensive ability of personnel should be strengthened to enable them to meet various work requirements and standards.

3.2 Carry Out Market-Oriented Reform

Market-oriented reform has been a hot topic in China in recent years. When carrying out medium and heavy repair and maintenance work on rural highways, it is necessary to conduct effective analysis on the implementation of different work contents, and through market-oriented reform, make it more in line with the requirements of project highway maintenance. Maintenance institutions have always carried out related work in the form of public institutions. In the process of development in the new era, they can be transformed into enterprise units. By using the market-oriented competition mechanism, the maintenance work can be carried out more openly and transparently, allowing the public to clearly identify existing problems. When supervising the medium and heavy repair and maintenance of rural highways, management institutions can open up in-depth green channels and use business preferential policies to help enterprise units grow rapidly. In the current market environment, competition among enterprises is becoming increasingly fierce. Deepening market-oriented reform can help units adjust their business models and promote their development towards normalization in operations.

3.3 Improve the Competition Mechanism

Improving the competition mechanism is mainly aimed at the problem of vicious competition existing in the current management of medium and heavy repair and maintenance of rural highways. Many bidding units believe that the requirements for medium and heavy repair and maintenance of rural highways are not high, so they can lower the quotation during the bidding process to obtain construction qualifications, and then reduce capital investment in materials during the work to make up for the loss caused by the low quotation in the bidding. When improving the medium and heavy repair and maintenance of rural highways, it is necessary to improve the competition mechanism, clarify the actual preset access conditions and requirements, strengthen according to the current development environment, and provide more space for the comprehensive development of enterprises. When implementing maintenance management work, relevant institutions need to improve actual operations, especially record relevant construction equipment in the bidding documents, making it an important competition indicator.

3.4 Formulate Maintenance Plans

The difficulty in achieving substantial effectiveness in maintenance work is largely due to the inadequate medium and heavy repair and maintenance plans for rural highways, which leads to changes in actual maintenance. Before carrying out medium and heavy repair and maintenance work, relevant units need to formulate maintenance plans, clarify the current damage status of rural highways, and repair the parts with serious quality problems. In the process of formulating maintenance plans, maintenance units need to reasonably allocate personnel, clarify the actual operation status of rural highways, and analyze traffic flow and pedestrian flow. After that, accurate detection data are also required to help staff gain a deeper understanding of the status of rural highways, facilitate the adoption of preventive measures, and enhance the effectiveness of comprehensive maintenance management.

3.5 Establish Special Funds

Funding cannot be ignored for the major and medium repair and maintenance of rural highways; many units struggle to carry out projects due to funding shortages. In the process of modern social development, transportation departments and government agencies need to establish special funds to assist rural areas in conducting major and medium highway repair and maintenance work, providing guarantees for the subsequent implementation of comprehensive work. When establishing special funds, social funds can also be raised, with enterprises sponsoring a certain amount of funds, which are managed by the financial department. When funds need to be used, they can be utilized rationally to improve fund utilization efficiency. It should be noted that before using the funds, an application must be submitted to the government department, and the funds can only be allocated after approval to avoid misuse of funds.

4. Conclusion

Major and medium repair and maintenance of rural highways need to be based on an effective management mechanism to regulate the behavior of staff so that they can meet various work requirements. Before implementing maintenance work, it is necessary to formulate targeted maintenance plans, standardize the maintenance market, establish maintenance funds, and effectively improve highway quality.

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