

Research on Compaction Technology of Municipal Road and Bridge Engineering Roadbed and Pavement

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Abstract: *In recent years, China has constructed various scale and level of road projects. The implementation of these projects has improved China's road transportation system and brought great convenience to people's travel. However, the implementation of roadbed and pavement compaction is an aspect that cannot be ignored in road engineering. The application of technology and construction effectiveness are related to the quality of road engineering. Therefore, in any road engineering project, standardized roadbed and pavement compaction must be carried out based on the construction requirements of the road itself to ensure that the compaction meets the construction requirements.*

Keywords: road engineering; Roadbed and pavement construction; Compaction technology.

1. INTRODUCTION

With the development of social economy and the improvement of urban construction level, municipal engineering has also entered a stage of continuous construction and large-scale development, especially the construction of municipal road engineering has become the focus of overall construction, with the aim of meeting people's increasing travel requirements, optimizing the current travel environment, and ensuring the stability and safety of road traffic. In order to ensure the construction quality of municipal road engineering, it is necessary to effectively control each construction link of the engineering construction. Among them, roadbed and pavement compaction is a very critical construction point, which affects the quality and efficiency of pavement engineering. Therefore, it is necessary to obtain the attention of the construction unit and effectively adopt scientific and reasonable construction techniques in accordance with road design requirements and relevant specifications for roadbed and pavement compaction, By improving technical content and grasping technical details, maintain the compaction effect of the roadbed and pavement.

By using compaction technology, the durability of the roadbed and pavement can be improved, its stability and firmness can be improved, which helps to extend the service life of the road and reduce the manpower, material resources, and financial investment in road maintenance. At the same time, effectively reducing the probability of road diseases, especially avoiding cracks, to improve the safety of vehicles driving on the road. Through the compaction technology of subgrade and pavement, the flatness of subgrade and pavement can be ensured, and the municipal Roadworks construction can be carried out orderly and the quality meets the standards. Scientific construction technology can significantly reduce the probability of rework, which has a significant effect on improving the economic benefits of enterprises.

"Data Article 20" points out that security runs through the whole process of data governance, builds a governance model of government, enterprises, and society, innovates the way of government governance, clarifies the main responsibilities and obligations of all parties, improves the industry self-discipline mechanism, standardizes the market development order, and forms a governance pattern of data elements that combines effective market and government[1]. Digital disputes, as the manifestation of interest conflicts in the era of digital economy, have multiple complexities. Different digital subjects have different expectations on data, and different interest claims should be identified in the process of dispute resolution. In this process, it is necessary to build a multi-entity collaborative resolution mechanism of digital disputes, through the participation of multiple subjects in dispute resolution, the real interest demands of the parties are identified, and the technical support of digital platforms and big data exchanges is provided. Better give space to the development of the digital economy, in the current situation of "litigation explosion and fewer cases", the contradiction will sink, and multiple collaborative solutions to digital disputes.

2. FACTORS AFFECTING THE COMPACTION CONSTRUCTION TECHNOLOGY OF MUNICIPAL ENGINEERING ROADBED AND PAVEMENT

2.1 The bearing capacity of the settlement section itself is limited

Compared with ordinary road surfaces, settlement sections have a high water content and limited resistance. At present, the construction of settlement road sections mostly adopts the scheme of reinforced concrete transition and reinforced soil, which is relatively expensive in the early stage. Some construction units are controlling costs and simplifying the construction process during the operation process have resulted in uneven stress on the overall tower plate structure, seriously affecting the safety and stability of subsequent use. In addition, the groundwater in the settlement section is relatively abundant, and the groundwater is in a flowing state for a long time, with strong impact force, which is easy to cause settlement [1].

2.2 Paving thickness of subgrade and pavement

The laying thickness of roadbed and pavement fillers also has a significant impact on the compaction effect. The measured compaction test results of the roadbed and pavement indicate that the compactness of the filling material shows a decreasing trend from top to bottom, and the compactness of the surface 5cm filling material is the highest [3]. Through a large number of roadbed and pavement construction practices, it has been proven that the roadbed and pavement should be laid with appropriate thickness. If the filling layer is too thick, the compaction of the lower half layer cannot meet the specifications and design requirements, and the compaction of the upper half layer will also be greatly negatively affected. Of course, the thickness of roadbed and pavement varies depending on the type of compaction machinery, and the specific parameter selection is determined based on laboratory tests or on-site test sections.

2.3 Material quality issues

In municipal Roadworks, material is the key to quality. If the material does not meet the standard, the road performance after compaction is far from meeting the standard, which makes it difficult to guarantee the project quality. Currently, composite materials are commonly used in the construction process of roadbed and pavement in China, consisting of various materials. In the actual use of composite materials, it is necessary to control the dosage of different materials to avoid poor performance of the mixture and affecting the compaction treatment. If the material ratio does not meet the actual engineering design requirements, the overall performance of the mixture is also difficult to guarantee. Therefore, in the actual process of subgrade and pavement construction, the attention and control of material quality and group distribution ratio should be strengthened to lay a good foundation for compaction and further improve the quality of Roadworks construction [2].

3. APPLICATION STRATEGY OF SUBGRADE AND PAVEMENT COMPACTION TECHNOLOGY IN ROADWORKS

Mediation, notarization, arbitration, administrative adjudication, administrative reconsideration and litigation are the main methods to resolve contradictions and disputes in our country, and they should be organically integrated and coordinated with each other. As an emerging economic form, big data, as a data set, is more difficult to collect and process. At the same time, the larger the data set, the stronger its ability to combine with other industries, and the economic value will also increase. Once a digital dispute occurs, it will involve a wide range of interests for all parties. It is particularly important to establish a multiple collaborative resolution mechanism to solve digital disputes. By clarifying that data security is the primary value orientation to ensure the development of digital economy, courts should be the backbone and guide of multiple collaborative resolution mechanism in digital dispute resolution, while digital platforms and big data exchanges participate in pre - litigation mediation, and different mediation streaming procedures achieve multiple collaborative resolution of digital disputes.

3.1 Improving the Quality of Roadbed and Pavement Fillers

Reasonable implementation of roadbed and pavement filling work is related to the specific progress of the entire construction and corresponding financial investment. During the preliminary construction preparation stage, personnel should be assigned to carry out material procurement progress and ensure that all materials have after-sales support. When materials enter the construction site, quality inspectors should be required to carefully inspect

high standard screening work to prevent the application of poor quality materials to specific construction, which may affect the overall quality of the construction. It should be ensured to complete the construction content within the specified time, carry out each construction according to the construction plan, and complete the corresponding tasks every day, which can continuously improve construction efficiency while ensuring quality. In addition, attention should be paid to the storage and placement of various construction materials, and waterproofing, fire prevention, and other measures should be taken to prevent material damage and affect the construction progress. Personnel should be appointed to manage construction materials to avoid material loss. Afterwards, the filling work will be carried out in accordance with relevant standards, continuously improving the quality of the filling and laying the foundation for the later construction of the road surface and roadbed.

3.2 Substantial control measures for roadbed and pavement pressure

In the application of roadbed and pavement compaction construction technology, the quality of maintenance technology application and the overall quality and safety of the project should be given top priority. Therefore, improving quality control measures is very important, and a series of guarantee plans should be proposed according to quality control requirements. Firstly, it is necessary to control the compaction of the foundation. In the specific construction operation process, it is necessary to grasp the various influencing factors of the compaction operation. In the initial stage, a scientific compaction plan design needs to be done, and the plan must be determined through the construction of the experimental section. In the selection of compaction machinery and equipment, soil properties need to be taken as an important basis. If the roadbed soil is sandy soil, a vibrating roller can be chosen to avoid using a smooth wheel roller. If it is cohesive soil, a compaction machine can be used. Secondly, it is necessary to control the water content. In terms of water content treatment, it is necessary to focus on reducing soil moisture content and improving operational stability. Alcohol combustion or drying methods can be used to reduce water content, with drying method mainly used in cohesive and sandy soil, and alcohol combustion method mainly used in organic soil. Finally, it is necessary to ensure the effectiveness of training for construction personnel. Specialized education and training shall be carried out for compaction construction technicians to improve their professionalism in the operation of various machinery and equipment. At the same time, their safety awareness and strain capacity shall be enhanced to be able to flexibly control all links in the compaction work [3].

3.3 Selection of appropriate roadbed and pavement compaction equipment and methods

When selecting compaction equipment, it is necessary to choose appropriate road compaction equipment based on the natural environment and paving layer conditions of the construction site. Small rolling equipment has strong flexibility and is suitable for working in complex terrain environments, but its work efficiency is low. The compactness of the compacted roadbed and pavement layer is not enough, making it difficult to achieve the expected leveling effect. However, some large and medium-sized rolling equipment have high work efficiency and can achieve the compaction effect of the roadbed. However, cracks are prone to appear on the roadbed and pavement after rolling, which affects the overall structure of highway engineering and is suitable for use in situations with larger filler particle sizes. Therefore, when selecting compaction equipment, it is necessary to choose appropriate equipment based on the actual construction situation of the project to ensure the compaction effect of roadbed and pavement construction. In highway engineering construction, segmented construction can be carried out according to different construction conditions, and different compaction methods can be selected based on the construction situation of each section.

3.4 Strengthen strict control over construction materials

In the compaction construction process of roadbed and pavement in road engineering, in order to ensure the compaction construction effect, it is necessary to follow the quality standards and requirements of road construction, select appropriate materials, and ensure the qualification of material quality during the construction process. When implementing road engineering projects, the soil and geology on site are poor. In order to improve the compaction construction effect, it is necessary to excavate these poor soil qualities to avoid mixing them with the compacted material. After completing the soil excavation treatment, construction personnel need to conduct tests and analysis on the materials, and verify whether the various indicators of the materials meet the requirements based on the test results. Only when the materials meet the requirements in all aspects of performance can they be used as the preferred material for compaction construction [4].

3.5 Control the quality of construction materials

Controlling the quality of materials is the foundation for ensuring the compaction effect of roadbed and pavement. Choose suitable materials according to the construction situation, choose suppliers with good qualifications to purchase high-quality materials, strengthen quality control when entering the site, randomly check the quality of each batch of materials, and avoid using inferior materials during construction. During the construction of municipal Roadworks, if the soil layer with poor geological conditions is encountered, it must be thoroughly excavated. Otherwise, the mixing of building materials will affect the performance of the materials, which is not conducive to subsequent compaction operations. The process parameters can be adjusted through proportion testing, with a focus on the quality control of key materials such as concrete. The usage should be controlled within a reasonable range, otherwise the strength may not meet the standard; If asphalt mixture is selected, in addition to ensuring the quality of raw materials such as asphalt, attention should also be paid to controlling the construction temperature, which is reflected in the steps of material mixing, paving, compaction, etc. The temperature at each stage should be maintained within a reasonable range.

3.6 Control of roadbed thickness

In the process of roadbed compaction construction, in addition to ensuring the standard of the foundation surface, it is also necessary to effectively control the thickness of the substrate in accordance with relevant construction regulations during construction operations. If the roadbed on site is too thick, subsequent compaction construction operations cannot be carried out smoothly, construction efficiency is low, and quality cannot be guaranteed. However, if the roadbed is too thin, it will lead to insufficient bearing capacity of the roadbed, and there may be problems of roadbed instability during compaction construction [6]. In response to this situation, professional construction personnel should effectively control the thickness of the roadbed according to the construction requirements when carrying out roadbed and pavement compaction construction. Before compaction construction, roadbed testing should be carried out first to ensure the rationality of the roadbed thickness. Multiple elevation points can be set up within the construction section, and professional personnel can complete segmented analysis of the roadbed height. Through corresponding calculations, the roadbed quality can be comprehensively controlled to ensure that the roadbed thickness can comply with relevant construction regulations.

4. CONCLUSION

With the continuous progress of society, the construction of municipal road and bridge projects has profound significance. The stability and safety of the roadbed and road surface in road engineering affect the effective use of the road. The scientific and reasonable use of roadbed and pavement compaction technology can significantly improve the service life of roads and improve usage efficiency. Pressing on the roadbed and pavement. In the actual process, a plan should be planned in advance, the use standards of the compaction process should be analyzed reasonably, and the construction process and operating methods should be adjusted and controlled appropriately. Mechanical equipment and raw materials should be well dispatched, and the moisture content of the roadbed should be strictly controlled to ensure the final construction effect. Therefore, this article explores the compaction technology of roadbed and pavement in municipal road engineering construction. By analyzing raw materials, construction techniques, and operational techniques, it aims to promote the scientific and effective application of roadbed and pavement compaction technology, promote municipal road construction, and enhance the continuous progress of China's regional economy.

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