Implement quality control of roadbed pressure in highway engineering

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Abstract. In daily life, highways are the most common public facilities and are closely related to people's travel. Therefore, various management departments must pay attention to strictly supervise the quality of each construction link of highway engineering, especially in accordance with the requirements of relevant standards, do a good job of quality control of highway subgrade compaction. This article first analyzes the factors affecting the quality of roadbed pressure in highway engineering, and proposes targeted quality control measures, hoping to provide a reference for the improvement of my country's highway engineering construction quality.

Keywords: highway engineering, roadbed compaction, construction, quality control

1. Introduction
With the rapid development of my country’s economy, people's living standards continue to improve, and the number of vehicles in the city has increased sharply. This has caused many road congestion problems and caused great troubles to people's lives. In order to solve the problem of road congestion, the state has adopted many effective measures. On the one hand, the existing roads in the city are widened, and on the other hand, new roads are continuously constructed. In the process of highway construction, roadbed compaction is an important link. How to control the quality of this link affects the construction of the entire project. In fact, in the process of subgrade pressure implementation, quality control often fails, which will cause the completed highways to fail to meet the acceptance standards, and bring safety hazards to our country's highways. Therefore, we must do a good job in the quality control of highway engineering roadbed compaction, improve the overall quality of my country's highway engineering construction, and promote a better and faster development of our country's economy.

2. The significance of roadbed compaction in highway engineering
At this stage, with the continuous development of my country’s economy, the overall economic level has been greatly improved. In every city, the number of vehicles on the road is increasing. Urban highways are gradually unable to meet the vehicle load demand. In order to solve this contradiction, the state has continuously invested manpower and material resources to speed up road construction. In order to ensure the quality and quantity of highway construction tasks, it is necessary to do a good job in subgrade compaction quality control, and to carry out construction in strict accordance with the national highway construction standards, which can further increase the service life of the highway. In
addition, the quality control of roadbed pressure implementation works is not only related to the standardization of road construction, but also affects people's daily travel safety. Therefore, roadbed pressure implementation tools are of great significance.

3. Influencing factors of roadbed compaction in highway engineering

(A). The nature of the soil

During the construction of highway engineering, the quality of subgrade compaction will be seriously affected by the nature of the soil. Therefore, the difficulty of subgrade compaction varies depending on the region where the highway project is constructed. This is due to weather factors in different regions. There are differences in soil structure and properties. It can be seen that highway construction personnel must do the preliminary preparations, carefully study the soil properties of the construction area, and adopt suitable roadbed compaction methods. For example, in northern China, due to the low overall precipitation and relatively loose soil, the roadbed pressure implementation work needs to be carried out with the help of large machinery.

(B). Soil moisture content

The soil moisture content of the construction site will also have a relatively large impact on the construction quality and construction safety. The soil moisture content is the most important factor determining the construction compaction. The soil moisture content is too low, which greatly reduces the soil during the construction process. The level of particle contact leads to greater resistance during the compaction process, resulting in uneven road surface after construction, which affects the effect of compaction. If the water content in the soil is too large, it will cause soil loss during the compaction process to fail to meet the compaction design requirements and affect the final construction effect. Therefore, before the compaction work, the moisture content in the soil must be guaranteed At the same level, to ensure the quality and safety of construction. The soil moisture content in the construction environment is at an appropriate level, which can ensure that the soil is evenly stressed during the compaction process, extend the use time of the road after completion, and improve the overall quality of the road.

(C). Influence of temperature

Among the factors that affect the effect of compaction operation, temperature is also a relatively important factor. The soil on the construction site needs to be in an appropriate temperature range. Too high or too low temperature will have a certain impact on the quality of construction. If the ambient temperature is higher, the soil temperature at the construction site will be higher, and the soil will be loose, and the degree of compaction after compaction will not meet the design requirements. On the contrary, if the construction environment temperature is low, the moisture in the soil is in a solid state. The compaction should be carried out at the beginning of the spring. Once the water melts in the spring, it will cause serious consequences of the collapse of the roadbed and threaten road traffic safety. Therefore, the roadbed compaction operation must choose suitable weather and temperature conditions.

4. Effective measures for roadbed compaction control

(A). Control the number of compactions

Compaction operation is a very important operation step in highway construction. Compaction can not only reduce the water content in the soil, but also strengthen the roadbed and ensure construction safety. However, the compaction operation needs to pay attention to the following issues. The first is the number of compactions. Excessive compaction will damage the soil at the construction site. Excessive soil load affects the soil structure and construction safety. In the actual process of compaction operation, attention should be paid to the strength and frequency of compaction. It is necessary to ensure that the degree of compaction loads the corresponding technical requirements, but also to ensure that the construction is not excessive and that the soil and soil conditions are not damaged.

(B). Strengthen the compaction strength of the roadbed
In the overall road construction safety system, the compaction strength of the road is very important. If the roadbed construction of a road does not meet the design requirements, then the road has certain safety problems. High-rise buildings rise from the ground. Only when the foundation is well laid can the superstructure be stable and safe. The decisive role in the compaction strength is the density of the roadbed. Therefore, the compaction operation is continuous throughout the entire construction process. From the filling of the embankment to the end of the final foundation, it must be compacted in accordance with the standards. The weak layer should be filled with sand and gravel to increase its density and compactness, improve its supporting force, and ensure the safe and smooth progress of the later compaction operation. The following table shows the results of the analysis of different subgrade compaction degrees.

| Table 1. Different degree of subgrade compaction |
|-----------------------------------------------|
| Types of section          | Depth below the top surface of the roadbed (m) | Compactness (%) |
|                            | Branch road | Secondary road | Main road | Freeway |
| Fill roadbed               | 0.4 ~ 0.7   | 91            | 93        | 94      |
| Fill roadbed               | 0.7 ~ 1.4   | 90            | 91        | 92      | 93      |
| Fill roadbed               | > 1.4       | 89            | 90        | 92      | 92      |
| Zero fill and excavation subgrade | 0 ~ 0.7     | 91            | 92        | 93      |
| Zero fill and excavation subgrade | 0 ~ 0.4     | —             | —         | 92      | 93      |

(C). Choose the right compaction tool

Compaction of the roadbed is the most critical step in the entire highway construction process. The quality of compaction will have a huge impact on the overall quality of the road. Therefore, in order to ensure the quality of the project, the work of roadbed compaction must be done well. There are two most critical factors affecting the compaction effect. The first is the tools used in the compaction process. In the process of compaction operations, the appropriate tools can achieve a multiplier effect with less effort. The depth and depth of the subgrade with the same tool The actual effect is not the same, and the compaction operation needs to be adaptively adjusted according to the actual situation of the construction site to meet the corresponding construction requirements. Another factor that has an impact on the compaction effect is the soil condition at the construction site. In the actual construction process, the compaction tool should be operated according to the actual soil conditions to protect the soil from damage while ensuring the construction quality. Roller-type rolling is generally used more widely, and the situational rolling is restricted by its own rolling times, and it is used less and less. The roadbed rolling process is a very critical step in the entire construction. The high-rise building is raised on the ground. Appropriate tools and operation methods must be selected to ensure the quality of construction.

5. Establish a sound construction supervision system

Before the start of the overall construction, the construction unit must carry out detailed and comprehensive preparations and inform the relevant units of all relevant conditions, especially in some relatively hidden projects and some projects that have a certain impact on driving safety. During the operation, All operating techniques and technical measures must strictly abide by the corresponding standards, not only to ensure the quality of the construction, but also to ensure the safety of the construction. After the project is completed as a whole, it must be confirmed with relevant departments to meet relevant standards before it can be opened to traffic.

The construction unit should report the overall construction plan to the equipment management unit in advance. The incident should be at least 72 hours in advance. The plan includes the overall
construction plan, construction location and the impact caused by it. The equipment management unit should send corresponding staff on the construction site. Conduct comprehensive supervision.

It is necessary to carry out scientific and modern construction, increase the proportion of large-scale modern machinery used on the business line, increase investment, and improve the overall modernization level of construction operations. This will not only save a certain amount of labor costs, but also improve the safety of construction.

Regular joint inspections must be conducted, led by the highway construction and construction project management unit, and multi-departmental and multi-unit joint inspections, including equipment management, design, driving organization, supervision, construction and other units.

6. Conclusion
To sum up, in order to achieve the purpose of extending the use time of the highway, it is necessary to do a good job of compaction of the highway subgrade during the actual road construction. Careful analysis of all factors that can affect the quality of the highway, and formulate relevant preventive measures and corresponding solutions after problems occur, to ensure that highway safety is not affected and the overall construction quality. Highways are the lifeblood of national economic development. Safety issues should not be ignored. We must pay attention to the overall quality training of construction personnel and safety publicity work. Project quality and construction safety must be grasped with both hands to continuously improve the overall construction level of domestic highway projects. The fast lane for the national economy to take off.

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