

# Quality Problems and Preventive Measures for Municipal Road and Bridge Construction

Yanlong Chen

Puyang Tongda Road and Bridge Engineering Supervision Co., Ltd., Puyang, 457000, China

**Abstract:** In the process of construction of municipal roads and bridges, it is especially important for the construction of waterproof roadbed. If the leakage of waterproof foundation surface will inevitably lead to the impact of the quality of roads and bridges, not only the economic and social benefits of the enterprise be lost but also threaten the safety of pedestrians' lives and property. Therefore, this paper analyzes the influencing factors in the waterproof roadbed surface of municipal road bridge construction, and proposes corresponding solutions.

**Keywords:** *municipal road and bridge construction; waterproof roadbed; construction technology*

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**Corresponding Author:** Yanlong Chen, yhm18105440621@sina.com

## 1 Introduction

The advancement of the urbanization process has accelerated the flow of urban population, and the improvement of people's living standards has led to an increase in the number of cars. These conditions have

increased the requirements for urban infrastructure construction, and the construction of roads and bridges has increased. Although the construction of roads and bridges provides some convenience for people's travel, at the same time, if the quality is not good during the construction process, it will lead to safety risks for pedestrians and trains. In particular, the construction of waterproof roadbeds in the construction of roads and bridges, if improper operation occurs during the construction process, resulting in poor construction results, will cause damage to the road surface, affect the quality of road bridges, shorten the service life, poses a serious safety hazard for the pedestrians and the passing vehicles.

## 2 Construction quality problems of waterproof roadbed in municipal road and bridge construction

Through the investigation of the waterproof road surface construction of the municipal roads and bridges, it can be seen that there are many reasons for the construction problems, among which the main ones are waterproof roadbed is designed unreasonably, the material selection is unscientific and the road surface is damaged (Table 1).

**Table 1. Analysis of the causes of construction problems of waterproof roadbed surface of municipal roads and bridges (N=100)**

	Unreasonable design	Material is not scientific	Damaged road surface	Other
Quantity	35	26	20	19
Percentage	35%	26%	20%	19%

### 2.1 The design of the waterproof road surface is unreasonable

During the construction of municipal roads and bridges, there are often cases where the construction plan is not suitable for the environment, and the reason for

this phenomenon is mainly because there is no on-site investigation and environmental analysis before construction. The result is too blind in the construction design, and the later construction cannot be carried out effectively. The construction design is inconsistent

with the actual construction, which will lead to safety hazards in the construction of the waterproof structure. Especially in the northern cities, the temperature difference between winter and summer is relatively large, which easily leads to cracking of the road surface, causing water infiltration on the surface of the road, causing corrosion of the road surface and affecting the quality of road bridges<sup>[1]</sup>.

## **2.2 The material selection of the waterproof road surface is not scientific**

During the construction of municipal roads and bridges, the most costly is the procurement of construction materials. However, some construction units will reduce construction costs in order to increase economic returns, and the reduction of construction materials costs has become the main goal. The cost reduction will inevitably have a serious impact on the quality of the materials, which will cause serious safety hazards in the application of materials, and cannot meet the design and construction requirements and standards<sup>[2]</sup>. At the same time, the application of unqualified materials during the construction process will increase the risk of roadbed construction and affect the quality of roads and bridges. For example, in the waterproof design process of roads and bridges, the materials needed are mainly anti-penetration materials, but some enterprises in the process of waterproof design, the selection of anti-seepage materials is unreasonable, many materials have not been qualified, resulting in waterproof design. The waterproof effect cannot be effectively exerted, which is inconsistent with the actual waterproofing requirements, and it is impossible to achieve the waterproof and anti-seepage effect on the road surface. If the material quality problem is large, the entire road surface will be seriously damaged, and the protection of the road bridge cannot be achieved.

## **2.3 Damage to the waterproof base surface**

During the construction of municipal roads and bridges, due to the influence of various factors, in order to improve economic efficiency, enterprises will select some construction units with low construction costs and insufficient construction experience. The construction personnel of these construction units are not high in quality, and the construction technology level cannot be effectively guaranteed, which makes the construction quality and progress difficult to guarantee, and has certain restrictions on the construction quality design of the road surface<sup>[3]</sup>. Especially under the

influence of force majeure, the road surface will be more easily damaged. In the construction process of roads and bridges, an uneven road surface can be easily caused due to poor management or low construction technology, which does not meet the requirements of waterproof layer design, and the road surface is not strong enough. In addition, during the construction process, the structural pulling is not carried out in accordance with the corresponding regulations and standards, which has a serious impact on the waterproof structure of the subgrade.

## **3 The preventive measures for the construction quality problems of waterproof roadbed in municipal road and bridge construction**

### **3.1 Guarantee the scientific design of the waterproof roadbed construction design**

During the construction of municipal roads and bridges, reasonable construction techniques and design schemes are the key to ensure the quality of municipal road and bridge construction.

Waterproof pavement construction technology directly affects the effect and quality of waterproofing. This also requires designers to scientifically and rationally design the construction of municipal roads and bridges, so that the quality of roads and bridges can be effectively guaranteed, making the road more smooth<sup>[4]</sup>. During the construction of municipal roads and bridges, the early design has an important impact on the service life of the road, and it is the guidance for the construction of municipal roads and bridges and the basis for the completion and acceptance of the roads. Therefore, in the engineering construction design, the scientific nature of the scheme must be ensured. In order to ensure the scientific and rationality of the construction design scheme, a comprehensive investigation of the construction link must be carried out before the construction, and experts are invited to conduct on-site inspections. Combining experts, the opinions and actual engineering requirements are reasonably formulated for the construction plan<sup>[5]</sup>. At the same time, in the design of the scheme, it is also necessary to consider all the influencing factors in the construction, combined with the drainage requirements and setting conditions, and focus not only on the construction quality, but also select the most economical construction cost control method to reduce the unnecessary losses in the construction. Strengthening the cost management of enterprises, improves the engineering quality of road

and bridge construction, and meet the construction requirements of road and bridge waterproof roadbed.

### **3.2 Reasonable selection of waterproof roadbed materials**

The quality of construction materials directly affects the quality of the project. The materials in the waterproof construction of municipal roads and bridges are also very important. Only when the quality of the selected materials is up to standard can the waterproof effect be improved and the waterproof performance of the road surface is improved<sup>[6]</sup>. In the purchase of waterproof materials, first of all, choose a seamless waterproof material as much as possible to prevent water leakage due to quality problems in the splicing. Secondly, select some waterproof materials with strong tensile strength for construction, so that the material can still return to its original state after being subjected to high-intensity pressure. Prevent the damage of materials during long-term use, and effectively prevent the problem of roadbed cracking. Again, select some waterproof materials with higher strength and adhesion, so that these materials can be better adhered to the roadbed, and they can be firmly adsorbed to prevent falling off. Finally, in the process of selecting and purchasing construction materials, construction materials must be reasonably selected according to the actual requirements of the construction and controlled within the budgetary funds.

Material selection is strictly carried out according to the requirements of construction materials standards, and the purchase process of materials is regulated to highlight the waterproof properties of the materials. In addition, in the selection of materials, it is necessary to strictly control the quality, and after the materials are qualified, they can be purchased and applied to the project. In order to ensure the quality of the materials, the test can be carried out before the construction, the test confirms that the requirements are met before the construction, and the waterproofing ability of the road and bridge pavement is improved by strict control of the materials<sup>[7]</sup>.

### **3.3 Strengthening the specification of the construction of waterproof roadbed surface of roads and bridges**

The construction of the waterproof roadbed of municipal roads and bridges needs to be strictly carried out according to the specific construction standards, and the relevant contents and requirements of the

regulations shall be implemented to improve the construction quality of municipal roads and bridges. First of all, do a good job in the initial structure of the concrete, and stabilize the structure of the waterproof roadbed. If necessary, manual or small-scale mechanical auxiliary construction can be carried out. After the completion of the construction, it is necessary to remove the floating slurry on the concrete surface to make the concrete surface rougher and improve the adhesion of the concrete<sup>[8]</sup>. In this process, it is necessary to select suitable construction personnel and construction materials according to the actual construction requirements to ensure that the roughness of the concrete meets the requirements. At the same time, in the actual construction process, if the surface structure of the concrete is not roughed, transport vehicles are not allowed to pass, and it is necessary to improve the construction technology of the waterproof roadbed surface based on the guarantee of the construction quality of the municipal road bridge, and do a good job of quality and safety protection measures to prevent the danger of the vehicle being forcibly opened during the period of not being pulled.

In the construction of the project, it is necessary to strengthen the emphasis on the construction of the waterproof layer, and strictly implement the requirements and regulations of the construction, and conduct a comprehensive and meticulous inspection of the construction site before the construction to ensure the smoothness of the construction pavement. Cold wow phenomenon is that if you find that there is a problem, you must solve it in the first time and do a good job of cleaning the road. During the spraying process of the first layer of the waterproof coating, it is necessary to add some active substances, and after the coating is completely dried, the second spraying is carried out, and after the thorough drying, the third and fourth spraying is performed. After the waterproof layer is sprayed, the asphalt is laid again to achieve effective protection of the concrete layer<sup>[9]</sup>. At this stage, it is strictly forbidden to leave a mark on the road or make a sharp turn on the road. In the use of the water repellent, after cleaning the multi-modified asphalt, if there is still a watermark on the road surface, it is necessary to carry out the construction after the road surface is completely dried. In the process of construction, three-layer spraying can be used, and linear blasting is adopted along the lane direction, and then retrograde spraying is performed. In order to ensure that the water

repellent meets the operational requirements, it is generally sprayed at intervals of 5 hours. However, if the construction environment temperature is relatively high, the solidification time can be shortened.

### 3.4 Pay attention to the improvement and innovation of construction technology

Municipal road and bridge construction personnel are important factors to ensure the quality of municipal road and bridge construction. At the same time, the professional ability of construction workers and comprehensive quality are directly related to construction quality. In order to improve the construction quality of road surface waterproofing roadbed, it is necessary to strengthen the training of construction personnel's professional ethics and professional skills, and promote the continuous improvement of construction technology. Therefore, construction enterprises must do a good job in training technicians, improve the quality and safety awareness and construction level of construction workers, and promote communication and learning among construction personnel<sup>[10]</sup>. At the same time, through network information technology to strengthen the analysis and understanding of the industry's prospects, clarify the current construction

management philosophy, summarize the experience and lessons in the construction, improve the overall level of the construction team, through the practical guidance to focus on the innovation of the road surface waterproofing process. Concurrently, through the improvement of the existing technology, the construction quality of the roadbed of roads and bridges is improved.

## 4 Construction technology of waterproof roadbed surface for municipal road and bridge construction

### 4.1 Shot blasting technology

This technology mainly grinds the surface of the work piece to improve the aesthetics of the work piece. The work piece is ground and struck by the centrifugal force generated by the high-speed rotation of the impeller of the shot blasting machine. The shot blasting treatment of different hardness materials is different (Figure 1). In the construction of the waterproof roadbed surface, in order to ensure the effect of the construction and meet the waterproof requirements of the road surface, some equipment is needed to improve the tightness and strength of the roadbed surface and improve the waterproof effect.

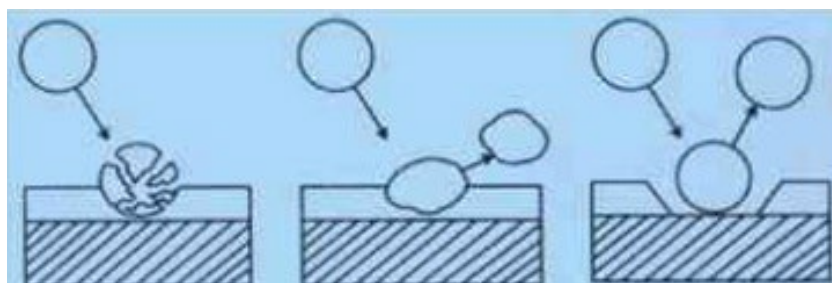


Figure 1. Shot blasting treatment of different hardness

### 4.2 The grinding process technology

In order to make the roughness of the subgrade surface meet the requirements, it is necessary to polish the road surface, which not only can remove the garbage and dust on the road surface, but also ensure the roughness of the road surface. The current waterproof road surface grinding technology is mainly processed by wire brushes and grinding machines. Among them, the grinding machine can be divided into two types according to different blades, namely a diamond cutter head and a wire brush cutter. This technology has a

better dustproof effect and can accurately grasp the construction process.

### 4.3 The foundation of soft soil foundation treatment

The treatment of soft soil foundation also plays an important role in the construction of waterproof roadbed. In the treatment of soft soil foundation, the method of replacing the cushion layer can be used to replace and excavate the soft soil layer with strong soil. Use Soil layer reinforcement or the Geocell reinforced gravel cushion method (Figure 2) to compact the soft soil foundation.

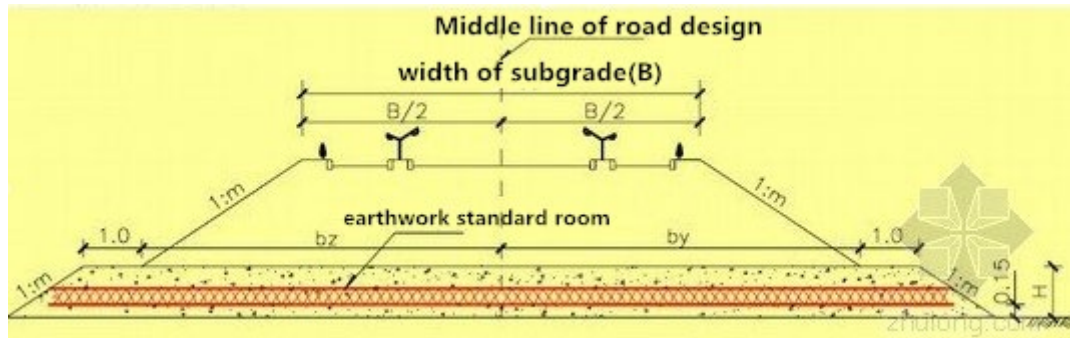


Figure 2. Geocell reinforced gravel cushion method

## 5 Conclusion

In summary, the construction of waterproof roadbed surface in municipal road and bridge construction has a direct impact on the quality of road and bridge. Therefore, it is necessary to strengthen the emphasis on the construction of waterproof roadbed surface of municipal road and bridge construction, and analyze the factors affecting construction quality and take appropriate solutions.

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