

# Analysis and Research on Construction Technology of Road Cement Stabilized Macadam

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**Abstract.** In recent years, with the development of road construction, people pay more and more attention to the quality and performance of roads. As an important part of road construction, cement stabilized macadam not only guarantees the bearing capacity and integrity of the basic road, but also meets some important requirements in the course of road construction to a certain extent. Through summing up the previous research experience, this paper analyzes and studies the construction technology of road cement stabilized macadam.

## Introduction

Under the influence of the rapid development of our country economy, the urban construction of our country has also been developed on a large scale, and the traffic industry is an important part of the urban construction. With the continuous development of science and technology, the requirements of people for all aspects are also gradually raised, in the transport industry concentrated on the quality, performance and durability of the road, and so on. The road construction techniques and materials used for many years have been unable to meet the conditions of road construction at the present stage. It is urgent to develop new construction techniques and find new materials. A reasonable and scientific way of construction is the most important part of this work. In the course of road construction, in order to guarantee the effect and quality of construction and ensure the performance and durability of the road, we must attach great importance to the quality control of the whole project. Cement stabilized macadam is an important basic material in road construction. When it is used, it must be operated strictly in accordance with the relevant requirements, and should be harmoniously unified with the actual situation, thus optimizing the construction method to a certain extent. As a kind of cement stabilized macadam with strong stability, it also has better bearing capacity and durability compared with other kinds of materials, thus laying a solid foundation for the road. In addition, cement stabilized macadam also has stronger impermeability and freezing resistance than other similar materials, which can better stabilize the roadbed and integrate the road surface with the roadbed more completely, thus greatly reducing the construction time and reducing the difficulty of construction.

## Composition of Cement Stabilized Macadam

The main composition of cement stabilized macadam is granular material and mortar volume. Granular material is a graded crushed stone, mortar volume is composed of water and cementitious material, and cementitious material is composed of cement and other mixed materials.

## Application Principle of Cement Stabilized Macadam

Fill the gap between aggregates and press them evenly using the principle. This work requires that the compaction degree and density be almost equal, and the strength depends on the interbedded and locked crushed stones, and that the cracks in the aggregate should be filled with the quantitative mortar volume. The strength of cement stabilized macadam is high from the beginning, at the same time, it has good impermeability and frost resistance. Its use on cement is generally 3-7% of the total mixture, and the surrounding compressive resistance can generally reach 1.5-4.0% MPA, generally higher than other types of materials [1].

## **Application of Cement Stabilized Macadam Construction Technology in Road Engineering**

In the current society, in the course of road construction, the quality of all roads depends on the road subgrade construction. Because of the stability of cement stabilized gravel and the good performance of anti-Japanese war, this kind of material can satisfy the requirement of material thickness of roadbed construction to a great extent. Therefore, in the course of roadbed design, the use of cement stabilized crushed stone must conform to the requirements and principles of national policy, at the same time, in the construction process, it should be strictly in accordance with the relevant provisions. In addition, the staff involved in the construction must understand the construction site in detail, so as to ensure the smooth development of the construction work, at the same time, strict requirements of construction technology to ensure the cement stabilized gravel construction technology in road engineering application.

### **Characteristics of Cement Stabilized Macadam**

**Composition of materials.** Road engineering mainly includes three kinds of raw materials, such as cement, fine aggregate and water. In general, the selection of cement must select such common materials as Portland cement; The aggregate can select artificial gravel and stone debris, cement stabilized crushed stone is relatively simple in material use, no special materials need to be used, so it shows obvious universality and simplicity [2].

**Construction Technology.** Cement stabilized macadam usually adopts two kinds of processes, one is concentrated mixing and the other is mechanical spreading. The reason for using these two processes is that they have relatively simple characteristics, strong productivity and mechanization level at the same time. Therefore, there is a complete system of norms. In addition, it has the characteristics of high efficiency, short working time and high stability.

**Material Properties.** The integrity of cement stabilized macadam leads to its semi-rigid structure and relatively obvious plate effect and better resistance. In addition, combined with its high strength, strong impermeability and cold resistance, it is widely used in road construction.

### **Construction Analysis of Cement Stabilized Macadam**

Before developing the construction work of cement stabilized crushed stone, we should prepare the relevant measurement work in advance, at the same time, we should make the design and distribution proportion of compressive capacity scientific, strictly standardize the mixing process of materials, and control the construction quality. At the same time, it is necessary to do a good job related to the basic maintenance work. In the early construction of foundation, the staff should carry out survey and lofting work in advance, and at the same time, to a certain extent should increase the correctness of the measurement of sheep, so as to better ensure the later work of the development. In the process of measurement, it is necessary to distribute the measurement work scientifically, so as to make every team have relevant professional surveyors, and further make the measurement work to be carried out better. In the concrete implementation process of surveying work, the foundation center line should be restored in advance, and the fixed pile should be set according to the standard distance of 10 meters, but the spacing of the curve section should be guaranteed to be about 5 meters, at the same time, the marking should be done well and the horizontal surveying work should be ensured.

In controlling the proportion, we must consider the working requirements of the construction, to ensure that there is a certain standard of compressive capacity. When designing the matching proportion, the actual situation and the experiment process should be fully combined to adjust the proportion scientifically, and at the same time, through the combination of the proportion in the construction process, the regulation of the output should be more scientific. When mixing, the relevant crushed stones should be stored and classified according to certain standards in advance. Before the production of mixed materials, the machines and equipment that need to be used should be debugged in advance, and all the equipment in the debugging process should be fully controlled

to ensure the appropriate amount and accuracy of the material, water content and particle blending should be suitable for the corresponding standards [3].

Before spreading, the base should be wetted ahead of time and spread out by echelon, so as to ensure the smooth progress of the spreading. Before work, check the lower layer, deal with the obstacles in time, and check all kinds of materials that need to be used. At the same time in the discovery of unqualified materials, timely removal and replacement. Before the construction work is carried out, it is necessary to make effective arrangements according to the weather conditions of the working hours, to eliminate the possibility of construction on rainy days, and to ensure that there will not be stagnant water on the road surface. If it is not possible to avoid the construction in rainy days, it is necessary to make full use of floating reference beams for spreading, at the same time, to control all kinds of mixed materials reasonably and to eliminate the accumulation of materials. In addition, it is necessary to strictly control the height of the spreading construction process, reduce the number of joints, at the same time, reasonably use more advanced technology, so that the effect of paving can be effectively improved. When some pavement obstacles lead to uneven paving, the relevant staff should carry out manual repair, which can further improve the cleanliness and quality of the stalls.

In the process of rolling, the moisture content of the mixture must be strictly controlled according to the requirements, and the principles of from low to high, from outside to inside and from first to last should be followed. In addition, in order to ensure that the roller line and the central line of the road are parallel to each other in the process of rolling, the roller with only one steel wheel should be used in advance for preliminary compaction. In rolling to the curve section, we must adhere to the principle of internal to external continuous compaction, at the same time through the heavyweight vibratory roller further compaction to ensure that the overlap between the roller track should reach  $1/3$  wheel width. The rolling time should be strictly controlled to ensure that the rolling work is carried out in time and the compaction work is completed before the first solidification of the material. At the same time, it also puts forward some requirements to the relevant staff, such as strict supervision of the strength of rolling, so as to ensure the strength of the compaction, but also to clear the wheel track very well [4].

When the construction work of the base course is carried out, the quality after rolling and the strength of compaction accord with the standard of the construction process, the maintenance should be carried out in the first time, and the relevant staff shall be required to complete the maintenance work. As a common maintenance method, geotextile cover is mainly used to ensure that the wet degree of the foundation conforms to the corresponding specifications by sprinkling water to the foundation of the site early before the maintenance work is carried out, and then carries on the subsequent geotextile covering work. In the course of maintenance work, not only must there be more than 7 days of maintenance period, but also the phenomenon of vehicle running on the surface of roadbed during the maintenance period should be avoided. The staff should finish the sprinkling work regularly and quantitatively to ensure that the roadbed is always in the state of wetting in the process of maintenance, and to eliminate the possibility of dryness, so as to further improve the effect of the maintenance work.

### **How to Control the Construction Quality of Cement Stabilized Macadam**

The construction of cement stabilized macadam requires a certain amount of time to ensure the successful completion of the work within two hours. Therefore, the preparation of cement-stabilized gravel must be completed well before it can be carried out. At the same time, according to the actual situation, we should draw up a reasonable and scientific construction plan to ensure the sufficient and complete equipment needed by the relevant staff during the construction process, and then carry out the debugging work early, and do a good job of pavement maintenance before construction. In addition, it is necessary to strictly check the level of pavement bearing layer and road surface density and other relevant data, so that they meet the requirements of the construction code [5].

Scientific experiments are reasonably used to put forward a scientific and reasonable mix of water and mud composition of the allocation of materials, water and mud use of the ideal amount of

water and mud, the best effect of water content, the coefficient of loose paving, rolling should be applied, and so on, in order to ensure harmonious unity of mixing, transportation, spreading, rolling machinery in the construction process to further shorten the construction time.

In order to eliminate the inaccuracy of material and dosage of ingredients and the uneven mixing of materials, it is required that the mixing of cement mixture materials be concentrated in the mixing plant as far as possible. After the start of the construction, in addition to paying attention to the influence factors such as temperature, sunshine and other factors, we should also pay attention to the field distance between the construction site and the mixing plant. In order to ensure the quality of cement mixing materials to meet the requirements, the staff should observe the mixing materials in time, check the moisture content of the mixing material at any time, and make the corresponding adjustment according to the actual situation [6].

For the choice of transportation mode, the vehicle with automatic loading and unloading function is generally selected, which has good condition, sufficient quantity and can carry 15 tons or more of mixed materials. Prior to daily stirring, the staff should carefully check the condition of vehicles to remove any possible malfunctions. When a car is loaded with mixed materials, it must be constantly moved. When driving out of the mixing plant, the driver has to fill in the distribution sheet and make sure that during the transportation process there is only one driver to take the responsibility and deliver it himself. The reclaimer of the site shall strictly inspect the material to ensure that the supply time is adequate. We should pay attention to the weather condition and the distance of transportation, and decide whether to cover the material with geotextile according to the situation, so as to avoid the situation of water loss.

In order to ensure the uniformity of the spreading work and maximize the effect of the screw feeder, the large paver should be used to spread the mixed material. When the mixed materials arrive at the construction site, the workers shall, in accordance with the relevant work requirements, promptly spread the materials, carefully review the discharge sheet, and confirm the discharge time on the spot. Professionals are assigned to regularly or irregularly check whether the spread uniformity and voucher degree meet the requirements, once problems must be carried out before the rolling process [7].

In order to control the number of rolling, such as initial pressure, recompaction, final pressure and static pressure, we should use large rollers, such as vibratory, steel wheel or caster roller. Once you find that the compaction is not up to the requirement, immediately replenish the pressure until the compaction reaches the standard. In the process of rolling, the speed of rolling must be strictly in accordance with the rules, when the roller in the rapid start, emergency brake, change direction or pull over to stop, it is necessary to avoid the uncompacted section of the road. In order to ensure the quality of the roadbed, the mixture used must keep the surface moist, and ensure that the joint between the two segments of the stubble should show trapezoid shape, and the trapezoid must be 45 degrees transverse.

## **Conclusion**

To sum up, the application of cement stabilized gravel construction technology in the construction process can further improve the integrity, safety and comfort of the road surface, and play a very important role in the road construction process. In addition, the construction technology of cement stabilized crushed stone is helpful to improve the stability of roadbed and eliminate the possibility of quality problems related to materials, thus laying a solid foundation for road construction. Through analyzing the principle, application, characteristics and how to control the construction quality of cement stabilized crushed stone construction technology, this paper shows the important significance of this technology in the road construction nowadays. In the process of construction, the staff should pay more attention, manage materials and construction technology reasonably, so as to improve the scientific and careful degree of work, and lay the foundation for good road construction.

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