Analysis of highway engineering construction technology management and maintenance method

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Abstract: In recent years, with the rapid progress of the highway engineering construction process in China, the economic exchanges and communication between different provinces and regions have become more and more close. Highway engineering plays a great role in promoting the development of various economic undertakings in our society. However, due to the difficulty of highway engineering construction technology management, the long construction cycle, and the huge capital required, any construction link or management problems, will affect the quality of highway construction. However, after the delivery of highways, there are many and complex maintenance problems, which have brought a lot of impact on the normal use of highways, so the research on this aspect should be strengthened. This paper analyzes the construction technology management and maintenance methods of highway engineering, combines the different construction requirements, principles and maintenance needs, put forward some reasonable construction technology management and maintenance scheme, improve the construction technology management and maintenance quality.

1. Introduction

Since the reform and opening up, our country attaches great importance to the domestic highway construction. By speeding up the highway construction, we can improve the transportation efficiency, lay a solid foundation for our social and economic development, and provide more guarantees. At the same time, by speeding up the construction of highway projects, the traffic barrier between different provinces and regions can be opened up, and a complete road transport line can be built, so that the communication between different regions can become closer, and the common personnel and economy can be accelerated. In this way, we can better develop the economic development and improve the level of social and economic development of our country. To increase the research on the technical management and maintenance measures of highway engineering has dual significance, on the one hand, it is beneficial to improve the technical level of highway construction, and improve the quality of highway engineering construction; on the one hand, it is conducive to improve the level and efficiency of highway maintenance, solve the highway pavement diseases, and improve the technical repair ability of highway pavement cracks. This is a very worthwhile question to be discussed at present.

2. Key points of highway engineering construction technical management

2.1 Key points of subgrade construction technical management

Subgrade construction technology management has a great influence on the quality and level of highway construction. In the process of subgrade construction technology management management, there are many points involved in the construction process. Therefore, in the process of subgrade construction, the relevant technical personnel, only fully grasp the requirements of different technical points, then to complete the highway infrastructure construction work and tasks in quality and quantity, to meet the relevant highway construction technical standards and requirements. First of all, the technical and construction personnel before carrying out the work, need to carry out a detailed measurement of the road surface construction, and then, according to

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the construction requirements to carry out earthwork filling, the subgrade compaction[1].details are as follows.

First, in the process of early construction measurement, to the wire, middle line, level point, multiple measurements, especially in the measurement of the line, should reduce the measurement is not careful enough, and caused by the measurement process of measurement error. In this way, the accuracy of the longitudinal and cross-sectional positioning of the highway path can be guaranteed. At the same time, before the construction, the construction unit should advance the different underground pipelines, and then conduct careful investigation to understand the distribution and depth of the pipeline. Before the construction, the construction unit should communicate with the local gas, water, power and communication departments in advance to understand the distribution of gas pipelines and water pipes, especially the burial depth of different pipelines, so as to avoid the unintentional destruction of underground pipelines due to excavation operations during the construction of highway projects, resulting in huge economic losses and dangerous accidents.

Second, in the process of roadbed filling, the construction unit should always adhere to the layered filling, as the primary principle of construction, that is, after laying a layer of earthwork, after compaction and then laying the new earthwork. For the first filling section, the construction unit should strictly reserve 1:1 slope reserved steps[2]. If it is suitable for two different sections at the same time, it can be layered for filling, but it is worth noting that the length of the lap should not be less than 2m. The stable thickness of the subgrade base should be controlled at about 20cm~30cm, and the specific thickness should be determined according to the construction requirements or road conditions.

When rolling the subgrade surface, the construction unit and personnel should adhere to the principle of "first light and then fast, first slow and then slow". This is because, in the first round of rolling, the use of light pressure, can make the subgrade earthwork become tight, not loose. On the contrary, if in the first round of rolling, directly using the heavy pressure, then it will lead to the earthwork pressure is too large, and become loose, uneven thickness, but also easy to deformation. This will bring a lot of problems[3]. It is worth noting that before the rolling, the horizontal slope of 2%~4% from the middle line to the embankment. It is necessary to ensure that the front and back two rolling wheel tracks overlap between 12cm~20cm, and at the same time, to ensure that the rolling is uniform and tight, so as to prevent the roadbed accidents.

2.2 Pavement construction technology management

(1) Construction technology management of pavement cushion layer

The pavement cushion is between the interlayer between the subgrade and the base of the highway engineering. In the process of the cushion construction, the cushion construction technology[4] should be strictly controlled. In this way, the quality of highway construction can be improved.details are as follows.

First, the control of the quality of construction materials should be improved, and the ratio should be carried out in strict accordance with the sand proportion standard. At the same time, attention should be paid to the moisture content of sand and stone, and the ratio ratio should be controlled in accordance with the relevant design standards.

Second, the purity of the sand and gravel road should be monitored in an all-round way. In the construction of the garbage and debris on the surface, and do a good job of road leveling.

Third, in the paving construction, should be strictly in strict accordance with the requirements, laying, should be strictly controlled the thickness of the loose shop, such as: keep in 15cm~20cm, can take a layered way for operation. The number of rolling construction should be controlled at more than four times, and the wheel spacing lap distance should be controlled at about 50cm. For the mechanical rolling edges or corners that are difficult to use, the cushion can be compacted by manual compaction method of[5].

(2) Facial layer construction technical management

In the process of surface construction, the construction quality of the base should be carefully

checked, and all kinds of impurities or dust on the surface should be removed in time. Only in this way can the adhesion of the base and asphalt be improved, so that the two become more compact and firm. Tramount of water can be used to spray the base road surface, to ensure that the nozzle and related oil pipelines are kept unobstructed, so that all kinds of construction work can be carried out in an orderly way. Then, the roller and other equipment are used to consolidate the road surface. When rolling the road surface, about one-third of the wheel width should be used to overlap, so as to fully ensure that the compaction width and compaction degree meet the relevant standards.

(3) Key points of bridge construction technology

In the process of bridge construction, C50 commercial concrete should be used to pour the box girder. First, the bottom plate should be poured, and then the web pouring. When the steel bar binding is completed, the roof should be poured, and then the wing plate should be poured. In the fit of vibration, insert drill vibration and insert vibration must be used to improve the quality of bridge construction. At the same time, the density of vibration should be fully ensured. In the process of bridge prestressed construction, in order to prevent the winding of steel strand, the cold drawing process of steel bar can be adopted for construction, so as to effectively control the cold drawing rate. When the tension is completed, the grouting construction operation should be carried out in time. The site construction personnel should make sufficient construction preparations. For example, in the test tube, the grouting time should not be delayed due to the delay. When the transition construction of road surface and bridge, the slab can be laid on the bridge, or the backfill is used for construction. In order to prevent the situation of jumping, drainage consolidation can be adopted for construction, or the method of overload pre-loading for construction, so as to fully ensure the flatness of the road and bridge connection, so as to better prevent the occurrence of traffic accidents.

3. Maintenance status and measures of highway engineering

3.1 Highway pavement maintenance status quo

In recent years, with the continuous development of road maintenance technology in China, more and more road maintenance technology has been widely used, so as to improve the level of road maintenance technology in China. However, due to China's vast territory, the road surface complexity is relatively high. In addition, the construction technology quality is uneven, resulting in some roads after the delivery of use, due to the large number of traffic, resulting in road diseases emerge in endlessly, directly affecting the travel comfort and safety. In such cases, in addition to strengthening and standardizing the construction management work. At the same time, but also need to continue to strengthen the maintenance of the road surface work. The relevant construction units should strengthen the maintenance and management of the highway pavement in the control area, and should formulate different maintenance plans according to the geographical environment and pavement performance of the area, and then carry out construction operations according to the actual situation. In addition, with the rapid development of China's highway pavement maintenance technology work, China's highway maintenance technology has also made a great breakthrough. In recent years, many technical experts have innovated the maintenance technology to continuously improve the maintenance level of road surface. Because many advanced road pavement technology is widely used in the road pavement maintenance, the quality of road pavement maintenance has been significantly improved. However, in general, China's road surface maintenance process is later than the developed countries. Therefore, compared with the developed countries of China's highway pavement technology, it is still a little backward, has not met the relevant technical requirements.

3.2 Highway engineering maintenance measures

(1) Pavement crack maintenance measures

In the process of highway construction and use, the highway pavement is very easy to produce cracks. If there is no timely maintenance of the suitable, then it will lead to the continuous expansion of the cracks, resulting in the whole road becomes difficult in the normal use. Therefore, if there are suitable for cracks on the road surface, the relevant technical units and personnel should

combine the degree of highway pavement cracks and the type of pavement cracks, to choose different maintenance technology[6]. Then, the road surface repair method is adopted to narrow the road surface cracks, and eliminate the cracks. Only in this way can the normal use of the highway be ensured. If the road crack is still relatively small, and the type of crack is not the working crack, then the filling method can be used to repair the[7]. It is worth mentioning that the sealant has strong adhesion and high durability, which can be filled with road cracks, which can effectively eliminate road diseases and improve the effect and quality of road maintenance.

At present, the more common pavement repair filling materials mainly include rubber, asphalt, resin materials, these different materials have their own different advantages and disadvantages, the scope of application is relatively wide, work technical personnel can combine different actual conditions, flexible to apply. Among them, compared with other technologies, the irrigation joint maintenance technology is more suitable for application to the road surface with relatively large cracks. For example: the width and diameter of the pavement is relatively large, and has seriously affected the normal use of the highway, so the technical maintenance personnel can use the filling joint technology method to maintain and treat the highway pavement. In the process of highway maintenance, the construction personnel can use the grooving machine for pavement grooving according to the direction and situation of the highway crack. Then, according to industry technical standards, the sealant is heated, and then the sealant is poured into the groove that has been dug, and then laid by workers to make it seamlessly connected with the original road surface.

Compared with other maintenance technologies, it is not difficult to see that the repair efficiency of this maintenance technology is relatively high, and the maintenance cost is relatively low, which is worthy of wide promotion and application. Sealant has a very good sealing effect, after the maintenance of the road in a long time will not appear new cracks, the use of durability is high. There is another method available for road cracks. During the inspection, if the crack width is <4mm, if the pavement crack is> 4mm, it is not suitable for differential seam filling. At this time, the combination of stitching and filling seam can be used to repair the cracks to further improve the road maintenance effect. In the use of seam technology to fill the seam, technicians should timely clean up the road, to ensure that there is no any dust or debris in the construction area, and then, according to the length or width of the crack to clip the seam belt, in accordance with the relevant technical standards to seam[8].

In the process of construction, attention should be paid to the crack to be completely covered, and pay attention to the crack to be in the middle of the crack zone. In many cases, the shape of cracks is strange, according to different shapes of cracks to take different repair methods. If you need to turn, you can cut the slit band.

(2) Road surface deformation and maintenance technology

Pavement deformation is one of the most common types of highway diseases. From the present point of view, the most direct cause of the highway pavement deformation is that in the process of highway construction, the foundation treatment is not in place, or because the pavement technical treatment is not up to the standard. Therefore, for the road surface deformation of this problem, the relevant technical management units should cause enough attention. In the process of daily inspection, if found the road deformation, so timely to find the specific cause of the road deformation, and understand the road deformation process, etc., then, combined with the specific situation, to formulate different measures, formulate different maintenance countermeasures, so as to constantly improve the road driving comfort and safety.

4. Conclusion

In reality, different construction technology management and highway maintenance management will be encountered in the construction and maintenance technical problems. First of all, in the process of construction technology management, the construction construction unit should be combined with different conditions and characteristics, requirements, to develop different construction technology management scheme, strengthen the construction technical control, to the construction of each different link, and follow the principle of construction technology, in

accordance with the basic requirements for construction, improve the level of construction control and quality, improve the level of highway construction, quality. Secondly, in the process of road pavement maintenance, construction technicians should formulate different maintenance measures according to the type, size and shape of road surface diseases, and then choose different maintenance schemes. In this way, the road maintenance technology can be improved to ensure that the road becomes more flat and can be seamlessly connected with the original road surface, making the traffic safer and more comfortable. To sum up, at present, the engineering construction and maintenance management development is rapid, however, there are still a certain construction quality problems, affect the use of the subsequent highway, in view of this, should strengthen the pavement construction technology management and maintenance technology research, improve the quality of highway construction engineering management and maintenance management level, provide more technical support for highway engineering quality.

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