

## Discussion and Attempt on Construction Technology of Asphalt Road Pavement in Expressway

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**Abstract.** With the development of socialist market economy in our country, our country has made great progress in highway traffic, so the requirement of highway pavement structure in our country should be raised. The asphalt pavement is the main component of the highway pavement of our country, the service performance of such roads and the quality of the asphalt pavement are inseparable, so that the quality of the asphalt pavement is very important in the course of the asphalt pavement operation, and the quality of the construction is ensured by the skillful use of the key points of the construction technology. At the same time, the asphalt pavement operation of the expressway is not only an engineering which needs the system model and technical skill, but also an important factor to determine the level of the construction enterprise. On the premise of not violating the principle of highway quality, it is necessary to discuss and explore the key points of asphalt pavement construction technology.

### Common Problems of Asphalt Pavement of Expressway in China

**Common Problems of Asphalt Pavement.** Whether cracking, rutting, or oil, oil bundles, pushing and so on, are all common problems of asphalt pavement. No matter how high the flexibility of the newly built asphalt pavement roadbed is, to a certain extent, the initial problems will occur, and the causes of these problems are often caused by the asphalt pavement cracks. There are many factors that cause cracks in asphalt pavement, such as the quality of asphalt used, the settlement and load of asphalt, etc., especially when it rains, the cracks will increase because of the increase in moisture content of asphalt pavement. Because of this road asphalt pavement performance has been damaged.

**Damage to Asphalt Pavement.** The phenomenon of water damage will also occur on asphalt pavement. Water damage is caused by a large area of rain and a large amount of stagnant water, combined with the effect of temperature and load on the asphalt pavement. The phenomenon that the stagnant water on the pavement penetrates to the aggregate and interface of the asphalt will produce a huge permeation pressure in this case, which will make the surface of the asphalt highway appear the condition of peeling off, and directly lose and destroy the adhesion force between the aggregates. The problem of water damage of asphalt pavement is a global problem. Only through the effective control of the important construction link of asphalt pavement, can we improve the construction quality of highway asphalt pavement in essence, make the service life of highway long and try to avoid road asphalt pavement damage phenomenon [1].

### Important Points of Highway Asphalt Pavement Construction Technology

**Selection of Construction Materials for Highway Asphalt Pavement.** The mixture of asphalt concrete used in the construction of highway asphalt pavement includes modified asphalt, liquid petroleum asphalt and coal asphalt. However, it is necessary to combine it with the concrete conditions of highway pavement during the construction process, and at the same time, consider the road grade, technology, conditions and pavement structure of its construction to select the appropriate asphalt concrete and asphalt label. It is important to pay attention to the fact that coal asphalt is not used as the material of highway surface because of its special properties, but is used in the permeable layer of highway. Emulsified asphalt is composed of cationic emulsified asphalt and anionic emulsified asphalt [2]. In the course of pavement construction, it is necessary to decide

which emulsified asphalt to use according to the acid-base degree of stone.

**Mixing of Highway Asphalt Concrete.** If according to the construction of each kilometer of asphalt pavement, it is necessary to mix the asphalt mixture in the mixing plant. When mixing, most of the mixing is done with intermittent mixing machines and so on. It is necessary to mix in a certain order so that the amount of asphalt is not only guaranteed the mixing time and heating temperature and factory temperature will be more consistent with the required standards to greatly improve the quality of asphalt mixture. In our country, after mixing asphalt mixture, it is required to be uniform with the mixture, and the situation of separation and agglomeration of coarse and fine materials is not allowed. There will also be a sampling of bituminous aggregate and aggregate gradation for those bituminous mixtures that meet the requirements and, if they do not meet the requirements, adjust and improve until the requirements are met.

**Paving of Asphalt Mixture in Highway.** As a first step, we should clean up the debris at the base of the highway. The second step is to prepare the pavement surface of the highway asphalt pavement and inspect the base course of the highway in a timely manner to ensure that its thickness and density meet the requirements. If there is a pit or loose in the base of the road surface, it is necessary to repair it in the first time. In the third step, the sprayed layer asphalt on the base layer surface of the highway pavement granular material needs to be kept at about 1.2kg/m in the period of 4-8 hours before the road surface layer is paved, as that can make the road surface layer and the base layer adhere more well[3]. When the pavement of the road surface course is to be started, a layer of sticky layer asphalt is first sprayed to the surface of the old asphalt pavement, compared with those of the base layer for the old asphalt pavement. In the fourth step, when paving the asphalt mixture, the steps are as follows:

First, the paver dump the vehicle automatically and unload the asphalt mixture; Second, the conveyer unloaded the material to the spreading hopper; Third, paving hopper conveys asphalt mixture with chain conveyer to spiral paver; Fourth, the spiral paver will use its own driving to spread the mixture evenly; Sixth, the conveyer carries the evenly laid mixture to the vibrating plate; Seventh, after the pounding, ironing was made with an ironing plate. The control of pavement paving is sleigh laying thickness, because it can make the smoothness and slope closer to the prescribed requirements. In the process of multi-layer mixture laying, the seams of upper and lower layers should be separated, the distance of vertical joint should be maintained at about 15 cm, and the distance of transverse joint should be kept at about 1 meter.

## **Summary of Asphalt Pavement Construction Technology of Expressway**

**Microsurfacing Technology of Modified Emulsified Asphalt.** The technology of modified emulsified asphalt microsurfacing is to make the mixture of asphalt emulsion raw materials and corresponding aggregates, admixtures, water and so on into a paste flow mixture according to a certain proportion. Then these mixtures are evenly laid on the highway surface using the corresponding laying instruments. Because the performance of asphalt emulsion raw material is very special, it is very simple to form a strict asphalt concrete surface with different aggregates in highway. In the process of using the construction technology of modified emulsified asphalt microsurfacing, the accuracy of the corresponding asphalt emulsion raw material configuration and the selection of suitable proportion of the used raw materials are the most important parts of the application of the modified emulsified asphalt microsurfacing construction technology, which is also the key research part of the modified emulsified asphalt microsurfacing technology [4].

**The Characteristics of Microsurfacing Technology of Modified Emulsified Asphalt.** First of all, the mixture on the surface of the highway surface take place chemical reaction, in order to enhance the internal adhesion and force of asphalt concrete highway; Secondly, the laminated mixture at the micro-surface can form a strong bond adhesive, which can greatly enhance the stability of asphalt concrete surface; And then, by covering all the materials with the micro-surface sealing mixture, the effective bonding can effectively solve a series of major problems of highway pavement, but also can inhibit the main asphalt coagulation emulsion pavement wear problem. The dense composition of the sealing layer on the microsurface determines that it can use the

construction technology of modified emulsified asphalt microsurfacing to effectively play the role of waterproof, prevent the water from leaking to some important parts, at the same time, a high quantity of coarse aggregate exists in the sealing layer of micro-surface, which can not only solve the problem of asphalt concrete pavement smoothness, but also restrain the problem of peeling and mesh cracking.

**Construction Technology of Fog Sealing Layer.** For the paving of asphalt concrete pavement, the construction technology of fog sealing layer can be adopted, that is, the modified emulsified asphalt material in the upper section is mixed with the corresponding pavement construction material, and then the material is sprayed on the highway after mixing, which technology can effectively solve the highway construction work. Fog sealing layer technology can greatly reduce the cost of construction, but also to ensure that asphalt concrete road pavement such as potholes, mesh cracks and other problems to lay a solid foundation, and also prevents air and water from infiltrating into the asphalt concrete subgrade. In a word, fog sealing layer technology has greatly improved the use efficiency of asphalt concrete, prevented a series of problems in asphalt concrete highway, and laid a solid foundation for the practicability of highway, which can prevent the disease of asphalt concrete pavement, such as loose disease, pothole disease, open bone disease and so on [5].

**Characteristics of Construction Technology of Fog Sealing Layer.** The use of this technology can not only improve the performance of asphalt concrete pavement, but also ensure the robustness of asphalt concrete pavement. In fact, it is in the process of ensuring friction of asphalt concrete pavement, the technology of fog sealing is fully used to cover asphalt concrete pavement in order to keep a good friction coefficient of asphalt concrete pavement. The mixture of emulsified asphalt and corresponding pavement construction materials can penetrate into the subgrade of asphalt concrete highway and enhance the anti-seepage ability of expressway to ensure the construction effect of expressway pavement. In fact, in the process of use, the permeability coefficient of asphalt concrete pavement can be improved through the use of these materials that enhance the permeability coefficient. At the same time, it can prevent rain water and other substances from infiltrating into the foundation of asphalt concrete, which not only ensures that the disease of asphalt concrete pavement is not further affected, but also ensures the normal use of asphalt concrete pavement. The construction technology of fog sealing layer is mechanized processing method, because the speed of highway construction is on the high side. By using fog sealing layer technology, not only can the asphalt concrete highway wear problems that may occur to the owner of the house occur, but also can guarantee the construction effect of asphalt concrete highway to accelerate the construction efficiency of expressway.

At the same time, in the process of using the construction technology of fog sealing layer, in order to maximize the effect of the fog sealing technology, it is necessary to select the most suitable construction materials during the process of preparing the fog sealing layer. At the same time, we should plan the usage of different materials to ensure the performance of fog seal and the friction strength of asphalt concrete pavement. In practice, the following points need to be noted: First, spray a specific amount of fog sealing material onto the asphalt concrete pavement to be built, and then look at the phenomenon. If the phenomenon of fog sealing material infiltrating into the asphalt concrete pavement occurs, the amount of fog seal should be reasonably reduced and grasp it in the best proportion. Second, it is necessary to select the corresponding construction environment and control the construction quality. Generally, the construction should be carried out at about 20 degrees to avoid construction on rainy days as far as possible. And in the process of construction that must be as much as possible to remove the surface of asphalt concrete impurities, to do a good job in preparation, prepare the corresponding construction materials, and prepare the corresponding construction technology; After the construction of the fog sealing layer, the quality acceptance work should be carried out, and the corresponding maintenance treatment should be paid attention to after the completion of the construction [6].

## **Flattening of Highway Asphalt Mixture**

The initial roller compaction should be done immediately after the asphalt pavement is paved with asphalt concrete. We usually use a two-wheel roller to do the initial rolling at least twice and to keep the drive wheel of the roller facing the paver every day. The rolling line of the roller must be the same as the rolling direction because the asphalt mixture can be avoided. After the initial compaction work is finished, the constructors should check the pavement in time, and take timely action to repair the road arch which does not meet the requirements of the regulation. After that, the secondary recompaction should be carried out, the vibratory roller and the tire roller should be used successively to ensure that the compaction strength of the road surface meets the prescribed requirements, and the compaction times of both of them must not be less than 4 times. At the end of repressing, double cylinder roller should be used to carry out the final compaction to eliminate the unevenness left over in the surface of asphalt highway during the recompaction. In the construction of compacted asphalt pavement, the quality of construction should be checked in time, and the defects should be repaired in time.

## Conclusion

The key point of expressway construction lies in asphalt pavement, which is the most important part and is also the basis to guarantee the overall quality of expressway. Of course, only by strengthening the technical key points of expressway asphalt pavement construction control, to ensure the technical effectiveness and scientific, we can just better ensure the high quality of highway asphalt pavement construction. Therefore, we should strengthen the use of the technology from the two important links of asphalt mixture and construction. Only by better ensuring the quality of highway asphalt pavement construction, And in the course of construction, combining with the local environment and specific construction conditions, making adequate work preparation, selecting the most suitable construction plan, and strictly managing the construction site to ensure the quality of the construction, can we improve the quality of highway asphalt pavement and prolong the service life of expressway in China, and lay a solid and good foundation for highway construction in our country. In the future research work, we will further explore the types of highway pavement construction technology, and according to the actual needs, will study and formulate more targeted asphalt concrete highway pavement construction measures to more effectively solve the problem of highway pavement construction.

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