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(19) **United States**(12) **Patent Application Publication****Chen et al.**(10) **Pub. No.: US 2017/0067211 A1**(43) **Pub. Date: Mar. 9, 2017**(54) **LOW-NOISE ANTI-SKID ROAD SURFACE
PROCESSING METHOD****E01C 19/48** (2006.01)**E01C 19/17** (2006.01)(71) Applicant: **ShanDong Dashan Road&Bridge
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ABSTRACT(73) Assignee: **ShanDong Dashan Road&Bridge
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A low-noise anti-skid road surface processing method is provided, which takes a highway as a construction object and includes steps of: closing a construction section of the highway, and then disease-treating and cleaning a road surface of the construction section; through a construction vehicle, synchronously sprinkling an interlayer interface agent, modified emulsified asphalt, an anti-skid noise-reducing material, modified emulsified asphalt and a surface protection agent which are successively distributed in a multi-layer manner to the road surface, and forming an ultra-thin overlay structural layer with a thickness of 2-9 mm on the road surface. The present invention is able to prevent the flying stones easily occurred in the gravel seal from affecting driving safety, and overcome the flaking off easily occurred in the prior art, so that it is a ultra-thin surface processing technology with fast construction and effectively cost.

LOW-NOISE ANTI-SKID ROAD SURFACE PROCESSING METHOD

CROSS REFERENCE OF RELATED APPLICATION

[0001] The present invention claims priority under 35 U.S.C. 119(a-d) to CN201610535117.9, filed Jul. 8, 2016.

BACKGROUND OF THE PRESENT INVENTION

[0002] Field of Invention

[0003] The present invention relates to a technical field of thin overlay in pavement maintenance, and more particularly to a low-noise anti-skid road surface processing method.

[0004] Description of Related Arts

[0005] Technical requirements for ultra-thin surfaces of the pavement are as follows. Currently, new construction projects in domestic road are slowed down, most of the roads go into the conservation stage, and the cement pavement needs to be changed from white to black.

[0006] Currently, the commonly used ultra-thin surface processing technology includes fog seal with sand, slurry seal, micro-surface processing, gravel seal, Novachip ultra-thin wearing course, and epoxy coating. In spite that these technologies are able to meet basic functional requirements, there are varying degrees of defects. The fog seal with sand is poor in functionality, and only has functions of water sealing and landscaping. The slurry seal and the micro-surface processing are big in noise, so that the flaking off easily appears. The gravel seal is big in noise, so that it is easy to produce flying stones, thereby affecting traffic safety. The Novachip ultra-thin wearing course and the epoxy coating are high in cost and long in closed construction time, thereby affecting traffic.

[0007] Therefore, the development of a new ultra-thin surface processing technology has a wide range of market demand.

SUMMARY OF THE PRESENT INVENTION

[0008] In order to make up the shortcomings of the prior art, the present invention provides a low-noise anti-skid road surface processing method with fast construction and effectively cost.

[0009] The present invention is achieved by technical solutions as follows.

[0010] A low-noise anti-skid road surface processing method which takes a highway as a construction object and comprises steps of:

[0011] (1) closing a construction section of the highway, and then disease-treating and cleaning a road surface of the construction section;

[0012] (2) through a construction vehicle, synchronously sprinkling an interlayer interface agent, modified emulsified asphalt, an anti-skid noise-reducing material, modified emulsified asphalt and a surface protection agent which are successively distributed in a multi-layer manner to the road surface, and forming an ultra-thin overlay structural layer with a thickness of 2-9 mm on the road surface; and

[0013] (3) after drying the ultra-thin overlay structural layer, rolling the road surface for 1-4 times through a rubber tire roller, and then maintaining, and finally opening traffic.

[0014] A preferred technical solution of the present invention is as follows.

[0015] In the step (2), a weight ratio of the modified emulsified asphalt, the interlayer interface agent, the anti-skid noise-reducing material, and the surface protection agent is (6-20):(1-3):(20-50):(1-5); the modified emulsified asphalt is adopted as a bonding material and has an excellent road performance; through a special construction vehicle, various materials, which are successively distributed in the multi-layer manner, are synchronously constructed.

[0016] The modified emulsified asphalt is prepared by mixing and emulsifying an emulsifier, asphalt, a modifier and water with a weight ratio of (1-3):(50-60):(5-10):(30-40), performance indexes of evaporated residues of the modified emulsified asphalt provided by the present invention are better than those of conventional modified emulsified asphalts.

[0017] The interlayer interface agent is developed based on a principle of surface chemistry, contains an emulsifier, a polymer bonder and an asphalt regeneration agent/a cement reinforcing agent, is capable of enhancing the permeation of the emulsified asphalt to an original road surface, regenerating aging asphalt/reinforcing cement, improving interlayer bonding force, and avoiding flaking off. According to different materials, the interlayer interface agent is divided into two types, namely, an interlayer interface agent for asphalt concrete pavement and an interlayer interface agent for cement concrete pavement.

[0018] The anti-skid noise-reducing material is prepared by mixing basalt or a diabase stone material, with high elastic rubber particles and a hydraulic cementitious material, and is able to meet the anti-skid performance, ensure low driving noise, and improve driving safety and comfort.

[0019] The surface protection agent comprises special resin, polymer binder, anti-sticking agent, surface active agent, solvent and water, and has functions of consolidating surface stones, anti-sticking, wear and shear resistance and resistance to high and low temperature, thereby effectively preventing the anti-skid noise-reducing material from wearing off and avoiding the sticky wheel phenomenon.

[0020] The durability, water sealing property and skid resistance of the present invention are better than those of the fog seal with sand and the micro-surface processing, and the driving noise thereof is lower than that of the micro-surface processing and the gravel seal. The present invention is able to prevent the flying stones easily occurred in the gravel seal from affecting driving safety, and overcome the flaking off easily occurred in the prior art, so that it is a ultra-thin surface processing technology with fast construction and effectively cost.

[0021] These and other objectives, features, and advantages of the present invention will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Embodiment 1

[0022] Twenty-part modified emulsified asphalts are adopted as a bonding material, blended with 1-part interlayer interface agent, 50-part anti-slip noise-reducing materials and 1-part surface protection agent. A construction method comprises steps of:

[0023] (1) closing traffic, wherein: according to a determined traffic closure scheme, traffic control is carried out;
 [0024] (2) locally disease-treating an original road surface, such as crack pouring and pothole repairing;
 [0025] (3) cleaning the disease-treated road surface, wherein: road dust, clod and other sundries are cleaned;
 [0026] (4) low-noise anti-skid ultra-thin surface constructing, comprising: through a special construction vehicle, synchronously constructing wetting water, an interlayer interface agent, modified emulsified asphalt, an anti-skid noise-reducing material, modified emulsified asphalt and a surface protection agent which are successively distributed in a multi-layer manner to the road surface;
 [0027] (5) after drying the road surface, rolling the road surface for 1-4 times through a rubber tire roller; and
 [0028] (6) maintaining, and then opening traffic.

Embodiment 2

[0029] Six-part modified emulsified asphalts are adopted as a bonding material, blended with 3-part interlayer interface agents, 20-part anti-slip noise-reducing materials and 5-part surface protection agents. A construction method of the embodiment 2 is as same as that of the embodiment 1.

Embodiment 3

[0030] Twelve-part modified emulsified asphalts are adopted as a bonding material, blended with 2-part interlayer interface agents, 30-part anti-slip noise-reducing materials and 3-part surface protection agents. A construction method of the embodiment 3 is as same as that of the embodiment 1.

Embodiment 4

[0031] Fifteen-part modified emulsified asphalts are adopted as a bonding material, blended with 2-part interlayer interface agents, 40-part anti-slip noise-reducing materials and 2-part surface protection agents. A construction method of the embodiment 4 is as same as that of the embodiment 1.

[0032] One skilled in the art will understand that the embodiment of the present invention as shown in the drawings and described above is exemplary only and not intended to be limiting.

[0033] It will thus be seen that the objects of the present invention have been fully and effectively accomplished. Its embodiments have been shown and described for the purposes of illustrating the functional and structural principles

of the present invention and is subject to change without departure from such principles. Therefore, this invention includes all modifications encompassed within the spirit and scope of the following claims.

What is claimed is:

1. A low-noise anti-skid road surface processing method which takes a highway as a construction object and comprises steps of:

- (1) closing a construction section of the highway, and then disease-treating and cleaning a road surface of the construction section;
- (2) through a construction vehicle, synchronously sprinkling an interlayer interface agent, modified emulsified asphalt, an anti-skid noise-reducing material, modified emulsified asphalt and a surface protection agent which are successively distributed in a multi-layer manner to the road surface, and forming an ultra-thin overlay structural layer with a thickness of 2-9 mm on the road surface; and
- (3) after drying the ultra-thin overlay structural layer, rolling the road surface for 1-4 times through a rubber tire roller, and then maintaining, and finally opening traffic.

2. The low-noise anti-skid road surface processing method, as recited in claim 1, wherein: in the step (2), a weight ratio of the modified emulsified asphalt, the interlayer interface agent, the anti-skid noise-reducing material, and the surface protection agent is (6-20):(1-3):(20-50):(1-5).

3. The low-noise anti-skid road surface processing method, as recited in claim 1, wherein: the modified emulsified asphalt is prepared by mixing and emulsifying an emulsifier, asphalt, a modifier and water with a weight ratio of (1-3):(50-60):(5-10):(30-40).

4. The low-noise anti-skid road surface processing method, as recited in claim 1, wherein: the interlayer interface agent contains an emulsifier, a polymer bonder and an asphalt regeneration agent/a cement reinforcing agent.

5. The low-noise anti-skid road surface processing method, as recited in claim 1, wherein: the anti-skid noise-reducing material is prepared by mixing basalt or a diabase stone material, with high elastic rubber particles and a hydraulic cementitious material.

6. The low-noise anti-skid road surface processing method, as recited in claim 1, wherein: the surface protection agent comprises special resin, polymer binder, anti-sticking agent, surface active agent, solvent and water.

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