

MOUNTING STRUCTURE AND MOUNTING METHOD FOR HOOD OF CAB

Field of the Invention

- 5 The present invention relates to a mounting structure and a mounting method for a hood of cab, which are especially suitable for mounting the hoods of railway vehicles.

Background of the Invention

- 10 With the rapid acceleration of rail transit and the increasing demands of users on the appearance of vehicles, the axle load required for the vehicles have become increasingly lighter and the streamlined surface modeling requirements for cabs have become more complex.

- 15 In order to adapt to these changes, it is difficult to meet if the cab is all made of traditional metal materials, so only glass fiber reinforced plastics with lighter weight and being easy to form or a carbon fiber hood and a metal structure load the vehicle body can be used for replacement. However, the problems caused by the use of the glass fiber reinforced plastics and the carbon fiber hood are as follows:

- First, the hood is difficult to position when fitted with the metal vehicle body, and currently, there is no solution; and
20 second, the forming deformation of the glass fiber reinforced plastics and the carbon fiber hood is difficult to control, and meanwhile, the metal structure vehicle body is also deformed after welding, which leads to the misalignment between the hood and the metal structure vehicle body.

- There are two main solutions to the problems. The first one is to adjust the misalignment between the hood and the metal structure by using a viscose layer therebetween. However, the drawback of the method is that there is still a height difference between the hood and the vehicle body, so that during the high-speed running of the train, the aerodynamic performance of the train is affected. The second is to use supporting rods to correct both sides of the hood, so that the hood is aligned with
25 the molded line of the vehicle body, and then gluing is performed, but the curing time of glue is relatively long (about 48h), the supporting rods can be removed only after complete curing of the glue layer, such that other procedures in the cab cannot be performed when the hood is collected, which prolongs the production period. Moreover, after the hood is glued, due to the prestress, the hood will still rebound after the
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supporting rods are removed, and the glue layer is subject to shear stress for a long time, thereby having a risk of cracking. Meanwhile, the supporting rod adjustment method can only be used when the sizes of both sides of the hood are smaller than the size of the metal vehicle body, and if the sizes of the both sides of the hood are larger than the size of the metal vehicle body, the supporting rod adjustment cannot be used.

Summary of the Invention

The present invention aims at providing a mounting structure and a mounting method for a hood of cab. The mounting structure can thoroughly solve the problem of positioning difficulty during the mounting of the hood, the problem of failure to align molded lines of the hood with the vehicle body of a metal structure due to the deformation of the hood and the vehicle body, and the problems of long mounting time, rubber layer cracking and the like.

To achieve the above object, the present invention adopts the following technical solution:

A mounting structure for a hood of cab is structurally characterized by including a center positioning structure and a side positioning structure that are arranged between the hood and a vehicle body;

the center positioning structure includes hood positioning elements respectively arranged at a head end and a tail end of the hood, and vehicle body positioning elements arranged on the vehicle body, and the hood and the vehicle body are positioned in the transverse direction of a cab by the cooperation of the vehicle body positioning element and the hood positioning element; and

the side positioning structure includes multiple positioning holes preset in a mounting surface of the hood and multiple positioning plates provided with holes and fixed to a side wall of the vehicle body, the positioning plates and the corresponding positioning holes in the mounting surface of the hood are fixedly connected by means of fasteners so as to fixedly connect the side wall of the hood with the vehicle body, and an adjusting element is arranged between the positioning plates and the positioning holes in the mounting surface of the hood to keep the two side faces of the hood in alignment with the vehicle body.

Therefore, center positioning is performed firstly to restrict the displacement of the hood in the front and back directions, then side positioning is performed to restrict the displacement of the hood in the left and right directions. The center positioning

structure well solves the problem of center positioning during the mounting of the hood, and the positioning holes and the positioning plates are fixed through the fasteners, thereby solving the problem of side positioning during the mounting of the hood.

According to the embodiments of the present invention, the present invention can be

5 further optimized. The following is a technical solution formed after optimization:

In order to better realize the center positioning of the hood, the hood positioning element arranged at the head end of the hood is arranged on one side of the longitudinal centerline of the cab, the hood positioning element arranged at the tail end of the hood is arranged on the other side of the longitudinal centerline of the cab, the vehicle body positioning element arranged at the head end of the vehicle body is arranged on one side of the longitudinal centerline of the cab, the vehicle body positioning element arranged at the tail end of the vehicle body is arranged on the other side of the longitudinal centerline of the cab, thereby restricting the displacement of the hood relative to the front and back directions of the vehicle body.

15 In order to ensure the positioning accuracy, the hood positioning elements and the vehicle body positioning elements are arranged in a staggered manner.

According to the embodiments of the present invention, the hood positioning elements and the vehicle body positioning elements are positioning pins or positioning blocks.

20 Preferably, plates with screw hole are pre-embedded in the mounting surface of the hood, and screw holes in the plates with screw hole form the positioning holes.

According to the embodiments of the present invention, the positioning plates are arranged to extend upward relative to the vehicle body, the fasteners are bolts, and screws of the bolts pass through the holes in the positioning plates and the adjusting element successively and are fixedly connected with the positioning holes. The positioning plates can be welded on the vehicle body.

25 Preferably, the lower surface of the positioning plate is an inclined plane adapted to the lower surface of the hood.

In order to increase and decrease the adjusting element conveniently, the adjusting element is adjusting pad with U-shaped slot hole.

30 In order to further improve the fixing effect of the hood and the vehicle body, a viscose layer is arranged between the mounting surface of the hood and the vehicle body. As a result, a double fixing structure is formed between the hood and the vehicle body, which completely solves the security risks caused by cracking of the rubber layer.

Based on the same inventive concept, the present invention further provides a method

for mounting a hood of cab by using the mounting structure for the cab hood, including the following steps:

S1, hoisting the hood, and performing center positioning on the hood and the vehicle body through the hood positioning elements arranged on the hood and the vehicle body

5 positioning elements arranged on the vehicle body;

S2, fixedly connecting the positioning plates on the side wall of the vehicle body with the positioning holes in the hood by means of the fasteners;

S3, adjusting the gap between the side wall of the vehicle body and the hood through the adjusting element to keep the two side faces of the hood in alignment with the

10 vehicle body;

i, when the transverse sizes of the two sides of the hood are smaller than that of the vehicle body, increasing the thicknesses of the adjusting element to push the two side walls of the hood outward, and performing fastening through the fasteners when the two side faces of the hood are aligned with the vehicle body; and preferably, gluing is

15 performed between the mounting surface of the hood and the vehicle body after the fastening through the fasteners; and

ii, when the transverse sizes of the two sides of the hood are greater than that of the vehicle body, decreasing the thicknesses of the adjusting pads, drawing the two side walls of the hood inward via the fastening of the fasteners until the two side faces of the hood are aligned with the vehicle body; and preferably, gluing is performed between the mounting surface of the hood and the vehicle body after the two side faces of the hood are aligned with the vehicle body.

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By means of the structure, in the present invention, positioning is performed on the center at first and then is performed on the two sides.

Hood center positioning method is as follows: disposing one positioning block on each of the front and back sides along the longitudinal centerline of the cab of the metal structure, wherein the two positioning blocks are arranged in a staggered manner, and also disposing positioning blocks on the front and back sides along the centerline of the hood, wherein the positioning blocks are also cross-arranged, so that during hoisting of the hood, mutual limiting can be quickly and accurately achieved through the front and back staggered positioning blocks, and the positioning blocks well solve the problem of central positioning during installation of the hood.

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Positioning method of two sides of hood is as follows: the positioning plates are provided on the mounting surface of the hood on the two sides of the cab of metal

structure, the positioning plates are provided with holes, meanwhile plates with screw hole in corresponding positions on the two sides of the hood are pre-embedded, and during the mounting of the hood, the deformation on the two sides of the hood can be adjusted through the positioning plates, the plates with screw hole and the adjusting pads between the positioning plates and plates with screw hole. When the sizes of the two sides of the hood are smaller than that of the metal vehicle body, the thicknesses of the adjusting pads can be increased to push the two sides of the hood outward until the two sides of the hood are flush with the metal vehicle body; and when the sizes of the two sides of the hood are greater than that of the metal vehicle body, the thicknesses of the adjusting pads can be decreased, the two sides of the hood are drawn inward by tightening the bolts until the two sides of the hood are flush with the metal vehicle body. The method replaces the original supporting rod which is used for adjustment, and meanwhile well solves the problem when the sizes of the two sides of the hood are greater than that of the metal vehicle body.

Compared with the prior art, the present invention has the following beneficial effects:

1. the positioning blocks and the positioning plates of the present invention have simple structures and high positioning reliability;
2. the hood mounting method of the of the present invention is fast, convenient and easy to operate;
3. in the hood mounting method of the of the present invention, the original supporting rods are omitted without affecting the subsequent procedure operations;
4. the adjustable hood mounting method of the present invention is not only feasible when the sizes of the two sides of the hood are smaller than that of the metal vehicle body, and is also feasible when the sizes of the two sides of the hood are greater than that of the metal vehicle body; and
5. the hood mounting method of the of the present invention avoids the cracking risk of the rubber layer, and shares the stress of the rubber layer at the same time, such that the hood is safer and more reliable during the operation.

Brief Description of the Drawings

Fig. 1 is a side view of an embodiment of the present invention;

Fig. 2 is a top view of Fig. 1;

Fig. 3 is a structural schematic diagram of side positioning of the present invention;

Fig. 4 is an outside view at a position of a positioning plate of the present invention;

Fig. 5 is an outside view of an adjusting pad of the present invention;

Fig. 6 is a view of a direction A of Fig. 2;

Fig. 7 is a view of a direction B of Fig. 2.

Reference signs:

- 5 1-hood; 2-vehicle body; 3-hood positioning block; 4-vehicle body positioning block; 5-vehicle body positioning plate; 6- adjusting pad; 7-pre-embedded plate with screw hole; 8-bolt; 9-washer.

Specific Mode for Carrying Out the Invention

- 10 The present invention will be described in detail below with reference to the drawings and in conjunction with the embodiments. It should be noted that the embodiments in the present invention and the features in the embodiments can be combined with each other without conflict. For the sake of description, the words “upper”, “lower”, “left”, and “right” as appear in the following text only indicate the same direction as the top,
15 bottom, left, and right of the figure itself, and do not limit the structure.

- An mounting structure for a hood of cab, as shown in Figs. 1, 6 and 7, a fast center positioning structure is used to perform center positioning, that is, positioning blocks are welded on front and back positions of a vehicle body 2 of a metal structure at the center of an area connecting to a hood 1, and the front and back positioning blocks are
20 arranged to be staggered along the centerline. Similarly, the positioning blocks, serving as positioning elements, are pre-embedded at the front and back positions of the hood 1 at the center of an area connecting to the vehicle body 2 of the metal structure, and the front positioning block on the hood 1 and the front positioning block on the vehicle body 2 of metal structure are arranged on different sides of longitudinal centerline, and
25 the back positioning block on the hood 1 and the back positioning block on the vehicle body 2 of metal structure are arranged on different sides of longitudinal centerline. When the hood 1 is hoisted, the front and back corresponding positioning blocks limit each other to ensure that the center of the hood 1 is aligned with the center of the vehicle body 2 of the metal structure.

- 30 As shown in Figs. 3 to 5 , the positioning structures on the two sides are positioning plates 5 (the number of the positioning plates 5 is set according to requirements) evenly arranged on the two sides of the vehicle body 2 of the metal structure in an area connecting to the hood 1, the positioning plates 5 and the vehicle body 2 of metal structure are welded and fixed to ensure the strength of the positioning plates 5, and

waist-shaped holes are formed in the positioning plates 5 which facilitates the adjustment of the hood 1 in the upper and lower directions and in the front and back directions. Plates with screw hole are pre-embedded in corresponding positions of the hood 1, adjusting pads with different thicknesses are arranged between the plates with screw hole and the positioning plates 5, and the positioning plates 5 are connected with the plates with screw hole through bolts. When the transverse sizes of the two sides of the hood 1 are smaller than that of the vehicle body 2 of metal structure, the thicknesses of the adjusting pads can be increased to push the two sides of the hood outward, the bolts are fastened after the adjustment is accomplished, and then gluing is performed. When the transverse sizes of the two sides of the hood 1 are greater than that of the vehicle body 2 of metal structure, the thicknesses of the adjusting pads can be decreased, the two sides of the hood 1 are drawn inward by fastening the bolts, the gluing is performed after the adjustment is accomplished. The bolts do not need to be demounted after the glue is dry, and meanwhile the bolts have function in fastening the hood 1. As an alternative, the central positioning block as the positioning element of the present invention can also be a positioning pin.

The contents illustrated in the embodiment mentioned above should be understood in such a manner that these embodiments are only used for illustrating the present invention more clearly and are not intended to limit the scope of the present invention.

After reading the present invention, various equivalent modifications made by those skilled in the art to the present invention shall all fall within the scope defined by the appended claims of the present application.

Claims

1. A mounting structure for a hood of cab, wherein the mounting structure comprises a center positioning structure and a side positioning structure that are arranged between the hood (1) and a vehicle body (2);
 - 5 the center positioning structure comprises hood positioning elements respectively arranged at a head end and a tail end of the hood (1), and vehicle body positioning elements arranged on the vehicle body (2), and the hood(1) and the vehicle body(2) are positioned in the transverse direction of the cab by the cooperation of the vehicle body positioning element and the hood positioning element; and
 - 10 the side positioning structure comprises multiple positioning holes preset in a mounting surface of the hood (1) and multiple positioning plates (5) provided with holes and fixed to a side wall of the vehicle body (2), the positioning plates (5) and the corresponding positioning holes in the mounting surface of the hood (1) are fixedly connected by means of fasteners so as to fixedly connect the side wall of the hood (1)
 - 15 with the vehicle body (2), and an adjusting element is arranged between the positioning plates (5) and the positioning holes in the mounting surface of the hood (1) to keep the two side faces of the hood (1) in alignment with the vehicle body (2).
2. The mounting structure for the cab hood of claim 1, wherein the hood positioning element arranged at the head end of the hood (1) is arranged on
 - 20 one side of the longitudinal centerline of the cab,
 - the hood positioning element arranged at the tail end of the hood (1) is arranged on the other side of the longitudinal centerline of the cab,
 - the vehicle body positioning element arranged at the head end of the vehicle body (2) is arranged on one side of the longitudinal centerline of the cab,
 - 25 the vehicle body positioning element arranged at the tail end of the vehicle body (2) is arranged on the other side of the longitudinal centerline of the cab.
3. The mounting structure for the cab hood of claim 2, wherein the hood positioning element arranged at the head end of the hood (1) and the vehicle body positioning element arranged at the head end of the vehicle body (2) are arranged in a staggered
 - 30 manner, and the hood positioning element arranged at the tail end of the hood (1) and the vehicle body positioning element arranged at the tail end of the vehicle body (2) are arranged in a staggered manner.
4. The mounting structure for the cab hood of any of claims 1-3, wherein the hood positioning elements and the vehicle body positioning elements are positioning pins or

positioning blocks.

5. The mounting structure for the cab hood of any of claims 1-3, wherein plates with screw hole (7) are pre-embedded in the mounting surface of the hood (1), and the screw holes in the plates with screw hole (7) form the positioning holes.

5 6. The mounting structure for the cab hood of any of claims 1-3, wherein the positioning plates (5) are arranged to extend upward relative to the vehicle body, the fasteners are bolts (8), and screws of the bolts (8) pass through the holes in the positioning plates (5) and the adjusting element successively and are fixedly connected with the positioning holes.

10 7. The mounting structure for the cab hood of any of claims 1-3, wherein the lower surface of the positioning plate (5) is an inclined plane adapted to the lower surface of the hood (1).

8. The mounting structure for the cab hood of any of claims 1-3, wherein the adjusting element is adjusting pad (6) with U-shaped slot hole.

15 9. The mounting structure for the cab hood of any of claims 1-3, wherein a viscose layer is arranged between the mounting surface of the hood (1) and the vehicle body (2).

10. A method for mounting a hood of cab by using the mounting structure for the cab hood of any of claims 1-8, wherein the method comprises the following steps:

20 S1, hoisting the hood (1), and performing center positioning on the hood (1) and the vehicle body (2) through the hood positioning elements arranged on the hood (1) and the vehicle body positioning elements arranged on the vehicle body (2);

S2, fixedly connecting the positioning plates (5) on the side wall of the vehicle body (2) with the positioning holes in the hood (1) by means of the fasteners;

25 S3, adjusting the gap between the side wall of the vehicle body (2) and the hood (1) through the adjusting element to keep the two side faces of the hood (1) in alignment with the vehicle body;

i, when the transverse sizes of the two sides of the hood (1) are smaller than that of the vehicle body (2), increasing the thicknesses of the adjusting element to push the two side walls of the hood (1) outward, and when the two side faces of the hood (1) are aligned with the vehicle body, performing fastening through the fasteners; and preferably, gluing is performed between the mounting surface of the hood (1) and the vehicle body (2) after the fastening through the fasteners; and

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ii, when the transverse sizes of the two sides of the hood (1) are greater than that of the vehicle body (2), decreasing the thicknesses of the adjusting pads to draw the two side

walls of the hood inward via the fastening of the fasteners until the two side faces of the hood (1) are aligned with the vehicle body; and preferably, gluing is performed between the mounting surface of the hood (1) and the vehicle body (2) after the two side faces of the hood (1) are aligned with the vehicle body.

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