

RUBBER PAD DEVICE FOR STORAGE AND TRANSPORTATION OF PREFABRICATED ELEMENTS

5 Technical Field

The present invention relates to a spacer block for storage and transportation of materials, more specifically to a rubber pad device for storage and transportation of prefabricated elements for construction use. The rubber pad device is especially
10 suitable for spacing and storing of prefabricated elements, such as prefabricated floor plates, prefabricated bathrooms, prefabricated kitchens and prefabricated beams, etc.

Background

15 Currently, wood beam is widely used for transportation and storage of prefabricated elements for construction use, in particular prefabricated floor plates. That is, fir beams of long strip shape are used to space adjacent prefabricated floor plates piled together for storage and transportation. Nevertheless, wood beams are comparatively non-durable, easily deformed with water in outdoor storage, and easily
20 broken and damaged. More importantly, in export transportation of prefabricated elements, according to the customs regulations, wood beams can be exported only after being fumigated and sterilized. However, the effective period for fumigation and sterilization is time limited, and wood beams stored for too long a time after fumigation and sterilization cannot be used. Also, fumigation and detection of
25 customs are very expensive. Further, it needs to be specially pointed out that, large use of wood beams is not environmental friendly. Nevertheless, if wood beams are intended to be replaced by other materials, e.g., iron beams, the transportation weight and the transportation cost will be both increased due to the weight increase of iron beams as compared to wood beams. In addition, iron beams are more costly per se.

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Summary of the Invention

To overcome the defects of conventional wood beams, the present invention provides a durable and light weight rubber pad device for storage and transportation
5 of prefabricated elements, with which fumigation and sterilization are no longer necessary.

The present invention provides a rubber pad device for storage and transportation of prefabricated elements, comprising a cuboid-shaped pad body. The pad body
10 comprises a framework structure and a hollow structure which aims to reduce the weight, wherein both ends of the pad body are provided a dovetail wedge and a dovetail slot respectively, for connecting a plurality of pad bodies in an end-to-end manner. The pad body with the dovetail wedge and the dovetail slot provided respectively at two ends thereof are manufactured as an integrated part through
15 injection molding with plastic materials.

The hollow structure of said pad body comprises a plurality of cylindrical spaces or cubic spaces alternatively arranged along the longitudinal direction of the pad body.

20 Alternatively, said hollow structure is arranged along the vertical direction and horizontal direction respectively, wherein the vertical hollow structure and the horizontal hollow structure are alternatively arranged along the longitudinal direction of the pad body.

25 Further, as an alternative, the framework structure of said pad body comprises a main frame arranged around the framework structure, and a plurality of vertical ribs and a plurality of slanting ribs located within said main frame. The plurality of vertical ribs is arranged along the longitudinal direction of the pad body and in parallel with the width direction of the pad body. Each diagonal rib connects two
30 adjacent vertical ribs to each other along the diagonal direction. The space surrounded by the main frame, the vertical ribs and the slanting ribs forms said hollow structure.

Said hollow structure runs through the top and bottom surfaces of said pad body,

or runs through the front and back side walls of said pad body for facilitating the injection molding.

Two dovetail wedges are provided at one end of said pad body, and two dovetail
5 slots are provided at the other end thereof. The dovetail wedges and the dovetail slots respectively provided at the ends of two adjacent pad bodies are matched with each other in a manner of convex-concave engagement.

The surface of said pad body is antiskid surface having antiskid patterns in
10 various directions.

Said pad body has a length no more than 600mm, and a cross-sectional dimension no more than 100mm × 100mm.

15 Said pad body is made of PP or PE materials, and thus is relatively durable.

As compared to the prior arts, the rubber pad device for storage and transportation of prefabricated elements according to the present invention can be recycled for use. It would not be easily damaged and deformed, and can be recycled
20 for much more times, twice at least, than wood beams. Therefore, it is more durable and lighter in weight. Even it is fully damaged, the rubber pad device can still be recovered for further treatment and use repeatedly, while damaged wood beams cannot be used and new purchase has to be made. Moreover, when wood beams are used for export transportation, the costs necessary for fumigation and customs
25 detection are significant, whereas the rubber pad device of the present invention is completely free of such costs. Although the first sum of investment on purchasing the rubber pad device is relatively high, using rubber pad device is more cost-saving as a whole and more environmental friendly.

30 **Brief Description of the Drawings**

Fig. 1 schematically shows the structure of the rubber pad device for storage and transportation of prefabricated elements according to Embodiment 1 of the present

invention;

Fig. 2 schematically shows the structure of the rubber pad device for storage and transportation of prefabricated elements according to Embodiment 2 of the present invention;

Fig. 3 schematically shows the structure of the rubber pad device for storage and transportation of prefabricated elements according to Embodiment 3 of the present invention;

Fig. 4 is the perspective view of the rubber pad device for storage and transportation of prefabricated elements according to Embodiment 3 of the present invention; and

Fig. 5 schematically shows how the rubber pad devices for storage and transportation of prefabricated elements according to the present invention match with each other along the longitudinal direction.

Specific Embodiments of the Invention

In the following the embodiments of the present invention will be discussed in detail with reference to the attached drawings.

The rubber pad device for storage and transportation of prefabricated elements according to the present invention is made as an integrated part through injection molding with plastic materials, and can be used to replace conventional wood beams. Therefore, no fumigation and sterilization are necessary for export transportation. Nevertheless, the density of wood beam is comparatively smaller than that of plastics. For example, a solid wood beam with a size of 75mm × 75mm × 1000mm only weighs a few kilograms, while a solid rubber pad device with the same size will be

heavier. Therefore, in order to reduce weight, as shown in Figs. 1 to 3, the rubber pad device for storage and transportation of prefabricated elements according to the present invention comprises a cuboid-shaped pad body 1, which is of a hollow structure and consists of a framework structure 11 and a hollow structure 12 that are alternated with each other. Based on the direction of the force that is applied to the rubber pad device during use and the physical properties of material for the rubber pad device itself, one skilled in the art can calculate the area of the framework structure 11 along the force-bearing direction as needed, and thus determine the cross-sectional size of the hollow structure 12 of the rubber pad device.

Considering the facts that the rubber pad device may be knocked, thrown or tossed during use so that it may be easily damaged, and that the prefabricated elements to be stored and transported therewith are relatively heavy, the materials used for the rubber pad device should be selected according to special requirements. The use of PP and PE materials has good effect. In the embodiments of the present invention, PE7200 material is used.

The hollow structure 12 of said pad body 1 can be designed into different shapes. For example, in Embodiment 1 as shown in Fig. 1, said hollow structure 12 is designed as a plurality of cylindrical spaces alternatively arranged along the longitudinal direction of the pad body 1. The cylindrical spaces may be arranged along the vertical direction or along the horizontal direction. The vertical cylindrical space and the horizontal cylindrical space are alternatively arranged along the longitudinal direction of the pad body 1, wherein the vertical cylindrical space runs through the top and bottom surfaces of the pad body 1, while the horizontal cylindrical space runs through the front and back side walls thereof. In addition, the width of the pad body 1 can be designed as having the same size as the height thereof. In this case, the injection-molding operation can be facilitated, and it is unnecessary to determine which side should be the upper side when laying out the rubber pad device.

In Embodiment 2 as shown in Fig. 2, said hollow structure 12 is designed as a plurality of cubic spaces alternatively arranged along the longitude direction of pad body 1. Similarly, the cubic spaces may be arranged along the vertical direction or along the horizontal direction. The vertical cubic space and the horizontal cubic space are alternatively arranged along the longitudinal direction of the pad body 1, wherein the vertical cubic space runs through the top and bottom surfaces of the pad body 1, while the horizontal cubic space runs through the front and back side walls thereof. In addition, the width of the pad body 1 can be designed as having the same size as the height thereof.

In Embodiment 3 as shown in Fig. 3, the framework structure 11 of the pad body 1 comprises a main frame 16 around the framework structure 11, and a plurality of vertical ribs 13 and a plurality of slanting ribs 15 located within said main frame 16. The plurality of vertical ribs 13 are disposed evenly along the longitudinal direction of the pad body 1, and are arranged in parallel with the width direction of the pad body 1, such that the space within the main frame 16 is divided into several square spaces, each having two crossing, diagonally-connected slanting ribs 15. The space surrounding by said main frame 16, the vertical rib 13 and the diagonal rib 15 forms said hollow structure 12.

Wood beams as pads can be cut into any length. However, since the rubber pad device of the present invention has to be produced with steel molds, the size of the rubber pad device is comparatively constant. In view of the pressure limitation of injection machines, currently the rubber pad device is produced by 1,200-ton injection machines. Hence, the length of the pad device is set within 600mm, and the cross-sectional size thereof is set within 100mm × 100mm. According to the requirements in use, the longer the rubber pad device the better. Hence, the rubber pad device of the present invention is designed so that it can be connected with another one along the longitude direction by means of joints. The joints can be designed into various shapes. In the embodiment as shown in Fig. 4, the left side and the right side

of the pad body 1 along the longitude direction have the same width. Along the vertical direction, two dovetail wedges 2 are provided at one side of said pad body 1 and two dovetail slots 3 are provided at the other. As shown in Fig. 5, the dovetail wedge 2 provided at one side of a rubber pad device exactly matches with the dovetail slot 3 provided at the corresponding side of an adjacent rubber pad device in a manner of convex-concave engagement. Further, the dovetail wedge 2 and dovetail slot 3 are both wider at the outer side and narrower at the inner side, thus enabling the rubber pad devices connected cannot be separated from each other easily. Of course, the number of the dovetail wedges 2 and dovetail slots 3 can be one, as shown in Fig. 1, or more.

To enable the rubber pad device having a better antiskid effect, as shown in Fig. 4, the surface of the pad body 1 is designed as an antiskid surface, which may be provided with antiskid patterns 17 along various directions so as to obtain a better antiskid effect.

The rubber pad device of the present invention may be used as pad for storing various kinds of prefabricated elements in factories, or used as pad or spacer for transportation. The prefabricated elements for construction use for which the rubber pad device can be applied include prefabricated floor plates, prefabricated bathrooms, prefabricated kitchens, prefabricated beams, etc. In any circumstance where pads are needed, the rubber pad device of the present invention can be used in place of wood beams. The rubber pad device of the present invention can be disposed vertically or horizontally, and placed in between two adjacent prefabricated elements so that the prefabricated elements can be piled layer by layer. The rubber pad device can also be mounted in a crossing manner as needs, thus increasing the distance between two adjacent prefabricated elements.

The rubber pad device of the present invention is not only more durable and more environmental friendly, but can also save the costs for fumigation and

sterilization as well as customs detection during export transportation.

The foregoing are only preferred embodiments of the present invention and shall not be construed as restricting the present invention. Any amendments, equivalents or
5 improvements made under the spirit and principle of the present invention shall be included in the protection scope of the present invention.

Claims

1. A rubber pad device for storage and transportation of prefabricated elements, comprising a cuboid-shaped pad body (1),

5 characterized in that, said pad body (1) comprises a framework structure (11) and a hollow structure (12) for weight reduction, wherein both ends of the pad body (1) are provided a dovetail wedge (2) and a dovetail slot (3), respectively, for connecting a plurality of pad bodies in an end-to-end manner, and said pad body (1) with the dovetail wedge (2) and the dovetail slot (3) provided respectively at the ends thereof
10 are manufactured as an integrated part through injection molding with plastic materials,

the hollow structure (12) of said pad body (1) comprises a plurality of cylindrical spaces or cubic spaces alternatively arranged along the longitudinal direction of the pad body, and

15 said hollow structure (12) is arranged along the vertical direction and the horizontal direction respectively, wherein the vertical hollow structure (121) and the horizontal hollow structure (122) are alternatively arranged along the longitudinal direction of the pad body (1).

20 2. The rubber pad device for storage and transportation of prefabricated elements according to claim 1, characterized in that, said hollow structure (12) runs through the top and bottom surfaces of said pad body (1), or runs through the front and back side walls of said pad body (1).

25 3. The rubber pad device for storage and transportation of prefabricated elements according to claim 1, characterized in that, two dovetail wedges (2) are provided at one end of said pad body (1) and two dovetail slots (3) are provided at the other end thereof, wherein the dovetail wedges (2) and the dovetail slots (3) respectively provided at the ends of two adjacent pad bodies (1) match with each other in an
30 manner of convex-concave engagement.

4. The rubber pad device for storage and transportation of prefabricated elements according to claim 1, characterized in that, the surface of said pad body (1) is antiskid

surface having antiskid patterns (17) in various directions.

5 5. The rubber pad device for storage and transportation of prefabricated elements according to claim 1, characterized in that, said pad body (1) has a length no more than 600mm, and a cross-sectional dimension no more than 100mm × 100mm.

6. The rubber pad device for storage and transportation of prefabricated elements according to claim 1, characterized in that, said pad body (1) is made of PP or PE materials.