STRUCTURE OF SOFTBALL

A softball includes a core, a separation layer, and a cover. The core is made of polyurethane that has high compression displacement. The separation layer is formed by wrapping, in a laminated manner, yarns around the core and soaking the wrapping yarns in adhesives. The cover is made of soft skin and includes a buffering layer formed on an inside surface thereof. When the durability of the softball is improved by increasing the compression displacement of the core, the buffering layer provided on the inside surface of the cover provides counterbalance of the overall compression displacement of the softball in order to meet the requirement of the softball specifications. The separation layer that is arranged between the core and the cover and is formed by wrapping the yarns in a laminated manner around the core, followed by soaking the yarns in adhesives so that the separation layer features waterproofness and resistance against humidity, by which invasion of water or humidity into the core, which leads to change of the compression displacement of the softball and eventually causes failure/damage of the softball, can be prevented. Thus, the durability and performance of the softball can be enhanced.
PRIOR ART

FIG. 1
STRUCTURE OF SOFTBALL
CROSS-REFERENCE
[0001] This is a continuation-in-part of the co-pending patent application Ser. No. 11/327,468, filed Jan. 9, 2006.

BACKGROUND OF THE INVENTION
[0002] (a) Technical Field of the Invention
[0003] The present invention relates to a softball, and in particular to a softball having a core that is protected against humidity and that has enhanced durability.
[0004] (b) Description of the Prior Art
[0005] Once softballs meet the requirements of compression by all softball associations they also must meet players acceptance. The crack sound must be prominent when the player hits the ball off the bat. If battered ball has a soft, mushy or thud sound it will not be accepted by players.
[0006] A conventional softball that is currently used is shown in FIG. 1 of the attached drawings and generally designated at 1, comprising a core 11 and a cover 12. The core 11 is made of cork or foamed substance, such as polyurethane (PU). The cover 12 comprises a soft skin and is fixed to and wraps the core 11 by stitching to form the softball 1. In different applications, the softball 1 must satisfy different specifications, such as the specification stipulated by ASA and USSA. In respect of compression displacement of the softball, it is required that the compression displacement of the softball must be no higher than 375 lbs., 400 lbs, and 500 lbs, set in different specifications. To be sold in the market, all the softballs must be manufactured to meet the specifications. Since the softball 1 is comprised of a core 11 and a cover 12, in respect of the requirement of 375 lbs compression displacement, the softball 1 must be made in such a way that the core 11 can have a compression displacement not greater than around 375 lbs in order to prevent the overall compression displacement of the softball 1 become over-specification, disqualifying the ball. Under this situation, when the ball 1 is put in use, the ball 1 is often subjected to a hitting force greater than 375 lbs. Such a force is transmitted through the cover 12 to the core 11, and leads to damage of the core 11. When the core 11 is damaged, the ball 1 can no longer be qualified for use. As a consequence of such a situation, the conventional softball has a poor durability. Further, when the softball 1 is used in a rainy day or is put in a high humidity environment, rain water or humidity will invades into inside the softball 1 by penetrating through the cover 12, making the core 11 wet. The core 11 is of high humidity absorption so that the cover 11 will absorb a great amount of water, which substantially increases the weight of the core 11 and reduces the compression displacement and bouncing coefficient of the softball 11, thereby disqualifying the ball. Thus, a softball 1 with a wetted core 11 is considered damaged and must be disposed of.
[0007] Besides the drawback of being wetted, the conventional softball 1 cannot be deposited or stored in a high humidity environment for water molecules or humidity will penetrate through the cover 12 and invade into inside the softball 1, making the core 11 wetted. Again, the wetted core 11 makes the compression displacement and bouncing coefficient of the softball 1 substantially reduced, and eventually turning the softball 1 into a disqualified one. Thus, it is a major challenge of the softball manufacturing industry to protect a softball from invasion and damage caused by humidity and water.

SUMMARY OF THE INVENTION
[0008] The primary purpose of the present invention is to provide a softball, which comprises a core, a separation layer, and a cover. The core is made of polyurethane. The separation layer is formed by wrapping, in a laminated manner, yarns around the core and soaking the wrapping yarns in adhesives. The cover is made of soft skin. The separation layer that is arranged between the core and the cover and is formed by wrapping the yarns in a laminated manner around the core, followed by soaking the yarns in adhesives so that the separation layer features waterproofness and resistance against humidity, by which invasion of water or humidity into the core, which leads to change of the compression displacement of the softball and eventually causes failure/damage of the softball, can be prevented. Thus, the durability and performance of the softball can be enhanced.
[0009] Another objective of the present invention is to provide a softball comprising a core, a separation layer and a cover. The core is made of polyurethane that has high compression displacement. The separation layer is formed by wrapping, in a laminated manner, yarns around the core and soaking the wrapping yarns in adhesives. The cover is made of soft skin and comprises a buffering layer formed on an inside surface thereof. When the durability of the softball is improved by increasing the compression displacement of the core, the buffering layer provided on the inside surface of the cover provides counterbalance of the overall compression displacement of the softball in order to meet the requirement of the softball specifications.
[0010] The foregoing object and summary provide only a brief introduction to the present invention. To fully appreciate these and other objects of the present invention as well as the invention itself, all of which will become apparent to those skilled in the art, the following detailed description of the invention and the claims should be read in conjunction with the accompanying drawings. Throughout the specification and drawings identical reference numerals refer to identical or similar parts.
[0011] Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

BRIEF DESCRIPTION OF THE DRAWINGS
[0012] FIG. 1 is a cross-sectional view of a conventional softball;
[0013] FIG. 2 is a perspective view, partially broken, of a softball constructed in accordance with the present invention;
[0014] FIG. 3 is a cross-sectional view of a core and a separation layer of the softball in accordance with the present invention; and
FIG. 4 is a cross-sectional view of the softball in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following descriptions are of exemplary embodiments only, and are not intended to limit the scope, applicability or configuration of the invention in any way. Rather, the following description provides a convenient illustration for implementing exemplary embodiments of the invention. Various changes to the described embodiments may be made in the function and arrangement of the elements described without departing from the scope of the invention as set forth in the appended claims.

With reference to the drawings and in particular to FIGS. 2-4, a softball constructed in accordance with the present invention, generally designated with reference numeral 2, comprises a core 3, a separation layer 4, a cover 5 and a buffering layer 6 arranged on an inner surface of the cover 5.

The core 3 is made of polyurethane. This provides the core 3 with better performance of compression displacement and the softball 2 can be made matching the specification of compression displacement or exceeding the specification of the compression displacement.

The separation layer 4 is formed on windings of yarns 41 wrapping around an outer circumference of the core 3 to provide a layer of wrapping yarns of a desired thickness. The yarns 41 can be made of polyester fibers, which help improving waterproofness of the separation layer 4. The core 3 with the yarn layer can be soaked in adhesives to completely fill gaps between the yarns with the adhesives. The adhesiveness of the adhesives fixes the separation layer 4 and the core 3 together. Further, the adhesives that fill into the gaps between the yarns provide the separation layer 4 with excellent water-proofness. As such, the separation layer 4 functions to protect the core 3 from being invaded by humidity or water.

The cover 5 can be made of natural leather, composite leather, PVC (Poly Vinyl Chloride) PU or other synthetic materials and is stitched to surround the separation layer 4 and the core 3.

The buffering layer 6 is made of a soft material, such as rubber, PU (polyurethane) foams, PE (polyethylene), and EVA, and is arranged on an inner side of the cover 5. The thickness range of the buffering layer 6 is 1 to 2 mm, preferably 1.5 mm. Further, the buffering layer 6 preferably has a hardness of 40 Shore A.

To embody the present invention, polyurethane is subjected to foaming to make the core 3, and this gives the core 3 a compression displacement that meets the requirement of the specifications, or the core 3 can be made exceeding the required compression displacement. Polyester yarns are then wrapped around, in a laminated manner, an outer circumference of the core 3. The core 3 that is wrapped by the yarn layer is soaked in the adhesives to form the separation layer 4 around the outer circumference of the core 3. Finally, the cover 5 that is provided at an inner side thereof with the buffering layer 6, is stitched to attach to an outer surface of the separation layer 4, whereby the cover 5 wraps the separation layer 4 and the core 3 therein to thereby complete the manufacturing of the softball 2, which contains, from inside to outside, the core 3, the separation layer 4, the buffering layer 6, and the cover 5.

The softball 2 in accordance with the present invention at least has the following advantages:

1. The separation layer 4 is formed between the cover 5 and the core 3. The separation layer 4 is made of wrapping yarns 41 soaked in adhesives and thus, has improved waterproofness. Therefore, when the softball 2 of the present invention is put in a high humidity environment, or when the softball 2 of the present invention is put in contact with water or liquids, the separation layers 41 functions to isolate the core 3 from the invasion of the humidity or liquids, so that the life span of the softball 2 can be extended and the performance enhanced. Further, since the separation layer 4 is formed by soaking the wrapping yarns 41 in the adhesives, the softball 2, upon hit, gives off a sharp sound. This enhances the performance of the softball 2.

2. The cover 5 is provided at the inner side thereof with the buffering layer 6. This allows the core 3 to be made in an over-specification manner. For example, when the specification requirement for the softball is set to be 375 lbs, the core 3 in accordance with the present invention can be made with a compression displacement of 400 lbs. Or, in case that the overall compression displacement of the softball is required to be 400 lbs, the core 3 in accordance with the present invention can be made with a compression displacement of 450 lbs. Although the core 3 in accordance with the present invention is made over-specification with higher compression displacement, the buffering layer 6 provides means of counterbalance by which the overall compression displacement of the softball 2 can be eventually set to the desired value. The increase of the compression displacement of the core 3 allows the softball 2 made in accordance with the present invention durable. This is simply because that when the softball 2 is subjected to a hitting pressure of 430 lbs, the core 3 that has a higher compression displacement of 450 lbs can effectively take the 430 lbs hitting force without being damaged. Consequently, the softball 2 of the present invention is more durable.

3. The buffering layer 6 that is arranged on the inside surface of the cover 5 allows the core 3 to be made in an over-specification manner, and this not only improves the durability of the softball 2 but also enhances the performance of the softball 2 due to the increased compression displacement of the core 3, which provides the core 3 with higher hardness, so that when the softball 2 is hit, a sharp sound is given off and the softball 2 flies a longer distance.

4. The buffering layer 6 that is arranged on the inside surface of the cover 5 provides cushioning between a high-speed flying softball 2 and an individual when the softball 2 is thrown or hit to move toward the individual, whereby damage to the person by the flying softball 2 is alleviated and safety is enhanced.

Although the present invention has been described with reference to the preferred embodiment thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.
It will be understood that each of the elements described above, or two or more together may also find a useful application in other types of methods differing from the type described above.

While certain novel features of this invention have been shown and described and are pointed out in the annexed claim, it is not intended to be limited to the details above, since it will be understood that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing in any way from the spirit of the present invention.

I claim:

1. A softball comprising a core, a separation layer, and a cover, the separation layer being arranged between the core and the cover, the separation layer being formed by wrapping, in a laminated manner, yarns around the core and soaking the wrapping yarns in adhesives, a buffering layer made of soft material and formed on an inside surface of the cover, whereby the core is allowed to make with high compression displacement.

2. The softball as claimed in claim 1, wherein the core is made of polyurethane.

3. The softball as claimed in claim 1, wherein the yarns are formed of polyester fibers.

4. The softball as claimed in claim 1, wherein the separation layer and the core are tightly fixed together.

5. The softball as claimed in claim 1, wherein the separation layer and the cover that is provided with the buffering layer are tightly fixed together.

6. The softball as claimed in claim 1, wherein the buffering layer is made of a material selected from a group consisting of rubber, polyurethane, polyethylene, and ethylene vinyl acetate.

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