

SEAMLESS TIGHTLY INTERLOCKED PLASTIC RESIN BULKHEAD STRIPS

BACKGROUND OF THE INVENTION

(A) TECHNICAL FIELD OF THE INVENTION

The present invention is related to bulkhead strips which are used in seawalls for retaining soil on the river, lake and sea shores. More specifically, the bulkhead strips are made of plastic resin and are formed continuously by a plastic extruder into wave-shape, or M- or Z-shape strips. The bulkhead strip has a tongue edge and an edge groove on the either side thereof. At least one sealing protrusive rib is formed on both or one of the tongue edge and the edge groove of the bulkhead strip. When the bulkhead strips are interlocked with each other, the rib is constructed as a wall for retaining soil or blocking water so as to keep the river water or the sea water out and prevent the bedload loss and the land subsidence. The drawback to the bulkhead strips in the existing technology (prior art) which cannot be tightly interlocked are solved.

(B) DESCRIPTION OF RELATED ART

Heretofore, the seawall near waterway, river, lake, or sea is generally made of wood, steal, or cement and is constructed as a wall (in a row) to keep the water out and prevent the bedload loss and the nearby land subsidence so as to make sure of the integrity or safety of the seawall or the shore.

U.S. Patent No, 4,674,921, issued on Jun. 23, 1987 entitled "Seawall," discloses a bulkhead strip which is used for shore protection and made of polyvinyl chloride (hereinafter referred to as PVC). The strip is provided with a tongue edge and an undercut edge groove on either side. Since the tongue edge of one strip and the edge groove of another strip can be interlocked/engaged with each other, a series of the strips can be vertically driven into the ground at the junction position of the water and the shore of the waterway, river, lake or sea so as to construct a wall (in a row) for keeping water out and preventing the bedload loss and the land subsidence.

However, in the above mentioned U.S. patent, the space or gap between the outer surface of the tongue edge of one strip and the inner surface of the edge groove of the other strip cannot be designed too small to influent the interlocking process of the strips. In the other way, if the space of the gap is larger than 5mm, the bulkhead strips can be easily slid and interlocked with each other but the tongue edge and the edge groove cannot be interlocked tightly and the water may leak at the interconnection of the strips. By now, there is not any preferred technical idea which can solve this drawback.

SUMMARY OF THE INVENTION

The present invention is about to solve a technical problem of providing a seamless tightly interlocked improved plastic resin bulkhead strips, which have very simple structure and are able to effectively block the water of the shore of river, lake or sea or the waterway at the conjunctions of the bulkhead strips, such that the water or the seawater cannot infiltrate through the seawall of the bulkhead strip into the soil of the shore so as to prevent the bedload loss and the

land subsidence, and, at the same time, the commercializing cost, such as the manufacturing cost of the improved bulkhead strip and the cost for the engineering of connecting bulkhead strips, can be almost the same.

In order to solve the above mentioned drawback that the bulkhead strips cannot be interlocked tightly, the present invention provides a seamless tightly interlocked plastic resin bulkhead strip, in which the improved technical characteristics are that at least one sealing protrusive rib or two sealing protrusive ribs are formed on one or both of the outer surface of the tongue edge and the inner surface of the edge groove of the bulkhead strip. Therefore, when the bulkhead strips are interlocked with each other, the sealing protrusive rib can be used to tightly seal the gap between the outer surface of the tongue edge and the inner surface of the edge groove so as to achieve the anticipated function of keeping water out and preventing the bedload loss and the land subsidence.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective and a cross sectional illustrative diagrams of a shore of river, lake or sea constructed with bulkhead strips.

FIG. 2 is a perspective structure illustrative diagram of a bulkhead strip for the shore of river, lake or sea in accordance with the embodiment of the present invention, which is similar to a bulkhead strip in the prior art.

FIG. 3 is perspective structure illustrative diagrams of a M-shaped seamless tightly interlocked plastic resin bulkhead strip in according with the embodiment of the present invention.

FIG. 3-1 is perspective structure illustrative diagrams of a Z-shaped seamless tightly interlocked plastic resin bulkhead strip in according with the embodiment of the present invention.

FIG. 4 is cross sectional diagrams showing the interlocking statuses of a tongue edge and an edge groove of two seamless tightly interlocked plastic resin bulkhead strips in accordance with the embodiment of the present invention.

FIG. 5 is cross sectional illustrative diagrams showing the interlocked statuses of the varied shapes of the tongue edges and the edge grooves of the seamless tightly interlocked plastic resin bulkhead strips according to the embodiments of the present invention.

DETAIL DESCRIPTION OF THE INVENTION

In order to further understand the features and technical contents of the present invention, a detailed description of the present invention will be made with reference to the accompanying drawings. However, the drawings are illustrative only but not used to limit the scope of the present invention.

Referring to FIG. 2, it depicts a bulkhead strip structure in the prior art for river, lake and ocean. In the drawing, a bulkhead strip 1 has a body, the structure of which is similar to the bulkhead strip in the prior art. An edge groove 11 is formed on one side of the bulkhead strip and a tongue edge 12 is formed on the other side of the bulkhead strip. The upper edge 13 and the lower edge 14 of the bulkhead strip 1 are also shown.

Referring to FIG. 3 and FIG. 3-1, they depict a plastic resin bulkhead strip structure according to the embodiments of the present invention. A plurality of the bulkhead strips can be seamlessly tightly interlocked with each other. The plastic resin bulkhead strip shown in FIG. 3 is in M shape, and the plastic resin bulkhead strip shown in FIG. 3-1 is in Z shape. In the drawings, reinforced ribs 10 are formed on the bulkhead strip. An edge groove 11 is located on one side of the bulkhead strip and a tongue edge 12 is located on the other side of the bulkhead strip. A plurality of sealing protrusive ribs 111 are formed on the edge groove 11 and are shaped into an isosceles triangle, the top angle of which is 30 degree and the base angle of which is 75 degree. A slant 1112 is located on the terminal end of the sealing protrusive ribs 111. A plurality of sealing protrusive ribs 122 are formed on the tongue edge 12 and are shaped into an isosceles triangle, the top angle of which is 30 degree and the base angle of which is 75 degree. A slant 1222 is located on the terminal end of the sealing protrusive ribs 122. The tongue edge 12 has an opening 121 such that the tongue edge 12 is elastic so as to facilitate sliding the tongue edge 12 tightly into the edge groove 11.

Referring to FIG. 4, it depicts a pair of a tongue edge and an edge groove of the plastic resin bulkhead strips interlocked.

Referring to FIG. 5, it depicts illustrative diagrams of varied shaped tongue edges and edge grooves on the either side of the plastic resin bulkhead strips which are interlocked with each other.

Those skilled in this art can understand that the seamless, tightly interlocked plastic resin bulkhead strips are made of plastic resin and are formed continuously by a plastic extruder (extruding process) through a mold implementing the design feature of the present invention in temperature between substantial 160 and substantial 200 degrees Celsius at the rate between substantial 0.4 and substantial 4 m/min. The continuously formed bulkhead strip is substantial 4 mm to 30 mm in thickness, substantial 30 cm to 120 cm in width, and can be cut to form substantial 1m to 30m in length. The material of the plastic resin used to make the bulkhead strip is selected from the group of PVC, PP, PS, ABS, FRP, PET, or common plastic having glass fiber or carbon fiber. And, the sealing protrusive rib on both or one of the tongue edge and the edge groove of the bulkhead strip is 6mm or below 6mm in length and is shaped into an isosceles triangle, the top angle of which is 30 degree and the base angle of which is 75 degree. The number of the sealing protrusive ribs can be at least one and no more than 4, and the preferred number thereof is 2. The space or gap between the outer surface of the tongue edge and the inner surface of the edge groove when the two bulkhead strips are interlocked with each other is not larger than 5mm and less than 2mm.

WHAT IS CLAIMED IS

1. A seamless tightly interlocked plastic resin bulkhead strip having a tongue edge and an edge groove on the either side of the bulkhead strip, and characterized by comprising:

a sealing protrusive rib formed on one of the outer surface of the tongue edge and the inner surface of the edge groove of the bulkhead strip.

2. The seamless tightly interlocked plastic resin bulkhead strip of claim 1, characterized by further comprising another sealing protrusive rib formed on the other one of the outer surface of the tongue edge and the inner surface of the edge groove of the bulkhead strip.

3. The seamless tightly interlocked plastic resin bulkhead strip of claim 1, characterized in that the sealing protrusive rib is shaped into an isosceles triangle, the top angle of which is 30 degree and the base angle of which is 75 degree, and is 6mm or below 6mm in length.

4. The seamless tightly interlocked plastic resin bulkhead strip of claim 1, characterized in that the tongue edge of one of the bulkhead strip is able to be interlocked with the edge groove of another one of the bulkhead strip, and a gap between the outer surface of the tongue edge and the inner surface of the edge groove is no larger than 5mm and less than 2mm.