

Low Cost Woven Coir Blanket Performs Right

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ABSTRACT

Mattress coir woven erosion control blanket (ECB) has proven to be very effective in controlling erosion and establishing vegetation in a variety of applications. The blanket has a number of added advantages as a regular organic ECB. One hundred percent coir in the blanket provides the required strength and ground cover for proper erosion protection. The absence of multiple raw materials in the blanket eliminates the problem of one raw material staying longer or decomposing earlier than other raw materials. It has an ideal functional longevity of three to four years to ensure proper erosion control and vegetation establishment. Its woven feature eliminates chances for wildlife entrapment, enhances the environmental friendliness, and allows planting directly into the soil through the blanket without cutting the blanket. The high flexibility of the woven coir ECB allows the blanket to conform to the contour of the soil surface easily. The blanket's ability to make a direct contact between the fibers and the soil develops a bond between soil and the blanket. The blanket provides excellent performance for cost and gives designers and specifiers an opportunity to solve their erosion problems effectively and environmentally friendly manner.

INTRODUCTION

There is world-wide growing attention being given to the control of soil erosion and sedimentation. With this increasing concern, design professionals in the erosion control industry face the challenge of solving soil erosion problems in the most economical, effective, and environmentally friendly manner. Vast improvements in techniques and tools used for soil erosion and sedimentation control have occurred during the past twenty years. One such tool is the soil erosion control blanket. Erosion control blankets (ECBs) are available in various raw materials and configurations. The most commonly used erosion control blanket materials are straw, wood fiber, jute, coir (coconut fiber), and synthetic fibers. Performance, environmental friendliness, and cost are the governing factors in the selection of erosion control blankets.

This poster introduces a low cost erosion control blanket woven from mattress coir yarns. It provides excellent performance for its cost. A number of case studies document that this woven coir blanket has performed very well. Three factors contributing to this blanket's vast acceptance in applications on steep slopes and stream banks are its excellent environmental friendliness, its functional longevity and its cost effectiveness. This presentation provides designers and specifiers an opportunity to identify a solution to their erosion control problems that demand low cost, environmental friendliness, and high performance.

MATTRESS COIR WOVEN EROSION CONTROL BLANKET

Loosely spun coir yarns are woven to make a coir blanket. The type of coir used in the blanket is freshwater-cured brown mattress coir. Mattress grade coir contains lightweight, thin fibers. The coir yarns in the blanket are extremely flexible. These yarns are lower in tensile strength compared to the tightly spun yarns. Loosely spun mattress coir yarns have a puffy texture. When used in a woven blanket, puffy yarns increases the ground cover and hold extra moisture. Flexible yarns increase the flexibility of the blanket.

The high flexibility of the blanket increases the blanket's ability to conform to the contour of the soil surface. As a result, upon installation the woven coir blanket hugs the soil surface and holds soil particles in place. The puffy formation of the woven structure in the blanket leaves fibers sticking out from individual coir yarns. Upon installation, these protruding fibers create a micro-bond between the soil and the blanket. This micro-bonding effect significantly contributes to the halting of water flow between the erosion control blanket and the soil surface. It also prevents the washing away of soil particles from the soil surface. The weight of the blanket is 600 g/m² (17.8 oz/sy). This weight makes the blanket very stable upon installation, increases its ability to hold extra moisture and thus reduces runoff. The woven structure of the blanket allows direct sunlight to reach the soil surface at the open areas and creates an excellent environment for seed germination and growth of seedlings. The woven

structure of the blanket also allows intersecting yarns to move independently. This feature permits planting through the blanket without cutting it. The woven structure also avoids possible wildlife entrapment in the blanket.

HOW IT COMPARES WITH OTHER ORGANIC EROSION CONTROL BLANKETS

The woven coir blanket has higher wet tensile strength and functional longevity (3-4 years) than many other organic ECBs. The blanket is extremely environmentally friendly compared to other organic ECBs that have synthetic nets. The organic ECBs with synthetic nets create an entrapment danger to wildlife and a nuisance for maintenance and human activities. The woven structure of this blanket consists of freely movable intersecting points. This feature significantly increases wildlife friendliness compared to synthetic net stitched organic blankets. There are many instances where fish, birds, and reptiles get entangled in synthetic nets. The open-weave structure of the blanket facilitates planting through the blanket without cutting it. It also allows hydroseeding in subsequent years as well as immediately after installation. When organic ECBs that have double nets are installed, the bottom net forms a barrier between the soil and the organic fibers in the blanket. That barrier prevents an excellent contact between the soil and the blanket fibers. On the other hand, the puffy fibers in the mattress coir blanket penetrate into the soil and create a micro-bond between the soil and the blanket.

Mattress coir woven blankets come in widths of two meters, three meters, and four meters. The available wide widths of the blanket reduce installation labor and save materials due to fewer overlaps. The one hundred percent coconut fiber blanket eliminates problems associated with organic ECBs with either polypropylene or jute nets. Degradation problems with these organic ECBs include the remaining synthetic material after the degradation of organic fibers in the synthetic net organic ECBs or the too rapid degradation of the jute in jute net organic ECBs. The extended functional longevity in the mattress coir woven blanket compared to many other types of organic ECBs guarantees erosion protection for a long period of time and furnishes enough time for the establishment of vegetation. While providing these advantages, the mattress coir woven blanket also costs the same or perhaps less than the double net organic erosion control blankets.

APPLICATIONS OF MATTRESS COIR WOVEN BLANKET

Field evaluation carried out at **Texas Transportation Institute (TTI)** erosion control testing facility in Texas showed good erosion protection and vegetation growth with the mattress coir blanket in slope applications. As a result, the mattress coir blanket is on the **Texas Department of Transportation (TXDOT)** approved product list.

Figure 1 shows an application of the mattress coir woven blanket in a stream bank with rocks at the toe. **Figure 2** shows a stream bank six months after application of mattress coir woven blanket. **Figure 3** shows another stream restoration project one month after installation of mattress coir blanket on bank slopes with coir rolls at the toe. **Figure 2 and 3** both show live woody plant cuttings planted through the mattress coir woven blanket. **Figure 4** is the stream restoration site shown in **Figure 3** two years after installation. All these field applications of the mattress coir woven blanket resulted in completely satisfactory erosion control and establishment of vegetation. The poster presentation will include many other successful applications of the mattress coir woven erosion control blanket.



Figure 1: An application of mattress coir woven ECB in a stream bank.



Figure 2: A stream bank six months after installation of mattress coir woven ECB.



Figure 3: A stream restoration project one month after installation of mattress coir woven ECB and coir rolls.



Figure 4: The stream restoration site shown in Figure 3 two years later.