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मानक

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IS 15871 (2009): Use of coir geotextiles (coir Bhoovastra) in unpaved Roads - Guidelines [TXD 30: Geotextiles and Industrial Fabrics]



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भारतीय मानक

खंडजारहित सड़कों में नारियल जटा के भू-वस्त्रादि  
(नारियल जटा भूवस्त्र) के प्रयोग हेतु मार्गनिर्देश

*Indian Standard*

USE OF COIR GEOTEXTILES (COIR *BHOOVASTRA*)  
IN UNPAVED ROADS — GUIDELINES

ICS 59.080.30

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## FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Geosynthetics Sectional Committee had been approved by the Textile Division Council.

Coir geotextiles (Coir woven *bhoovastra*) is a natural coir mattir. In India most of the village roads are unpaved. These roads are deformed due to high axial loads. The application of coir geotextiles is expected to improve the sub grade strength. Unpaved roads are defined as roads in which the pavement material is unbound. Unpaved roads are used as a temporary or permanent access depending upon conditions. The village roads where the traffic load is less are usually unpaved. The unpaved road on soft subgrade gets deformed due to high axial loads of construction vehicles.

The sub-grade strength is normally expressed in terms of California Bearing Ratio (CBR) value.

During rainy season, due to high hydrostatic pressure there is formation of large depression or potholes. Also due to poor bearing capacity of the soil foundation, the sub-base soil goes under large deformation. To prevent local shear failure either to increase the thickness of the base layer or sub grade improvement through stabilization. The application of coir woven *bhoovastra* will increase the characteristics of the unpaved roads. Coir woven *bhoovastra* will be an ideal geotextile for the unpaved roads.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this standard.

## Indian Standard

# USE OF COIR GEOTEXTILES (COIR *BHOOVA*STRA) IN UNPAVED ROADS — GUIDELINES

### 1 SCOPE

This standard prescribes the guidelines of coir woven *bhoovast*ra suitable for application in unpaved roads including the selection of coir woven *bhoovast*ra and installation methods.

### 2 REFERENCES

The standards listed below contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

<i>IS No.</i>	<i>Title</i>
898 : 1985	Specification for retted coir fibre ( <i>second revision</i> )
9308 (Parts 1 to 3) : 1987	Specification for mechanically extracted coir fibres ( <i>first revision</i> )
13162 (Part 3) : 1992	Geotextiles — Methods of test: Determination of thickness at specified pressure
(Part 5) : 1992	Determination of tensile properties using a wide width strip
15868 (Parts 1 to 6) : 2008	Natural fibre geotextiles (Jute geotextiles and coir <i>bhuva</i> stra) — Methods of test

### 3 MATERIALS

#### 3.1 Coir Woven *Bhoovast*ra

Open structure coir woven *bhoovast*ra made out of coir threads in which each warp thread gets interlaced alternatively over and under by successive weft thread.

### 4 SAMPLING AND INSPECTION

#### 4.1 Roll

The cylindrical rigid package containing a particular type of coir woven *bhoovast*ra rolled on a suitably and wrapped with a roll covering with its outer layer stitched properly.

#### 4.2 Lot

In any consignment all coir woven *bhoovast*ra of the same types and manufactured under similar conditions shall be grouped together to constitute a lot.

### 5 APPLICATION

In order to perform beneficially in road stabilization applications the coir woven *bhoovast*ra must not only be properly designed, it must be properly installed and must be cleared of sharp objects, which could puncture the geotextiles. Coir woven *bhoovast*ra damaged during placement, or installed in a highly wrinkled condition will not perform. Coir woven *bhoovast*ra shall maintain integrity during the course of its life. The aggregate overlay must be placed to its full design depth, and it must be applied in a manner that will not cause damage to the coir woven *bhoovast*ra from movement of construction equipment.

### 6 FUNCTIONS

The main functions of the coir woven *bhoovast*ra in unpaved road application are separation, filtration/drainage and reinforcement. Figure 1 depicts the performance of coir woven *bhoovast*ra in terms of the following functions.

#### 6.1 Separation

This is the principle function of coir woven *bhoovast*ra when placed beneath with aggregate layer of an unpaved road. The coir woven *bhoovast*ra prevents intermixing of aggregate and underlying sub-grade soil. Without the coir woven *bhoovast*ra, loss of aggregate thickness and intermixing of finer grained material reduces load-bearing capacity. A stone is forced down by compaction or the passage of construction plant, the coir woven *bhoovast*ra act to spread the load and tends to cause the whole layer to act together in the manner of a flexible beam. This separation and confinement plus additional strength gained by frictional interlock between the aggregate and coir woven *bhoovast*ra, helps maintain reduced stress on the sub-grade, thereby increasing, load bearing capacity of structural section.

#### 6.2 Filtration/Drainage

The coir woven *bhoovast*ra may also function as a filtration and drainage capacity in the presence of wet or saturated soils. Under dynamic load high pore pressure create soil slurry that pumps upward against the fabric. The coir woven *bhoovast*ra act as a filter screens out fines from contaminating the aggregate layer, while allowing water to drain freely through the aggregate or through the plain of the coir woven *bhoovast*ra.



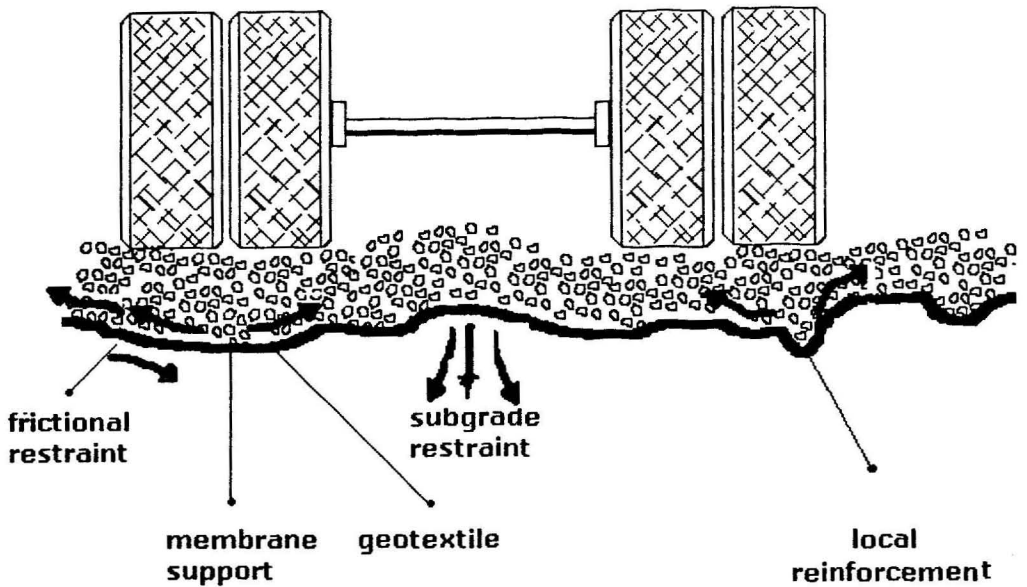


FIG. 1 WAYS IN WHICH A GEOTEXTILE HELPS IN STABILIZING AN UNPAVED ROAD

**6.3 Reinforcement**

The two principal mechanism of the coir woven *bhooastra* is to confine and restrain movement of the granular, structural layer and the so-called membrane effect whereby a fabric that develops high tensile strength under load can induce a vertical stress upward. This aids the granular layer to support vehicular loading while reducing the magnitude of stress imposed upon sub-grade. Coir woven *bhooastra* will ensure that no intermixing takes place at this level and the effective depth of the pavement to remains intact.

6.4 The coir woven *bhooastra* is useful for soft sub-grades with CBR ≤ 3.

**7 INSTALLATION**

The three basic steps involved in installation of the coir woven *bhooastra* are:

- a) Sub-grade preparation,
- b) Geotextile placement, and
- c) Aggregate application and compaction.

The area over which the coir woven *bhooastra* is to be placed must be cleared of sharp objects, tree stumps

or large stones that could puncture the coir woven *bhooastra*. The area should be excavated, stripping away soft soil or unsuitable base materials, then compacted to design grade.

The coir woven *bhooastra* is unrolled on to the prepared sub-grade in the direction that aggregate will be placed. The coir woven *bhooastra* sections must be overlapped side-to-side and end-to-end around 0.5 m. The edges of coir woven *bhooastra* should slope towards drainage ditches or other drain systems that parallel the roadway. Granular material can now be back dumped on to the coir woven *bhooastra*, beginning on firm ground just in front of the coir woven *bhooastra* edge.

The aggregate is then spread to a thickness sufficient to allow subsequent compaction. Initial compaction can be accomplished and then fully compacted. Ruts must not be graded down; rather, they should be filled with additional aggregate and compacted.

**9 SELECTION OF COIR WOVEN BHOOVASTRA**

The choices of coir woven *bhooastra* basically depend on the type of pavement to be protected.

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### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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