



NatureFabrics

INDIAN  
**jute**  
A Versatile Natural Fibre

# Use of Jute Geotextiles as Sustainable Materials in construction of Roads & Slope Protection

*by*

*Dr. Mahadeb Datta*

*&*

*Shri Monimoy Das*



**NATIONAL  
JUTE BOARD**

**Ministry of Textiles, Govt. of India**

- **Jute & Jute Geotextiles (JGT)**
- **Basic Functions of JGT , Application Areas in Civil Engineering field and laying of JGT**
- **Standards and Guidelines**
- **Case Studies on PMGSY Road Construction using JGT**
- **Performance Evaluation of JGT - India & Bangladesh**
- **Support of NJB**
- **List of JGT using Organizations**



# JUTE & JUTE GEOTEXTILES (JGT)



**Plant**



**Fibre**



**Fabric**

## Glimpse of Jute Geotextiles for use in various Civil Engineering Field



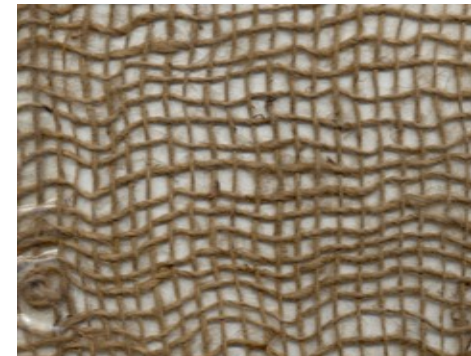
**Woven JGT**

**IS 14715 Part I & Part II : 2016**



**Non Woven JGT**

**IS 17070 :2018**

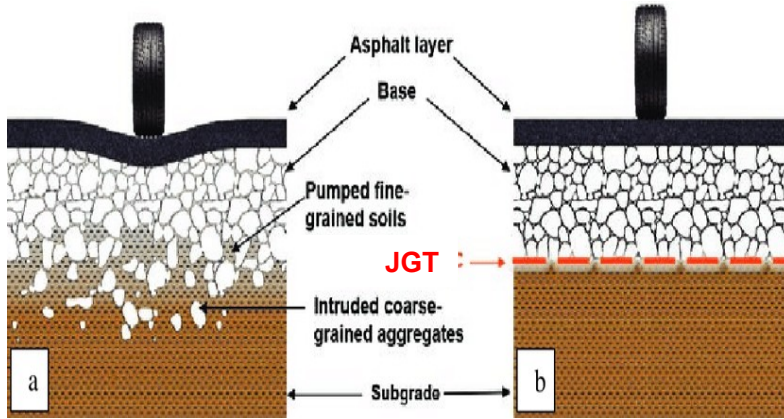


**Open Weave JGT**

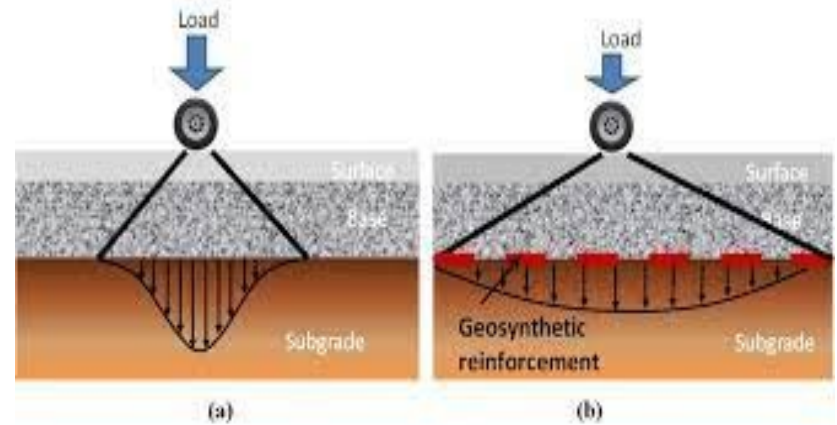
**IS 14986:2001**



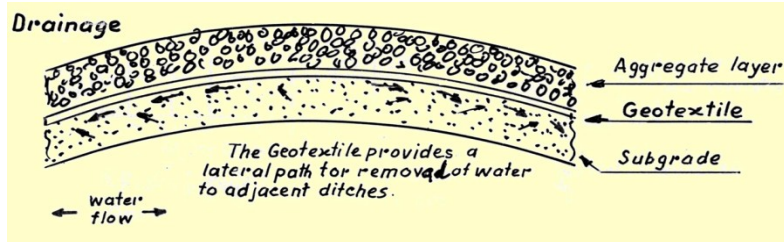
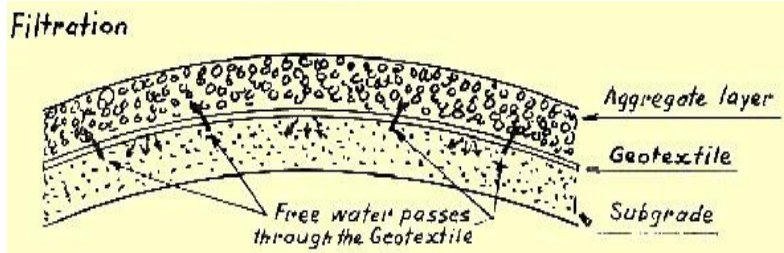
# BASIC FUNCTIONS OF JUTE GEOTEXTILES



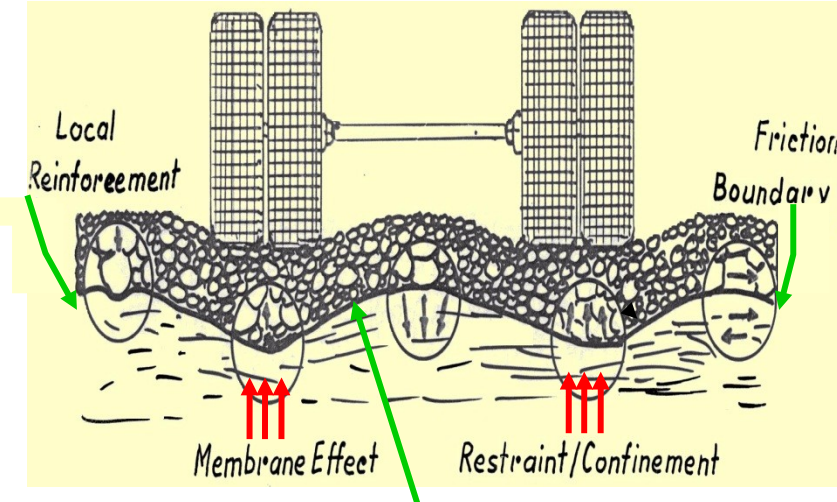
**SEPARATION**



**INITIAL REINFORCEMENT**



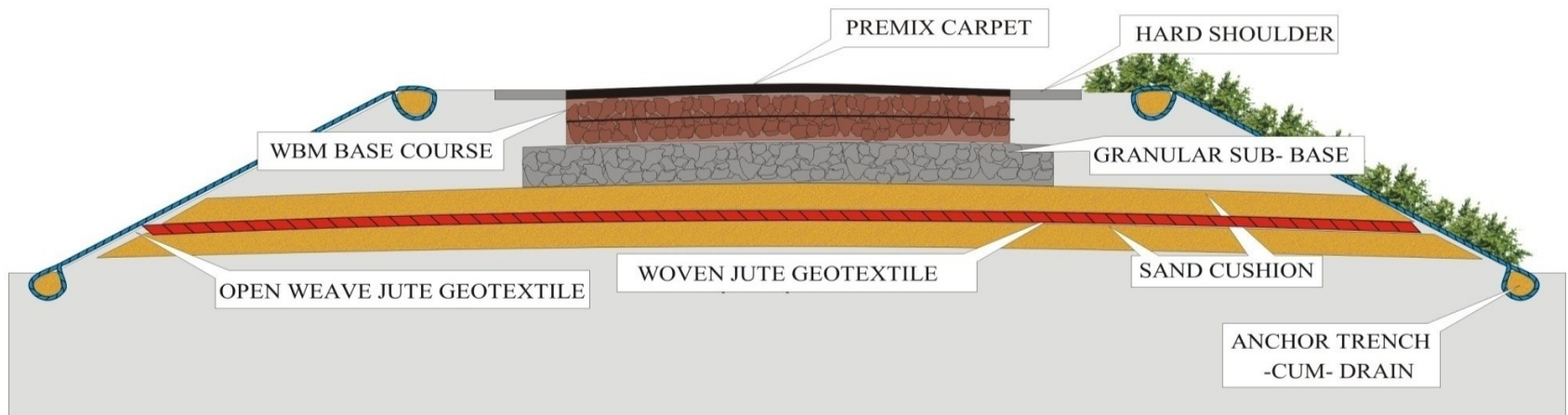
**FILTRATION & DRAINAGE**



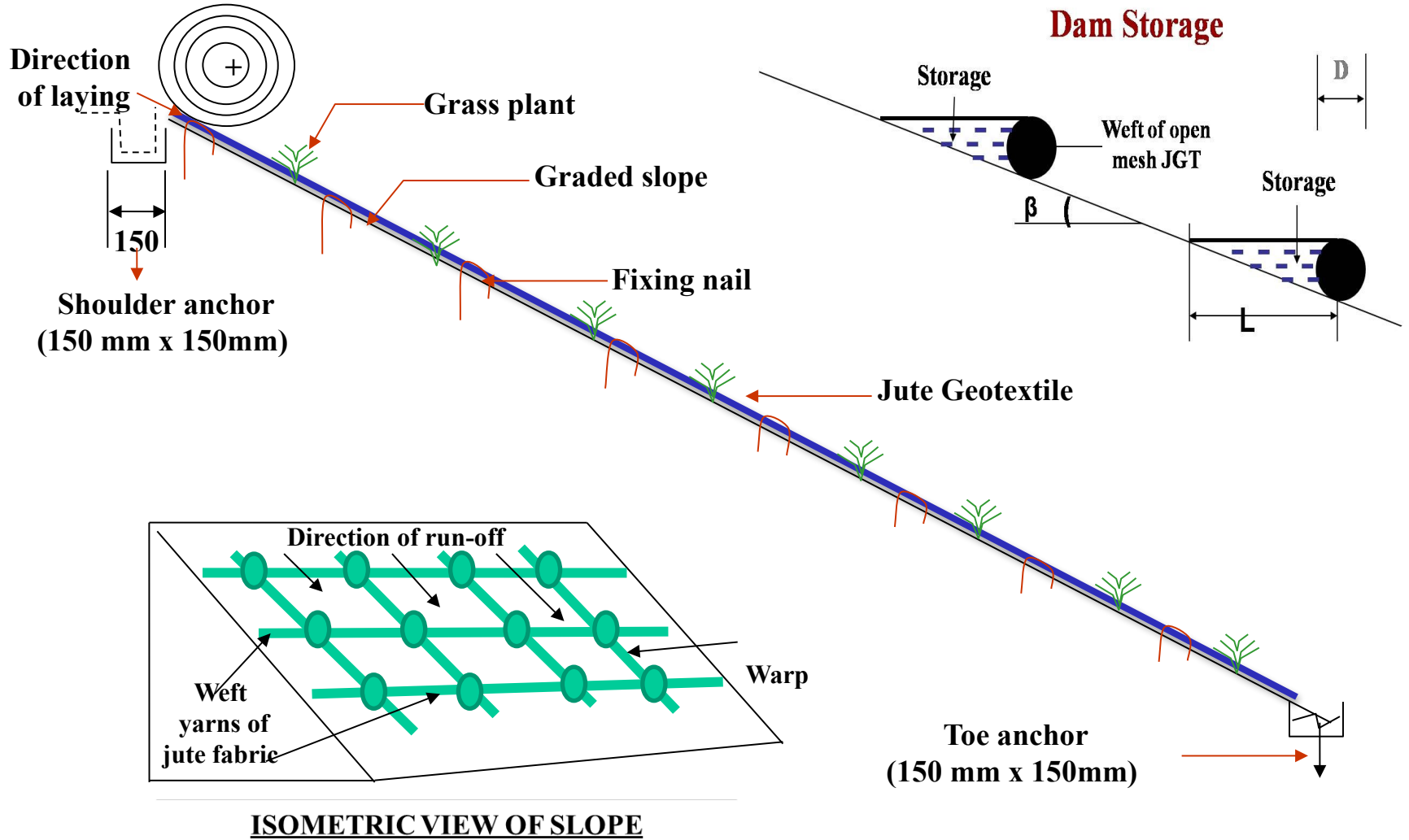
**MEMBRANE EFFECT OF JGT**

Jute Geotextiles

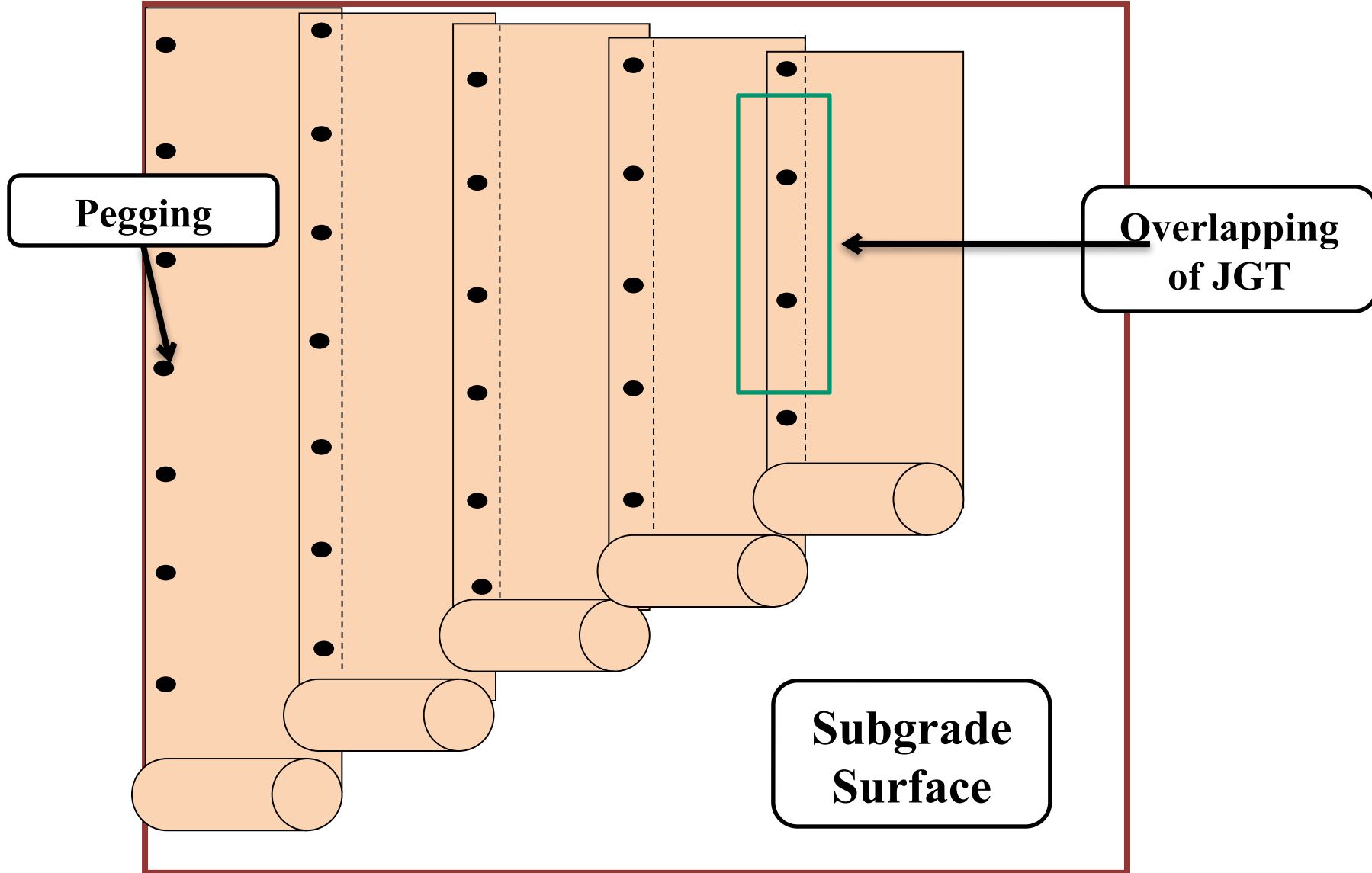
## STRENGTHENING OF ROAD WITH JUTE GEOTEXTILE



# APPLICATIONS OF JGT - SLOPE PROTECTION



Jute Geo-Textiles



## Standards and Guidelines :

### BIS

- ❖ Guidelines for application of Jute Geo-textiles for rain water erosion control in road & railway embankments and hill slopes( IS 14986:2001)
- ❖ Guidelines on rural road construction with JGT ( IS 14715 Part I : 2016 )
- ❖ Guidelines on river bank protection with JGT ( IS 14715 Part II : 2016 )
- ❖ Guidelines for jute sapling bag for growth of sapling in nurseries ( IS 16089 : 2013 )
- ❖ Jute Agrotexiles for growth of plants and suppression of weeds ( IS 17070 :2018)

### RD&SO, Ministry of Railways –

- ❖ Guideline no GE:G1 (July 2003)—
- ❖ Guidelines for earthwork in railway projects, 2007
- ❖ Unified Standard Schedule of Rates by Indian Railways,2019

### Indian Roads Congress—

- ❖ Specifications for road & bridge works (2001) & Recommended practice for treatment of embankment slope & erosion control (1991)
- ❖ State-of-the Art Report on JGT prepared jointly by CRRI, IJIRA & NJB has been published by Indian Roads Congress in November 2011
- ❖ Guidelines for the Design and Construction of Low Volume Rural Roads Using Jute Geotextiles, IRC :SP:126-2019

### Schedule of Rates –

**PWD, WBSRDA & I / W – Govt. of WB, PWD – Govt. of Assam & Meghalaya, BRO and all the 17 Divisions of Indian Railways**



# Case Studies

## Strengthening of road sub-grade, Kanksa to Bati, Murshidabad, WB

**Length of Road: 8.08 km**



**Pre-work**



**Laying of 724gsm woven JGT**



**Sub-base spreading & roller compaction**



**Condition of road after 2.5 years**

**Before Construction  
CBR (%)**

**2.6**

**After construction of  
2.5 Year- CBR (%)**

**7.42**

# Case Studies



## PMGSY Road from Jibantala to Motherdighi Mouza , S-24 Pgs WB

**Length of Road: 4.480 km**

**Year of construction- 2019**



**installation of 724gsm woven JGT on sub-grade**



**Before Construction  
CBR (%)**

**3.5**

**After construction  
of 2 Year CBR (%)**

**5.52**

**Condition of the road during inspection with NRIDA team, Sept. 2021**

Jute Geo-Textiles

# Case Studies



**Arresting Crack & Potholes of rural road under PMGSY with the**

**Use of 292gsm open weave JGT at Mansorabad, Allahabad, UP**



**Damaged road**



**Spreading Prime & Tack Coat**



**Laying of JGT**



**Spreading Prime & Tack Coat on JGT**



**Pre-mix Carpeting**



**Condition of Road after 3 years**

Jute Geo-Textiles

# Case Studies



## Gayabari Paglajhora land slide area on NH 55, Gayabari, Darjeeling



**Before application**



**During application**



**Progress of vegetation growth after application**

## Slope Stabilization of Cuttings, N Rly, Nangal, Panjab



**Eroded Slope of Cuttings**



**Sprouting of grass seeds through pores of JGT**



**Slope Stabilized with Vegetative Cover**

Jute Geotextiles

# Performance evaluation – INDIA part

Sl. No.	Name of the Road	Performance Evaluation done by	CBR before construction	CBR after construction	Span of time while the CBR increased(months)
1.	Udal to Chakbrahma, South Dinajpur, West Bengal	IEST	2.8	11.39	47
2.	Nihinagar to Hazratpur, South Dinajpur, West Bengal	IEST	2.2	7.93	47
3.	Kanksa to Bati, Murshidabad, West Bengal	IEST	3.8	7.42	33
4.	Bagdimarimulo Barada Nagar to Damkal Kheya Ghat, Mathurapur, South 24 Paraganas, West Bengal	IEST	3.5	11.11	29
5.	Promod Nagar to Muga Chandra Para, Agartala, Tripura	NEST (NABL & ISO accredited)	8	10.86	19
6.	Koracharahatti to T-10 Road, Bidar, Karnataka	University B.D.T. College of Engineering	4	13.4	36
7.	Devarahospet to Gundur, Davangere, Karnataka	University B.D.T. College of Engineering	2.8	14.6	36

Source: Study report of the Project on “Development and Application of Potentially Important Jute Geotextiles (CFC/IJSG/21)” funded by the Common Fund for Commodities.

# Performance evaluation-BANGLADESH part

Sl. No.	Name of the road	Performance Evaluation done by	CBR before construction	CBR after construction	Span of time while the CBR increased (Months)
1.	Turag- Rahitpur Bourvita Road	BUET	3 (With JGT) 3 (Without JGT)	13.57 9.64	50
2.	Circular Road at Savar Cantonment	BUET	3.6 (With JGT) 3.6 (Without JGT)	12.68 7.61	34
3.	Bancharampur southpara, Brahmanbaria	BUET	2.3(With JGT) 2.3 (Without JGT)	13.10 6.50	31
4.	Tezkhali- Titas Riverghat Road Brahmanbaria	BUET	3.3 (With JGT) 3.3 (Without JGT)	8.2 7.7	33
5.	Noabanki Shamnagar Road Sathkira	BUET	1.4 (With JGT) 1.4 (Without JGT)	19.80 5	39

Source: Study report of the Project on “Development and Application of Potentially Important Jute Geotextiles (CFC/IJSG/21)” funded by the Common Fund for Commodities.

**Provides technical support and guidance to the manufactures for producing standard quality of JGT.**

**Customization of JGT to address site-specific requirements.**

**Provides technical support and guidance in selection of right type of JGT & its installation at site apart from other remedial measures.**

**JGT is available from selected jute mills; NJB helps the end-users in procuring the right quality of JGT from the right manufacturers/suppliers and its testing with certification.**

**Conducts awareness programme all over the country and also take classes for the trainee engineers at IAHE,IRICEN, CRRI, RCTRC etc. as guest faculty.**

# LIST OF JGT USING ORGANIZATIONS

Sl. No.	Govt. of India Organization	Sl. No.	State Govt. Departments
1	ICAR-Indian Institute of Soil and Water Conservation (ICAR-IISWC)	1	SRDAs - WB, Assam, Odisha, MP, Chh'garh, Karnataka, Tripura, Monipur, UP, TN
2	Western Coalfields Ltd.	2	P.W.D. – W.B., Assam, Orissa, U.P.
3	Northern Coalfields Ltd.	3	I & W D – W.B. & Agri-Irrg.-WB
4	Border Roads Organization (BRO)	4	Irrigation & Public Health Deptt, Govt. of H.P.
5	Border Road Task Force (BRTF) Port Blair	5	Water Resource Department, Govt. of Orissa
6	National Hydroelectric Power Corporation (NHPC)	6	Sardar Sarobar, Narmada Nigam Ltd., Govt. of Gujrat
7	National Thermal Power Corporation (NTPC)	7	Department of Agriculture, Rajasthan
8	Indian Railways : Northern, Eastern, NF, SE, ECR etc.	8	Forest Deptt., Govt. of H.P.
9	Kolkata Port Trust	9	Horticulture Deptt, Govt. of H.P.
10	Kandla Port Trust	10	Forest Department, Arunachal Pradesh
11	National Highway Authority (NHAI)	11	Forest & Environment, Govt. of Sikkim
12	Central Tobacco Research Institute, Karnataka	12	Delhi Development Authority (DDA)
	<b>Municipality &amp; Other Organizations</b>	13	ICAR, Meghalaya
1	Kankinada Municipality	14	West Bengal Transport Infrastructure Development Corporation (WBTIDC)
2	Tata Nano Plant (Gujrat), TISC (Jharkhand)	15	Forest Department, Govt. of West Bengal
3	Agri-Horticulture, Kolkata	16	Forest Department, Govt. of Haryana
4	Indian Tea Research Association, Assam	17	MGNREGA, West Bengal





# THANK

For further details pl. contact National Jute Board

E mail – [jute@njbindia.in](mailto:jute@njbindia.in),

Website- [www.jute.com](http://www.jute.com)

# YOU