

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
স্থানীয় সরকার প্রকৌশল অধিদপ্তর
আগারগাঁও, শের-ই-বাংলা নগর
ঢাকা – ১২০৭।
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স্মারক নং - এলজিইডি/সিই/ডিঃইউঃ/ডি- ১৮৪/২০১২/১৬০০

তারিখঃ ০৭/০১/২০১৬ ইং

প্রাপকঃ

- ১। প্রকল্প পরিচালক (সকল)
স্থানীয় সরকার প্রকৌশল অধিদপ্তর
- ২। নির্বাহী প্রকৌশলী (সকল)
স্থানীয় সরকার প্রকৌশল অধিদপ্তর

বিষয়ঃ মাননীয় প্রধানমন্ত্রীর নির্দেশনা বাস্তবায়নের লক্ষ্যে এলজিইডি'র নির্মাণ কাজের প্রযোজ্য ক্ষেত্রে সিনথেটিক জিওটেক্সটাইল এর পরিবর্তে শত ভাগ জুট জিওটেক্সটাইল ব্যবহার প্রসঙ্গে।

সূত্রঃ পাট অধিদপ্তরের স্মারক নং – ২৪.০১.০০০০.০০৪.০৭১.০০৩.১৫- ২৭২, তারিখঃ ০৩/১২/২০১৫ ইং।

উপর্যুক্ত বিষয় ও সূত্রের প্রেক্ষিতে জানানো যাচ্ছে যে, মাননীয় প্রধানমন্ত্রীর অনুশাসন/ নির্দেশনা বাস্তবায়নের লক্ষ্যে পাট পণ্যের অভ্যন্তরীণ ব্যবহার বৃদ্ধির জন্য এলজিইডি'র আওতাধীন নির্মাণ কাজের প্রযোজ্য ক্ষেত্রে সিনথেটিক জিওটেক্সটাইলের পরিবর্তে শত ভাগ জুট জিওটেক্সটাইল ব্যবহার নিশ্চিত করতে এলজিইডি'র Schedule of Rates, July 2015 –তে জুট জিওটেক্সটাইল অন্তর্ভুক্ত করা হয়েছে যা নিম্নে প্রদত্ত হলো।

Chapter	Item Code	Short Description	Type of Work
Chapter 3: Road Works	3.11.24.01	JGT-RBP: Grade 627 gsm treated with Bitumen	River Bank Protection
	3.11.24.02	JGT-RBP: Grade 627 gsm treated with additive/ chemical	
	3.11.25.01	JGT-HSM: Grade 500 gsm	Hill Slope Management
	3.11.25.02	JGT-HSM: Grade 600 gsm	
	3.11.25.03	JGT-HSM: Grade 700 gsm	
Chapter 4: Bridge Works	4.14.13.01	JGT-RRC: Grade 627 gsm	Rural Road Construction
	4.14.13.02	JGT-RRC: Grade 724 gsm	
	4.14.14.01	JGT-RBP: Grade 627 gsm treated with Bitumen	River Bank Protection
	4.14.14.02	JGT-RBP: Grade 627 gsm treated with additive/ chemical	
	4.14.15.01	JGT-HSM: Grade 500 gsm	Hill Slope Management
	4.14.15.02	JGT-HSM: Grade 600 gsm	
	4.14.15.03	JGT-HSM: Grade 700 gsm	

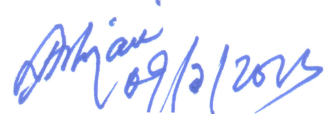
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার - এর বস্ত্র ও পাট মন্ত্রণালয়ের অধীণ জুট ডাইভারসিফিকেশন প্রমোশন সেন্টার (জেডিপিসি) কর্তৃক তিনটি ভিন্ন ক্ষেত্র তথা, Rural Road Construction, River Bank Protection ও Hill Slope Management - এ জুট জিওটেক্সটাইল ব্যবহারের জন্য ইনস্টলেশন পদ্ধতি প্রণয়ন করা হয়েছে যা অত্রসাথ সংযুক্তি আকারে প্রেরণ করা হলো।

এমতাবস্থায়, বর্ণিত অবস্থার প্রেক্ষিতে এখন থেকে ব্রিজ, সড়কসহ প্রযোজ্য সকল ক্ষেত্রে জেডিপিসি কর্তৃক প্রণীত ইনস্টলেশন পদ্ধতি অনুসরণ পূর্বক সিনথেটিক জিওটেক্সটাইলের পরিবর্তে শত ভাগ জুট জিওটেক্সটাইল ব্যবহারের প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য নির্দেশ প্রদান করা হলো।

বিষয়টি অতীত জরুরী

সংযুক্তিঃ

জেডিপিসি কর্তৃক প্রণীত জুট জিওটেক্সটাইল ইনস্টলেশন পদ্ধতি


(শ্যামা প্রসাদ অধিকারী)
প্রধান প্রকৌশলী
ফোনঃ +৮৮০ ২ ৯১২৪০২৭
ইমেইলঃ ce@lged.gov.bd

অনুলিপিঃ

- ১। অতিরিক্ত প্রধান প্রকৌশলী (সকল), স্থানীয় সরকার প্রকৌশল অধিদপ্তর।
- ২। তত্ত্বাবধায়ক প্রকৌশলী (সকল), স্থানীয় সরকার প্রকৌশল অধিদপ্তর।



**Development and Application of Potentially
Important Jute Geo-textiles(CFC/IJSG/21)
Bangladesh Part**

**Installation Method
for
Rural Road Construction, River Bank
Protection & Hill Slope Management**



Jute Diversification Promotion Centre(JDPC)
Ministry of Textiles & Jute
Government of the People's Republic of Bangladesh



In the life span of 120 days, jute crop per hectare can absorb about 12 MT of CO₂ from atmosphere and liberate 11 MT of O₂.

JGTs can lead us to a sustainable environment by bringing resilience and harmony in nature.



JGT may secure a market bigger than what it was a few years back due to its versatility.

JGT application in civil construction would usher in new days of glory for jute.



Development and Application of Potentially Important Jute Geo-textiles (CFC/IJSG/21), Bangladesh Part

Installation Method for Rural Road Construction, River Bank Protection & Hill Slope Management

September-2014

Prof. Dr. Abdul Jabbar Khan

Department of Civil Engineering
Bangladesh University of Engineering and Technology (BUET)
Prepared Under the CFC/IJSG/21 Project

Development and Application of Potentially Important Jute Geo-textiles (CFC/IJSG/21), Bangladesh Part

Relevant Project Information

Location of the Project	: Bangladesh & India
Duration	: (5 years from 01.01.2010 to 31.12.2014)
Estimated Total Cost	: USD 3,962,826
Financing from the Common Fund for Commodities (CFC)	: USD 2,045,000 (Grant) (Bangladesh USD 4,26,500)
Counterpart In kind Contribution (GoI) & (GoB)	: USD 1,807,826 (GoB 5,67,090)
Other Contributions	: USD 110,000 (JDPC & Pvt. Partner BD 35,000)
Project Executing Agency	: National Jute Board (NJB), Kolkata, India
Supervisory Body	: International Jute Study Group (IJSG)
Collaborating Institutions	: National Jute Board for India part & Jute Diversification Promotion Centre for Bangladesh part

Project Component

Component - 1	: Market Needs Assessment & Supply Chain Analysis
Component - 2	: Identification of Potentially Important Jute Geo-textiles based on Performance Evaluation
Component - 3	: Manufacture of the identified/selected potentially important JGT and its standardization
Component - 4	: Documentation and Dissemination
Component - 5	: Project Management and Reporting

Project Facilitating / Implementing Agencies (Bangladesh Part)

1. Bangladesh University of Engineering and Technology (BUET)
2. Bangladesh Jute Research Institute (BJRI)
3. Soil Resources Development Institute (SRDI)
4. Local Government Engineering Department (LGED)
5. Bangladesh Water Development Board (BWDB)
6. Roads & Highways Department (RHD)
7. Special Works Organization (SWO) of Armed Forces Division
8. Bangladesh Jute Mills Corporation (BJMC)
9. Janata Jute Mills Limited (JJML)

Installation Method for Rural Road Construction

1. Untreated 627 gsm (gram per square meter) or 724 gsm may be used for rural or union road construction depending on traffic volume.



Fig 1: 627 gsm JGT



Fig 2: 724 gsm

2. The subgrade is to be prepared to the required level, cleared of all foreign materials and compacted to the OMC (Optimum Moisture Content) and Specified Energy. Vegetation, if any should be uprooted and the area leveled with earth and rolled



Fig 3: Preparation of subgrade

3. A thin layer (maximum 75 mm thick) of Improved Subgrade (ISG) of local sand should be placed first on the subgrade ensuring desired compaction.

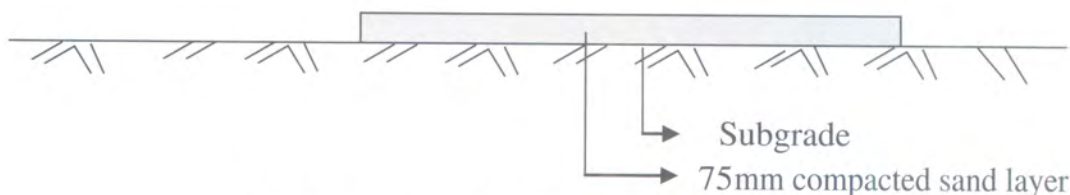


Fig 4: Preparation of ISG layer over subgrade

4. JGT, as selected, should be laid by unrolling, ensuring proper drapability (i.e. JGT should touch the ISG surface at all points) and stapled at an interval of 300 mm with overlaps of 100 mm. Staples should be preferably 6 mm dia U-shaped pegs or 37 mm long mushroom nails. It is preferable to avoid overlaps to the extent possible.

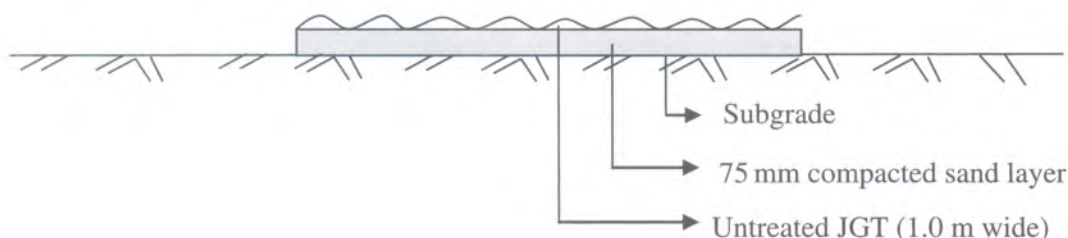


Fig 5: Placement of JGT over ISG layer

5. Another thin cushion of local sand (75 mm thick or as required), i.e. the second layer of Improved Subgrade (ISG) should then follow over the JGT to prevent puncture/damage due to rolling of the upper sub-base/base-layer.

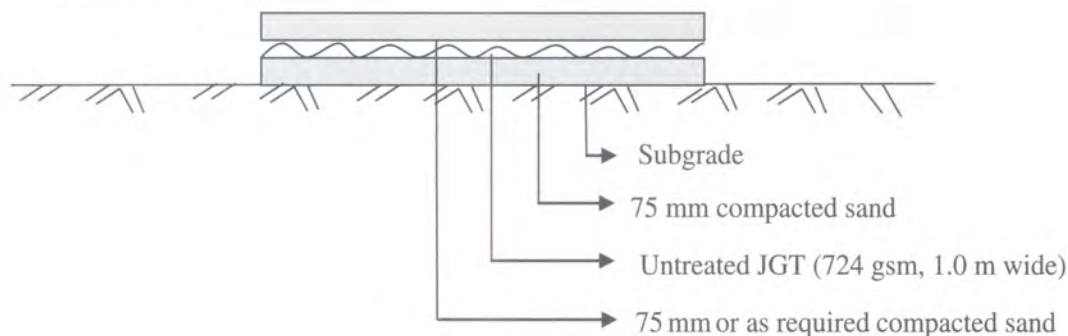


Fig 6: Preparation of another ISG layer over JGT

6. The first layer of aggregates in the base-layer should then be spread with gradings as recommended in design. No traffic should be allowed on uncompacted base with less than 200 mm (150 mm for CBR ≥ 3) thickness laid over JGT.

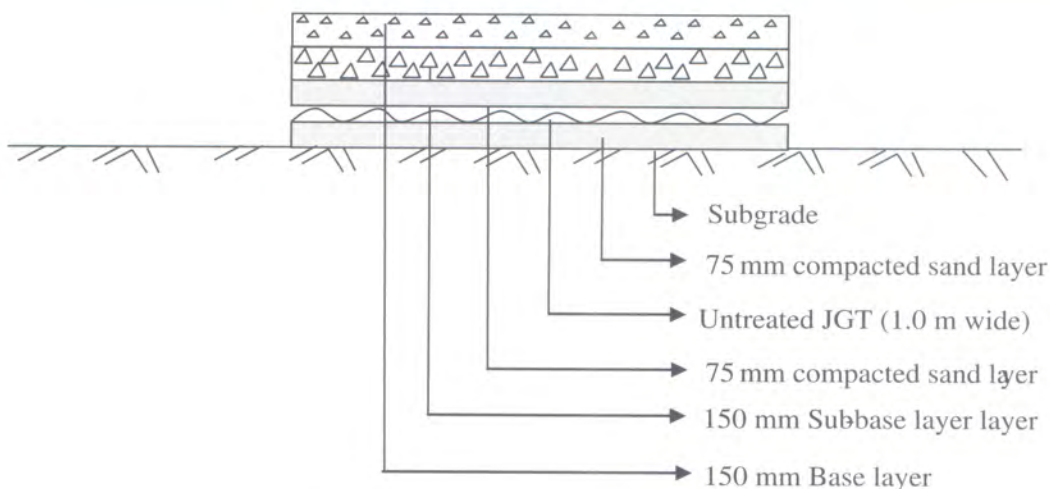


Fig 7: Preparation of sub-base and base layer

7. The subsequent layers should be constructed following the usual practice of relevant agency/organization.

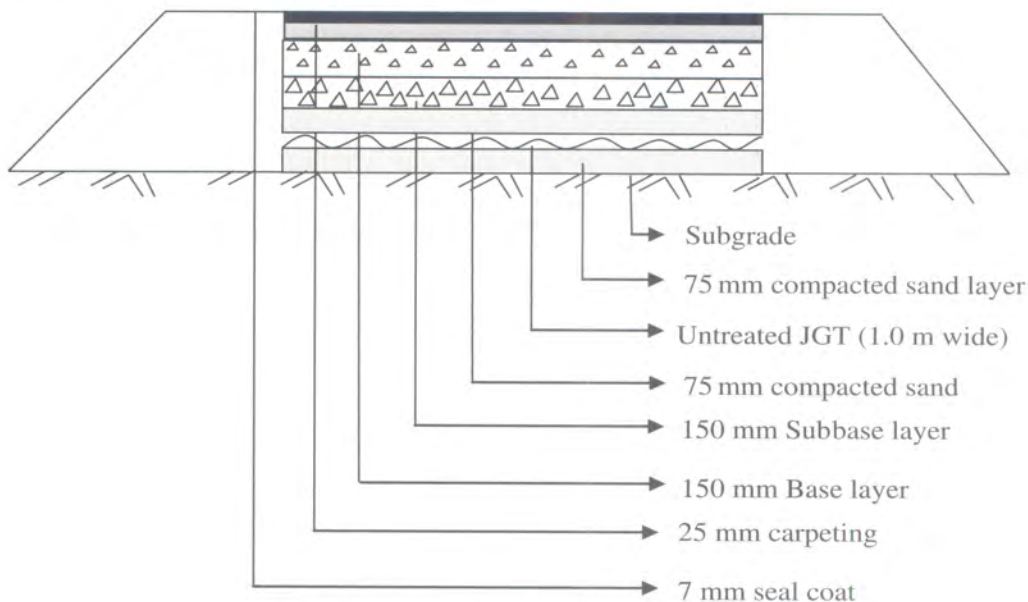


Fig 8: Cross-section for flexible pavement

8. Any rut that may be developed during construction should be filled in.

9. Parallel rolls of JGT should be overlapped and stapled.

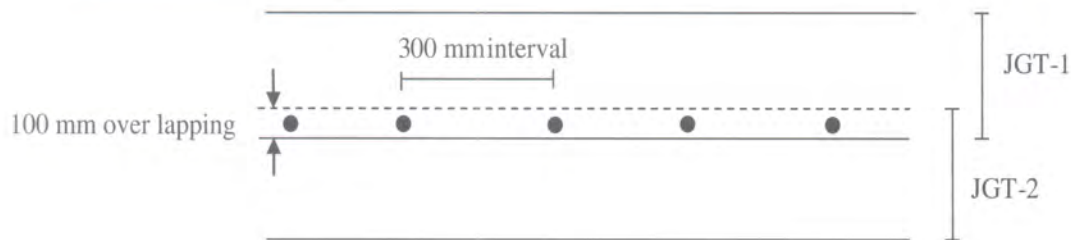


Fig 9: Overlapping of JGT

10. For application in curves, JGT should be folded or cut and overlapped in the direction of the turn. Fold in JGT should be stapled at an interval of 300 mm.

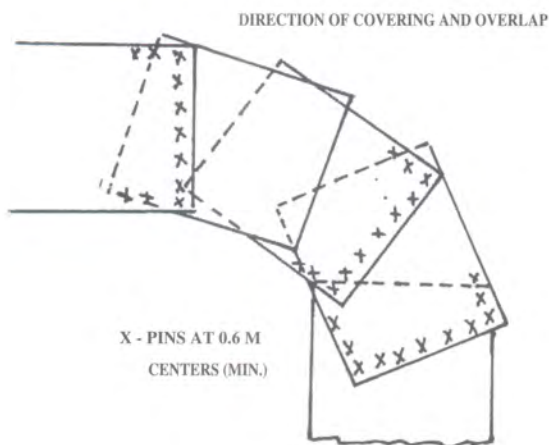


Fig 10: Folding of geo-textile in curves

11. Before covering up the JGT, its condition should be assessed for any constructional/installation damage. Torn/damaged portions may be covered by pieces of JGT and duly stapled on all sides preferably at interval of 75 mm. The extent of overlap will be such as to fully cover the damaged/torn portion fully plus at least 75 mm beyond, on all sides.

Installation Method for River Bank Protection

1. Only treated 627 gsm JGT shall be used for protection of mild to moderate river bank.



Fig 1: Bitumen treated JGT

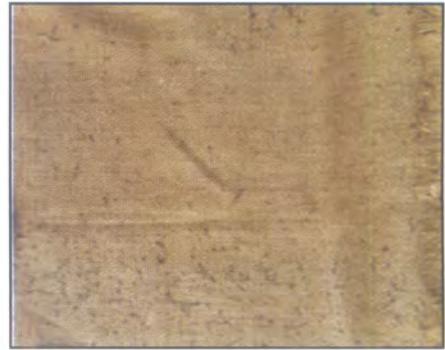


Fig 2: Additive treated JGT

2. The bank should first be cut/filled to a stable slope at an angle of internal friction of the bank soil usually 1V:2H or 1V:3H.

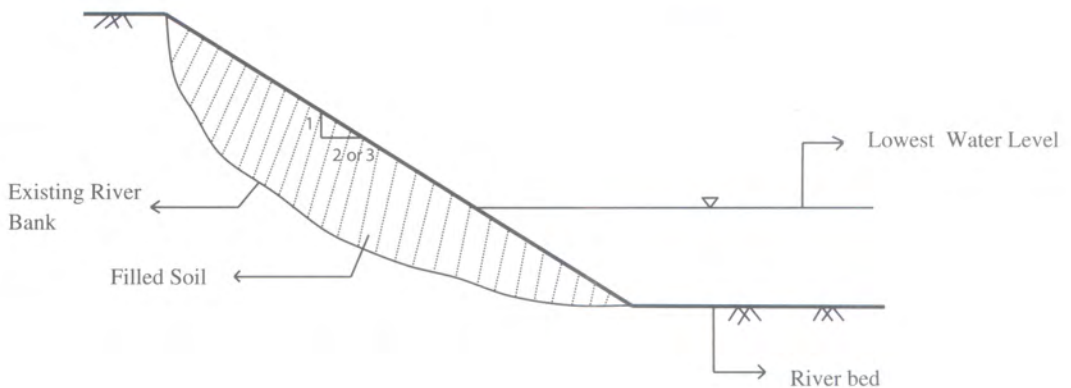


Figure 3: Preparation of bank to specified slope (in case of fill)

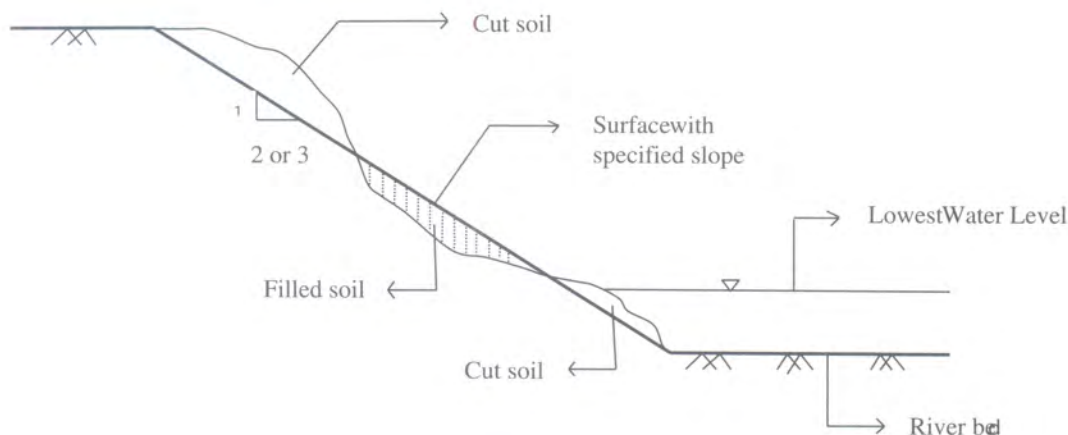


Figure 4: Preparation of bank to specified slope (in case of both fill and cut)

3. The surface should be leveled and made free from angular projections, undulation, soil-slurry or mud. Anchoring trench (usually rectangular) should be excavated at the top of bank-slope. Recommended dimensions of the trench 500 mm deep and at least 250 mm wide at the bottom. The trench should be free from foreign materials, mud etc.

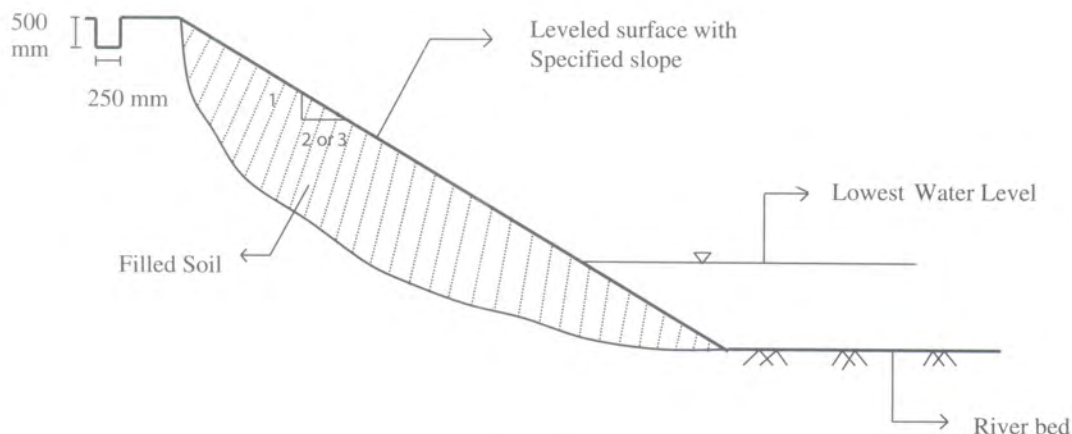


Figure 5: Preparation of Trench (250mm x 500mm)

4. Sand cushion is provided over leveled surface before the placement of JGT. Usually, fineness modulus of sand lies in between 1.0 to 1.5.

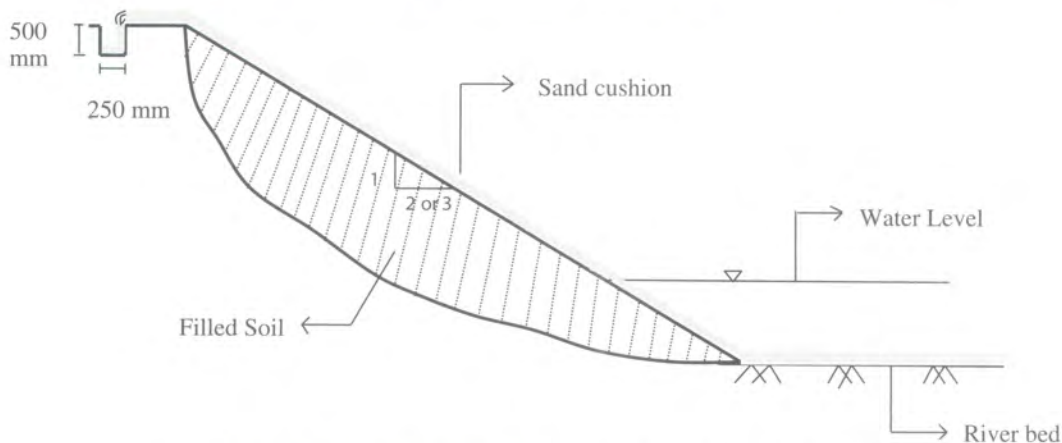


Figure 6: Preparation of sand cushion over leveled surface

5. JGT should then be unrolled along the slope from top to down up to the lowest point of the slope (including falling apron).

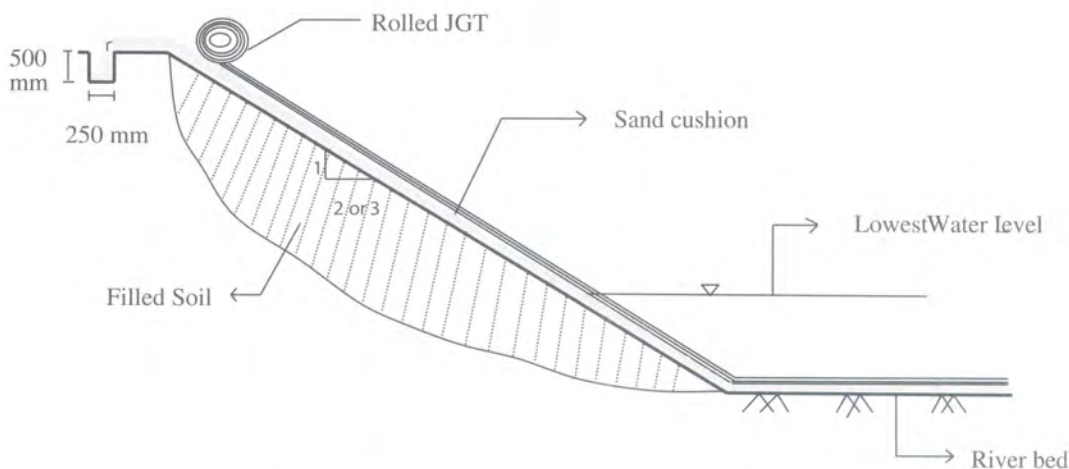


Figure 7: Placement of JGT over bank slope

6. JGT should be adequately embedded in the trench. The anchorage trench should then be filled with stones/boulders for securing and protecting JGT.

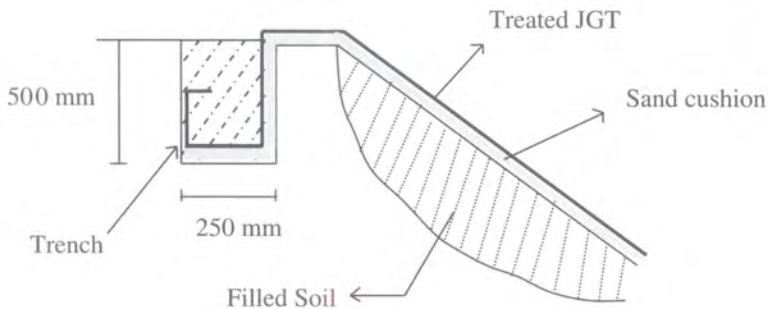


Fig 8: Anchorage of JGT

7. Care should be taken to ensure that JGT does not suffer damage due to puncture, tear and similar operational stresses.
8. The recommended overlap is 100 mm (minimum). The overlapped portion should be pegged at an interval of 300 mm using 6mm wire U-hook or mushroom shaped 37 mm long nails.

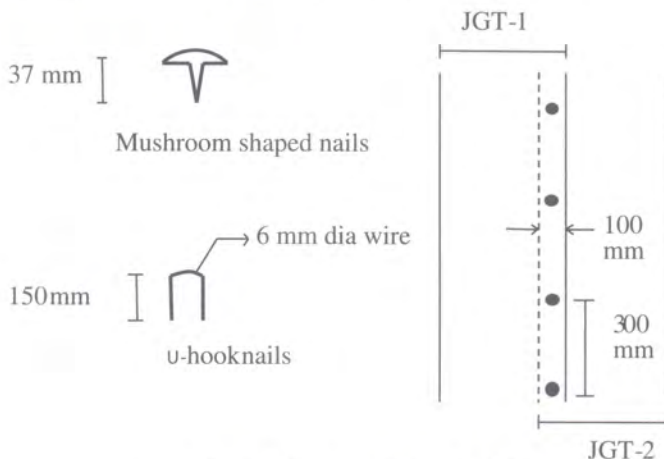


Fig 9: Overlapping of JGT

9. Care should be taken to ensure that JGT touches the bank slope at all points (proper drapability).

10. 75 mm – 100 mm thick brick aggregate layer is provided over JGT.

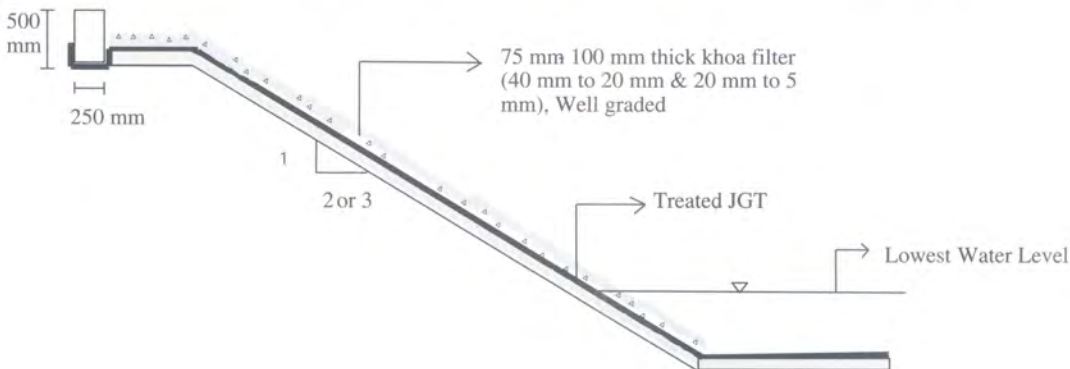


Figure 10: Placement of brick aggregate layer over JGT

11. Armour overlay of stone/boulder should then be placed on the JGT carefully. It should be ensured that armour stones/boulders are not dropped on the aggregate layer.

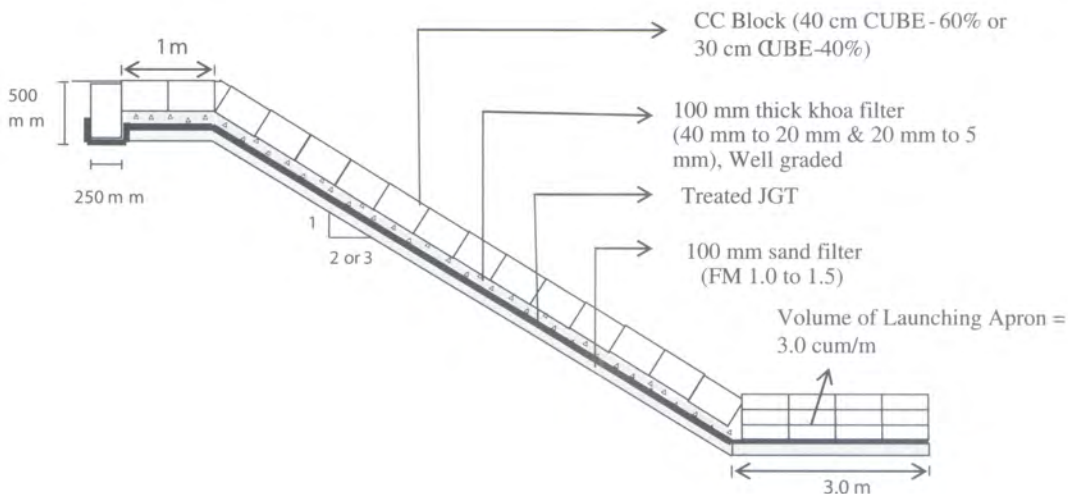


Figure 11: Placement of concrete blocks on brick aggregate layer covering the launching apron

Installation Method for Hill Slope Management

1. Only 500 gsm or 700 gsm open mesh type JGTs should be used.



Fig 1: 500 gsm JGT



Fig 2: 700 gsm JGT

2. The soil surface is to be leveled without any sharp aggregate protruding over it. (If necessary the slope may be regraded to the angle of internal friction of the soil prior to leveling)

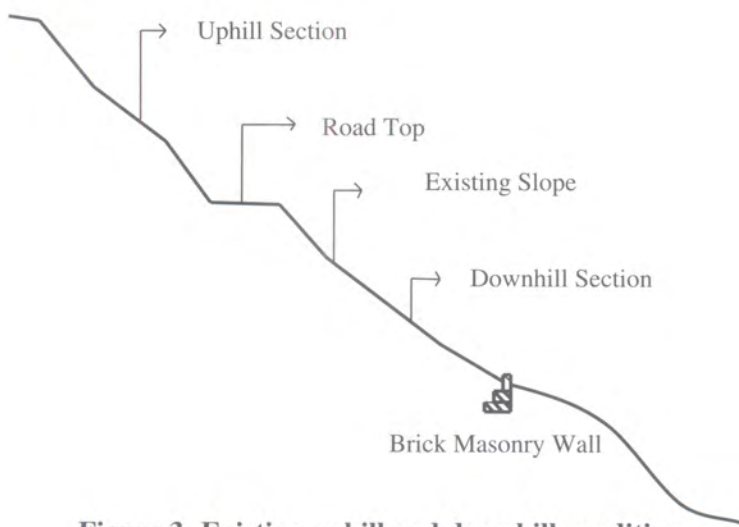


Figure 3: Existing uphill and downhill condition

3. Broadcasting of seeds of appropriate vegetation. Holes may be dug in selected locations for sowing of selected plants or trees.

N.B. The plants/trees shall have to be environmental friendly. They must have a widespread canopy of leaves. Roots must be strong enough and wide spread into the ground. The depth of root system should be at approximately 1 m.



Figure 4: Root system of Gyma plant as an example

4. Unrolling of JGT (soil saver) from the top of the slope to the bottom along the direction of surface run-off.

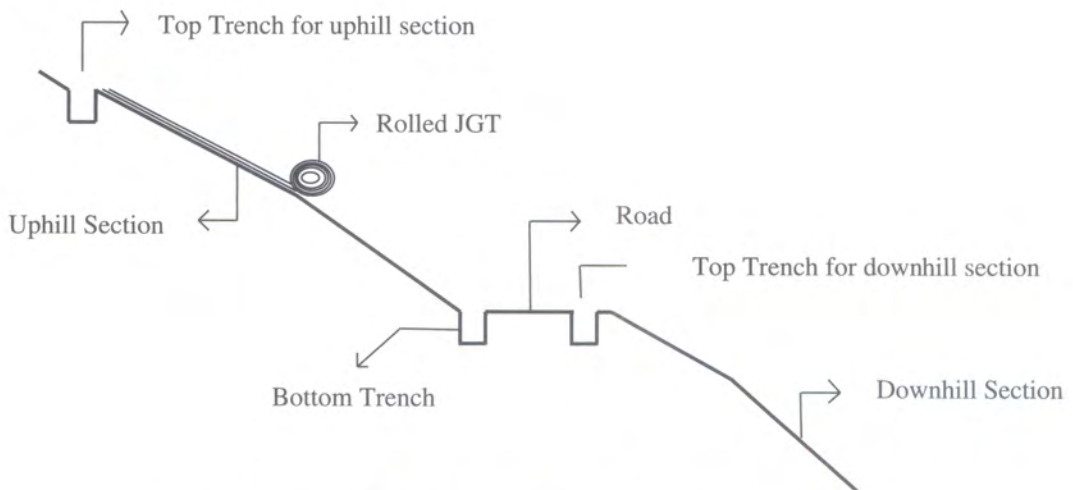


Fig 5: Unrolling of JGT in the direction of surface run-off

5. JGT (soil saver) should be carefully handled so that no part of it is torn.
6. JGT (soil saver) should be anchored with staples (U-shaped) into the ground at a specified spacing.



Figure 6: 'U' hook used for JGT application

7. JGT (soil saver) should be anchored within a trench at the two ends by filling the trench with big bats / gravel or other suitable materials.

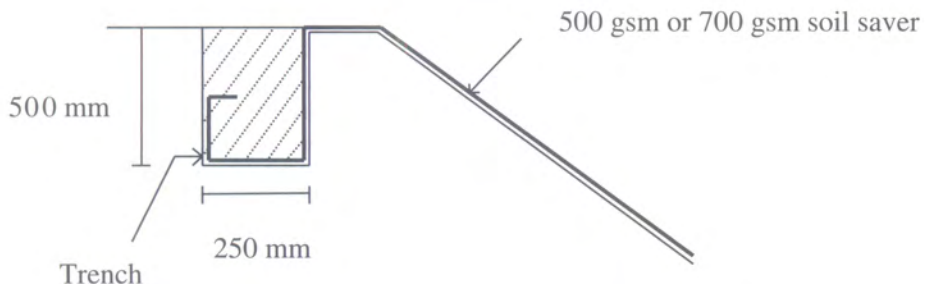


Figure 7: Cutting of trench for JGT anchorage

8. Care should be taken to ensure drapability of JGT (soil saver) i.e. the fabric must touch the ground at all points.

9. Overlaps should be 100 mm at the sides and 150 mm at the ends.

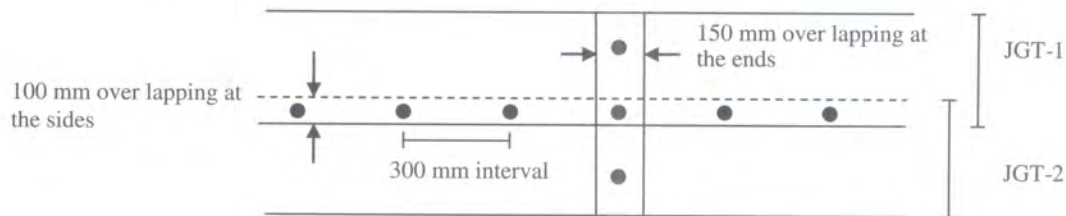


Fig 8: Overlapping of JGT

10. Plants / trees may be sowed at the predetermined holes.

N.B. Sowing / planting procedures are not uniform and depend on the types of species, soil composition, rainfall etc. Expert advice should be taken in respect of sowing of seeds / plantation of saplings including their choice, procedure of their nature and maintenance. Special provisions are to be made for draining out surface run-off in slopes through trench drains constructed at the toe.

11. The trench for the drain should be clean, free from mud, soil slurry at the sides and the bottom.
12. The drain materials should be filled in immediately after laying of JGT (soil saver)

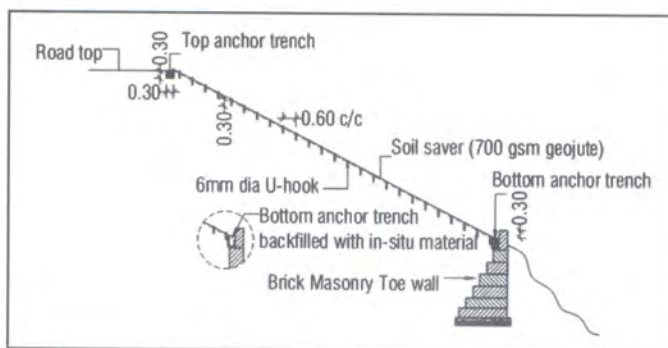


Fig 9: Details of geo-jute overlay and vegetation on hill

Attributes of Jute Geo-Textiles (JGT)

- JGT s are made of JUTE (natural) fiber;
- JGT is Environment friendly & Bio-degradable;
- Durability of JGT can be enhanced by proper treatment for use in river bank protective work;
- JGT is cost effective;
- JGT can be manufactured in existing Jute Mills of Bangladesh;
- Raw materials (Jute fiber) is easily available in Bangladesh;
- Potential areas of the use of JGT are-
**Rural road construction, River bank protection
& Hill slope management;**
- Decomposed JGT improves soil health by adding nutrients.

USE Jute Geo-Textiles in Construction.



Strengthening of road and highways.
Control of erosion in river bank and slopes.
Stabilization of embankments.
Consolidation of soft soil.

Jute and other fiber materials have been proved effective for stabilizing various buildings made as ancient mud houses for the mitigation of Earthquake Hazard.



JGTs are cheaper than any other type of Geo-textiles --- natural or synthetic.

The condition of JGT in Hatirjheel project through two years of its inauguration proved that the decision to use JGT was wonderful and excellent.





Jute Diversification Promotion Center (JDPC)

Ministry of Textiles & Jute

Government of the People's Republic of Bangladesh

(Collaborating Institution)

145, Monipuripara, Tejgaon, Dhaka-1215, Bangladesh

E-mail : jgt21@jdpc.gov.bd, ed@jdpc.gov.bd, info@jdpa.gov.bd

Website : www.jdpc.gov.bd