Jute Geo-Textiles: A Promising Utilization Area of Jute

Geo-textile is a class of technical textiles, usually permeable, made of natural or man-made fibres singly or in combination that are placed in or on soil for improving its geo-technical performance. Technical textiles manufactured primarily for their technical and performance properties rather than their aesthetic and decorative characteristics. Depending on the end uses, twelve areas of technical textiles have been identified by David Rigby Associates UK, in which geo-tech is for geo-technical and civil engineering. These are indicative of the widening market of technical textiles. The major functions of geo-textiles are separation, reinforcement, drainage and filtration. Drainage and filtration are primarily dependent on the properties of geo-textiles itself without having any predominant dependence on the geo-morphological features of the area where as separation and reinforcement are dependent on the nature of the sub-soil. Geo-textiles sometimes connote a broader group called geo-synthetics and are interchangeably used.

The use of textiles in the construction industry is not new. Geo-textiles (linen fabrics) were used in roadway construction in the days of the “Pharaohs” to stabilize roadways and their edges and cotton fibres have been found in centuries-old Chinese engineered slopes. In modern times these were supplemented by artificial fibres made from synthetic polymer such as Polypropylene, polyester, polyethylenes and polyamides or a composite of natural and synthetic materials. The synthetic polymers being a petrochemical product they use non-renewable resources in their construction and cause environmental pollution in their manufacture and use. Natural products and contrivances were concerned after discovery of man-made polymeric materials in 1950 and it become popular globally due to demand, rigorous research studies and field trials. Use of man-made geo-textiles (synthetics) to address soil related problems in civil engineering and improve overall performance of soil is a well tried and accepted concept all over the world. As a result consumption of geo-textiles has increased rapidly and the annual growth rate of sales is about 20%.

Threats arising out of dwindling petroleum reserves and increasing environmental degradation are prompting technologists to opt for natural alternatives wherever possible. Developed countries are now inclined towards adoption of bio-engineering measures to address soil related problems. Versatility of jute fibre made it possible to manufacture natural geo-tech to meet the specific technical requirements. Application of jute geo-textiles (JGT) in this field started in late 1980s. JGT improves geo-technical properties of the soil, it is permeable, allows the water retained within soil. The porometry of JGT is also the determinant in retention of soil-particles on which it is laid. Several studies with geo-textiles in civil engineering have furnished positive results regarding the efficacy of JGT in achieving the objectives of prevention of soil erosion, stabilization of slopes and embankments, prevention of settlement of railway tracks, consolidation of sub-soil highways etc.

Due to a growing environmental, health and social awareness the demand for sustainable materials products and services are increasing. This provides the jute producing countries with a competitive advantage compared to other countries. In addition to protection, JGT has some important biological key characteristics:

1. Improved growing opportunities for vegetation
2. Animals can dig through the material
3. Greater moisture retention capacity
4. No need for post-application waste removal because of the biodegradability

<table>
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<th>Item</th>
<th>1998</th>
<th>2003</th>
<th>2008</th>
<th>2013</th>
<th>2018</th>
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<td>Geo-textiles demand</td>
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<td>2810</td>
<td>3680</td>
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<td>Synthetic geo-textiles demand</td>
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<td>2600</td>
<td>3345</td>
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<td>% share of synthetic geo-textile</td>
<td>96</td>
<td>93</td>
<td>93</td>
<td>91</td>
<td>90</td>
</tr>
<tr>
<td>Natural geo-textile demand</td>
<td>52</td>
<td>140</td>
<td>210</td>
<td>335</td>
<td>480</td>
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<td>% share of natural geo-textile</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>
5. When degraded, the geo-textiles form a natural soil for micro-organisms.

Within the geo-textile sector the synthetic geo-textile had a share of 96 % in 1998 which is projected to drop to 90 % by 2018 giving way to environment friendly geo-textiles made from natural fibres (fig-1). The natural geo-textile market share of 4 % in 1998 and is projected to grow to 10 % by 2018 (table-1). The strength for unit cost of woven geo-textiles is highest for polypropylene followed by polyester, and jute respectively (table-2). Familiarity with JGT and insufficient clarity on technical specifications are presently the important bottlenecks for large scale application of JGT.

Ideally, vegetation can form the best erosion control, but this is often difficult to establish. JGT degrade to form organic mulch and help in quick establishment of vegetation. Jute is particularly useful for dust control because of the hairiness of the fibres. Application of JGT as a short term stabilization has cost advantage over the synthetics. Though it is accepted that JGT can not match man-made GT in terms of durability but in majority of applications, GT acts as a change agent to the soil on or in which it is laid. Measures to protect environment with eco-friendly materials should fetch a special discount. Though the techno-environmental viability of JGT has been demonstrated, the economic viability of JGT over synthetics especially where short life span, lower tensile strength, high permeability and vegetation are required, has not been convincingly brought out. So it is time to sensitize the jute industry and R&D institute to develop specific need oriented products through research and diverse field applications precisely ascertainment to the end-users instead of approaching single product for multiple uses. It is policy support of mandatory usage of JGT in all government projects, production and streamlining of application wise specified JGT supply chain ensuring along with promotional activities will be needed to boost up the JGT sector. With a view to supplement the above mentioned matters IJSJ has taken up a project “Development and Application of Potentially Important Jute Geo-textiles” implementing in Bangladesh and India with the involvement of both public and private sector organizations funded by CFC. The results of field application along with simulation of laboratory findings of the project will lead to the development of internationally acceptable standards and specifications of JGT which will emerge as the future of this sector both in the national and international market.

References
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Environmental Implication of Plastics Degradation

Plastic accumulation, particularly in the world’s oceans, is increasing environmental concern. One of the major components of plastic waste is poly (ethylene terephthalate) (PET), is highly resistant to environmental biodegradation and, thus, causes many and varied environmental concerns associated with its accumulation, including, but not limited to, absorption and concentration of organic pollutants, hazardous effects on marine wildlife and dissemination of potentially invasive species to new environments. A group of scientists from Australia lead by Webb published their paper in the journal “polymers” in January 2013 about the biodegradation fate of plastics. According to them, only three plastic disposal methods are routinely used on a large scale: landfill, incineration and recycling. They found that, each technique has disadvantages and drawbacks. Landfill and incineration both lead to the release of dangerous secondary pollutants into the environment, and landfill also has an additional drawback in the requirement of large portions of land space. Recycling addresses the environmental concerns of landfill and incineration, however, the process is relatively inefficient and the diminishing quality of the polymer yielded is a limiting factor. They suggested that biodegradation is an attractive option for environmentally friendly and efficient disposal of plastic waste but up to date, no protocol has yet been developed to feasibly dispose of PET by biodegradation on a commercial scale. That is use of plastics is leading towards more and more unhealthy world. However, they suggested that substantial research is still being conducted in the field of biodegradation of plastic.

Source: Polymers 2013, 5, 1-18;
Success Stories of a IJSG’s Project entitled “Small Scale Entrepreneurship Development in Diversified Jute Products”

The project entitled “Small scale entrepreneurship development in jute diversified products” was started on October 15, 2005 and completed in April 30, 2010. The collaborating institutes of the projects were Jute Diversification Promotion Centre (JDPC) in Bangladesh and National Jute Board (NJB) in India. A large number of new small entrepreneurs have been developed under the project (1150 in India and 1420 in Bangladesh). The entrepreneurs have started production and sale of JDPs and thus benefited. Two success stories of Bangladesh are shared here.

Ms Asma Mahabuba (Moni)

Ms Asma Mahabuba (Moni) was born in 1978 in the district of Jhinidah, Bangladesh. She was thinking to have a good job after graduation but she got married immediately. After marriage she was thinking for doing something to generate income for her family. Her laws also supported her idea. Initially she started production of various types of handicrafts with two flats sewing machines, 1 over lock machine and 5 labors. In 2007 Small Scale Project organized a diversified jute goods exhibition and fair at Mymensing. She participated at the fair and came in contact with the “Small Scale Project”. The officials of the projects were very pleased to see her activities and advised her to be involved in a better way. Forthwith she started following advises from them. In the meantime she got an order for supply of 10,000 pcs hand knit jute bags to Japan through one of her friends. This encouraged her very much towards production of deco-jute goods. She organized a 10 day long training course for her workers through the financial and technical aid of “Small Scale Project”. She participated in the Dhaka International Trade Fair 2007 under the Umbrella of JDPC and Small Scale Project. In such fair her products could attract attention of several foreign buyers and she has already started export. At present she has 12 sewing machines and 20 workers. By now she has become an ideal of inspiration to the unemployed youths of her locality. She is an established successful entrepreneur of Small Scale Project.

Ms Monowara Khanam

Ms Monowara Khanam comes from Manikgonj district. She believes sincerely and courage will definitely bring success in life. Due to family insolvency she could not have her education after HSC. She started struggle of life for establishment with only one sewing machine. She was not happy with the performance of her husband. Her husband would not give any accounts of the money properly. Centering all these misunderstanding they could not live together in the family life. During this crisis period she joined in an NGO. In connection to her job she came to know more about “Small Scale Entrepreneurship Development” project of IJSG. She participated in a training programme on “Production of Various Jute Diversified Products” organized by the project.

Reopening of Jute Mills in Bangladesh to Create 4000 Jobs

Around 4,000 direct job opportunities are come up in Bangladesh jute industry, as the Government has restarted two closed jute mills and also planning to reopen another to rejuvenate the country’s jute sector. Aiming to re-establish the industry at its past glorious position, the Government is planning to reopen Khulna-based Daulatpur Jute Mills, and already reopened Chittagong-based Forat–Karnaphuli Carpet Factory and Karnaphuli Jute Mills on 26 January, 2013. Of these, the Daulatpur Jute Mills has been carrying out test run for jute production since April 2012, and is ready for launch of commercial operations, according to the state-owned Bangladesh Jute Mills Corporation (BJMC).

Upon reopening, the three mills would function under the BJMC, and boost the Corporation’s annual production capacity from the present 230,000 tons to 250,000 tons at optimum levels.

BJMC, which owns 24 jute mills, 18 of which are operational, has already developed a project for modernization and expansion of these mills. The project includes replacing of obsolete machinery, refurbishment of old factory premises, developing new premises and replacing cables.

During last fiscal, BJMC produced 176,000 tons of jute as compared to its previous fiscal’s production of 160,000 tons. BJMC exported Tk 10.58 billion worth of jute items during last fiscal, which is higher than its previous year’s exports of Tk 9.43 billion.

Source: The Financial Express, January 27, 2013 and Worldjute.com
A section of the jute industry in India, being alarmed over the rise in raw jute imports from Bangladesh, has decided to approach the central government in New Delhi to discontinue the 4.0% special additional duty (SAD) imposed on imported fibre, according to a report published in Business Standard of India. The report said: "There is an over 75% increase in imports of high quality raw jute from Bangladesh in the past five years. Figures available from land customs - Petrapole, West Bengal show that raw jute imports have gone up from approximately 0.5 million bales in 2006-07 to almost 0.9 million bales till 2011-12.

As the quality of raw jute produced in Bangladesh is much superior to that produced in India. Almost 9.0-10% of India’s raw jute requirements are met through imports from Bangladesh. The Union finance ministry in New Delhi imposed SAD on raw jute imported from Bangladesh in March 2012. SAD on raw jute pushed up product costs, rendering the local jute industry uncompetitive in the domestic and export markets, according to the report.

The jute industry also continues being deprived of a jute goods export incentive scheme since April 2007. The Union textiles ministry scrapped the Export Market Assistance (EMA) scheme in April 2007 for jute goods exporters as it failed to yield the desired results. EMA has remained in operation since 1992."In another blow to the jute industry, the Reserve Bank of India (RBI) refused extending 2.0% interest subvention on rupee export credit to jute manufacturing sector till March 2014. Interest subvention was available to jute industry till March 2011. In June 2012, the RBI removed jute manufacturing from its list. [Source: The Financial Express, January 30, 2013]

Varied Hues of the Golden Fibre

A seven days fair was arranged by National Jute Board (India) at Visakhapatnarm for showcasing the versatility and adaptability of golden fibre. The exhibition had 23 stalls manned by artisans and manufacturers of jute products. The artisans and producers have also come up with a wider range of products that are styled in line with the latest fashion and demands of the new generation

Indian Jute Industry to Seek Withdrawal of Duty on Imported Fibre