Applications of Pre-fabricated Silt Curtains in Various Projects in HK

Fully customized prefabricated silt curtain is effective and practical, reliable and economical, with the least maintenance as well. This is now available from Korea. A few weeks is generally sought from design approval to delivery to site. Several projects have taken this approach. Here they are. Contact stanley at stanley@g-and-e.com.

3rd Runway DCM Project

Deep Cement Mixing is coming on full steam, specialist equipment has been mobilized and over 40 barges are expected to operate within the coming next month. Skirting type silt curtains are to be attached to the entire barge to confine the operation, limiting the spread of turbidity. The system is fabricated from 34 small individual panels (6 m width x 8 m depth) that can be shackled along the coaming without the necessity of float.

Between panels, a special designed overlap seals the opening with nylon ropes. A winch assembly is used to adjust curtain depth, to conform to seabed profile and to allow barge repositioning. Daeyoun in Korea arranged the fabrication and delivery with 2 weeks’ lead time.

Asia Pacific Gateway Project in Cape Collinson

Underwater fiber optic cable passes through an environment sensitive zone near Cape Collison. During this laying operation, silt curtain was sought to enclose the work area, to confine water turbidity. Two curtains of 70 m length with a depth of 12 m were placed in parallel along the cable trench, between which, the cable laying vessel operates. Prefabricated silt curtain were specially fabricated and delivered from Daeyoun in Korea. They were assembled on a barge and each span was lifted and placed in the water, diver to attend the panel connection. The system comes in customized size complete with floats, ballast and accessories, fully DIY kit that cuts installation time to a few hours. Removal was equally efficient when the cable was successfully placed and buried. Span connection was unraveled by diver and each span was lifted back onto the barge, the silt curtain was in good condition for potential reuse.
Tuen Mun Chek Lap Kok Link – Northern Connection (HY/2012/08)

A silt curtain system is designed and deployed for the water turbidity control over the final reclamation at Tuen Mun Chek Lap Kok Link – Northern Connection. Daeyoun in Korea was commissioned to fabricate 15 spans of silt curtain at 20 m span equivalent to 300 m to depths from 10 – 15 m. Each span is equipped with EPS floats, reinforced curtain fabric, inter panel connection, ballast chain, mooring buoy and anchor accessories. The units with all components were delivered within 2 weeks in one 40’ container.

All units are ready for deployment upon delivery to site. Floats need to be slotted into the float cover. Shackles and tying rope connect adjacent panels. When the concrete anchor blocks are properly positioned, the spans were lifted and placed on the water from a derrick barge, shackled to the anchors and marker buoys. Divers were employed to ensure the panels are jointed. The entire installation operation took a few days.

New Product / Application

**Maccaferri Articulated Concrete Block Mat, MACBM**

Maccaferri ACBM is a rectangular array of concrete blocks, interconnected by special polymer cables into panel resembled a mattress that can be stored, stacked, lifted and placed mechanically. The mattress comes in 2 to 3 m width x 3 to 6 m length, with thickness from 150 mm to 300 mm that weighs between 0.25 – 8.2 tons, and about 0.15 – 4.8 tons in submerged condition.

ACBM is not anything new and there are large varieties of assemblies in various sizes. What is different is that MACBM can be supplied and shipped directly to job site in ready-to-use units. Depending on the size of the project, production facility can be leased to optimize cost and efficiency or panel can be supplied directly from Maccaferri’s manufacturing facility in Malaysia.

With the high degree of flexibility, the mattress is ideal for underwater infrastructure, seawall protection, anchorage and ballasting. Technical back up to design, stability analysis, installation and lifting arrangement are supported by specialist whenever necessary.
New Product / Application

Several panels have recently been designed for fiber optic cable protection, serving as a flexible concrete ballast blanket at TKO and for the protection cover to an underwater box culvert also at TKO. A total of 5 panels of size 3.14 m x 1.93 m in 200 and 300 mm thick were used for these two applications. There were fabricated and shipped from production yard in Johor, Malaysia. While casting can be done locally, small volume production is far more practical ex-oversea factory and is more economical to be imported by container. Talk to Gary at nangary1@i-cable.com.

Technical Note

Is Prefabricated Band Drain (PVD) Project Specification Out-of-Date?

Prefabricated band drain found its debut in the late 80’s for reclamation ground consolidation. The material specification was based on the industry knowledge that was available then. Over the years, application, design, manufacturing, installation and testing have evolved dramatically. Yet current project specifications, even design manual, still reflect a great many legacies, however outdated. Reviews and updates are not in line to nowadays international standard. Some of the shortcomings have complicated project administration, time and again.

Typical Prefabricated Band Drain Project Specification

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Requirements</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal width</td>
<td>Nil</td>
<td>100 mm</td>
<td>ASTM D3774-(2016), testing method added</td>
</tr>
<tr>
<td>Thickness</td>
<td>Nil</td>
<td>5 mm</td>
<td>ASTM D5199-12, testing method added</td>
</tr>
<tr>
<td>Discharge Capacity (i=0.5 at 240 kpa) Straight Folded (‘S’ folded, r=3.2mm)</td>
<td>ASTM D4716-87</td>
<td>&gt;55x10^-6 m^3/s</td>
<td>Unusually gradient, for vertical situation i=1 Updated ASTM D4716-14 to 2014 ASTM D6918-09(2014) ambiguous folded testing shape</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D638</td>
<td>&gt;1,500 N</td>
<td>Updated ASTM D4632-15a to 2015</td>
</tr>
<tr>
<td>Elongation at Break</td>
<td>ASTM D4632-91</td>
<td>&gt;2 %</td>
<td>Updated ASTM D4632-15a to 2015</td>
</tr>
<tr>
<td>Elongation at 0.5kN</td>
<td>ASTM D4632-91</td>
<td>&lt;10%</td>
<td>Updated ASTM D4632-15a to 2015</td>
</tr>
<tr>
<td>Apparent Opening Size (AOS=O95)</td>
<td>ASTM D4751-93</td>
<td>&lt;75 μm</td>
<td>Updated ASTM D4751-16 to 2016</td>
</tr>
<tr>
<td>Permeability</td>
<td>ASTM D4491-92</td>
<td>&gt;1x10^-6 m^3/s</td>
<td>Updated ASTM D4491-17 to 2017</td>
</tr>
<tr>
<td>Permittivity</td>
<td>ASTM D4491-92</td>
<td>&gt;0.2 s^-1</td>
<td>Updated ASTM D4491-17 to 2017</td>
</tr>
<tr>
<td>Grab Tensile Strength</td>
<td>ASTM D4632-91</td>
<td>&gt;350 N</td>
<td>Updated ASTM D4632-15a to 2015</td>
</tr>
</tbody>
</table>

1 ASTM D4716-14 is limited to straight flat sample, ASTM D6918-09 standardizes crimped condition.
2 ASTM D638 tensile testing property of plastic material, ASTM D4632-15a grab breaking load and elongation, consistent with other parameters
3 ASTM D4491-17 expresses flow rate across an area per unit time, m^3/m^2/s or m/s
4 Tested with specific specimen width of the PVD

It can be frustrated when products in the market cannot be found with matching characteristics and conformance testing cannot be supported with fully equipped laboratories. While customizing a product in accordance to the obsolete specification is possible, this blind compliance distorts engineering merit and possibly undermines performance. Conformance testing can be more representative. A specification review seems to be beneficial and a means is sought to trigger the discussion. We hope a platform can be established. Call Gary at nangary1@i-cable.com.
Opinion Column

Engineer Paranoid

Approval of geosynthetics is largely based on comparison between product specification to the project requirement. When discrepancy is noticed, an engineering decision is inevitable. Whether an acceptance should be based on contractual requirement, engineering merit or precedent reference, depends on the engineers’ attitude and their experience. To follow contractual requirement is straightforward, with no further responsibility and liability. To assess the technicality assumes certain responsibility, one would need good knowledge support. To seek for advice and reference require reliable resources which are often not forthcoming and readily available.

As such, the simplest is to take the no liability approach, matching word by word, regardless of suitability and appropriateness. Wrong judgement and hidden oversight may have been compromised simply by going by the book. But that has been how projects have been managed effectively since, perhaps until potential problem afloat, sometimes over long period, sometimes never.

Geosynthetics evolves quickly since its debut in early 60’s and updated specifications, innovative applications, new polymers, advanced production, improved properties and more developed testing methods are often not ramped up timely in project specification. The gap of conflict between new and aged gets wider over time, confuses engineers, and complicates contract administration. Give some thoughts to the task force to bring project specification closer to the current industry standard, traditional applications stay but the updated knowledge are mismatched along the line. Talk to Gary at nangary1@i-cable.com.

For Your Information

Revamp G and E Website

Our new revamp our website will be ready soon. You will find it much more informative, with a new outlook and many project references. We have also included comprehensive product information. Stay tuned to our latest news on the launch of www.g-and-e.com.

Need More Information or to Know Where to Find Products & Service

We have catalogue, leaflets, applications, material presentation, data sheets, technical support, project references and referral of our comprehensive product range all compiled in a CD-Rom format. Make sure you have your own copy. Please make your request through Wing Yung at wing@g-and-e.com.

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