Failure of PVC Erosion Control Mat

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It is commonly believed that laying synthetic mat followed by hydroseeding over the mat is an effective measure in preventing wash out of topsoil and encouraging natural vegetation over the slopes. However, some recent findings review that the PVC erosion control mat is the murderer of vegetation on slopes. It prevents the plants from obtaining adequate water and nutrients from the topsoil.

Growing Habit of Creeping Plant

It is important to understand the growing habit of grass species to be sprayed over different PVC control mat as a wrong application will lead a serious result that vegetation will die soon after germination.

In Hong Kong, creeping grass species such as Bermuda Grass is the most popular grass species being used for hydroseeding. In the early stage of germination, the creeping grass will develop its first stem. Then, the secondary shoot grows by developing the lateral rhizome under the loose soil. Or it grows by developing stolon of the secondary root system above soil if the node of the stolon reaches the soil surface (Figure 1).

However, most of the cut slopes soil in Hong Kong are compacted slightly with decomposed granite so that only stolon instead of rhizome can developed.

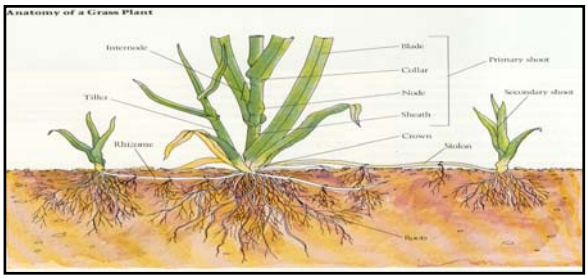
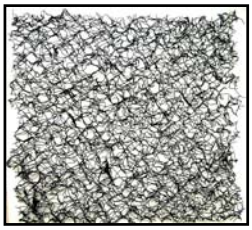


Figure 1 Grass Anatomy

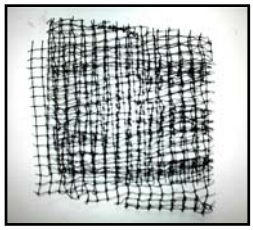
Function and Types of Erosion Control

The main function of PVC Erosion Control Mat (ECM) is to provide a medium to protect the soil slope surface against erosion due to water flow or rainfall. In Hong Kong, Enkamat, Tensar Mat, Multi Mat and Mira Mat are the most commonly used EMC, of which they all share the following similar physical properties:

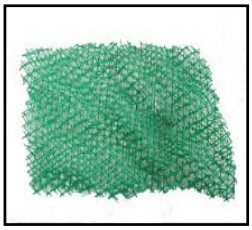
- Made with PVC
- Non-biodegradable
- Closely-knitted texture with small opening
- Lack of moisture retaining capacity
- High heat absorption rate



Enkamat



Tensar Mat



Mira Mat

Multi Mat

Failure of Erosion Control Mat

Basically, PVC ECM can only protect soil slope surface with gradient not greater than 60^{O}. To have landscape improvement on slope surface after the installation of the PVC ECM, hydroseeding is usually applied on the surface of PVC ECM. However, good coverage of healthy vegetation can hardly be achieved (figures 2 & 3).

Figure 2: Slope with poor vegetation coverage

Figure 3: Slope with poor vegetation coverage

There are three main causes leading to the failure of the PVC EMC.

1. In general, the PVC ECM is about 20mm to 30mm thick and its closely-knitted texture holes less than 10 mm. Thus, the stolon from grass root cannot reach the soil surface due to the obstruction caused by PVC ECM. The stolon continues to extend without developing its rooting system. Under such circumstance, a stolon can grow more than 1m long but that is not a healthy state (Figure 3). Eventually, the grass will die due to insufficient nutrients and water.

Figure 4: Unhealthy Stolon

2. Due to the small holes of PVC ECM and improper workmanship, part of the PVC ECM cannot be tightly installed on the irregular slope surface. Thus, grass is trapped under the mat and the temperature inside rises because of the dead grass (figure5).

Figure 5: Trapped Grass

3. Since most of the seed, mulch and fertilizer of the hydroseeding material cannot penetrate into the PVC ECM and reach the soil surface, the grass cannot develop its roots properly.

Figure 6: Seeds, mulch & fertilizer cannot reach soil

Summary for the failure of Erosion Control Mat

cannot penetrate the PVC ECM and

The PVC ECM is proven not to be an ideal planting medium to encourage vegetation over slope.

Material likes coir fibre is a 100% organic fibre that is a strong cellulose material. As it decomposes slowly that make it perfectly suitable for the use in geotextiles. Its biodegradable nature support for about 5 years on slope, this allows ample time for natural vegetation to be self-sustained.

-Use of biodegradable ECM: Coir mesh and Coir Log.
-Avoid using PVC ECM on slope surface