

EROSION & SEDIMENT CONTROL - PRODUCTS AND PITFALLS

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Abstract

This paper tries to unravel some of the mystery and misconceptions surrounding the use of common erosion and sediment control practices. Budget pressures, a general lack of knowledge of what products are available and how they are used, have led to much unnecessary environmental damage. In this paper John Powell will demonstrate the many pitfalls associated with the misuse of some techniques, and demonstrate the correct methods. He will display samples of many products and hopefully answer questions.

Key Words: erosion & sediment control practices

Introduction

Our landscape and topography have been shaped by millions of years of erosion. Many of our great plains consist of sediment generated by this erosion. Today erosion continues to wear away at the earth's surface. Fortunately, just as mankind has made important discoveries and improvements, we now recognise that we need to minimise the soil loss that is generated by the impact of our activities. Cumulative research suggest that excessive sediment in our waterways is one of the planet's most prevalent contaminants.

Contributing Factors :

Cost

As with any new technology there is generally a cost associated with its use or implementation. However, all too often we hear "Too expensive" as the response. The question then needs to be asked.

" Too expensive in relation to what ?"

- Too expensive in relation to doing nothing
- Too expensive in relation to using lesser practices
- Or is it that the budget just didn't allow for an effective treatment

It is all too easy to use the cost factor in relation to a particular site or project when deciding on what, if any, erosion and sediment practices to implement when the real factors should be the long term downstream affects.

Desire

Fortunately, through extensive education and training programs, most people involved in the construction industries now recognise the long term costs to the community associated with poor erosion and sediment control. Armed with this knowledge, most now have the desire to lessen the impact of their projects on the environment.

Ability

With the vast expansion in the erosion control industry in recent years there now are a large number of organisations which can assist with training of management and staff in cost effective methods. There are also contractors capable of delivering excellent results.

Pitfalls

Rather than dealing with the philosophical aspects of environmental impact, this presentation deals a range of practical solutions for everyday use in the civil construction industry. The following is a list of common mistakes and misconceptions.

Sediment Control Fencing

Sediment control fencing is perhaps the most widely used product in the sediment control field, but unfortunately also the most misused. Sediment control fencing is designed to prevent sediment from entering streams etc. However, we often see this product actually installed across a stream or watercourse, when in fact it should, in many cases, be installed parallel or adjacent to the stream or watercourse. If the sediment or soil has made its way into a watercourse, sediment fabric will not prevent it from migrating down stream. There are a number of sediment control structures which can assist in retaining sediment in minor watercourses, however these tend to treat the symptom not the cause.

Rock Check Structures

These should be used to retard the velocity of water flow. However, they are generally used as a primary treatment. That is, they are used to retain sediment, where no other treatment is used. In other words admitting that we are going to let a particular area erode, but we are hoping to capture the soil and sediment before it gets downstream. Overland flow channels should be lined with a suitable product to prevent erosion and check structures are only used to retard velocity, not to retain sediment.

However, these structures are an impediment to long term maintenance of drains and overland flow paths as mowing machinery cannot operate over the rock. Consequently they tend to become over grown and weed infested.

Channel Lining

There are a vast number of effective methods to prevent erosion in overland channels. Velocity, depth of flow and tractive force are all factors which need to be assessed when choosing which treatment to use. Generally the most effective long-term solution is permanent vegetation. Therefore the more quickly this vegetation can be established the better.

Vegetated channel liners have the added benefits of assisting with sediment control, allowing for infiltration and filtering contaminants, all of which have the effect of improving downstream water quality.

Hard armour has a place in some situations, which are so extreme that vegetated linings are not suitable. However, these solutions need to be assessed on an individual basis rather than "a rule of thumb," which is often the case. Concrete drains have the disadvantage of allowing zero infiltration and having zero filtering ability which means that whatever goes in the top of a concrete drain ends up in the downstream catchment.

Batter Stabilisation

Cut and fill batters are one of the most common revegetation situations encountered in the civil construction industry. However, they are perhaps the feature which is most poorly handled.

Many contractors see Hydromulching as the magic solution to vegetating batter slopes. The reality is that Hydromulching is merely a method of applying seed and fertiliser to difficult areas where other machinery cannot operate.

Products :

STAYturf

STAYturf is a reinforced turf product available in a variety of grass types produced in rolls up to 4 metres wide. STAYturf is able to withstand severe erosion forces and allows the use of environmentally friendly grass in place of rock or concrete.

Hydromulching

A specially blended mixture of mulch, seed, fertiliser, binders and water that can be sprayed on bare ground including steep batters. Mixtures and application rates are varied to suit each individual site. Mixtures can include grasses, native trees or shrubs.

Straw Mulching

Application of straw and binders over hydroseeding to protect from erosion and maintain moisture.

Seeding

Including scarification, soil amendments and seed mixes for all situations.

Mulching

Specialised equipment to spread tub ground mulch. Ideal for use over seeding to prevent erosion and retain moisture.

Erosion Control Matting

A range of natural products for both vegetation suppression and enhancement.

Silt Fencing

High quality silt fence fabrics specifically designed to reduce soil sediment and run off.

Gabions and Rock Mattresses

Made from flexible steel mesh, laced together and filled with rock or stones these structures can provide a cost effective and sometimes unique solution to many problems such as river works, soil stabilisation, coastal defence, flood and scour protection.

Continuous Berm

The Continuous Berm machine extrudes a fabric encapsulated 30cm continuous berm of sand, rock or native soil. By choosing the appropriate geo-synthetic fabric, the berm can be designed to filter or contain sheet flows. The berm can also be cut into sections and stacked for bank stabilisation.

STAYlogs

STAYlogs are 100% natural, biodegradable coconut fibre log. They are covered in a coir fibre net and used for bio-engineering solutions to erosion problems on stream and dam banks.

Conclusion

Only through well directed training and the establishment of a desire to achieve better environmental outcomes, can we hope to lessen the impact of our activities on the world's water systems. This paper merely scratches the surface of some very basic issues. However, if by the adoption of just one product in one job, we prevent a drain eroding or a batter slope from failing, we will have a difference.

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International Erosion Control Association Short Course Notes

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Having been involved in the agricultural and mining industries for over twenty years, John became involved with the erosion control industry in 1994. Since then he has been directly associated with the development and implementation of many new erosion control techniques. Most notably John was behind the development, testing and marketing of the revolutionary soil free, reinforced turf product STAYturf, which has not only become popular in Australia ,but is now widely used in The USA.

John is a Director of the IECA (Australasia) and has delivered papers to many forums including the International Erosion Control Association conference in the USA.

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