ılch Berm Sediment Barrier

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Environmental Compliance

Introduction

Alabama Power relies on the transmission grid to supply electricity to our customers across the service territory. Constructing and maintaining ROW corridors is essential to electric grid reliability.

The Process

Construction activity on ROW corridors is regulated by the Alabama Department of Environmental Management (ADEM).

An ADEM Construction Stormwater General Permit (CSWGP) must be obtained.

Best Management Practices (BMP's) must be utilized to maintain compliance with environmental regulations.

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Regulatory Requirements

Compliance with Environmental Regulations

- Construction activities are regulated by ADEM
  - It is requirement that a Construction Stormwater General Permit (CSWGP) be obtained for activities that disturb more than one acre of ground.
- Best Management Practices (BMP's) must be utilized
  - BMP's for permitted construction activities are a requirement of the permit.
    - Examples: silt fence, straw wattles, and erosion control blankets.
  - BMP's must be maintained in proper working condition.
    - Deficient or damaged BMP's can cause violations of the permit requirements
- Non-Compliance with these regulatory requirements can have negative impacts on Companies
  - Fines
  - Negative PR

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Standard Practices

- Typically, when Alabama Power clears a new ROW, the vegetated debris is burned: limbs, brush, trees, stumps, etc.
- Manufactured sediment control BMP's are installed to maintain compliance with regulatory requirements.
- Some counties in Alabama do not allow burning at certain times of the year, and there are certain scenarios where burning is not a feasible practice regardless of timing.
  - Baldwin
  - Etowah
  - Jefferson
  - Mobile
  - Montgomery
  - Shelby
  - Talladega
- When burning cannot be utilized, Alabama Power mulches the vegetated debris and hauls it to landfills.

Best Management Practices

- Until recently mulch was not an ADEM approved BMP:
  - Mulch had to be hauled to landfills
- Most BMPs approved by ADEM were manufactured:
  - Silt fence
  - Straw wattles
  - Erosion control blankets
- The use of manufactured BMP's require:
  - Maintenance
  - Frequent Inspections
  - Additional trips to the field for BMP removal
- Negative aspects of manufactured BMP's:
  - Manufactured BMP's routinely fail
  - Increased likelihood of non-compliance violations
  - Additional landfill waste
  - Maintenance activities must be performed in poor conditions

The Idea

- There are nearly 2,000,000 pounds of mulch generated from clearing one linear mile of new ROW.
- Hauling natural mulch to a landfill just doesn't make good environmental sense!
- Why not repurpose this material?

Mulch Berm Sediment barrier

So, what is a Mulch Berm Sediment Barrier?

- A mound of mulch strategically placed along the contour of the land that is used to prevent sediment from leaving a construction site and impacting streams or wetlands.

Sediment Capture

This was from a four-inch rain event that caused a catastrophic slope failure

All sediment was maintained upstream of the mulch berm

Auburn University Stormwater Research Facility Mulch Berm Testing

- Thanks to Michael Perez, Wesley Donald, and their Team for work on this project!

Auburn University Stormwater Research Facility Mulch Berm Testing

- Analysis of captured soil upstream and downstream of the barrier on the final installation indicated an overall sediment capture of 98%, with 88% of that capture being upstream of the barrier and about 10% of the capture occurring within the berm.
- Results from testing indicated there was a water quality improvement in downstream samples compared to the influent flow.
- TSS from the impoundment compared to downstream samples had an average reduction of 83.9%.
- Turbidity was reduced by an average of 78.5% when comparing the impoundment water samples and the discharge samples.
- Data suggested that both sedimentation and filtration through the berm provided sediment capture.
- The installation had a maximum impoundment depth of approximately 10 in. (0.25 m).
- The effluent of downstream samples was found to be comparable to tested silt fences. Silt fences had an average discharge turbidity of approximately 1,000 NTU (Whitman et al. 2018), while the slash mulch berm resulted in an effluent turbidity of 631 NTU

Description

- A trapezoidal berm constructed of slash mulch from the construction site clearing operation, placed along the contours of the land surface to prevent sediment from leaving disturbed areas. The slash mulch berm offers sedimentation benefits from ponding as well as filtration through the berm.

Planning Considerations

- In appropriate locations, slash mulch berms may be left in place to naturally biodegrade.
- At sites where slash mulch berms are to be left in place to naturally biodegrade, future drainage patterns should be considered.
- Slash mulch berms should not be placed in flood plain environments where there is potential for inundation and flotation of the slash mulch off site.
- Slash mulch berms should not be placed inside of the 25ft stream buffer zones.
- At locations where the berms will be removed upon completion of construction, applying lime and fertilizer according to soil test and heavy disking after berm removal can promote permanent vegetation establishment (see Mulching and Permanent Seeding practices in Alabama Blue Book).


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Installation

As with any Sediment Barrier, the Slash Mulch Berm should be designed to contain the runoff from the design storm event.

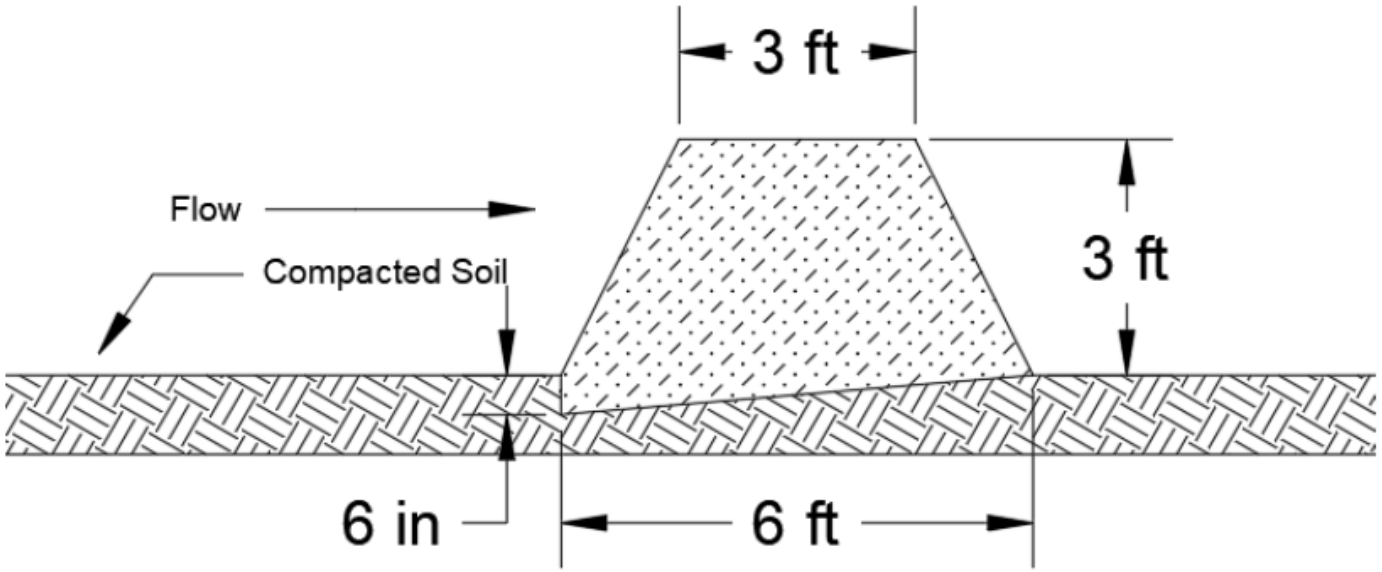
Begin by creating a six-inch triangular key on the contour in the lands surface where the upstream edge of the slash mulch berm will be placed. This can be accomplished by angling a dozier blade and skimming the lands surface.

Install the mulch to the desired width and slightly higher than the desired finished height. Maximum finished height should be about 3 ft.

Turn the ends of the slash mulch berms upslope to prevent storm water from bypassing the structure.

Compact the mulch by tracking over the berm with equipment such as a dozier or track hoe.

Installation Diagram

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The Finished Product

- It took 32 minutes from start to finish to install this berm.
- This included creating the key in the soil, and grinding, placing, and compacting the mulch berm.
- The berm is roughly 100 ft long.

Maintenance

Check the slash mulch berm after each storm event for undermining or mulch displacement.

Remove sediment deposits before they reach ½ the height of the berm.

There is very little maintenance associated with mulch berms!

Silt Fence vs Mulch Berm

Silt Fence Sediment Barrier

Mulch Berm Sediment Barrier

Silt Fence vs Mulch Berm

Silt Fence Sediment Barrier

- Installation Cost = $5.00/ft
- Maintenance Cost = $15.00/ft
- Landfill waste = 3 pounds/ft
- Durability = Fragile, easily damaged
- Debris must be hauled off site = $$$$$
- Serves one purpose

Mulch Berm Sediment Barrier

- Installation Cost = $3.00/ft
- Little to No maintenance required
- No landfill waste
- Durability = Can be run over with a bull dozier
- Eliminates hauling costs
- Multifunctional

Reduced Maintenance Cost

Average maintenance cost for a 100 ft section of silt fence = $1,500.00

- Mobilization
  - $500 per repair
- Equipment
  - $150 an hour X 2
- Employees
  - $25 an hour X 4
- New Silt Fence
  - $3 per ft X 100
- Disposal
  - $3 per ft X 100

Mulch Berm Sediment Barrier

Benefits

- **Superior performance compared to alternatives**
- **Maintained compliance with environmental regulations**
  - There are less chances for sediment loss and virtually no maintenance issues
- **Reduce maintenance activities**
  - Costs and safety hazards associated with maintaining conventional BMP's
- **Increases highway safety**
  - Eliminates the need for hauling material on the highways
- **Eliminates landfill waste**
  - Nearly 2,000,000 pounds of mulch produced per linear mile of new ROW
  - Silt fence disposal
- **Eliminates risks associated with burning activities**
  - Smoke hazards
  - Risk of causing wildfires
  - Safety hazards

CO2 Emissions Reduction

Example Project	
The average freight truck in the U.S. emits 161.8 grams of CO2 per ton-mile.	
So when you convert that to metric tons it is .000162 Metric tons/per mile.	0.000162
Ton -Mile per day per truck (Approximate 20 tons per truck load and 30 Miles per day)	600
Days for a given project	30
Truck loads per day	100
Total Metric Tons of CO2 emission removed.	291.6

Mulch Berm Sediment Barrier

- This mulch berm has served its purpose as a sediment control BMP and is now a permanent fixture on the ROW to aid in stormwater runoff control


Got Mulch?

Questions ?