Chemical Stabilization (CHS)

CS

Practice Description

Chemical erosion control on construction sites in the Southeast usually involves a water-soluble anionic polyacrylamide product referred to as PAM. It is used to minimize soil erosion caused by water and wind. PAM is typically applied with temporary seeding and or mulching on areas where the timely establishment of temporary erosion control is so critical that seedings and mulching need additional reinforcement. It may be used alone on sites where no disturbances will occur until site work is continued and channel erosion is not a significant potential problem.

Only PAM is currently included in this practice.

Planning Considerations

Anionic PAM is available in emulsions, powders, and gel bars or logs. Anionic PAM should be used in combination with other Best Management Practices. The use of seed and mulch should be considered for providing erosion protection beyond the life of the anionic PAM. If the area where PAM is applied is disturbed after the application, the application will need to be repeated.

Following are additional considerations to enhance the use of or avoid problems with the use of anionic PAM:

- Use setbacks when applying anionic PAM near natural water bodies.
- Decreased performance by the PAM can be expected if the PAM is exposed to ultraviolet light or if there is a delay between mixing the PAM with water and applying it to the exposed soil.

- When used in flow concentration channels, PAM's effectiveness for stabilization is decreased.

- If seed is applied with the anionic PAM, mulch should be used to protect the seed.

- Never add water to PAM; add PAM slowly to water. If water is added to PAM, the PAM tends to clot and form "globs" that can clog dispensers. This will result in an increased risk of under-application of the product.

- Only use anionic PAM; not all polymers are PAM.

- Requests to use other products on permitted sites should be made to the Mississippi Department of Environmental Quality.

Design Criteria

Application rates shall conform to manufacturers' guidelines for application. The following specific criteria shall be followed:

Only the anionic form of PAM shall be used. Cationic PAM is toxic and shall NOT be used.

PAM and PAM mixtures shall be environmentally benign, harmless to fish, wildlife, and plants. PAM and PAM mixtures shall be non-combustible.

Anionic PAM, in pure form, shall have less than or equal to 0.05% acrylamide monomer by weight, as established by the Food and Drug Administration and the Environmental Protection Agency.

To maintain less than or equal to 0.05% of acrylamide monomer, the maximum application rate of PAM, in pure form, shall not exceed 200/pounds/acre/year. Do not over apply PAM. Excessive application of PAM can lower its infiltration rate or increase suspended solids in water, rather than promoting settling.

Users of anionic PAM shall obtain and follow all Material Safety Data Sheet requirements and manufacturers' recommendations.

Additives such as fertilizers, solubility promoters or inhibitors, etc. to PAM shall be non-toxic.

The manufacturer or supplier shall provide written application methods for PAM and PAM mixtures. The application method shall ensure uniform coverage to the target and avoid drift to non-target areas including waters of the state. The manufacturer or supplier shall also provide written instructions to ensure proper safety, storage, and mixing of the product.

Gel bars or logs of anionic PAM mixtures may be used in ditch systems. This application shall meet the same testing requirements as anionic PAM emulsions and powders.

To prevent exceeding the acrylamide monomer limit in the event of a spill, the anionic PAM in pure form shall not exceed 200 pounds/batch at 0.05% acrylamide monomer or 400 pounds/batch at 0.025% acrylamide monomer.

Application

Prior to the start of construction, the application of PAM should be designed by a qualified design professional and plans and specifications should be available to field personnel.

The application should conform to the design and specifications provided in the plans.

Site Preparation

Prepare site following design and specifications.

Equipment Preparation

If using a liquid application system, pump a surfactant through the injection system before and after injecting concentrated liquid PAM into sprinkler-irrigation systems to prevent valves and tubing from clogging.

PAM used in hydroseeding applications should be the last additive to the mix.

After use, rinse all PAM mixing and application equipment thoroughly with water to avoid formation of PAM residues. Rinse residue should be applied to soil areas to create binding to the soil structure and increase erosion reduction.

PAM Application

Site testing for a PAM product should be conducted before PAM application to verify PAM-product performance and test reports (recommendations) should be supplied to the design professional and contractor before product application.

Toxicity reports, following EPA/600/4-90/027F 24 Hr. Acute Static Screen Toxicity Test (daphnia sp.), should be provided by the supplier to the contractor before application of a PAM product (this is to assure that PAM applications from the recommended product will be non-toxic).

PAM should be mixed and/or applied in accordance with all Occupational Safety and Health Administration (OSHA) Material Safety Data Sheet requirements and the manufacturers' recommendations for the specified use conforming to all federal, state and local laws, rules and regulations.

Emulsion batches should be mixed following recommendations of a testing laboratory that determines the proper product and rate to meet site requirements.

Never add water to PAM, but instead add PAM slowly to water.

Dry form (powder) may be applied by hand spreader or a mechanical spreader.

Mixing with dry, silica sand will aid in spreading. Pre-mixing of dry form PAM into fertilizer, seed, or other soil amendments is allowed when specified in the design plan. Application method should ensure uniform coverage to the target area.

Installation Verification

Check all components of the practice during installation to ensure that specifications are being met.

Common Problems

Consult with a qualified design professional if any of the following occur:

Problems with application equipment clogging.

Application specifications for PAM cannot be met; alternatives may be required. Unapproved application techniques could lead to failure.

Visible erosion occurs after application.

Maintenance

An operation and maintenance plan must be prepared for use by the operator responsible for PAM application. Plan items should include the following items:

Reapply PAM to disturbed or tilled areas that require continued erosion control.

Maintain equipment to provide uniform application rates.

Rinse all PAM mixing and application equipment thoroughly with water to avoid formation of PAM residues and discharge rinse water to soil areas where PAM stabilization may be helpful.

Downgradient deposition from the use of PAM may require periodic sediment removal to maintain normal functions.

References

BMPs from Volume 1

Chapter 4

Mulching (MU)	4-48
Temporary Seeding (TS)	4-103