JOB SHEET

Grade Stabilization Structure

USDA Natural Resources Conservation Service
Stillwater, OK

January 1999

WHAT IS A GRADE STABILIZATION STRUCTURE?

A grade stabilization structure is a structure used to control the grade and head cutting in natural or artificial channels.

HOW IT HELPS THE LAND

Grade stabilization structures stabilize the grade and control erosion in natural or artificial channels to prevent the formation or advance of gullies. Grade stabilization structures may also be used to provide stable outlets for other conservation practices.

WHERE THE PRACTICE APPLIES

Grade stabilization structures may be used in areas where the concentration and flow velocity of water require structures to control the grade in channels or to control gully erosion. They can also be used as outlets for other conservation practices, such as waterways, diversions and terraces.

WHERE TO GET HELP

For assistance in planning, designing and establishing grade stabilization structures, on your farm, contact your local Natural Resources Conservation Service or Conservation District office.

REQUIREMENTS FOR GRADE STABILIZATION STRUCTURES

Grade stabilization structures are designed to stabilize the grade in channels or to control channel erosion. Grade stabilization structures may be either embankment type or full flow open structures such as concrete chutes, box inlet drop spillways or toe wall drop structures.

Grade stabilization structures are designed to carry peaks from design storms ranging from the 10-year to 100-year frequency, 24 hour duration storm, depending on drainage area, rainfall, effective height for embankment structures, total vertical drop for full flow open structures, and other factors such as condition of vegetation in the emergency spillway.

Embankment type grade stabilization structures

Embankment type grade stabilization structures are located where failure of the dam will not result in loss of life, in damage to homes, commercial or industrial buildings, main highways, or railroads; or in interruption of the use or service of public utilities.

Principal spillways for embankment type grade stabilization structures are designed to carry the required design flows with reduction for detention storage. Principal spillway flows should not cause erosion or flooding downstream. Release rates should be such that no crop damage occurs from flow detention.

Full Flow Open Structures

Full flow open structures include drop, chute and box inlet drop spillways. Linings for chute spillways may include concrete, gabion mattresses or rip rap materials.

Full flow open structures should be installed so as not to create unstable conditions upstream or downstream. Provisions shall be made to insure reentry of bypassed storm flows.

APPLYING THE PRACTICE

The practice is considered applied when the grade stabilization structure has been constructed to the lines and grades shown on the designs and drawings and permanent vegetation has been established.

OUTLETS

Stable outlets are essential for installation and operation of grade stabilization structures. Use a stable natural outlet where possible.

For full flow open structures, stable outlets are essential for maintaining tailwater depths and preventing undermining of the structure.

VEGETATION

All exposed surfaces of the embankment, earth spillway, borrow area and other areas disturbed during construction shall be established to vegetation according to Conservation Practice Standard, Critical Area Planting (342).

MAINTAINING THE PRACTICE

Inspect the grade stabilization structure regularly especially following heavy rains and spring runoff. Inspect all areas of embankments, emergency spillways, berms and appurtenant structures. For full flow open structures, inspect the approach channel, outlet channel and all areas along the edges of the linings.

Repair any damage to vegetated areas with compacted earth fill, reshaping, sodding, reseeding and mulching as needed. Fertilize as needed to maintain vigorous growth. Control undesirable weeds as needed.

Control rodents or burrowing animals.

Remove silt blocks in inlet or outlet channels to maintain the required capacity.

If rills or other erosion occurs on embankment slopes, emergency spillway, or channel slopes, repair immediately with compacted earth fill, vegetation and mulching as needed.

Manage grazing to maintain an adequate vegetative cover and to reduce livestock trailing.