NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
SOUTH DAKOTA SUPPLEMENTS ITALICIZED

CHISELING AND SUBSOILING

(ac)
CODE 324

DEFINITION

Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.

PURPOSE

To improve water and root penetration and aeration *to improve plant growth and vigor.*

CONDITIONS WHERE PRACTICE APPLIES

On suitable soils, chiseling is applicable if layers *lie just below the normal tillage depth.* On suitable soils, subsoiling is applicable if *are present in the subsoil horizons. This practice does not apply to those soils where restrictive layers are due to soil alkalinity or salinity.*

CRITERIA

The exact depth, thickness and nature of the restrictive layer will be determined by investigating the restrictive layer with a shovel *or by obtaining a soil core. Root penetration through the restrictive layer, the feasibility to break up the restrictive layer as well as the depth of chiseling or subsoiling will be determined. The chiseling or subsoiling operation will be performed only when soil conditions are dry enough to the depth of the restrictive layer, such that the operation will not lead to additional compaction or soil smearing. Chiseling depth will be just below the restrictive layer. The subsoiling will be deep enough to shatter the restrictive layer.*

CONSIDERATIONS

Chiseling or subsoiling should be done on the contour or across slopes to reduce the potential for erosion and off site transport of sediment, nutrients, and pesticides.

If surface residue is a component of the conservation plan the chiseling or subsoiling operation shall be done in a manner to leave an adequate amount of residue on the surface to meet the plan objective.

Chiseling work should be done with a heavy duty chisel or point on a tool bar when the soils are dry to break up compacted layers caused by previous tillage. The most effective chisel point size is two to four inches in width.

Spacing depends on the local soil condition and crop cover. Chisel points from 12 to 24 inches apart are usually most satisfactory.

The frequency of chiseling or subsoiling may be reduced by varying the depth of tillage and by using a cropping sequence containing both tap and fibrous rooted plants. Repeating a chisel or subsoil operation should be based on the results of an assessment of the effectiveness of the operation (Refer to the Operation and Maintenance section of this Conservation Practice Standard).

Subsoiling should be done to break up restrictive layers at the depth of up to three feet with equipment designed specifically for subsoiling.

Exercise caution regarding buried irrigation pipelines and underground utility installations when conducting subsoiling operations..

The field should be assessed for the potential to develop saline seeps or other salinity problems resulting from increased infiltration near restrictive layers. Increasing infiltration by chiseling or subsoiling near restrictive layers may lead to an increase in size or the development of saline seeps.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria,

Considerations, and Operation and Maintenance described in this standard.

Specifications shall be recorded using narrative statements in the conservation plan, approved specification sheets, job sheets, or other acceptable documentation.

OPERATION AND MAINTENANCE

A subsequent in crop assessment needs to take place to evaluate the effectiveness of the chiseling or subsoiling operation. In this assessment, root penetration through the restrictive layer should be determined. Root penetration may be determined by excavation or soil core removal when the crop has reached maturity prior to harvest if possible.

If the restrictive layer is determined to be caused by compaction, management techniques that minimize soil compaction should be evaluated. Management such as minimizing the number of field operation trips across the field, controlling traffic to localize compaction and changing the timing of field operations need to be evaluated so that the compaction problem will not be repeated.

Evaluate the effectiveness of the chiseling or subsoiling operation at a minimum of three to five years to observe the condition of the restrictive layer and to determine if the practice should be repeated.