

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

CONTOUR STRIPCROPPING

(ACRES)

CODE 585

DEFINITION

Growing row crops, forages, small grains, or fallow in a systematic arrangement of equal width strips on or near the contour of the field slope.

PURPOSES

- ◆ To reduce sheet and rill erosion
- ◆ To reduce transport of sediment and other water-borne contaminants

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on sloping land where crops are grown.

Although this practice may be applicable on steeper slopes and/or in areas with higher 10-year-frequency, single storm EI values, it will be less effective in achieving the purpose(s) of the practice on slopes exceeding 15 percent and in areas with 10-year storm EI values greater than 140. (EI = total storm energy times the maximum 30-minute intensity).

The practice has the greatest impact where cropped or fallow strips having less than 10 percent cover are alternated with close grown and/or grass/legume strips (Cover-Management Condition 1-2), or strips of *residue management, no-till/strip-till* with 75 percent or greater surface cover (Cover-Management Condition 3). [Cover-Management conditions are described in Chapter 6, *Predicting Soil Erosion by Water, A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE)*. 1997. USDA Agricultural Research Service, Agricultural Handbook No. 703].

The practice is not well suited to rolling topography having a high degree of slope irregularity.

CRITERIA

General Criteria Applicable to all Purposes

Alignment of Strips

Where more than one strip boundary will be placed on the hill slope, strip boundaries shall run parallel to each other as long as their grades meet the row grade criteria. If unachievable, establish a new baseline at a distance up or down the slope equal to some multiple of strip widths that will limit the number of correction strips (non-uniform width strips) to the minimum needed to keep all strip boundaries within row grade limits.

All tillage and planting operations will follow the contour line established.

Where contour row curvature becomes too sharp to keep machinery aligned with rows during field operations, establish sod turn strips on sharp ridge points. On ridge tops, where grades are within row grade limits, row crops may be planted in these turn strip areas. Plant these areas last and harvest these areas first. When establishing *grassed waterways* in drainage ways, established vegetation at least up to that point of sharp curvature. These strips shall be wide enough to allow equipment to be lifted and/or turned and meet the same rows across the turn strip. Mow sod turn strips and *grassed waterways* at least once yearly after ground-nesting birds have hatched. Harvesting is optional.

Strip Width

Base strip widths on the slope length used for erosion prediction. Erosion-prone strips widths shall not exceed 50 percent of this slope length or 150 feet, whichever is less. The erosion-resistant and erosion-prone strips shall be of equal width, except for any correction strip needed to keep strip boundaries within prescribed row grade limits. The correction strip may vary in width but shall be no narrower than the widest working farm implement used to traverse the strip.

Minimum Row Grade

Row grades for soils with slow to very slow infiltration rates (soil hydrologic groups C or D), or for crops sensitive to ponded water conditions for periods of less than 48 hours, shall be designed with positive row drainage of not less than 0.2 percent on slopes where ponding is a concern.

Maximum Row Grade:

The row grade shall be aligned as closely as possible to the contour to achieve the greatest erosion reduction. The maximum grade of rows shall not exceed 2 percent or one half of the up and down hill slope percent used for erosion prediction, whichever is less. Up to 3 percent row grade may be permitted within 150 feet of the approach to a grassed waterway, field border or other stable outlet.

Minimum Ridge Height

The ridge height shall be designed to reduce soil erosion compared to that of rows oriented up and down the slope. As a minimum, this practice shall be designed to achieve a 0.5-2 inch ridge height during the period of the rotation that is most vulnerable to soil erosion. Ridge height design will be determined using on site conditions and current erosion prediction technology approved for use.

The minimum ridge height criteria is not required for close-growing crops, such as small grains, when runoff is reduced compared to that of rows planted up and down the slope. As a minimum, plant height shall be at least 6 inches high and the spacing between plants within the row shall not be greater than 2 inches.

The minimum ridge height criteria is not required where the practice *residue*

management, *no-till/strip-till* is used on the contour if at least 50 percent surface residue is present between the rows after planting.

Critical Slope Length:

The critical slope length for contour stripcropping is 1.5 times the critical slope length determined for contour farming. A contour stripcropping layout shall not occur on a slope longer than the critical slope length unless supported by other practices that reduce slope length below critical (e.g., *diversions, terraces*). The computation of critical slope length shall be determined using approved erosion prediction technology.

Stable Outlets

All runoff from *contour stripcropping* shall be delivered to stable outlets, such as *grassed waterways, field borders, water and sediment control basins*, or underground outlets for *terraces and diversions*.

Headlands/End Rows

On fields where row crops and tillage are a part of the rotation, keep headlands/end rows in permanent sod where their grades would be steeper than the criteria set forth for strip boundaries.

left after tillage and/or planting operations when cover-management conditions 4-7 are present. A low ridge height (2-3 inches) may be left after planting when surface cover is 75 percent or greater. A very low ridge height (0.5-2 inches) is permissible if surface cover is 75 percent or greater and row grade does not exceed 1.0 percent in areas with less severe storms, i.e., 10-year EI <100.

Additional Criteria to Reduce Sheet and Rill Erosion

Arrangement and Vegetative Condition of Strips

Alternate strips of erosion-prone crops or fallow (Cropland Cover-Management Conditions 4-7) down the slope with strips of erosion-resistant cover (Cropland Cover-Management Conditions 1-3). If condition 3 is utilized as one of the erosion resistant strips, at least 75 percent surface residue cover shall be present. The erosion resistant cover shall be present during periods when erosion expected to occur.

No two adjacent strips shall be in an erosion-prone condition at the same time during the year. However, two adjacent strips may be in erosion-resistant cover at the same time.

A vegetative cover shall be selected that is tolerant of the anticipated depth of sediment deposition and potential pesticide damage.

Additional Criteria to Reduce Transport of Sediment and Other Water-born Contaminants

Arrangement and Vegetative Condition of Strips

Erosion-prone crop or fallow strips shall be managed as Cropland Cover-Management Conditions 3-5. Erosion-prone strips shall be alternated down the slope with strips of erosion-resistant cover that meet Cropland Cover-Management Conditions 1-2. The erosion resistant cover shall be present during periods when erosion is expected to occur.

No two adjacent strips shall be in an erosion-prone condition at the same time during the year. However, two adjacent strips may be in erosion-resistant cover at the same time.

A vegetative cover shall be selected that is tolerant of the anticipated depth of sediment deposition and potential pesticide damage.

CONSIDERATIONS

The *conservation crop rotation* on stripcropped fields should be consistent with the farm enterprise crop mix and/or associated livestock operation. These will influence the proportion of row crops, close growing crops, and meadow crops.

To avoid wide fluctuations in acreage of different crops from year to year, fields having identical crop rotations can be set up that are nearly equal in size and have offset years of rotation commencement. The number of fields needed to produce a nearly constant acreage of each crop for each year in the rotation is equal to one half of the years in the rotation. Even-year rotation lengths are preferable to odd-year rotation lengths for ease of design.

Protect areas of existing or potential concentrated flow erosion by any one or more suitable conservation practices, such as *grassed waterways, water and sediment*

control basins, diversions, terraces, or underground outlets.

Design and install the strip layout to best facilitate operation of all machinery used on the strips. To avoid point rows and partial machine passes, lay out strip widths to have some multiple of full width passes by all farm implements, even at unavoidable constrictions.

Prior to design and layout, *obstruction removal* or changes in field boundaries or shape should be considered, where possible and feasible, to improve the effectiveness of the practice and the ease of performing farming operations across the slope.

Prior to layout, inspect the field to find key points for commencing layout or getting a full strip width to pass by an obstruction or ridge saddle. Whenever possible, run strip boundary parallel with fence lines or other barriers, as long as row gradient criteria are met. Account for access road widths when they must cross the field, and adjust strip boundary on either side accordingly.

When the slope length used in erosion prediction exceeds the critical slope length for the cover-management condition that best characterizes the field to be contour stripcropped, establish structures, such as *diversions* or *terraces*, to reduce slope length below the critical slope length.

When this practice is used in combination with *diversions* or *terraces*, coordinate the strip layout with the diversion or terrace grade and spacing so that strip boundaries will parallel terraces wherever possible within the criteria for row grade. Where grass-back or narrow-base terraces are used, allow for the uncropped width along the terrace so that the same strip width is maintained for all strips in the field.

Retaining the most crop residue possible on the soil surface by using residue management practices can maximize critical slope lengths. Certain tillage practices, such as uphill plowing and deep tillage with heavy-duty implements, can also be used to increase random roughness allowing deposition to occur in depressions between soil clods and increase critical slope length. However, if the most erosion-prone strips of the field are kept very rough, in high ridges, or under heavy residue most of the year, there is little need for stripcropping as an erosion and sediment

control practice. Little sediment will be delivered to the protective cover strips.

Contour stripcropping may need to be used in combination with other conservation practices to meet the goals of the conservation management system.

PLANS AND SPECIFICATIONS

Specifications for installation and maintenance of Contour Stripcropping shall be prepared according to the Criteria, Considerations, and Operations and Maintenance described in this standard, and shall be recorded on specification sheets, job sheets, narrative statements in conservation plans, or other acceptable documentation.

SPECIFICATION

1. Contour guidelines shall have grades from 0.2 to 0.5 foot per 100 feet.
2. In order to get proper strip alignment, row grades up to 3 percent are permitted for short distance.
3. Rows shall not have reversal of grade.
4. Allow sufficient row-fall at the lower ends of rows to obtain satisfactory drainage (usually an additional 0.6 foot in last 30 to 50 feet is sufficient).
5. Normally, row length draining in one direction will not exceed 400 feet.
6. All natural drains shall be utilized as waterways and established to a perennial grass (See *Grassed Waterway or Outlet* (412-A) Standard and Specification). Waterways shall provide an adequate disposal area for runoff from the field. See Engineering Standard and Specifications, *Grassed Water or Outlet* (412-B).
7. The width of cultivated strips shall not exceed 125 feet on subclass IIe; 100 feet on subclass IIIe; nor 75 feet on subclass IVe soils.
8. Control strips shall be at least 20 feet wide at the narrowest point.
9. Not more than 75 percent of the area, excluding waterways, shall be in cultivated strips on subclass IIe soils. On subclass IIIe soils, cultivated strips shall not exceed 60 percent of the area, excluding waterways.

OPERATION AND MAINTENANCE

Conduct all farming operations parallel to the strip boundaries except on end rows that have gradients flatter than the criteria set forth in this standard unless the end rows are in cover-management condition 3.

Plant odd areas and short rows to maximize adherence to the contour and protect sensitive areas. Using no-till in the odd areas and short rows or seeding close-grown crops rather than row crops increase options.

Substituting a crop different from one called for in the planned crop rotation, or adjusting the crop rotation due to failed crops or loss of stand, is acceptable, provided neither situation allows two adjacent erosion-prone strips.

Sediment accumulations along the upslope edge of protected strips may need to be smoothed or redistributed to maintain uniform sheet flow along the strip boundary.

When headlands/end rows are in permanent cover, renovate as needed to keep ground cover above 65 percent. No-till renovation of headlands/end rows is recommended but in any case should only include the immediate seedbed preparation and reseeding to a sod-forming crop with or without a nurse crop. Maintain full headland/end row width to allow turning of farm implements at the end of a tilled strip to double back on the same strip.