Cross Wind Ridges

Washington Conservation Practice Specification Guide WA-588

Purpose of Specification Guide
This specification provides guidance for effective planning, design and installation of the Conservation Practice Standard: Cross Wind Ridges (588). The guidance may include reference information, examples and other considerations to assist with effective application of the practice to site specific conditions.

Site specifications for the design, installation, operation and maintenance of the practice shall be prepared for each treatment area in accordance with requirements in the Conservation Practice Standard, Conservation Practice Job Sheet and guidance included in this document. The completed Job Sheet with practice specifications shall be reviewed with and provided to the client.

General information:
Cross wind ridges are formed by tillage and planting operations aligned perpendicular to the prevailing wind direction during a "critical wind erosion period" during a crop interval when surface residue or growing crops do not provide soil surface protection from the risk of wind erosion and wind damage to susceptible plants.

The site and soils:
Cross Wind Ridges can be effective for cropland with soils of loamy to clay surface soil textures that are stable enough to sustain ridges and soil aggregates through an identified critical wind erosion period. The site specific variables that determine planned effectiveness of using ridges for reducing wind erosion is discussed in National Agronomy Manual 190, Section 502. http://www.info.usda.gov/.

This practice is most effective on soils with a Wind Erodibility Index (WEI) of equal to or less than 104.
A description and interpretation for WEI is provided in Soil Survey Handbook Section 618:
http://soils.usda.gov/technical/handbook/contents/part618.html#73

A Soil Survey database report that documents (WEI) and soil surface textures for the planning is: Map Unit Description (WA) report for Washington. This report can be accessed with:

Soil Data Mart; http://soildatamart.nrcs.usda.gov/ ,
Web Soil Survey; http://websoilsurvey.nrcs.usda.gov/app/
NRCS servers, FOTG-Section II.

"Critical wind erosion periods"
Ridges are formed prior to an identified "critical wind erosion period" that may occur during individual "crop intervals" of a planned crop rotation. High erosive wind velocities during the fall and spring of each year in Washington is most common, however, erosive wind events can occur briefly during the entire year. Periods of low crop residue or growing crops that do not provide protection of the soil surface can be identified using Rusle2 or the current NRCS wind erosion prediction technology.

The official Rusle2 website provides access to software, current databases and user guidance.
http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm

The official WEQ website provides access to software, current databases and user guidance.
http://www.weru.ksu.edu/nrcs/weq.html

This practice applies most often to crop rotations that include crop intervals of low residue crops such as onions, sugar beets and potatoes. The critical period in these cases would be post harvest through establishment of the following crop.

There are other conservation practice alternatives and best management practices that can be used to reduce the risk of wind erosion and crop damage during this crop interval.

Conservation practices include: Crop Rotation (328), Cover Crop (340) and Cross wind trap strips (589c)
Management activities include: Planting/harvest date adjustments

Prevailing wind direction and ridge orientation:
During the identified "Critical Period", the prevailing wind direction will dictate the planned orientation of ridges to maximize effectiveness at reducing damage and erosion from wind.

The ridge angle to the prevailing wind direction is not to exceed 45 degrees from perpendicular. Local climate station wind direction data is provided with an input variable to current wind erosion models. AgriMet is a website that provides local wind direction data and other local climate data for Washington. http://www.usbr.gov/pn/agrimet/webarcread.html

Ridge Spacing and height:
Values for ridge height following tillage and planting operations are available in the Rusle2 operations database as well as current NRCS wind erosion technology models. Select a ridging operation that fits the crop management system and can produce efficient ridges for managing wind erosion.

In no case shall the spacing between ridges be more than four times the ridge height.

Ridge spacing (inches)	Minimum Ridge Height ** (inches)
10	2.5
12	3.0
24	6.0
30	7.5
36	9.0
** For planning use the average ridge height listed for comparable operation in Rusle2 Operation Database.	

Other Design Criteria:
Rusle2 can provide 1) the tillage and field operation sequence for each crop interval in a rotation, 2) planned yields and residue amounts after harvest and through the crop interval, 3) incorporate wind erosion estimates into calculation of Soil Conditioning index for the crop rotation, 4) selection of field operation to use to create ridges and 5) estimates of ridge heights and spacing that will be applied.

Document the wind erosion estimates for the planned crop rotation and management system that includes cross wind ridges. Application of Cross Wind Ridges conservation practice standard with associated practices in a resource management system is designed to meet quality criteria related to soil erosion from wind, air quality and crop health.

Document the soil conditioning index for the planned crop rotation and management system that includes cross wind ridges. The ridging operation introduces a significant amount of soil disturbance in the system and will have an impact on soil quality attributes such as soil structure, water infiltration rates and organic matter accumulation.

Considerations when using this conservation practice:
Consider minor soil inclusions within the field and adjacent field areas, roads or field corners that may also require site specific treatment to reduce saltation of soil particles onto the planning Treatment area.

Operation and Maintenance:
Maintain ridges during the critical wind erosion period by reestablishing the ridges unless doing so would damage the growing crop.

Encourage an end of season evaluation of effectiveness for the applied conservation practice and crop system.