VT NRCS Agronomy Technical Note 1

The Line Transect Method for Estimating Crop Residue Cover

Guidance From**: NRCS National Agronomy Manual --** 503.43

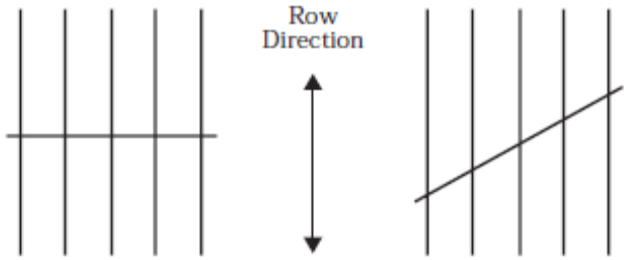
The line transect method has been proven effective in estimating the percent of the ground surface covered by plant residue at any time during the year. Estimates of percent cover are used for determining the impact of residue on sheet and rill erosion.

Estimates of percent cover obtained using the line transect method to evaluate the impact of residue on sheet and rill erosion are most accurate when the residue is lying flat on the soil surface and is evenly distributed across the field. The following is the recommended procedure for using the line transect method:

1. Use a commercially available 50- or 100-foot long cable, tape measure, or any other line that has 100 equally spaced beads, knots, or other gradations (marks) at which to sight.

2. Select an area that is representative of the field as a whole and stretch the line out tightly across the crop rows. The line may be oriented perpendicular to the rows, or in a direction that is at least 45 degrees off the row direction (fig. 503–1).

Figure 503–1 Acceptable orientations for residue measurement lines



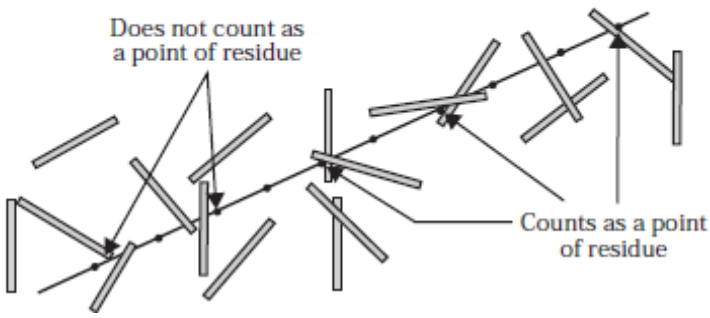
The locations in the field where the line is stretched out to make measurements should be selected randomly from among the areas of the field that are typical of the entire field. End rows, field borders, and parts of the field that appear different are probably not typical of the entire field and should be avoided.

3. Walk along the line, stopping at each mark. Position the eye directly over the mark, and look straight down at it. When sighting, do not look at the entire mark. Rather look at a single point on each mark. A point has an area about like the end of a needle. On

commonly used equipment, the knots, beads, or gradations have much larger areas than the end of a needle. A measurement is not based on whether or not some portion of a mark is over the residue. It is based on whether or not **a specific point associated with the mark** is over residue. It is important to use the same point on each mark for accuracy in your measurements. If using a commercially available beaded line, one way to accomplish the above is to select as the point of reference the place along the line where a bead begins.

4. Determine the percent residue cover by counting the number of points at each mark along the line under which residue is seen. Count only from one side of the line and from the same point on each mark. Do not move the line while counting. **Count only that residue that is large enough to intercept raindrops.** A rule of thumb is to count only residue that is 3/32 inch in diameter or larger (fig. 503–2). When using a line with 100 points, the percent residue cover is equal to the number of points under which residue is seen.

Figure 503–2 Counting residue pieces along a line transect



5. Three to five transects should be done in each field, using the procedure described in steps 1 through 4. **Five transects are recommended.** With five measurements, estimates of percent residue cover are accurate to within ±15 percent of the mean. Three measurements will give estimates accurate to within ± 32 percent of the mean. For example, if the mean of five measurements was 50 percent cover, you could be confident (at the 95% confidence level) that the true mean was between 42 percent and 57 percent cover. For a 30 percent cover average based on five measurements, you could be confident that the true value was between 25 percent and 34 percent cover.

6. The documentation of individual transects and computations made to determine average percent residue amounts should be done in a professional manner. Documentation should be done in a way that permits easy tracking from the field measurements to the final answer.

The use of the attached documentation worksheet is recommended.

Photographs from New Mexico Agronomy Note 67 http://www.nm.nrcs.usda.gov/Technical/tech-notes/agro/ag67.pdf

Corn Residue -- Measured After Planting

20% corn residue This level of residue might be expected from a fall chisel with twisted points, one spring shallow disking, a field cultivation, and planting.

30% corn residue This level of reside might be expected from one fall chiseling with straight points, a shallow disking in the spring, a field cultivation, and planting.

40% corn residue This level of residue might be expected from a fall shallow disking, one spring field cultivation, and planting. Paraplowing in the fall followed by a spring field cultivation and planting are similar.

60% corn residue This level of residue might be expected from a no-till system where you plant directly into the existing residue. Another system is to field cultivate once in the spring and plant.

Crop residue measurement worksheet
(for use with the line transect method)

State _____	County _____	
Land user _____	Opid _____	Tract _____

Field no. _____ Planned residue level _____ percent Residue type _____

Transect number	Total number of points 1/	Number of points with residue 2/	Percent residue this transect
1			
2			
3			
4			
5			
Average percent residue for field			

Field no. _____ Planned residue level _____ percent Residue type _____

Transect number	Total number of points 1/	Number of points with residue 2/	Percent residue this transect
1			
2			
3			
4			
5			
Average percent residue for field			

1/ To achieve the degree of accuracy quoted in the NAM-recommended procedure for using the line transect method, each transect must be based on looking at a total of at least 100 points.

2/ Attach a map or sketch showing the location of each line transect within the field. All measurements shall be made using the line transect procedure contained in the National Agronomy Manual.

_____	_____	_____
Data collector	Title	Date