NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

CONTROLLED TRAFFIC FARMING

(Ac.)

CODE XXX

DRAFT

DEFINITION

Controlled Traffic Farming (CTF) is confining all high load wheel traffic from farm equipment to specific lanes or tramlines (traffic pattern) in crop fields year after year.

PURPOSE

- Improve soil health
- Improve soil productivity
- Improve water infiltration and reduce excessive runoff
- Reduce energy consumption

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland where the crops and tillage systems support controlled traffic farming.

CRITERIA

Limit wheel/track traffic to no more 50 percent of the soil surface. For row crops (.e.g. corn in 30-inch rows) no tire should run on a row. The same traffic pattern must be used for all high load traffic continually year after year. For this conservation practice, high wheel load traffic is defined as any tire or track that bears a load higher than 6000 pounds at 30 psi (equivalent to 6 tons per axle).

No tire or rubber track shall be greater than 26 inches wide except as allowed for combines with wide flotation tires. Wide flotation tires do not work well in a CTF system. Split duals are a better alternative if single tires are inadequate. If wide flotation tires are used on combines, they must be big enough that the inflation pressure will be below **18** psi to minimize compaction on trafficked rows.

All equipment should cover the same working width or multiples of that width. Otherwise, any mismatched equipment will create another set of tracks. Adjust the traffic pattern of each piece of equipment to minimize the number of lanes or tramlines across the field. Utilize the Ohio Controlled Traffic Farming Design Tool (or similar tool) to plan the traffic pattern.

A Geographic Positioning System (GPS) is required for full width tillage operations that obscure the designated traffic lanes. For narrow width or drilled crops, use a skip row system (where the wheel tracks are not planted) or the use of a GPS is required

Once the tram lines or traffic pattern is established, do not deep till (>2 inches) the controlled traffic paths.

CONSIDERATIONS

Typically purchasing all new equipment to make a controlled traffic farming system work is not economically practical. Design the system eliminating as much traffic across the field as possible, keeping trafficked area below 50%. As older equipment is replaced, purchase equipment that will enhance the CTF system and reduce the number of tramlines in the system.

Some relatively simple and inexpensive equipment modifications can be made that can significantly reduce the traffic across the field. For example, extend the front axles of tractors to match the rear.

Once tramlines are well established, operations which previously required the use of duals or extra wide tires may no longer need them. Removing duals will significantly reduce the amount of trafficked area.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of the standard, contact the Natural Resources Conservation Service.

ADDITIONAL CONSIDERATIONS TO REDUCE COMPACTION IN NON-TRAFFICKED AREAS

Require all traffic (high and low load) that crosses the field to utilize the designated traffic pattern. This includes custom applicators, pickup trucks etc.

Monitor soil moisture. Compaction is greatly influenced by soil texture and soil moisture. A trip across the field in a tractor on a coarse textured soil under dry conditions would cause little compaction; whereas the same tractor operating on a heavy moist soil can cause a great deal of compaction. It is best to use the permanent wheel tracks for all field operations.

Consider a No-Till or Direct Seed system of planting. Tillage equipment destroys soil structure, often resulting in more compaction.

Utilize cover crops that are known to help reduce compaction, such as cereal rye, oil seed radish, or annual ryegrass. See the standard and job sheet for Conservation Practice (340) Cover Crops for more information.

ADDITIONAL CONSIDERATIONS TO IMPROVE WATER INFILTRATION

In general activities that reduce compaction and limit soil disturbance will also increase water infiltration. See considerations above to reduce compaction.

Soils with improved structure have better infiltration and internal drainage, and cope better with adverse weather conditions. Crops experience less stress, which can result in higher yields.

ADDITIONAL CONSIDERATIONS TO IMPROVE SOIL HEALTH

Utilize a No-Till or Direct Seed system of planting. Any tillage operation destroys soil structure, increases compaction, and oxidizes soil organic matter. No-Tillage can also significantly reduce energy consumption and fuels costs.

Utilize a diverse crop rotation that consists of a warm season grass (such as corn, sorghum), warm season broadleaf (soybeans) and cool season grass (such as wheat, barley, cereal rye, or meadow) and a cool season broadleaf. A diverse mix of cover crops can also supplement the missing components of the crop rotation and prevent erosion, especially on sloping ground.

ADDITIONAL CONSIDERATIONS TO ACCURATELY PLACE SOIL AMENDMENTS

Utilize a Real-Time Kinematic (RTK) Global Positioning System to guide your fertilizer, herbicide, and planting equipment. RTK systems are accurate within an inch and can be used to automatically steer the equipment down the tramlines. With this kind of accuracy fertilizer can be banded and the crop accurately planted relative to the banded fertilizer.

Herbicides can also be applied very accurately, eliminating the need for overlapping. Skips or missed areas are also greatly reduced or eliminated using RTK auto steering.

RTK systems allow for Precision Nutrient Management. Fields can be subdivided into management zones which have similar characteristics such as soils, yield data and soil nutrient levels. Lime and fertilizer can then be applied using Variable Rate Technology (VRT) which adjusts the rate of application based on the needs of each management zone.

ADDITIONAL CONSIDERATIONS TO IMPROVE OPERATOR AND EQUIPMENT EFFICIENCY

Consolidated tramlines have lower rolling resistance and wheel slip than cultivated soil. Firm ground is able to support higher axle loads, so tramlines also allow safe machinery access in higher soil moisture conditions.

Consolidated wheel tracks and un-compacted growing soil increases traction and reduces cultivation draft. Less draft horsepower means less time and fuel requirements.

With a RTK system, operations such as spraying or planting can be done at night, making more efficient use of time, weather, and soil conditions.

DRAFT

ADDITIONAL CONSIDERATIONS DURING ENTRY PHASE

If feasible avoid deep tilling a field less than 12 months prior to establishing controlled traffic lanes. Repair all ruts and ephemeral gullies prior to establishing the system. Establish/interseed a cover crop, with fibrous roots, before or immediately after the first harvest of the first year of controlled traffic.

PLANS AND SPECIFICATIONS

Utilize the Ohio Controlled Traffic Farming Design Tool (or similar tool) to plan out the traffic pattern. Print a “before” and “after” sheet for the case file.

OPERATION AND MAINTENANCE

Actions shall be carried out to insure that this practice functions as intended. As older equipment is replaced, purchase equipment that will enhance the Controlled Traffic System, reducing the number of tramlines in the system.

Setup the tramlines when soil conditions are suitable for traffic, i.e., when the soil is not too wet or has just been deep tilled.

Keep tramlines in good condition.

- If they are used when the soil is wet, they will support less load and may become rutted.
- If tracks become rutted, pull soil into the ruts when soil conditions are dry.

REFERENCES:

Reeder, Randall, and John M. Smith. 2000. Controlled Traffic. In: Conservation Tillage Systems and Management, MWPS-45. Midwest Plan Service, Ames, IA. (pages 77-82)

Reeder, Randall C. 2002. Controlled traffic. Encyclopedia of Soil Science. Marcell Dekker, Inc. pp.233-236.

DRAFT

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.