

# ROTAVATION





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## CHAPTER I

### WHAT IS ROTAVATION?

*"Forget everything you've ever known about plowing . . . Rotavation starts you out with a completely different concept . . ."*

The moldboard plow does one thing, and one thing only: it digs into the earth and turns it over.

Rotavation is an entirely different operation. With Rotavation, the earth is *actually re-structured* producing a fully prepared and improved seedbed with properties conducive to faster seed germination and better plant growth.

In rotavation, the earth is cut and lifted by the revolving blades of the machine. Accurately controlled rotor blades work the soil—mulching roots, weeds, and stubble. The soil is uniformly tilled with less compaction and higher moisture content. It's in better planting and growing condition — without the use of discs, harrows, shredders or choppers. And all of this can be accomplished with a single pass across the field.

We say that the soil is "re-structured" because more has been accomplished in this single pass over the field than can be done in plowing, discing, and harrowing operations combined. This is why it is impossible to compare conventional seedbed preparation methods with Rotavation. The methods are not the same and *the results are not the same*.

Rotavation is not an entirely new method of seedbed preparation. However, advanced technology and design engineering have brought the method within the scope of every farming operation, and have brought about a practical method of building the soil and making it more productive than ever before.

### WHAT IS RESTRUCTURED SOIL?

Plowing turns over the soil. Subsequent passes with disc, harrow, or other drag equipment breaks the clods so they are suitable for planting.

On the surface, a rotary tilled field may look similar . . . *But is it?*

First of all, with Rotavation the grass, stubble, or other crop residues are cut up by the rotating blades and distributed evenly throughout the soil — not simply buried under it. This helps hold the soil open and protect it from heavy rains and extreme temperature changes. This organic matter also de-

composes more rapidly when chopped up, adding to the value of the soil.

Every pass over a field, turning and working the soil, releases moisture. Since fewer passes are made with Rotavation, most of the moisture is retained.

With Rotavation, the field is also much less compacted. "Tractor wheels will return the soil to its original density before plowing with just three passes . . . return it to 90 percent of that density on the second pass!" Again, because only one pass is made, the tractor wheels will have no opportunity to re-pack the soil.

### WHAT IS THE BENEFIT OF RESTRUCTURING SOIL?

Soil that has been re-structured through Rotavation not only is in better condition for planting, but tends to retain any subsequent moisture for longer periods. Fur-

thermore, Rotavated beds tend to warm up faster from the Spring sunshine, thus producing earlier seed germination. This, in turn, reduces the danger of "Capping," or crusting of the soil, as is the case with poorly structured soils.

Rotavated fields are also more resistant to wind and water erosion. They "hold their shape" better, and are, therefore, easier to work year after year.

And of course, richer, better structured soils produce higher yields year in and year out!

### HOW IS ROTAVATION ACCOMPLISHED?

In plowing, discing, harrowing and other operations, your tractor *pulls* equipment which is setting up a drag force *against* it. In certain con-

ditions, the tractor must be weighted down to gain the traction needed to pull this equipment . . . causing more drag against your tractor, as well as more compacting force on your fields.

In Rotavation, power is applied directly to the rotating blades of the machine. Contrary to setting up a force against the tractor, it sets up a *complementary force* that works *with* the tractor, even helping push it along. Adding weight to the tractor is not required, because the need for extra traction is

never a consideration . . . even working in wet lowland beds, rice fields, or even on snow and ice. The result: more effective use of your tractor power, lower fuel consumption, and less strain on the tractor.

And this advantage is multiplied by the number of passes you ordinarily have to make across your fields . . . one for plowing, two for discing, three for harrowing. And there is even more saved if you combine planting and spraying in a minimum tillage operation.

In other words, Rotavation gives you more power to work with. You will not only be getting more power out of your tractor, but you will be using it three or more times /ess than you are presently using it.

### **SOME OTHER ADVANTAGES OF ROTAVATION**

We've looked at the advantages of better soil structure and more efficient use of tractor power, but there are three other major benefits that Rotavation offers.

One is the savings in capital investment. While one piece of Rotavation equipment will cost more than any single piece of other tillage equipment, it still costs considerably less than *all* of the equipment needed to prepare fields and maintain them.

There is a great savings in man-hours. One man alone can accomplish the work that often requires two men . . . and do it in a fraction of the time. You will be using far fewer man-hours than normally required — a very important factor in this age of ever decreasing farm help.

Time is another critical factor. At best, the planting season is short . . . and when late Springs and other conditions prevent early working of the soil, crops may not get in on time. One-pass seedbed preparation provided by Rotavation avoids these delays that have a direct bearing on crop yields at harvest time.

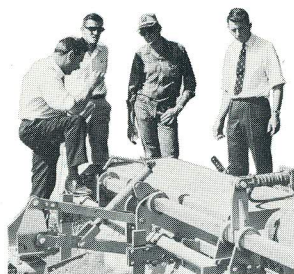
### **A SUMMARY OF THE ADVANTAGES OF ROTAVATION OVER CONVENTIONAL METHODS**

1. Better soil structure • less compaction • better moisture retention • earlier seed germination • better erosion control • easier working year after year . . .
2. More efficient use of tractor power • less strain on the tractor • less fuel consumption • less working time for the tractor . . .
3. Less capital investment . . .
4. Lower labor costs . . .
5. Less time required before planting even with a late start in the fields, it is possible to get seeds in earlier.

**BETTER SOIL STRUCTURE  
+ MORE EFFICIENT USE OF TRACTOR POWER  
= BIGGER YIELDS+ LOWER OPERATING COSTS**



## CHAPTER II

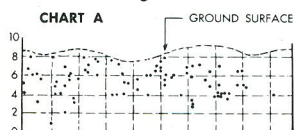


### TEST STUDIES OF ROTAVATION

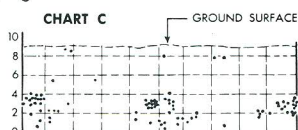
Over the years there have been many tests made to try to determine the exact differences between Rotavation and conventional tillage methods. The results of some of these tests are reported below:

#### Uniformity of Soil Mix

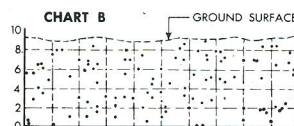
How thoroughly will Rotavation equipment mix in the pre-plant fertilizers, insecticides and herbicides? In this experiment the ground had not been previously prepared. Sorghum grains were broadcast directly ahead of various tillage tools and worked into the soil. In the following chart, the dots represent the sorghum and show the degree of mix.\*



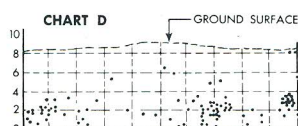
This plot was ROTAVATED ONCE.



This plot was plowed 7" deep and cross harrowed 4" deep.



This plot was ROTAVATED twice.



This plot was discing 3", plowed 7" and cross harrowed 4" deep.

#### Time saved in Rotavation

Travel speeds depend upon the size of the tractor and the width of the Rotavation equipment. The following chart shows the number of acres per hour at varying rotor widths and tractor speeds. In considering the speed of the operation, the work should be compared with the total time it takes for shredding residues, plowing, discing and harrowing. No time is lost in Rotavation due to wheel slippage, since the forward thrust of the power driven blades assists the tractor forward.

SPEED CHART					
Rotor Width	Acres Per Hour at the Following Speeds				
	1 M.P.H.	2 M.P.H.	3 M.P.H.	4 M.P.H.	5 M.P.H.
40"	.41	.81	1.21	1.61	2.01
50"	.50	1.01	1.51	2.02	2.52
60"	.61	1.20	1.82	2.42	3.03
70"	.71	1.41	2.12	2.83	3.53
80"	.81	1.62	2.42	3.23	4.04
100"	1.00	2.02	3.02	4.04	5.04
130"	1.32	2.61	3.94	5.25	6.56
160"	1.61	3.22	4.84	6.46	8.07
180"	1.81	3.64	5.44	7.27	9.08

\*Experiment conducted by U.S.D.A. engineers at Beltsville, Maryland

### Cost of Labor

In studies of alternate systems of Tillage made by the University of Illinois in 1965, the following was determined:

#### LABOR AND VARIABLE MACHINERY COSTS PER TILLABLE ACRE†

Method of Tillage	Labor*	Tractor	Machinery	Total
Conventional Preharvest	\$2.60	\$1.58	\$.28	\$4.46
Harvest	1.50	.72	.66	2.88
<b>Total</b>	<b>4.10</b>	<b>2.30</b>	<b>.94</b>	<b>7.34</b>
Rotary Tillage Preharvest	1.04	1.46	.31	2.81
Harvest	1.49	.94	.66	3.09
<b>Total</b>	<b>2.53</b>	<b>2.40</b>	<b>.97</b>	<b>5.90</b>

\*\$1.50 per hour

#### Combined Labor and Machinery Cost on Variable Size Farms†

In an extension of the same study reported above, the University of Illinois compared total labor and machinery costs for preharvest operations for farms of varying sizes. The cost estimates were based on the use of new equipment with each method.

Number of tillable acres	Total labor and machinery cost		Cost advantage of rotary tillage over conventional methods
	Conventional	Rotary tillage	
100	\$2,741	\$2,676	\$ 65
200	3,187	2,972	215
400	4,079	3,582	497
600	4,971	4,186	785
800	5,863	4,790	1,073

#### How Many Acres Can be Cared For? †

Again referring to the University of Illinois studies, the figures showed the following maximum number of acres that can be cared for using varying methods.

Method of Operation	Number of days available	Conventional	Rotary tillage
Conventional plowing	22.2	749	...
Rotary tillage	24.0	...	1,184

†Full report available on request.

## CHAPTER III



### WHERE IS ROTAVATION EFFECTIVE?

A Rotavator, designed for primary tillage, is the ideal all-around piece of equipment. It can prepare the best possible seedbed in less time, with less labor and less capital investment than any other method. In addition to operating as a plow, disc and harrow, the same machine can cultivate, chop stalks, renovate pastures, control weeds and reclaim waste lands.

More specifically, here are the ways Rotavation can be used in particular crop operations:

#### Making a Seedbed From Pasture

This is best accomplished by making two passes. The first pass should be shallow to break up the sod. Then, after allowing about two weeks for the sod to die, make a second pass at a greater depth to bring up more soil and produce the seedbed. Lime, fertilizers and herbicides may be mixed in during this second pass.

If the pasture is to be saved or reseeded, a complete kill is not necessary, and one pass should be sufficient.

#### Winter Fallow and Stubble Cleaning

In general, a cleanup in the Fall will put you way ahead when it comes to fitting your land in the Spring. All crop residues should be returned to the soil, weeds killed off and the land left rough and open to absorb Winter snows and rains.

This land may be worked even after frost has penetrated three or four inches. In fact, frozen land is ideal, since the resistance offered to the power driven blades helps the cutting action, and the tractor can ride over the land without possible damage to the soil structure.

#### Corn After Corn

Handling the tough, fibrous stalk residues from corn, milo, cotton, etc., can be a problem, and in the Fall it is often too costly to be handled successfully with a shredder, disc, harrow and plow. However, one pass with a Rotavator in the Fall will do all that is required for Winter fallow, plus adding to the fertility of the soil, reducing compaction, giving it better moisture holding capacity, and allowing it to warm up quicker in the Spring . . . and also relieving you of the job in the Spring when time is so valuable.

#### Wheat After Corn

Because the Winter weather helps break down the clods after the crop is in, winter wheat does not require as fine a seedbed. Once over a stalk field with a Rotavator is usually sufficient to chop the stalks and produce a good seedbed. A seedbed for cover crops can be handled the same way; one pass after harvest is plenty, and a heavy matted growth will be ready by the time it is to be Rotavated in the Spring.

### Beans After Wheat

In some parts of the country beans are planted as soon as possible after the combine has done its work in the wheat field. Usually one pass — occasionally two — is all that is required to prepare the seedbed. Moisture will be retained, and young seedlings will get off to a good start. This is particularly important, since many passes over the land, as is necessary with a disc type harrow, will release whatever moisture there is.

### Cotton

Here the Rotavator is a year 'round tillage tool. In Fall it will chop stalks and mix them throughout the tillage depth with just one pass. Bedding can be accomplished at the same time with a bedding attachment. In the Summer, weeds can be kept under control by cultivating, whether solid or skip row. And of course, Spring seedbeds are a natural, producing the ideal environment for good seed germination and water holding capacity for the dry years. Chemicals can be mixed evenly throughout the control area: the mix can be broadcast or in controlled bands. Rotavation has been proven superior in mixing pre-emergence and post-emergence chemicals in both Spring and Summer applications.

### Rice

Rotavation solves the age-old problem of handling heavy stubble after harvest. Special blades are available to chop and mix the rice stubble so that the straw will rot down during the Winter months. The machine will ride over the rough terrain of levees and cope with the ruts caused by the tractor and combine wheels cutting into wet clay soil. The forward thrust of the power-driven blades actually assists the tractor forward and eliminates wheel slippage.

And when beans go in, Rotavation is ideal for all tillage operations from Spring seeding, chemical incorporation, cultivating, on through Fall — getting rid of bean straw and preparing for the next crop.

### Vegetables

Rotavators are particularly good for preparing seedbeds for vegetable crops, even for deep root plants such as carrots, beets or potatoes, where the ground must be worked fine and deep. The machine is ideal for the post-harvest job of turning in residues for any vegetable grower, small or large. Excellent, also, for cultivating, even in crops such as tomatoes, where the tiller will work close to the young plants, cultivating and mulching at the same time. Sweet corn, cabbage, lettuce — all vegetable crops are more economically handled with power tillage.

### Fruits

In strawberry fields the Rotavator will cut back runners without damaging the feeder roots. Plant guards can be attached to prevent soil from being thrown up onto the plants, and straw mulch and weeds are mixed evenly with the soil to provide additional humus. The complete operation can be performed in one pass.

Rotavation is used extensively in bush berry culture as well. Use it to keep grass out of the bush berries; accurate and uniform depth control prevents damage to feeder roots, and one pass with a Rotavator can eliminate four or five trips with a disc.

### Orchards and Nurseries

Rotavators, offset from the tractor, are available for working in orchards and groves. This makes it possible to cultivate in close to the trees without damaging low overhanging branches. Positive depth control makes these machines ideal for work in nurseries, where cultivation can be done in close to young plants without damaging roots.



### Flowers

Large growers of flowers, such as chrysanthemums or gladioli, may have 30 or more acres under cloth. The Rotavator can be used to chop old stalks and prepare beds for new seeds before the beds are sterilized and bedded for the next crop. It would be very difficult to handle that much acreage without power tillage.

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