

**COST OF MECHANICAL LOADERS IN DITCH CLEANING
AS COMPARED WITH COSTS OF HAND
OPERATIONS IN VIRGINIA**

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The information contained in this paper is compiled from data collected from the field engineer in charge of maintenance operations throughout Virginia only.

The Virginia Department of Highways maintains 9,000 miles of primary roads

ditches onto the shoulders of the road. The complete disposal of this material was a real necessity and presented a big problem. Labor not being available, it became evident that the loading of this material onto trucks would have to be done

TABLE 1
ENGINEERS' REPORTS - COMPARING COSTS AND SAVINGS OF THE MECHANICAL LOADING
OF DITCH CLEANING OVER HAND LABOR METHODS

Mechanical Loading Costs Per Mile (Both Ditches)		Hand Labor Loading Costs Per Mile (Both Ditches)		Difference in Cost Per Mile	Estimates of Number of Laborers Replaced by Loading Equipment	
Test Sections	Cost Per Mile	Test Sections	Cost Per Mile		No. Engineers Reporting	No. Laborers Replaced
1	\$ 40 00	1	\$ 274 00	\$ 234 00	1	25
2	111 00	2	274 00	163 00	1	30
3	51 16	3	482 60	431 44	2	40
4	23 65	4	76 39	52 74	4	50
5	75 00	5	130 00	55 00	1	80
6	128 58	6	500 00	371 42		
7	135 00	7	225 00	90 00		
8	100 00	8	165 00	65 00		
9	80 00	9	100 00	20 00		
10	95 00	10	165 00	70 00		
11	35 00	11	102 00	67 00		
12	62 13	12	275 92	213 99		

NOTE-The engineers reported a rate of progress of from 1 to 5 miles per day

The outfits consisted of
1 Foreman
1 One-man or tractor pulled grader and operator
1 Mechanical Loader and Operator
4 to 5 1½ Ton dump body trucks and drivers
1 Rotary power broom
2 to 3 Laborers

NOTE-The engineers reported a rate of progress of from 1/4 to ½ mile per day

The outfits consisted of
1 Foreman
1 One-man or tractor pulled grader and operator
4 to 6 1½ Ton dump body trucks and drivers
12 to 16 Laborers

and 38,000 miles of secondary roads. As in most States, during and since the war, a very definite shortage of hand labor has existed. At the same time, naturally, many miles of ditches were becoming clogged with grass and washed in debris. Inadequate drainage was causing excessive base and surface failures. Grader equipment, both one-man and tractor pulled, was available for pulling material from the

by machinery. It was necessary that such a machine be capable of picking up wet or dry sandy or clayey materials containing grass, roots or small stones and load them onto trucks working in line so that there would be a minimum of interference to traffic. Also the machine would have to be capable of moving rapidly from one location to another under its own power.

In attempting to arrive at comparison

MAINTENANCE

TABLE 2
TIME STUDIES OF LOADING ONE TRUCK
(3 Cubic Yard Load)

Test Number	Mechanical Loading	Hand Loading
	Average Time Recorded Minutes	Average Time Recorded Minutes
1	1/4	3
2	1/2	5
3	2/3	10
4	2/3	12
5	1	12
6	1	15
7	1	25
8	1-1/4	17½
9	1-1/2	25
10	2	10
11	2	12
12	2	20
13	2-1/2	7½
14	2-1/2	10
15	2-1/2	15
16	3	10
17	3	15
18	3	12
19	4	20
20	5	12

TABLE 3
COST STUDIES OF LOADING ONE TRUCK
(3 Cubic Yard Load)

Test Number	Mechanical Loading	Hand Loading
	Average Cost Recorded	Average Cost Recorded
1	\$ 0.12	\$ 0.70
2	0.24	1.33
3	0.25	2.88
4	0.33	1.63
5	0.39	1.55
6	0.43	1.23
7	0.72	2.13
8	0.78	4.07
9	0.81	1.65
10	0.91	3.17
11	0.92	2.19
12	0.95	1.50
13	1.01	2.06
14	1.05	2 01
15	1.32	4 89
16	1 67	5.87

costs it soon became obvious that practically every road had its peculiarities which reflected in the cost of the operation, i.e., the amount of material from the ditch, the kind of material handled, and the distance that the excess material had to be hauled for disposal, etc.

The disposal of the materials from the ditches, within a reasonable haul, does not present any problem. The materials that contain good soil and grass are used extensively for top dressing slopes and fills. The materials that contain stones or clay are dumped uniformly over the fills. Often the material is given to citizens along the road for filling low spots in fields and house lots. In many cases the citizens are so anxious to get the materials that they will furnish trucks at their expense.

The wide variation in operations and locations accounts for the wide variations

in replies received from the field engineers (Table 1 - 3). Also the terrain in Virginia varies from the tidewater area in the east, rolling country in the central section and mountainous conditions in the west. The soils in each area are widely different, varying from sandy loams to heavy clays.

The machines capable of loading ditch materials are also used for many other purposes such as loading aggregates from stockpiles, light excavation work in widening narrow grades, and for loading snow. We are now operating in Virginia 85 mechanical loaders for these purposes.

It would be very desirable to have a machine that would clean ditches, and in the same operation load the material onto trucks. Such a machine, so far as known, has not been developed. It is believed there is a definite field for such a machine.