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Tractors O.S.

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TRACTOR COST INVESTIGATION

1947-48 and 1948-49

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TRACTOR COST INVESTIGATION

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This report covers the operating costs of a small sample of tractors on farms in the East Midland Province during 1947-48 and 1948-49.

The Sample

13 Wheeled tractors and two tracklayers were costed in 1947-48 and 14 wheeled-tractors and one tracklayer in 1948-49. The make and age of each tractor is shown in Table 1. Six of the wheeled-tractors and one tracklayer were included in the investigation in both years and the costs of operating these have been shown separately in the tables below.

Hours worked per annum

The average number of hours worked per annum by the six wheeled-tractors was just over 1500 hours in 1947-48 and nearly 1400 hours in 1948-49. The amount of work performed by these tractors was greater than the average for the sample as a whole. The average number of hours worked for all the tractors included in the investigation was just over 1200 hours in 1947-48 and just over 1000 hours in 1948-49 but the amount of work performed by individual tractors varied widely. For example, the lowest number of hours worked in a year was 190 and the highest 2363.

Altogether three tractors worked less than 500 hours in 1947-48 and four in 1948-49. Some of these were used on farms where more than one tractor was kept and were used only at peak periods. Others were used on farms with only a small acreage under arable crops so that the farmers had only limited opportunity of using their tractors to full capacity on their own holding.

Generally the work done by the wheeled-tractors was fairly evenly distributed throughout the year. The tracklayers, on the other hand, were used for comparatively few hours in the summer and 85 per cent of their work was done during the seven months from September to March.

Total annual costs

As would be expected with the wide variations in the amount of work performed the total cost of running the individual tractors varied considerably ranging for the six wheeled-tractors from £60. 3. 2d to £319. 0. 0d. in 1947-48 and from £291-7-1d to £79. 0. 6d to ~~£319. 7. 1d.~~ in 1948-49. The total costs incurred by the tracklayer was £378. 14. 4d in the first year and £374. 16. 11d in the second. The average total costs for the six wheeled-tractors were £210. 23. 5d in 1947-48 and £220.9.13d in 1948-49.

Total costs for each tractor are given in the Tables 2 and 3

Cost per hour

The average cost per hour in both years as well as the percentage distribution of the main items of cost are shown below. The average cost per hour for the six wheeled-tractors was 2s 9d in 1947-48 and 3s 2d in 1948-49. The tracklayer showed an average hourly cost of 5s 3½d in the first year and 7s 3d in the second.

COSTS PER HOUR

(a) Average of 6 wheeled-tractors

	1947-48		1948-49	
	Cost per hour	Per cent of total	Cost per hour	Per cent of Total
	s. d.		s. d.	
Petrol	3 ³ / ₄	2. 3.	1	2. 6.
TVO	1. 0 ¹ / ₂	38. 6.	1. 1 ¹ / ₂	35. 5.
Oils	2 ¹ / ₂	7. 6.	1 ¹ / ₂	4. 6.
Total Fuel and Oils	1. 4.	48. 5.	1. 4¹/₄	42. 7.
Repairs and Maintenance	6 ¹ / ₂	19. 7.	1. 1 ¹ / ₂	35. 5.
Depreciation	10 ¹ / ₄	31. 1.	8	21. 1.
Taxation and Insurance	- 1 ¹ / ₄	0. 7.	1 ¹ / ₄	0. 7.
TOTAL	2. 9.	100. 0.	3. 2.	100. 0.

(b) One Tracklayer

	1947-48		1948-49	
	Cost per hour	Per cent of total	Cost per hour	Per cent of total
	s. d.		s. d.	
Petrol	1 ¹ / ₄	0. 4.	1 ¹ / ₄	0. 3.
Diesel	9 ¹ / ₂	14. 6.	10.	11. 5.
Oils	1 ¹ / ₂	2. 7.	1 ¹ / ₂	0. 6.
Total Fuel and Oils	11¹/₂	17. 7.	10³/₄	12. 3.
Repairs and Maintenance	3 ¹ / ₂	5. 1.	2. 3 ¹ / ₂	31. 6.
Depreciation	4. 0 ¹ / ₂	76. 4.	4. 0 ¹ / ₄	55. 5.
Taxation and Insurance	1 ¹ / ₂	0. 8.	1 ¹ / ₂	0. 6.
TOTAL	5. 3¹/₂	100. 0.	7. 3.	100. 0.

The highest operating cost recorded for any individual wheeled-tractor was 7s 0d per hour for tractor No.13a in 1948-49, largely because the number of working hours (190) was extremely low. The lowest was 1s 4d per hour for tractor No.30 in 1947-48. This nine year old tractor worked nearly 900 hours in the year and showed extremely low costs for depreciation, repairs and maintenance.

Composition of Total Costs

(a) Fuel and Oils. The prices used were as follows :-

	<u>1947-48</u>	<u>1948-49</u>
	Cost per Gallon	
	s. d.	s. d.
TVO and Diesel Oil	11 ³ / ₄	11 ⁵ / ₄
Petrol	1. 10.	2. 1.
Oil	6. 0.	6. 0.

The price of 6-0d for oil is a weighted average of engine oils (5s 7d per gallon) and gear oil (8s 10d per gallon).

The average cost per hour of fuel and oils for the

6 wheeled tractors amounted to 1s 4d in 1947-48 (48.5% of the total cost) and 1s 4½d in 1948-49 (42.7% of the total cost)

Fuel costs per hour for the tracklayer were 11½d in 1947-48 (17.7% of the total cost) and 10¾d in 1948-49 (12.3% of the total cost).

Taking the sample of wheeled tractors as a whole, five recorded costs in excess of 2s 0d per hour for fuel and oils in 1948-49 and, at the other extreme, six tractors used chiefly for light work, had a cost of under 1s 0d per hour. In 1947-48 none of the 13 wheeled tractors costed had costs per hour for fuel and oils exceeding 2s 0d and in only three cases were costs of less than 1s 0d per hour recorded.

(b) Repairs and Maintenance

Included under this heading are the costs of spare parts, the time spent by members of the farm staff on maintenance and repair work, and garage bills. All payments for repairs were fully charged against the tractor in that year, whereas some of the charges may in fact represent major expenditure which ought to have been spread over several years. On the other hand tractors with low costs for repairs may have incurred heavy costs in previous years, or may do so in subsequent years.

Labour time spent in daily maintenance was charged against the tractor at the rate of 2s 1d per hour in 1947-48 and 2s 3d per hour in 1948-49.

The more time devoted to care and maintenance, therefore the heavier the charge against the tractor. In theory this should be reflected in lower repair bills but it will not always be so in any one year.

The average cost for repairs and maintenance for the six wheeled tractors was 6½d in 1947-48 (19.7% of the total cost) and 1s 1½d in 1948-49 (35.5% of the total cost). The cost of repairs and maintenance for individual tractors, however, showed wide variations.

(c) Depreciation

In determining costs of depreciation the following rates of wear and tear were applied : -

1936-1940	22½ per cent per annum
1940-1945	27 per cent per annum
1945 -	28½ per cent per annum

These figures correspond to the Inland Revenue rates for wear and tear and no adjustment was made to allow for differences in the number of hours worked and in the general standard of maintenance of individual tractors. They do not, therefore, necessarily represent the true cost of depreciation of the tractors and depend entirely upon the age and initial cost of the tractor. It may be expected that as a tractor gets older and the depreciation charge is reduced, this will be counterbalanced to some extent by rising repair and maintenance costs.

The average depreciation charge per hour for the six wheeled tractors was 10½d in the first year (31.1% of the total costs) and 8d in the second year (21.1% of total costs).

The highest individual charge for depreciation for any of the thirteen wheeled tractors costed in 1947-48 was £133. 0. 0d. This was for a tractor bought for £172. 0. 0d one month before the enquiry opened. The lowest

charge for depreciation for this year was £1. 5. 0. for a Fordson Standard bought for £135 in 1936. In 1948-49 the variation in the depreciation charges for the 14 wheeled-tractors costed was from £95. 10. 7d to £3. 14. 0. The depreciation charges for the two tracklayers in 1947-48 were £290. 0. 0.d and £36. 4. 0d. respectively. Both were D2 Caterpillars, but the former was bought for £1079 in 1947 and the latter for £804. in 1941

(d) Taxation and Insurance

During the two years of this investigation the road fund tax was 5s 0d per year. Some owners were content with a third party policy while others preferred a comprehensive insurance.

Taxation and Insurance costs per hour of work amounted to an average of between $\frac{1}{2}$ d and $\frac{1}{2}$ d per hour, or less than 1% of total cost

Summary and Conclusions

The sample covered in this enquiry was small, and average figures based on so few tractors must necessarily be viewed with caution. The records obtained, however, suffice to show the very considerable variations which occur in the hourly operating cost of tractors on different farms. All the main items of cost, except the relatively unimportant one of taxation and insurance, exhibit this high degree of variability. Fuel costs per hour, for example, in 1947-48 varied by as much as $8\frac{1}{2}$ d per hour even for tractors of the same make. Although some of the variation in fuel cost may have been due to differences in the type of work performed, the wide margin of variation suggests that on some farms substantial economies in fuel cost could be obtained by higher standards of tractor care and maintenance.

Similar wide differences were recorded in the cost of repairs and maintenance of individual tractors. Some of the tractors underwent major repairs or overhaul during the two years covered by the enquiry, whilst others incurred very low repairs and maintenance costs during the period. The average cost of repairs and maintenance for six wheeled-tractors in 1947-48 was $6\frac{1}{2}$ d per hour. For the same tractors in 1948-49 this was 1. $1\frac{1}{2}$ d. This increase was partly a result of the increasing age of the tractors, a fact which was reflected also in lower charges for depreciation. In 1948-49 the average charge for depreciation amounted to 8d per hour compared with a charge of $10\frac{1}{4}$ d in the previous year. Repairs and depreciation together accounted for 50% of the total cost in the first year and 56% in the second year.

As would be expected the most important cause of individual differences in hourly cost was the charge for depreciation. This naturally varies within wide limits, depending on the age and initial cost of the tractor and the amount of use which is made of the tractor in the year. In order to achieve low unit costs it is essential that the more-or-less fixed charge for depreciation should be spread over as great an output of work as possible. The tractor recording the highest operating cost per hour in the sample worked only 190 hours. In this instance the charge of £42. 3. 9. for depreciation for the year amounted to as much as 4s 5d for each hour worked.

The average operating cost for the six wheeled-tractors which were costed in both years of this enquiry rose from 2.9d per hour to 3.2d an hour, an increase of 15% due almost entirely to higher costs for repairs and maintenance. The one tracklayer recorded in both years showed costs of 5s $3\frac{1}{2}$ in the first year

and 7s 3d in the second, an increase again due very largely to higher costs for repairs and maintenance which rose from 3d per hour in the first year to 2s 3d in the second.

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TABLE 1

MAKES AND AGES OF TRACTORS IN THE SAMPLE(a) Tractors costed in both 1947-48 and 1948-49

Tractor No.	Make	Date of Purchase	Age at 1.IX.48
30	Fordson Standard	March 1940	8 years 6 months
40	Fordson Major	April 1947	1 year 5 months
48	Fordson Major	September 1947	1 year 0 months
49	John Deere AN	June 1940	8 years 3 months
77	Fordson Major	February 1946	2 years 7 months
78	David Brown	August 1947	1 year 1 month
79	Caterpillar D2	July 1947	1 year 2 months

(b) Tractors costed in 1947-48 only

Tractor No.	Make	Date of Purchase	Age at 1.IX.48
4	Fordson Standard	June 1941	7 years 3 months
5	Fordson Major	April 1946	2 years 5 months
20	Fordson Standard	September 1943	5 years 0 months
28	Fordson Major	March 1947	1 year 6 months
46	Fordson Standard	June 1936	12 years 3 months
50	John Deere AN	March 1940	8 years 6 months
51	John Deere BR	March 1938	10 years 6 months
36	Caterpillar D2	December 1941	6 years 9 months

(c) Tractors costed in 1948-49 only

Tractor No.	Make	Date of Purchase	Age at 1.IX.49
10a	Ferguson	August 1947	2 years 1 month
11	David Brown	June 1945	4 years 3 months
11a	Minneapolis-Moline	October 1942	6 years 11 months
12a	Case	May 1945	4 years 4 months
13a	Fordson Major	June 1946	3 years 3 months
14a	Allis Chalmers	October 1941	7 years 11 months
31	Ferguson	September 1947	2 years 0 months
86	Case	July 1937 *	12 years 2 months

* Bought second hand at this date. Actual age not known.

TABLE 2

COSTS IN 1947--48 A Tractors Costed in both 1947/48 and 1948/49
 B Tractors Costed in 1947/48 only

Tractor No.	Petrol		TVO or Diesel		Oils		Total Fuel and Oils		Repairs and Maintenance		Depreciation		Taxation and Insurance		Total Cost	Time Worked Hours	Cost per hour
	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.			
A.																	
30	3.	4.	33.	13.	1.	16.	45.	9.	8.	2.	4.	5.	3.	1.	60.	893	1.44
40	1.	6.	23.	5.	2.	2.	26.	13.	2.	12.	1.	76.	5.	1.	107.	390	5.8
48	5.	2.	154.	1.	22.	10.	161.	14.	45.	12.	8.	109.	10.	2.	513.	1629	3.11
49	5.	15.	123.	19.	32.	2.	161.	16.	35.	19.	11.	12.	6.	2.	212.	1721	2.53
77	6.	2.	100.	11.	24.	10.	151.	4.	117.	4.	9.	51.	0.	2.	301.	2191	2.9
78	4.	9.	67.	16.	15.	10.	87.	15.	37.	15.	9.	153.	0.	2.	260.	2363	2.2
79 *	1.	5.	55.	2.	10.	2.	66.	10.	20.	1.	0.	290.	0.	2.	373.	1453	5.32
B.																	
4	3.	9.	75.	14.	16.	4.	95.	8.	90.	1.	4.	7.	14.	2.	195.	1051	3.8
5	11.	0.	83.	13.	19.	13.	119.	6.	25.	7.	1.	53.	10.	2.	200.	1724	2.4
20	6.	9.	86.	1.	21.	12.	114.	2.	16.	3.	10.	13.	2.	2.	145.	1482	1.11
28	3.	0.	28.	7.	5.	8.	36.	16.	42.	6.	3.	83.	16.	1.	164.	476	6.11
46	1.	3.	18.	10.	2.	2.	21.	15.	13.	8.	11.	1.	5.	2.	33.	341	2.5
50	4.	1.	50.	15.	8.	14.	63.	10.	67.	4.	5.	12.	16.	2.	166.	1045	3.2
51	1.	17.	23.	14.	3.	15.	29.	7.	17.	19.	9.	4.	13.	2.	54.	606	1.9
36 *	1.	6.	47.	12.	17.	5.	66.	4.	14.	12.	11.	36.	4.	1.	118.	928	2.6

* Tracklayer

TABLE 3

COSTS IN 1948/49

A Tractors costed in both 1947/48 and 1948/49

B Tractors costed in 1948/49 only

Tractor No.	Petrol	TVO or Diesel	Oils	Total Fuel and Oils	Repairs and Maintenance	Depreciation	Taxation and Insurance	Total Cost	Time worked	Cost per hour
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	Hours	s. d.
A.										
30	5.15.7 $\frac{1}{2}$	43.17.4	2.4.0	51.16.11 $\frac{1}{2}$	22.1.6	3.14.0	1.8.1	79.0.6 $\frac{1}{2}$	1081	1.5 $\frac{1}{2}$
40	1.0.10	23.6.0	1.7.11	24.14.9	33.0.6	54.18.6	2.1.3	119.15.0	348	6.11.
48	5.14.7	131.13.9	24.1.6	161.15.10	35.13.4 $\frac{1}{2}$	78.17.10	2.2.9	276.2.9 $\frac{1}{2}$	1570	3.6.
49	6.17.6	149.1.3	13.15.6	174.14.9	107.2.1 $\frac{1}{2}$	7.7.6	2.2.9	297.7.1 $\frac{1}{2}$	1722	3.0.
77	7.7.11	67.5.4	10.12.6	85.5.9	159.0.9	36.6.0	2.0.0	282.12.6	1877	3.0.
78	5.19.8	53.8.2	8.3.0	67.10.10	108.9.5	95.10.7	2.0.0	373.10.10	1784	3.1.
79 *	0.14.7	43.7.2	2.3.0	46.4.9	118.12.2	207.17.0	2.5.0	374.16.11	1033	7.3.
B.										
10a	59.11.2	-	3.15.7	63.6.9	42.4.0	77.1.3	2.3.0	184.15.0	1189	3.1.
11	5.8.3	32.2.3	7.4.0	44.14.6	18.2.4	46.8.1	2.2.6	111.7.5	985	2.3.
11a	12.4.11	26.3.0	6.17.9	45.5.8	17.15.7	19.11.8	2.0.6	84.13.5	338	5.0.
12a	4.10.2	34.2.11	4.5.0	42.18.1	84.13.9	30.5.0	2.2.3	160.2.1	860	3.9.
13a	4.3.6	14.7.0	1.4.3	19.14.9	2.6.0	42.3.9	2.2.9	66.7.3	190	7.0.
14a	10.14.7	105.13.7	18.3.7	134.11.9	205.11.11	8.7.3	1.10.0	350.0.11	1544	4.6.
31	42.14.2	-	2.4.0	44.18.2	4.6.6	89.8.0	1.19.3	140.11.11	668	4.2 $\frac{1}{2}$
86	5.12.6	25.1.10	4.12.0	35.6.4	77.12.1	4.2.0	2.0.0	119.0.5	348	6.10.

* Tracklayer