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EC762 Revised 1958 Figure your Costs

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Figure Your Costs...

power and machinery

BY D.E. LANE Ass't. Ext. Engineer

EXTENSION SERVICE
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE
AND U.S. DEPARTMENT OF AGRICULTURE
COOPERATING
W. V. LAMBERT, DIRECTOR

You can estimate the capacity and costs on any machine used on your farm by using the nomographs in this circular. You should determine for each operation:

1. days allotted to the operation

2. power required or available

3. size of machine required or available

(A nomograph is a device used to multiply and divide by using a ruler - straight edge - only. Follow thru on the dashed line examples on the nomographs. NOTE: The long dashed line does not cross the scale to the right of the point where it connects with the short dashed line - in other words it jumps over it.)

MACHINE CAPACITY NOMOGRAPH

You need to know: (see nomograph)

1. width of the machine in feet

2. average working speed of the operation in miles per hour

3. field efficiency* in per cent

MACHINE HOURS NOMOGRAPH

You need to know: (see nomograph)

1. acres to be covered with the machine

2. capacity of the machine in acres per hour (found from machine capacity nomograph)

FUEL COSTS NOMOGRAPH

You need to know: (see nomograph)

1. fuel consumption in horsepower-hours per gallon (see column 72, Nebraska Tractor Test Summary Sheet)

Ranges of fuel consumption - hp-hr/gal

diesel	8 - 17	LP gas	6 - 9
gasoline	9 - 11	tractor fuel	8 - 10

2. rated horsepower of your tractor (see operators manual)

3. fuel cost in dollars per gallon (21¢ = $0.21)

FIXED COSTS NOMOGRAPH

You need to know: (see nomograph)

1. expected life of the machine in years

* Field efficiency refers to the amount of time a machine is doing useful work. Field efficiency drops for time spent in refueling, lubrication, machine adjustment, adding seed and fertilizer, unloading, etc.

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2. purchase price of the machine in dollars

3. annual use of the machine in hours

TOTAL COST

The total cost of owning and operating the machine is the sum of the fuel and fixed costs found above plus the labor charge of the operator. (see example, p. 6). If more than one machine is used the total cost for the combination is the sum of the costs for each machine.

SAMPLE PROBLEM: A 100 acre field is to be tilled with a 10 foot tandem disk pulled by a 3-plow tractor.

SAMPLE CALCULATIONS:

MACHINE CAPACITY

width of machine	10'
speed of operation	5 mph
field efficiency	80%
capacity	5 A/hr (see nomograph)

MACHINE HOURS

capacity	5 A/hr
field size	100 A
time required	20 hr

FUEL COST

fuel consumption	10.6 hp-hy/gal
(see col. 72, Nebraska Tractor Test Summary Sheet)	
rated power	35 hp
(See operator's manual)	
fuel cost	0.20 $/gal
fuel cost	0.66 $/hr

FIXED COSTS

Tractor

purchase price	$4500
expected life	7 yr
annual use	700 hr
fixed costs	1.50 $/hr

Disk

purchase price	$650
expected life	15 yr
annual use	100 hr
fixed costs	1.10 $/hr

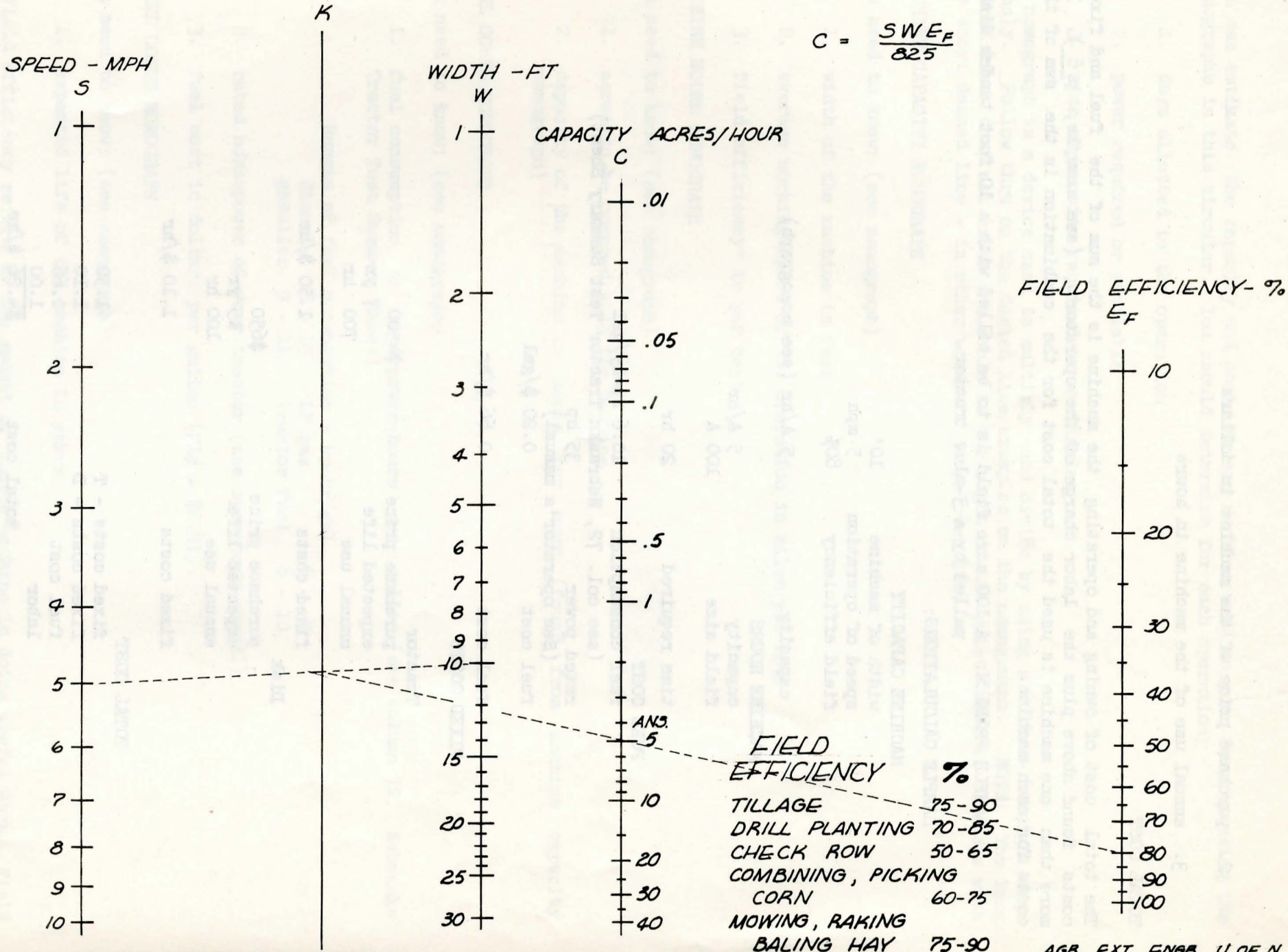
TOTAL COST

fixed costs - T	1.50
fixed costs - D	1.10
fuel cost	0.66
labor	1.00
total cost	$4.26 $/hr

capacity 5 A/hr

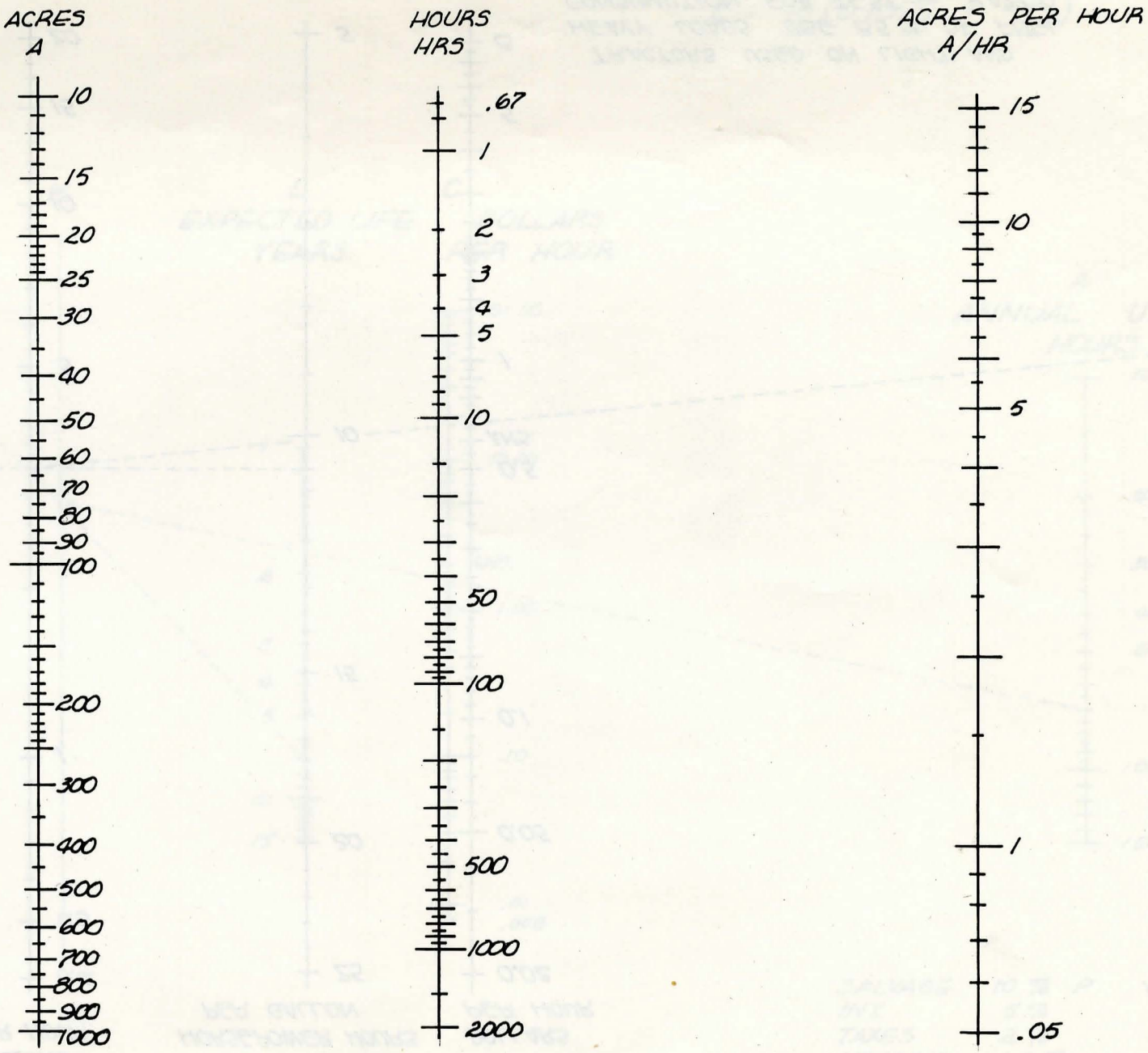
then $\frac{4.26}{5} = 0.85$ $/A

$$C = \frac{S W E_F}{825}$$



MACHINE CAPACITY

$A \div HRS = \frac{A}{HRS}$



MACHINE HOURS

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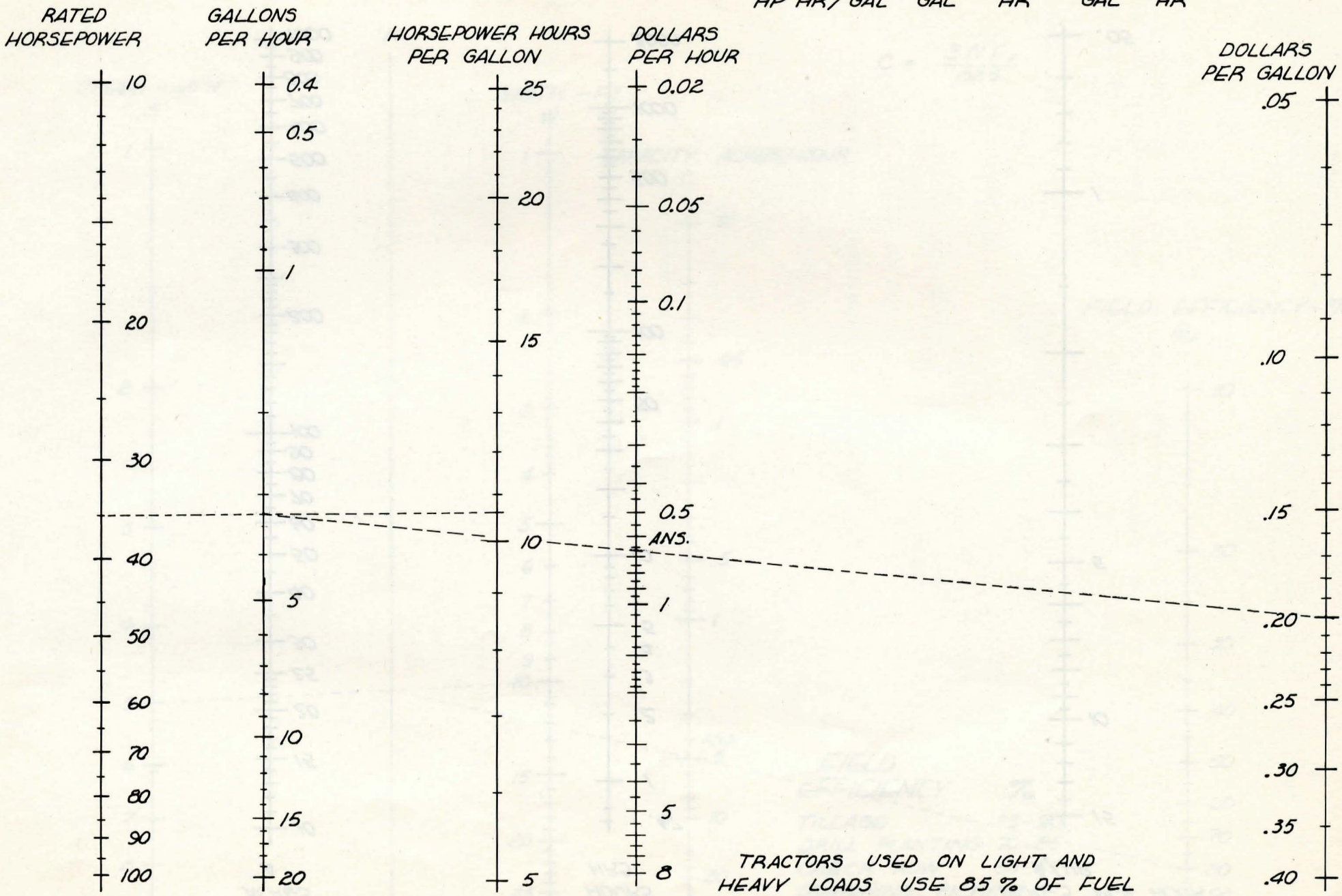
6-58

$$\frac{HP}{HP\ HR/GAL} \times \frac{\$}{GAL} = \frac{GAL}{HR} \times \frac{\$}{GAL} = \frac{\$}{HR}$$



TRACTORS USED ON LIGHT AND HEAVY LOADS USE 85% OF FUEL CONSUMPTION FOR TEST H. RATED LOAD - 10 HRS, SEE TRACTOR TEST SUMMARY SHEET, COLUMN 72.

FUEL COSTS

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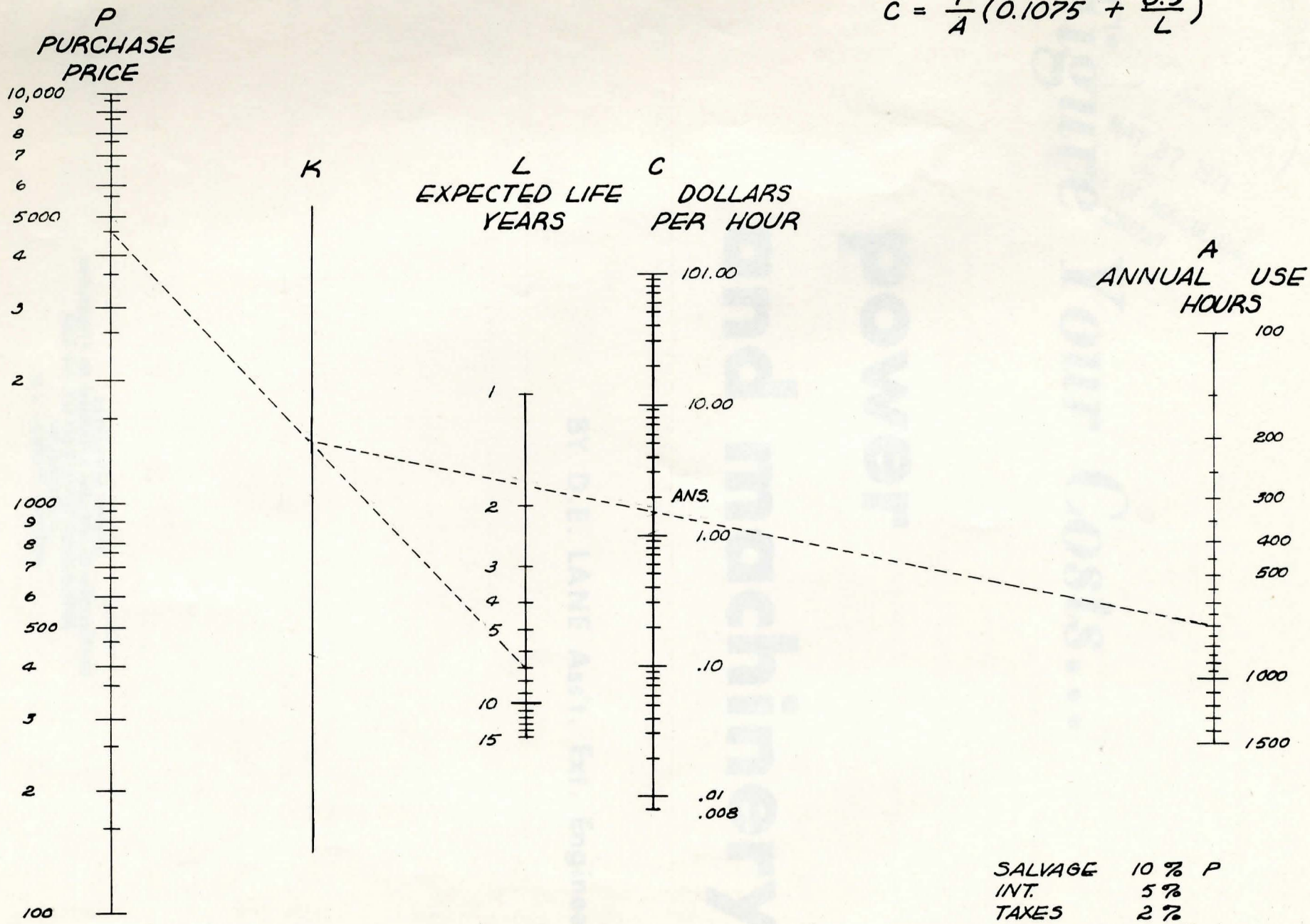
6-58

$$C = \frac{P}{A}\left(0.1075 + \frac{0.9}{L}\right)$$



SALVAGE	10 %	P
INT.	5 %	
TAXES	2 %	
HOUSING	1.6 %	
INS.	.4 %	
REPAIRS	4 %	

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6 – 58

FIXED COSTS