

will have significance only up to the capacity of the equipment upon which it is based.

As an example of the use of this method of picturing fluctuations in cost due to fluctuations in production, we have drawn up a simple case to use as an illustration. In order to avoid unnecessary complications and take a familiar subject for discussion, we have chosen the cost of operating an automobile.

In Table 4 we have our basic assumptions to use in this problem. They have been chosen with no particular case in mind and by no scientific means. They are simply intended to illustrate the method, rather than to convey any useful information concerning the cost of running a car. The tabulation gives the cost per year and per month for the fixed charges, such as depreciation, insurance, license fees, etc., and the cost per mile for variable items, such as gasoline, oil, tires, etc. From these figures, the cost per mile for operating is computed for two convenient points for plotting.

TABLE 4

ITEM	COST PER YEAR	COST PER MONTH	COST PER MILE	
			100 MI. Per Mo.	1000 MI. Per Mo.
Average Depreciation & Interest on Investment	\$480.00	\$40.00	\$.40	\$.04
Insurance & Auto Club	72.00	6.00	.06	.006
License Fees	18.00	1.50	.015	.002
Garage Rent	120.00	10.00	.10	.010
Tires	—	—	.01	.01
Repairs, Oil, Grease & Incidentals	—	—	.01	.01
Gasoline	—	—	.013	.013
<b>TOTAL</b>			<b>.608</b>	<b>.091</b>

Figure 6 shows these items of cost plotted on a hyperbolic scale. The variable items are added and placed at the bottom, and the fixed charges are divided into three groups and plotted above them. The top line then represents the trend of total operating costs. This shows, for example, that if the car is driven but 200 miles per month the cost will be approximately 33 cents per mile, while if the car is driven 2,000 miles per month the cost will be approximately 7 cents per mile. If these figures were based upon practical experience, the car owner might consider the chart a standard by which to measure performance. He might plot his actual costs on this chart, and if they did not follow the standard it might pay him

to check with his garage man and determine the source of his high cost, if such were the case.

Now let us consider how this method of determining a fluctuating standard cost may be applied to a practical industrial situation. In the first place, it is of use only in a situation where there is a fairly pronounced variation in production and it will be more useful where these fluctuations occur in a more or less systematic or seasonal manner.

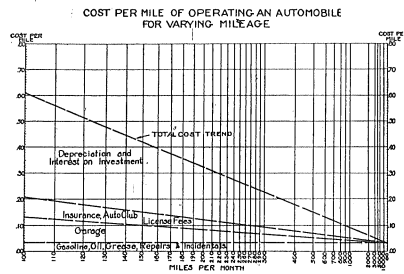


Figure 6

In any business of this kind it is necessary for management to have some sort of estimate of what production will be. The more accurate this estimate is, the better able management will be to plan for it. But, whether it is scientifically arrived at or merely a hunch, some idea of peak production at least is necessary for planning equipment and labor to take care of it. We will assume then that a production estimate has been worked out and plans to meet it have been made.

The next problem is to arrive at proper standards or estimates upon which to base the cost charts. Items of expense can usually be taken from past records. Fixed charges are usually known in advance and can be used without much study. Doubtful items, such as maintenance, may be studied by plotting past costs on hyperbolic paper and estimating trend lines through the points. These lines should be straight and it is here that the usefulness of the special ruling will be especially evident.

In drawing up material cost standards, the cost of the proper amount of material of the proper specification, purchased in the most advantageous way, and allowing only for reasonable waste should be used. Past records are sometimes unreliable due

to changing conditions, excess waste or inefficient handling in the past. Comparison of actual cost with a reasonable standard of this character will act as an incentive for lower material costs in the future. Time studies should be made of the operations involved after correct standard practice has been determined. Reasonable standards should be set up and an organization worked out to handle the estimated peak in production. Also a minimum staff should be determined and the production of the minimum staff computed.

From these facts it is a simple matter to compute the standard cost per unit for two production levels and these points will determine the estimated cost trend. It is advisable to compute the cost of one or two extra points to be used as checks on the assumed trend and to verify results.

From the cost charts the unit cost for the estimated production may be read and a fluctuating budget and average yearly cost estimated. This average cost when compared to the selling price will determine what the profit should be in advance.

To illustrate this method of determining cost standards for fluctuations in production a series of charts and tables have been prepared which show current costs compared with such standards for a period of some seventeen months. The product of the department used for illustration is turned out to meet the special requirements of the customer so that there is no possibility of carrying a stock. Furthermore, this product is subject to pronounced seasonal variation.

These fluctuations, of course, caused wide variations in cost, and the current reports did not give management a correct idea of what was actually happening in this department. The result was a continuous stream of explanations in which nobody could tell the difference between actual facts and excuses for inefficiency. These fluctuations are shown in Figure 7.

As a result of this condition, a thorough investigation was carried on, following the lines already outlined. As a result, a system of fluctuating cost standards was worked out, which will be shown below.

Figure 8 shows the total cost estimate or standard for varying production, together with actual costs attained. The heavy dash line represents the estimated trend. Theoretically, the actual cost per unit for any production should fall on this trend.

The points circled and marked with dates show how the actual costs have compared with these predetermined standards over a period of seventeen months. From this chart it can be seen at a glance whether the cost for a particular month was high or low for the production level attained. When

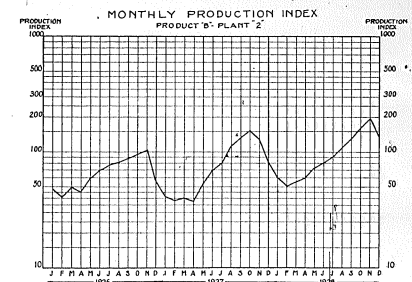


Figure 7

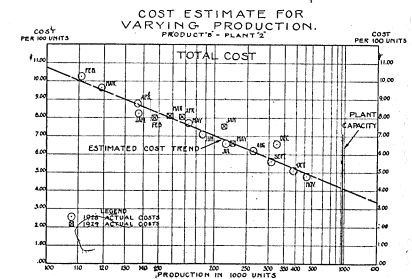


Figure 8

costs are shown in this manner, management can tell immediately whether the department has been well managed or not.

Figure 9 shows the cost for the three major elements, material, labor, and expense, that go to make up the total cost. Each chart shows the estimated trend, together with the actual costs, as in the case of Figure 8. If the cost is high for a particular month, as shown by Figure 8, by tracing back through Figure 9 the elements out of line