

the form of a novel and the ratios may have been fictitious, but the principles were correct. The general manager had apparently been opposed by the directors with respect to his ideas on how to manage the factory, until the financial aspect of the company looked very bad. Apparently the other directors were not well posted upon sound financing and therefore were not aware of the crisis they faced. The general manager had prepared facts and figures showing the condition and his plans for remedying the trouble. His analysis of the balance sheet showed the following results:

We have \$.10 in cash for each \$1.00 of liabilities; we should have \$.25.

Our surplus is only 3.3 per cent of our liabilities.

Our ratio of inventory to assets is as high as 42 per cent.

Our payables and bonds are as high as 41 per cent of our liabilities.

Our ratio of sales to inventory is only 1.6 to 1.

I did not find out how he solved his problem because that was in the next installment, but from the above facts it seemed to me that the inventory was the cause of the whole trouble. They probably carried an inventory which was twice as high as it should have been, thus tying up cash and increasing accounts payable and bonds, and reducing the earnings on their investment.

A general idea as to the amount of money which should be tied up in inventory may be obtained by roughly calculating the inventory turnover. This is obtained by dividing the cost of stores purchased, produced and shipped per year by the average inventory balance.

Let us assume that, on an average, we replenish active finished part stock every six months, and that each month we use on contracts parts averaging \$75,000 in cost. We must assume that we should have three months' supply on hand at all times to maintain a six months' supply, some parts being entirely used and some not used at all. Our inventory then should be $3 \times 75,000$ or 225,000, representing a turnover of four times. If it is greater than that we assume that we must have some inactive or dead stock or else quantities in excess of requirements. It is very desirable to establish if possible the economical quantities to run in each lot. The larger the lots the smaller the cost per unit, because of set-ups on machines and increasing speed of the operators as the work becomes more familiar to them. But there is a limit to the quantities which may be run because of the limitation of machine capacity to cover the entire line, and the interest in the investment

exceeding the saving in cost. By referring to the cost records, calculating on one hand the saving by increased quantities and on the other the interest on the investment, a standard size lot may be obtained. These standards may have to be decreased or increased with the trend of business.

The stock records should be gone over periodically to ascertain whether any stock is obsolete. If so, we should scrap it if we have no use for it; however, if we may at times have a call for it on repair orders or for use in supplying a duplicate of an obsolete model, we may keep the stock on hand in the obsolete section of the stock room; but we must be sure to inventory it at scrap value. A reserve should be set up monthly to take care of such losses as it should not all come out of our profit at the end of the year. The effect that this method has on our federal taxes is well worth the effort. We should not give full value at any time to parts which we do not have any hopes of disposing of at a profit.

Great care must be used by the stores department to keep stock in balance. We may have a normal inventory in terms of cost, but if we are not in balance, production is slowed up and eventually the inventory is forced up. These errors in judgment show up very readily in the general accounts either by increased inventory or decreased shipments. It may be advisable during a depression to build up the finished parts inventory and reduce raw material inventory, so that when good business is resumed we shall be able to make quick deliveries. Another direct saving from this method comes from saving in our overhead. During curtailed production the burden rate goes up, and if standard burden rates are being used the difference between standard and actual represents a loss which at times becomes very large. This abnormal burden is a cost which we watch very carefully. Details of the burden are checked monthly with a budget based upon the ratio of each account to the production payroll. In this way glaring defects can readily be found and remedied.

The stores department is given each month the Stores and In Process balances and is thereby enabled better to control stock.

If it were not for our perpetual inventory we should be at a loss to know how our inventory is running until the end of the year. But then it is too late.

The two evils which must be avoided are over- and underproduction. If we become too economical we may decrease the size of our lots to such an extent that the cost per unit becomes objectionable, and if we

greatly increase the size of our lots we tie up money, the interest on which eats up in time the profits we have made by increased production. In addition to this we may have to re-value our inventory on a falling market and lose a large proportion of the profits we have made. During and just after the war very large inventories were built up, partly because of increased costs and partly because of overproduction. When the depression came late in 1920 many thousands of dollars were lost in this way, some of which was entirely avoidable. Enormous taxes were paid on these book profits during the war period; no provision was made in the tax law allowing us to set up a reserve to guard against this inevitable loss, and those who were unable to decrease their inventory to a reasonable amount before the depression came found that they had not realized these profits at all but had paid taxes on them.

Considering again the inventory turnover, we find that various kinds of stock have entirely different turnovers. Castings, for instance, are never purchased much in advance of requirements; hence we expect a turnover of twelve times a year.

Shop supplies and fuel usually have a very rapid turnover.

Small purchased tools have a very slow turnover. This, with us, is due to the many kinds and sizes required to be in stock at all times. Our turnover is only about once every two years.

Electric motors have a rather slow turnover in that we have to stock up so many sizes, all of which are necessary to cover the different current, voltage, phase and cycle conditions.

Structural steel has a fluctuating turnover inasmuch as we try to purchase large stocks of this at favorable prices when business is dull. Deliveries are also usually very long, thus requiring us to predict as far ahead as possible and place our orders accordingly.

It may be well to use an example showing the economies effected by increasing the turnover on inventory. Let us assume that because of poor management the inventory represents \$500,000. The net worth represents \$700,000; the average inventory turnover is two times per year.

By careful management we are able to increase the turnover to three times. We reduce the investment in inventory one third, or \$167,000. The saving in interest cost at 6 per cent would amount to \$10,020, or 1.43 per cent of the net worth. In addition to this our liabilities are lower, there is less risk during a decline in business and we save insurance and floor space.

Large inventories tie up cash, increase accounts payable and bank borrowing, and reduce earnings on investment.

The working capital ratio, more commonly known as the ratio of current assets to current liabilities should be at least two to one. We try to keep our ratio as near three to one as possible. If we can keep a three to one ratio and still keep our inventory in proper balance, we feel we are doing very well.

The same set of accounts excluding inventory should be at least one to one. This ratio may be called the quick asset ratio; it allows one to pay off all immediate liabilities with cash on hand or quickly obtainable, providing the ratio is maintained above one to one. This ratio is checked very carefully by bankers from whom we borrow money.

The working capital ratio may be at least two to one, and may appear to be all right, but by applying the quick asset ratio we may find that a great deal of money is tied up in inventory which is subject to market conditions. If business is bad it is not a liquid asset because there is no way of rapidly turning it into cash, and much of it requires extra capital to transfer it from raw to finished stock.

The Income-Expense statement should show of course how much profit we obtain from our operations, how much it costs to produce the product in the factory, how much it costs to sell it, etc.

The profits should be considered not only on a basis of a percentage of sales but on a percentage of net worth or capital stock. It is possible to make a profit of 15 per cent on sales and yet the profit may not be sufficient to pay regular dividends on capital stock. It is also possible to make a very small percentage of profits on sales and yet earn a large percentage of profit on net worth or capital stock. Take as an example Swift & Company. Over a period of years they made a profit of only 1.7 per cent on sales, but based on net worth it amounted to 8.6 per cent. This is all due to the relation of sales to net worth.

Profits should also be analyzed to see if any line or size of product is unprofitable, thus calling for readjustments in selling price, or if that is impossible a discontinuance of unprofitable lines.

Some consideration should also be given to the ratio of net sales for the year to the total assets or investment, and to the fixed property. By keeping down the investments and increasing the sales, very satisfactory results will be obtained from the standpoint of returns to the stockholders.