PART 1. FUNCTIONS AND LOT SIZES

'Why are we always out of stock?' So goes the complaint of great numbers of businessmen faced with the dilemmas and frustrations of attempting simultaneously to maintain stable production operations, provide customers with adequate service, and keep investment in stocks and equipment at reasonable levels.

But this is only one of the characteristic problems business managers face in dealing with production planning, scheduling, keeping inventories in hand, and expediting. Other questions - just as perplexing and baffling when managers approach them on the basis of intuition and pencil work alone - are: How often should we reorder, or how should we adjust production, when sales are uncertain? What capacity levels should we set for job-shop operations? How do we plan production and procurement for seasonal sales? And so on, and so on.

In this article, I will describe some of the technical developments which aim at giving the business manager better control over inventory and scheduling policy. While these techniques sometimes employ concepts and language foreign to the line executive, they are far from being either academic exercises or mere clerical devices. They are designed to help the business manager make better policy decisions and get his people to follow policy more closely.

As such, these techniques are worth some time and thought, commensurate with the central importance of production planning and inventory policy in business operations. Indeed, many companies have found that analysis of the functions of inventories, measurement.

These are only a few instances of applications. Numerous others could be drawn from the experience of companies ranging from moderate to large size, selling consumer goods or industrial products, with thousands of items or only a few, and distribution in highly stable, predictable markets or in erratically changing and unpredictable circumstances.

In the present article major attention will be devoted to:

a. the conceptual framework of the analytic approach, including the definition of inventory function and the measurement of operational costs; and

b. the problem of optimum lot size, with a detailed case illustration showing how the techniques are applied.

This case reveals that the appropriate order quantity and the average inventory maintained do not vary directly with sales, and that a good answer to the lot size question can be obtained with fairly crude cost data, provided that a sound analytical approach is used. The case also shows that the businessman does not need calculus to solve many inventory problems (although use has to be made of it when certain complications arise).

Inventory problems

The question before management is: How big should inventories be? The answer to this is obvious — they should be just big enough. But what is big enough? This question is made more difficult by the fact that generally each individual within a management group tends to answer the question from his own point of view. He fails to recognize costs outside his usual framework. He tends to think of inventories in isolation from other operations. The sales manager commonly says that the company must never make a customer wait; the production manager says there must be long manufacturing runs for lower costs and steady employment; the treasurer says that large inventories are draining off cash which could be used to make a profit. Such a situation occurs all the time. The task of all production planning, scheduling, or control functions, in fact, is typically to balance conflicting objectives such as those of minimum purchase or production cost, minimum inventory investment, minimum storage and distribution cost, and maximum service to customers.

Production vs. time

Often businessmen blame their inventory and scheduling difficulties on small orders and product diversity: 'You can't keep track of 100,000 items. Forecasts mean nothing. We're just a job shop.' Many businessmen seem to feel that their problems in this respect are unusual, whereas actually the problems faced by a moderate-size manufacturer with a widely diversified product line are almost typical of business today. The fact is, simply, that under present methods of organization the costs of paper work, setup, and control, in view of the diversity of products sold, represent an extremely heavy drain on many a company's profit and a severe cost to its customers. The superficial variety of output has often blinded management to the opportunities for more systematic production flow and for the elimination of many of the curses of job-shop operation by better organization and planning.