

material is made to our order. This necessitates looking ahead, as the time from purchase to delivery to our factory-receiving department varies from two and one-half to four and one-half months, according to type.

The time figures mentioned are taken from our experience for normal transactions and used as standards in our planning. They do not take into consideration the preparation of designs, the making up of samples by cloth mills and the holding of these samples for comparison with others. In some cases these operations spread over another six months.

Raw material of all classes is turned into what we call rough stock when it is received at the factory. This is done in accordance with an order of work determined by our needs in the subsequent processes. This first stage consists of slitting, sewing two hems in continuous lengths, cross cutting and cross sewing. The average time for these operations is two weeks in all.

From purchase to rough stock the time element therefore varies from three to five months. It must be remembered that these figures apply only to six to eight per cent of a given purchase, which is the economical delivery unit for our cloth mills.

Rough stock may be used in two ways:

1. It may be ironed, folded, ribboned and boxed for delivery without embroidery. We call this process finishing and it requires about eight days. Here, as well as in the preparation of rough stock, allowance must be made for a reasonable amount of work in process ahead of each operation.

2. The other use of rough stock is for conversion into embroidered handkerchiefs. This embroidery may be made either by hand in Porto Rico or by machine in New Jersey. The time we must allow for hand embroidery is three and one-half months; for machine embroidery one month. To these periods must be added the eight days for finishing mentioned before. Hence, from start to finish on an embroidered handkerchief we must allow from six and one-half to eight and one-half months on hand embroidery and from four to six months on machine work.

It will clarify the subsequent part of this paper to explain here that a rough-stock style number is carried only through the stitching operation. At this stage the stock is available for plain finishing, hand embroidery or machine embroidery. The style

number then assigned to it depends on the particular steps of manufacture that are to follow and is assigned in accordance with a mnemonic classification which automatically places it in known classes.

It is our policy to run our plant the year round at as even a level as possible. We therefore endeavor to plan our sales and production programs to bring about this result.

All the major details of planning are carried on at our New York office with the aid of a series of records which will be described. Our factory at Lebanon, Pennsylvania, carries out the details on instruction from the New York office and through information from another series of non-conflicting records. Most of these records are an evolution from those installed many years ago, at a time when this plant was operating under orthodox Taylor-system conditions. Standards then arrived at as to accounting, manufacturing methods, appliances and time study remain in active and useful operation today.

The record which controls purchase of raw material and provides sufficient work through the rough-stock stages is called our general account. It is divided into sections for each main class of raw material and shows the situation at the following stages: (1) purchase, (2) delivery to bleachery, (3) delivery from bleachery, (4) cutting, (5) stitching.

Cumulative totals are carried for each stage and subtractions from the preceding stage show the condition of the particular picture being studied. Entries are made when appropriate from: (1) purchase contracts, (2) cloth bills, (3) cutting reports, (4) stitching reports. This work is made a simple routine through use of the mnemonic classifications worked out at the time of the installation of the Taylor system. A report from this record is rendered weekly and is inspected and discussed by the entire executive organization. We are thus constantly aware of our raw-material situation for months ahead and can operate so as to keep a constant flow of work, if sales and financial conditions permit. For the two latter fields we have two series of records which supply all the necessary information. The financial record consists of a daily account of: (1) cash, (2) bills receivable, (3) accounts payable, (4) notes payable, (5) total sales, (6) shipments, (7) cloth commitments, and

### Joint Discussion

**B. A. Beavan.**<sup>2</sup> I should like to ask Mr. Herrmann a few questions. First, how much does he depend on records of past sales as a guide in determining new styles; second, how much of his product is stable; third, whether or not his raw material is always the same; and fourth, what his rate of turnover of inventory is. We should appreciate it very much if Mr. Flanders also would give us this latter figure.

I am wondering, too, since lathes are bulky articles, what consideration Mr. Flanders gives to cost of set-up as against the number of pieces to be manufactured. For example, if the cost of set-up is \$50 on an operation worth \$50 would Mr. Flanders run off more of that piece than the program required or allow the one job to absorb all the set-up cost? Variants of this problem come up now and then.

**C. C. Balderston.**<sup>3</sup> I should like to ask Mr. Flanders whether in his opinion the control of detailed planning should be completely functionalized or left to the foreman or department head? This question is prompted by a study which Mr. Brecht of the Wharton School has just completed. He has made a rather detailed investigation of seventy-five manufacturing companies and finds that at the present time their production control is on two levels, general planning on one and detailed on another. In nearly all of these companies general planning is functionalized but detailed planning is left to foremen. The study gives no evidence as to whether there is a tendency away from complete functionalization and, therefore, I should like to ask Mr. Flanders whether, in his opinion, detailed planning is likely to be left to foremen or whether concerns will gradually come around to complete functional control over detailed routing, scheduling, issuing of tools, etc. Is the pendulum swinging back, as it did in personnel management, to the idea that there is a limit to the expediency of functionalization and that it will be more effective to work through, rather than around, the foreman?

<sup>2</sup>Planning Manager, S.K.F. Industries, Inc., New York, N. Y.

<sup>3</sup>Assistant Professor of Industry, University of Pennsylvania, Philadelphia, Pa.

an analysis of all expenditures which, combined with the daily record, enables us to prepare budgets whenever necessary. Our sales analysis consists of a record of each completed style number sold or listed for future potential sale with a chain store. Whenever a definite order is entered, the delivery-due date is specified. These entries are constantly inspected and originate the manufacturing orders to our mill. An automatic order of work is thus created from the rough-stock stage on to the finished goods and from the raw-material stage back to rough stock.

The reversion to the rough-stock order of work is carried by an analysis of rough-stock requirements in what we call our stitching book. Herein are posted: (1) requirements, (2) manufacturing orders placed, (3) an index of finished numbers for which rough stock is used, (4) amount cut, (5) amount stitched. When the requirements for rough stock are more than our manufacturing orders for it, orders are placed to cover. At times, especially at the beginning of the season, our rough-stock orders are far in excess of needs. This is really a way of keeping the plant going until sales tendencies of complete numbers are developed. The stitching order of work is controlled at our plant in accordance with due dates of finished styles for which rough stock is not available.

The general situation with reference to handkerchiefs embroidered in Porto Rico is reflected by a simple record, the basis of a weekly report which shows: (1) total cloth requirements, (2) shipments of cloth to Porto Rico, (3) returns from Porto Rico. This is a series of cumulative totals and the position of each stage is revealed by subtraction from the preceding stage.

These are the principal records we use to guide planning operations. In connection with them we have the usual credits and debits of stock shipment. As these reflect performance rather than influence planning they are of no interest here.

Our mill has for its internal planning an analysis of sales somewhat similar to that described above. An analysis of cloth for embroidery needs is co-ordinated with the analysis of sales to take care of the delivery-time element of the completed article.

The two records form the basis of our routing system, which is adequate for the disposition of the product through the plant.